



Nuiqsut Comprehensive Development Plan

2015 - 2035

Final Draft
January 2016



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Nuiqsut Comprehensive Development Plan

ADOPTED [DATE]

NORTH SLOPE BOROUGH ASSEMBLY ORDINANCE #

NORTH SLOPE BOROUGH PLANNING COMMISSION RESOLUTION #

CITY OF NUIQSUT RESOLUTION #

NATIVE VILLAGE OF NUIQSUT RESOLUTION #

KUUKPIK CORPORATION RESOLUTION#



North Slope Borough
Charlotte Brower, Mayor

Prepared by
Community Planning and Real Estate Division
NSB Department of Planning & Community Services

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List of Abbreviations

ACS	American Community Survey
ADEC	Alaska Department of Environmental Conservation
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOTPF	Alaska Department of Transportation and Public Facilities
AFN	Alaska Federation of Natives
AFS	Air Force Station
AHFC	Alaska Housing Finance Corporation
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ANWR	Arctic National Wildlife Refuge
ANTHC	Alaska Native Tribal Health Consortium
AS	Alaska Statutes
ASRC	Arctic Slope Regional Corporation
ATV	all-terrain vehicle
BAT	Best Available Technology
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMI	body mass index
BMP	Best Management Practice
BOEM	U.S. Bureau of Ocean energy Management
Borough	North Slope Borough
BP	British Petroleum
CAFF	Conservation of Arctic Flora and Fauna Work Group of the Arctic Council
CAH	Central Arctic Herd
CCHRC	Cold Climate Housing Research Center
CD	Colville Delta
CIP	Capital Improvement Plan
CPAI	ConocoPhillips Alaska, Inc.
CY	cubic yards
DDT	dichloro-diphenyl-trichloroethane
DEW	Distant Early Warning
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
F	fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FUDS	Formerly Used Defense Sites
GMT	Greater Mooses Tooth Oil and Gas Development
gpm	gallons per minute
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
H	high
HIA	Health Impact Statement
HUD	Department of Housing and Urban Development
IAP	Integrated Activity Plan
ICAS	Iñupiaq Community of the Arctic Slope

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IHLC	Iñupiaq History, Language, and Culture
IRA	Indian Reorganization Act
kg	kilogram
kW	kilowatt
KSOP	Kuukpik Subsistence Oversight Panel
L	low
LEO	Local Environmental Observation
LLC	Limited Liability Company
M	medium
MMS	Minerals Management Service
mph	miles per hour
NIOSH	National Institute for Occupational Safety and Health
NO ₂	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NPR-A	National Petroleum Reserve-Alaska
NPRPA	National Petroleum Reserves Production Act
NSB	North Slope Borough
NSBMC	North Slope Borough Municipal Code
NSSI	North Slope Science Initiative
NUC	Nuiqsut Utility Cooperative
O ₃	ozone
OCS	Outer Continental Shelf
OSHA	Occupational Safety and Health Administration
PAPI	Precision Approach Path Indicators
PCB	polychlorinated biphenyl
PCE	Power Cost Equalization
Plan	Comprehensive Development Plan
PM ₁₀	particulate matter
POL	petroleum, oils, and lubricants
POP	Persistent Organic Pollutants
ROD	Record of Decision
SNAP	Scenarios Network for Alaska and Arctic Planning
SO ₂	sulfur dioxide
SWOT	Strengths, Weaknesses, Opportunities, and Threats
SY	School Year
TNHA	Tagiugmiullu Nunamiullu Housing Authority
TCH	Teshkepuk Caribou Herd
TLUI	Traditional Land Use Inventory
USCOE	U.S. Corps of Engineers
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VASI	Visual Approach Slope Indicators
VHF	very high frequency
VOC	volatile organic compounds
WAH	Western Arctic Herd

Chapter 1: Introduction

Twenty-seven families traveled from Barrow to the Colville River delta in 1973 to resettle the Kuukpikmiut ancestral homeland. For 18 months, the families lived in tents as they prepared their new community. A festival was held in August 1974 to celebrate the dedication of the village. The Nuiqsut Paisanich Heritage: a Cultural Plan was written in February 1979 to document the cultural landscape and how the community practices its heritage way of life during a time of rapid change and still serves as a guide for development of the community¹. The Paisanich is currently being updated by Stephen R. Braund & Associates and is expected to be completed during the latter half of 2016. This Comprehensive Plan will be updated soon after the completion of the Paisanich. Chapter 4 of this Plan identifies the goals, objectives, and implementing strategies proposed to fulfill the community's current needs and its vision for its future. The objectives of the 1979 Paisanich that are addressed by the Plan's goals and objectives are noted in Chapter 4.

Located above the banks of a tributary to the Colville River, this community of 444 mostly Iñupiaq people, is closer to current oil and gas facilities than other North Slope communities. Nuiqsut has been identified as the North Slope Village most directly impacted by oil and gas activities². When the area was resettled in 1973, the road system of the fledgling Prudhoe Bay oil field was more than 50 miles away. Today, the nearest road system that connects to Prudhoe Bay is less than 15 miles away. To the north, Nuiqsut is connected by road to the Alpine Development Project. Proposed oil and gas development projects will nearly surround the community with the addition of the Greater Mooses Tooth Oil & Gas Development (GMT) to the west and the Umiat prospect to the south. While the Iñupiat have always faced change, expanding oil and gas development and impacts from climate change pose new challenges. This Comprehensive Development Plan (Comprehensive Plan or Plan) is designed to assist the community in charting its future as it takes advantage of new opportunities and creates solutions to current and future challenges. Residents can use this Plan to advocate for projects and measures that would improve community infrastructure and enhance their quality of life.

This chapter provides an introduction to the Nuiqsut Plan, the community's first comprehensive plan. It begins with a discussion of the Plan's purpose and continues with an overview of the scope of the Plan, the community's vision statement, a description of local

¹ Village of Nuiqsut, North Slope Borough Planning Commission and North Slope Borough Commission on History and Culture. *Nuiqsut Paisanich Heritage: A Cultural Plan*. Prepared by Arctic Environmental Information and Data Center. Ed. Judy Brogan. 1979.

² Mikkelsen, Aslaug and Oluf Langhelle, eds. *Arctic Oil and Gas: Sustainability at Risk?* Routledge Explorations in Environmental Economics. 2011.

governance, a summary of the basis for comprehensive planning, and a description of public involvement during the plan's development. This chapter concludes with a summary of how the Plan is organized.

1.1 Purpose of the Comprehensive Plan

A Comprehensive Plan provides many benefits to the community of Nuiqsut. It establishes a vision for the future, inventories current conditions, serves as a foundation for seeking outside funding for community projects, directs planning efforts, identifies important resources and uses, and guides land use and development. Each of these purposes is described below. The strategic approach used to develop this Plan involved creation of a community vision statement and an examination of the village's strengths, weaknesses, opportunities, and threats. The goals, objectives, and strategies for the Plan were developed with a 20-year outlook into the future.

Vision: The vision statement in Section 1.3 describes how the residents would like the community to develop. The vision provides overall direction for the Plan's goals, objectives, and strategies. The strategies in Chapter 4 provide a road map to achieving this community vision.

Background Information: While this is the first comprehensive plan for the community, a background for planning was previously prepared by Alaska Consultants 1983. The 2005 North Slope Borough (NSB) Comprehensive Plan contains a Nuiqsut Community Profile.

The Plan includes an assessment of current conditions and how those conditions influence planning for the future. This information is intended to be useful to both community leaders and other residents, especially young people who will be the future community leaders. The Plan provides community data and guidance to help companies understand opportunities that are compatible with community values and needs.

Funding: Many agencies and organizations require a community to have an up-to-date comprehensive plan to be considered for community project funding. In addition, the Plan provides a single source of information when developing grant or capital project proposals.

Planning: The Plan provides the NSB (Borough) with current information for its planning and management efforts, including updates to the Borough Comprehensive Plan and Title 19 municipal zoning code. It also provides useful information about Nuiqsut's priorities and important resources to state and federal agencies during their planning efforts.

Important Resources and Uses: The Plan identifies important natural resources, cultural resources, environmentally sensitive areas, and subsistence use areas. The Borough and the

community may use this information when commenting on proposed projects that affect the village.

Development: The Plan guides future development in and around Nuiqsut, including the location, timing and scale of community improvements, and proposed development projects. It provides the basis for investments in infrastructure and future land use policy decisions. The goals and objectives of the Plan offer guidance for community action to avoid or minimize negative consequences of development. The community and Borough use the Plan to develop mitigation measures that can be placed on Borough, state, or federal permits to make projects compatible with the Plan.

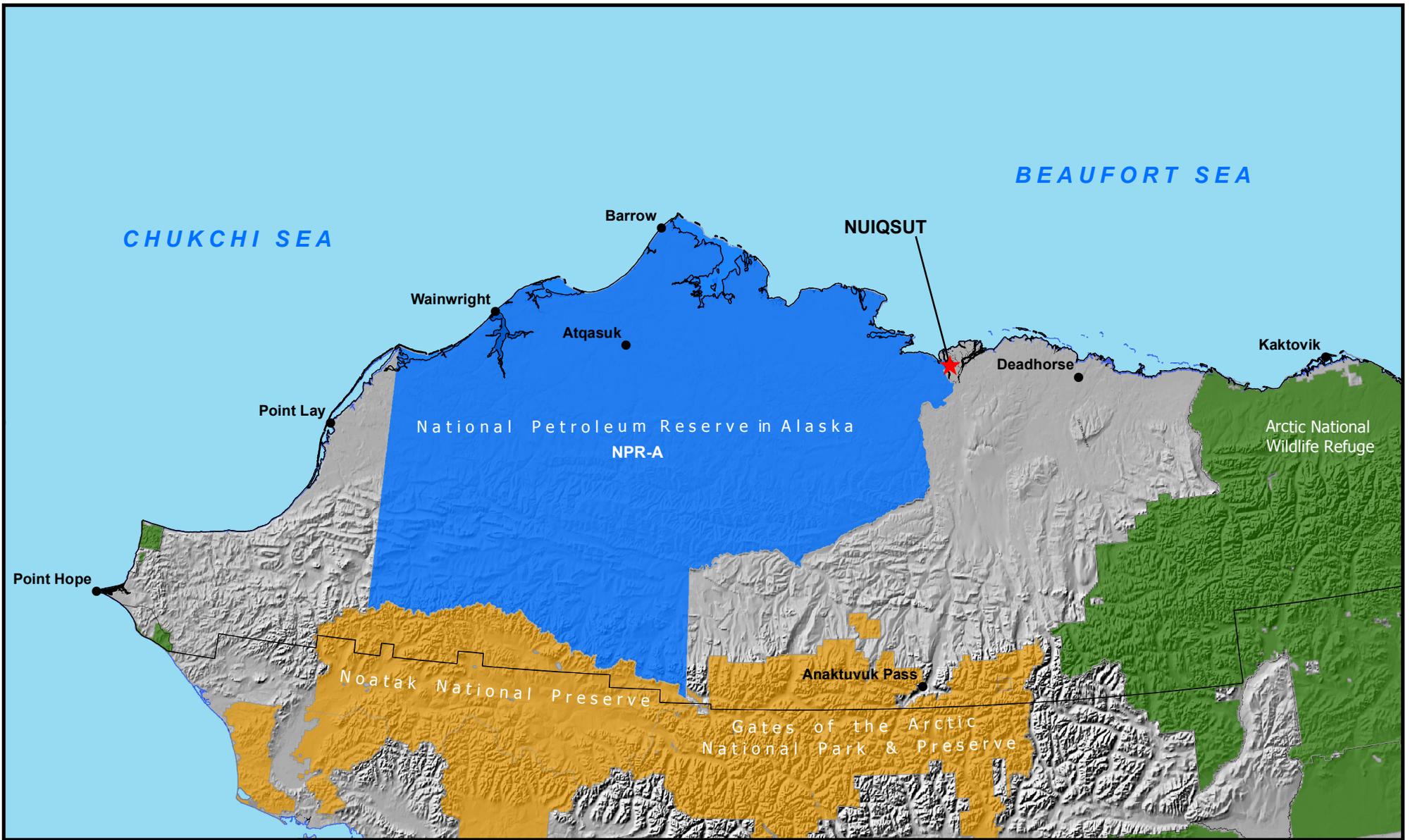
1.2 Comprehensive Plan Scope and Process

While the geographic scope of the Plan focuses on the village townsite, it also addresses the greater subsistence area used by Nuiqsut residents. Figure 1 illustrates the location of Nuiqsut within the North Slope region. The City of Nuiqsut is approximately three miles by three miles whose boundary coincides with the Borough Village District zoning boundary shown in Figure 2. The Nuiqsut Area of Influence, illustrated in Figure 4, represents the lands and waters where Nuiqsut residents hunt, fish, and gather subsistence resources.

The Plan has been developed with a 20-year outlook. However, it should be reviewed every two years and updated every five years. Regular updates to a comprehensive plan ensure that the community responds to changing conditions. The community may wish to update the tables in Chapter 4 on an annual basis to record progress and respond to new opportunities.

This Nuiqsut Comprehensive Plan addresses land use as well as environmental, social, and economic issues. It addresses the suitability of land for current needs and future growth, including the health clinic, school, recreation areas, roads, local energy systems, and utilities, such as water, sewer, landfill, airport, and local energy systems.

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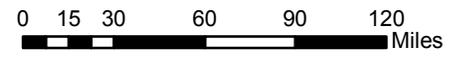


- North Slope Borough Boundary
- NPR-A
- U.S. Fish and Wildlife Service
- National Park Service



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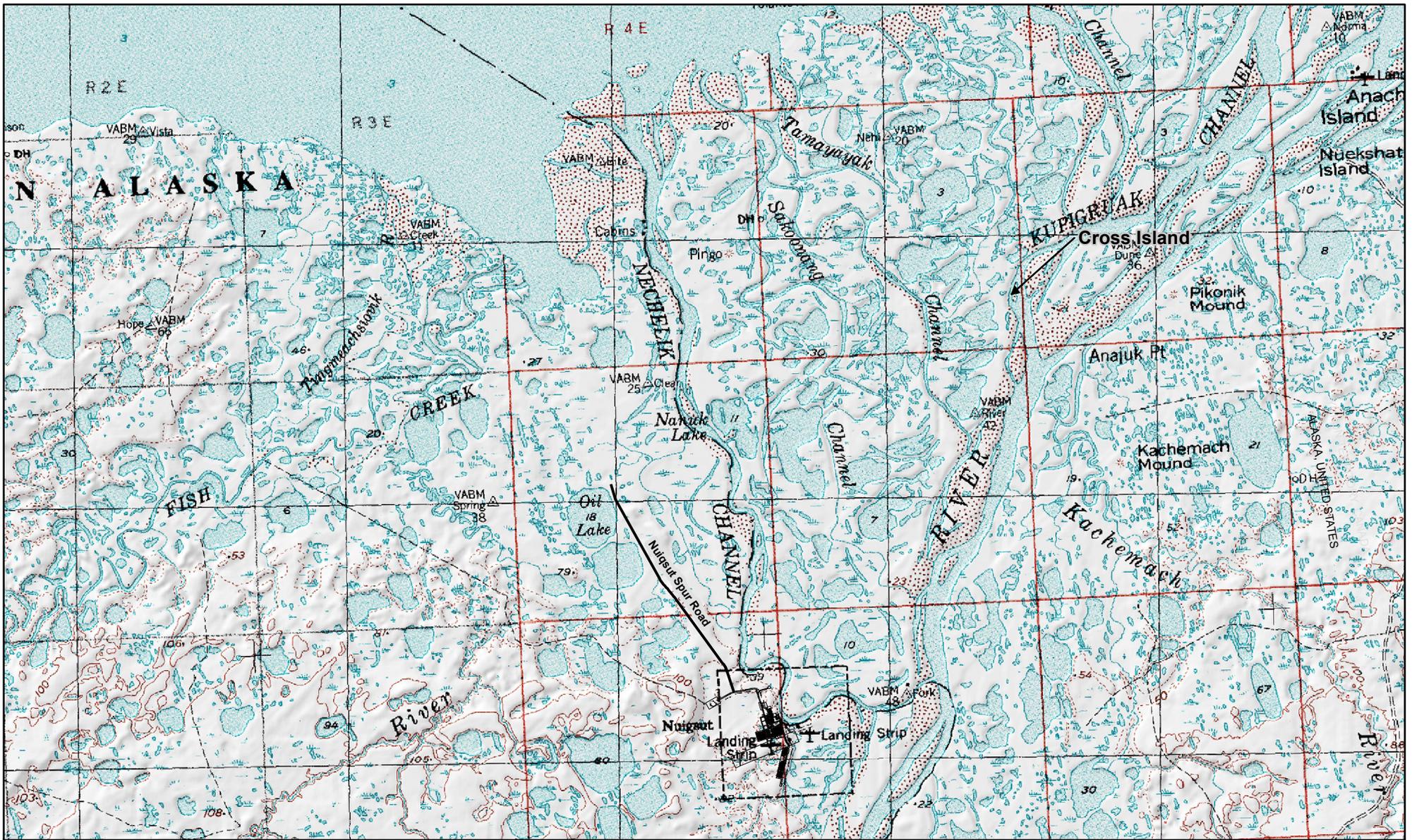
NUIQSUT, ALASKA VICINITY MAP



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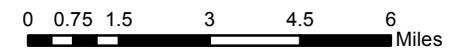
Figure 1

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NUIQSUT, ALASKA LOCATION MAP



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Figure 2

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1.3 Vision Statement

The community Vision Statement summarizes how residents would like the community to develop over the next 20 years. Created at a community meeting held in Nuiqsut in July 2010 and confirmed at a community meeting held in August 2015, the statement below guides the Plan contents, most specifically the goals, objectives, and strategies in Chapter 4.

In 2035, Nuiqsut will remain a beautiful place where traditional values and lifestyles will benefit from 21st Century technologies to create a healthy, satisfying and family-friendly quality of life for its residents, workers and visitors. The community and its partners will:

- *Continue to respect the Iñupiaq heritage and traditional ties to the land, water and air and associated biotic communities,*
- *Support a subsistence way of life and serve as stewards of the natural resources, protecting residents and natural resources from damage by development,*
- *Adapt to changes in technologies, climate and wildlife behaviors to ensure a sustainable environment for generations to come,*
- *Create a diverse economy that supports local businesses, regional cooperation and clean industries,*
- *Foster the arts and recreational opportunities that celebrate the talents and culture of local residents,*
- *Support opportunities for quality education for all ages,*
- *Promote healthy lifestyles,*
- *Offer safe and affordable housing, quality infrastructure, and convenient community facilities and services, and*
- *Encourage an involved citizenry that actively participates in development of public policy and decision-making.*

1.4 Local Governance

The community has both tribal and city governments. The City of Nuiqsut is a subdivision of the NSB. All three of these governments are briefly described below.

City of Nuiqsut: Nuiqsut incorporated as a second-class city within the NSB in 1975. A seven-member City Council elected by local voters provides local governance and the Council elects the Mayor for a one-year term. The Council meets the first Monday of each month. Nuiqsut has a “strong-mayor” form of governance where the Mayor is responsible for managing city affairs, assisted by a city administrator.

Native Village of Nuiqsut: The Native Village of Nuiqsut is a federally-recognized tribe governed by a seven-person Tribal council. It was established under the authority of the Indian Reorganization Act (IRA) of 1934. The Native Village of Nuiqsut is a member of the Iñupiat Community of the Arctic Slope (ICAS), the regional Native Tribal government, also recognized by the federal government.

North Slope Borough (NSB or Borough): The NSB is a home rule borough which means it retains all powers not specifically restricted by its charter or by state law. The Borough provides many services for Nuiqsut residents and retains planning and zoning authority for the City of Nuiqsut. The NSB generally levies a property tax of 18.5 mills with authority for up to 20.0 mills.

The Borough Planning and Community Services Department (Planning Department) administers the subdivision, planning, and zoning regulations and oversees long range planning for the Borough. The Planning Department strives to provide a balanced and orderly community development process, and it encourages economic development as directed by Section 19.05.040 of the NSB Municipal Code (NSBMC). It issues administrative zoning permits through the authority of Title 19 (Zoning Code) and approves subdivisions through the authority of Title 18 (Subdivision Code).

One person from each community is appointed by the Borough Mayor and confirmed by the Assembly to serve on the Borough Planning Commission (NSBMC § 2.12.010). The Planning Commission is responsible for preparing the Borough's Comprehensive Plan and recommending its approval to the Assembly. In addition, the Planning Commission:

- Makes recommendations to the Assembly on amendments to Title 19 and zoning map amendments (outside of Barrow),
- Reviews the annual capital improvements program and submits a recommendation to the Assembly,
- Makes recommendations to the Assembly on public improvements,
- Decides on preliminary plats for subdivisions under Title 18, and
- Reviews NSB Planning and Community Services Department permits and approvals and hears and decides conditional use permits and appeals of administrative permit decisions.
- Provides a forum for North Slope village residents to voice concerns, receive answers to questions on a wide range of topics and obtain information on activities planned in a village's general vicinity and subsistence use area.

1.5 Basis for Comprehensive Planning

Title 29 of the Alaska Statutes provides the authority for comprehensive planning in Alaska. As a home rule borough, the NSB is responsible for developing a comprehensive plan and for establishing and implementing land use planning and zoning: Alaska Statute Title 29 governs municipal governments, including first class boroughs. AS § 29.40.030 states that “The comprehensive plan is a compilation of policy statements, goals, standards and maps for guiding the physical, social, and economic development, both private and public, of the first or second class borough, and may include, but is not limited to, the following: (1) statements of policies, goals, and standards; (2) a land use plan; (3) a community facilities plan; (4) a transportation plan; and (5) recommendations for implementation of the comprehensive plan.” The NSB uses the state’s requirements in their own municipal ordinance § 2.12.170 for developing the Borough-wide comprehensive plan and the contents of the plan.

The Planning Department implements land use regulations within the Borough. The Department’s Community Planning Division oversees development and updates of the Borough and community comprehensive plans, and coordinates the annual capital project request cycle as well as develops the NSB Six-Year Capital Improvement Plan.

1.6 Public Involvement in the Planning Process

To obtain input from residents of Nuiqsut and village leadership, the planning team used a multi-pronged approach. A Strengths, Weaknesses, Opportunities, and Threats (SWOT) community workshop was held in July 2010. A follow-up SWOT was held in August 2015. These two community workshops were used to develop the community Vision Statement noted above and were a basis for establishing the goals, objectives, and strategies found in Chapter 4. The SWOT resident discussions in both 2010 and 2015 are summarized below and are listed in no particular order of importance. The goals and objectives of this Plan that address each of the following SWOT findings are noted in parenthesis below.

In addition to holding SWOT workshops, the planning team also sought input from local leaders through direct outreach, participation in regularly scheduled council and board meetings and through hard copy draft plan distribution to the City of Nuiqsut, Native Village of Nuiqsut and Kuukpik Corporation. Copies of the draft plan were also distributed throughout the community. A notice stating that the draft plan was available for public comment and the locations where it could be found was posted throughout the community. This information was also posted in a Facebook post on the North Slope Comprehensive Planning page. The public comment period deadline was also extended to provide additional time for comments.

1.6.1 SWOT Comments

Strengths of the Community:

- Unity of residents to work together to thrive as a community [Goal 1];
- Leadership abilities and dedication by residents to participate in governance and protection of the health of residents and the environment [Objective 3.2 & 3.2];
- Year-round, seasonal availability of subsistence resources of fish, whale, moose, caribou, seals, and berries [2.1];
- Community commitment to the protection of subsistence hunting and lifestyle now and for generations to come [2.1-2.7];
- Elder knowledge and the sharing of that knowledge with youth [1.2];
- The enduring family tree—each person knowing who they are in relation to other extended family members and valuing that connection [1.1];
- Community gatherings [1.1];
- Natural gas-generated electricity/inexpensive energy [6.1];
- Education system [6.6];
- Job opportunities in the oil & gas industry for motivated people whose subsistence duties do not conflict with industry work schedules [3.2];
- Water and sewer services [6.1]; and
- Whaling as a community effort [1.1].

Weaknesses of the Community:

- Restricted access to traditional hunting grounds by nearby industry [2.1];
- Concern that air pollution from oil industry potentially contributes to asthma and respiratory infections in villagers, particularly young children [3.2];
- Individual's low motivation for jobs and career training, particularly for jobs in the oil and gas industry/ inability of industry to cope with employee's subsistence duties and schedules [3.2];
- Need gravel for village public and private residents' use, particularly for repair of damage due to road subsidence and driveway wear [6.5];
- Need new housing to relieve severe overcrowding [4.1];
- Need a day care center to facilitate parents working/current proposed center is small/no outdoor play yard/who will run it? [see capital asset Chapter 4.11 Table 24];
- Desire to eradicate drugs and alcohol use and abuse [6.6];

- High cost of living, particularly costly food and gas [5.4];
- Communication between elders and youth needs improvement [1.2];
- High drop-out rate by high school students/still needs improvement [6.6];
- Lack of understanding of how Borough funds are allocated between the villages and Barrow coupled with a desire to have a more equitable distribution of resources [3.2];
- Need local decision making on how Borough resources are allocated, rather than “top down” decisions [3.2];
- Helicopter activity within the subsistence area “spooks” the caribou and alters their migration patterns away from the village [2.1 & 2.2];
- Need to extend water/sewer service to all residences [6.1];
- Septic tanks freeze due to lack of, or failure of, heat tracers [6.1];
- Need a washateria [see Table 24];
- Borough needs to hold contractors accountable for quality design, materials, and construction work (poor quality heating, sewers and housing systems are examples) [9.1];
- The village needs health assessments of its residents as a baseline as well as regular monitoring [3.2];
- Need apartment buildings [4.1];
- Need housing for all income levels, including working families whose income is above Department of Housing and Urban Development (HUD) low-income criteria [4.1];
- Need activities for kids [1.1 & 1.2];
- Need year-round monitoring of spur road activities, particularly with regard to oil spills and damage to the adjacent environment by worker traffic [2.1];
- Need parking at Prudhoe for residents’ vehicles coming in on the ice road [See Section 4.10, Table 24];
- Need to bring back DARE officers to the school [6.6];
- Need a school bus driver [See Section 4.10, Table 21];
- Taguiugmiullu Nunamiullu Housing Authority (TNHA) housing construction jobs go to out of town people and not to local residents [5.4];
- A need to provide indoor recreation for youth and adults [1.1].

Opportunities for the Community:

It was suggested that the community could:

- Dredge the silted Puutu Channel to provide improved boat access to the Colville River [6.5] and to produce gravel for village use [6.4];
- Build new arctic climate energy-efficient homes in the south side of town [4.2];
- Operate job training and offer a broader spectrum of educational opportunities [3.2];
- Operate a day care center [5.5 & Table 24];
- Provide improved access to the Colville/Kuukpik River [6.4];
- Provide cultural and recreational activities for youth and adults [1.1];
- Improve interaction between Elders and youth in the school [1.2];
- Stand up against state and federal permitting agencies to prevent sport/trophy hunters within the village subsistence area [2.2 – 2.4];
- Stand up to state and federal permitting agencies to require mitigation for commercial and industrial development to assure the least possible impact to the community's way of life [2.1];
- Establish a cost-effective dust control system [6.2];
- Provide a road to the Cross Island area to bring whale meat and muktuk to the village instead of flying it in and to bring whaling supplies to the island [Table 24];
- Provide roads, power, water, sewer, and other utilities to shareholder lots to build new homes [4.3];
- Native Village of Nuiqsut to get federal funds and knowledge to build new housing, similar to what the Native Village of Barrow has [4.1];
- Provide boat and trailer access to the river³ [6.5];
- Provide a shared system of boat trailers and trucks to haul boats to the river (for households who do not have those vehicles) [6.4];
- Improve runway with paving and other elements to assure emergency medical evacuations, if needed [6.3];
- Avoid multiple landing strips and air traffic by industry, which disturb subsistence resources and hunters, by having Nuiqsut airport serve as a regional airport [6.3];

³ The boat ramp discussion during the 2015 SWOT workshop included both the removable boat ramp and the need for a permanent boat ramp. The removable boat ramp is placed in a shallower portion of the river and props can become damaged. It was discussed that most residents prefer to launch their boats near the bend in the river where the river is deeper, upstream from the removable boat ramp. Because this area poses vehicular access difficulties, there was discussion that creating better access to this site would be preferable to building a permanent ramp that would likely be washed out by the current.

- Provide public parking at Prudhoe [Section 4.10, Table 24]; and
- Provide a natural gas filling station [6.2].

Threats That May Adversely Affect the Community:

- Expensive gas/diesel fuel and resulting expensive food and airfare [6.1];
- Alcohol, drugs, and smoking use and abuse [6.6];
- Climate change and its effects—stream bank erosion, subsidence, change in timing of subsistence wildlife, hazardous ice travel [6.7];
- Air pollution due to industry discharges (including from flaring gas) into the prevailing winds towards the village [3.1 & 3.2];
- Reduced access to subsistence resources due to area oil and gas activities [2.1];
- Oil and gas development too close to the village with the potential for an oil spill on water and land as well as greater air pollution [2.1];
- Helicopter activity spooking the caribou and changing their migration routes out of reach of residents [2.1 & 2.2];
- Off-shore oil and gas exploration could disrupt, disturb, or damage Cross Island whaling resources [2.1 & 2.3];
- TNHA housing construction jobs go to out of town people and not to local residents [5.4];
- Contractors do not train and hire local residents and this becomes an endless cycle [5.4];
- The Borough “freeze” on the sale of gravel for private lots and driveways cause Fire and Health emergency personnel to be unable to access people in need [6.5];
- Since the Alpine development, Borough Capital Improvement Program funds no longer come to Nuiqsut [3.2];
- On the east side of the river oil companies will be building roads and residents will have to go through numerous “check points” to pass these roads to access subsistence resources [2.1];
- Oil company roads are too high for snow machines to pass and access to subsistence resources is blocked [2.1];
- Sport hunters scare away caribou, particularly the vanguard⁴ herd [2.1];

⁴ The Merriam Webster online dictionary definition of vanguard is “the forefront of an action or movement”. The “vanguard herd” refers to the lead animals in a migratory movement, deflection or death of which can divert the entire herd.

- State and federal agencies limiting subsistence harvest (quotas and bans) resulting in uncertainty about the ability to hunt in the future [2.1, 2.4, 2.5, and 3.1];
- Loss of State revenues result in worsening of enforcement of permits for environmental protection [2.1]; and
- Airport “hub”/expansion to accommodate large planes for industry may change the character of the village [6.3].

1.7 Organization of the Plan

This Plan contains a wealth of information about Nuiqsut. Chapters 1 – 3 provide introductory material and a context for the goals, objectives, and strategies, which are included in Chapter 4. Chapter 5 explains Plan implementation, and the references at the end of the Plan identify studies, reports, and other sources of information. A summary of each Plan component follows:

- **Chapter 1 - Introduction:** This chapter provides the introduction to the Plan, including the basis for comprehensive planning.
- **Chapter 2 – Community and Area Overview:** This chapter provides background about the community including the people, the natural environment, the economy, public services, and the importance of the subsistence way of life.
- **Chapter 3 - Land Use and Zoning:** This chapter provides information about land ownership, land use regulation, and current and anticipated future land use.
- **Chapter 4 – Goals, Objectives, and Strategies:** This chapter includes the goals of the Plan, related objectives and actions that will help meet those objectives.
- **Chapter 5 – Implementation and Plan Revision:** The Plan concludes with a discussion of implementation actions.
- **References:** This section provides a list of references that were used to develop this document.
- **Appendices:** Response to public comments and input, and potential climate change impacts and adaptation strategies.

Chapter 2: Community and Area Overview

This chapter provides an overview of the community and the surrounding region. It begins with a description of the Kuukpikmiut people and continues with information about the physical environment. It ends with socio-economic information and information about the community infrastructure.

2.1 The Kuukpikmiut People

The Iñupiat and their ancestors have inhabited northern lands and waters for thousands of years. The Kuukpikmiut nation settled the Colville River region, thriving on the bounty of plants and animals in the rivers, lakes, sea, and on the land. They traditionally followed the migratory patterns of wildlife with seasonal settlements along the river and coastline.

Historically, the Kuukpikmiut sponsored an important trade fair each year at Nigliq at the mouth of the Colville River attended by other northern people⁵. *Kat̄ut*, the Iñupiaq name for these trade fairs, means peaceful gatherings of people from different nations.⁶ The Nigliq trade fair occurred in July and in addition to trading, it involved singing, drumming, feasting, dancing, athletic contests, and games.

In the late 1940s, the Bureau of Indian Affairs (BIA) required all school-age children to attend formal schools. Since the closest school for the Kuukpikmiut was in Barrow, families with children were compelled to leave their homeland.

In 1973, 27 Kuukpikmiut families completed a historic trek from Barrow to re-claim their homeland traveling by foot, dog sled, and snow machine. These families customarily hunted, fished, or trapped in the Colville River area. Before resettlement, there were five cabins in the Colville River Delta owned by the Kuukpikmiut; one was used year-round and the others used seasonally by families who lived in Barrow⁷.

Leaders of the resettlement group searched the banks of the Colville River for an appropriate village site on high ground which would be safe from spring flooding. They chose a site on the Nigliq Channel near its confluence with the Colville River channel because of the abundant wildlife⁸. For 18 months, these adults and children lived in tents, protected by

⁵ Burch, E. *Alliance and Conflict: The World System of the Iñupiaq Eskimos*. University of Nebraska Press. 2005.

⁶ Other Iñupiaq trade fairs occurred at Point Spencer on the Bering Strait, Sisualik on Kotzebue Sound, and Sullivik on the Northwest Coast.

⁷ Hoffman, D., Libbey, D., and G. Spearman. *Land Use Values Through Time in the Nuiqsut Area*. North Slope Borough and the Anthropology and Historic Preservation Section of the Cooperative Park Studies Unit, University of Alaska, Fairbanks, for the NPR-A Planning Team, 1978 and revised 1988.

⁸ Village of Nuiqsut, North Slope Borough Planning Commission and North Slope Borough Commission on History and Culture. *Nuiqsut Paisanich Heritage: A Cultural Plan*. Prepared by Arctic Environmental Information and Data Center. Ed. Judy Brogan. 1979.

snow blocks in the winter, until houses could be built. The Kuukpikmiut retained the village name of Nuiqsut because it recalled the historic place of fish camps and earlier settlements on the main channel of the Colville River. The Arctic Slope Regional Corporation (ASRC) assisted with moving and relocation costs as well as construction of housing and a store for the new village.

Eighty-nine percent of Nuiqsut residents are Iñupiat⁹. In addition to city and Tribal governments, the local and regional Native corporations are important institutions for the Kuukpikmiut. In 1971, Congress passed the Alaska Native Claims Settlement Act (ANCSA) which settled Native land claims by cash payment and land grants. ANCSA created village and regional Native corporations. The Arctic Slope Regional Corporation was incorporated in 1972. ASRC has approximately 11,000 Iñupiaq shareholders, owns nearly five million acres of land, and operates a diverse family of companies¹⁰. On April 19, 1973, the Kuukpik Corporation formed with an enrollment of 212 shareholders. The Kuukpik Corporation has about 384 shareholders, and owns about 146,000 acres of surface land while ASRC retains subsurface title. The Kuukpik Corporation operates several subsidiaries involved with ice road construction, gravel mining and hauling, civil construction, drilling, seismic exploration, camps and catering, surveying and security^{11, 12}.

2.1.1 Community Values

Nuiqsut residents enjoy a special relationship to the environment that is reflected by their values. The need to survive in a harsh climate facilitates strong community traditions and values. The harvesting and sharing of marine mammals, land animals, fish, birds, and plants are central to the livelihood and cultural traditions of the Iñupiat. The land, air, and water provide both food and way of life called *Inuuniagniqput*, commonly referred to as subsistence. The following bullets and Table 1 summarize the community values.

- Being good stewards of the environment to ensure healthy wildlife for generations to come.
- Preparing for the hunt, gathering, maintaining, and sharing tools and equipment.

⁹ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.
www.north-slope.org/your-government/census-2010

¹⁰ Arctic Slope Regional Corporation. *Who We Are*. Accessed December 28, 2015.
www.asrc.com/Pages/default.aspx.

¹¹ Kuukpik Corporation companies include Nanuq, Inc. (ice road construction, gravel mining and placement, camp construction and maintenance and civil construction), Kuukpik Drilling, LLC (oil field exploration, development and production drilling), and Kuukpik Transportation Company (pipeline holding company). Kuukpik business ventures/affiliates include Kuukpik/Arctic Services LLC (camps and catering and maintenance), Kuukpik/NANA Management Services, LLC (oil field security), Kuukpik/UMIAQ/LCMF (civil engineering, architectural and surveying services), and Kuukpik/SAExploration (seismic and geophysical).

¹² Kuukpik Corporation. Nuiqsut Comprehensive Plan Comments. December 4, 2015.

- Teaching young hunters and fishers about weather, migratory patterns of wildlife, travel routes, and hunting skills and strategies.
- Making trails and communicating new or changed landmarks to other hunters.
- Harvesting, processing, storing, and sharing the food.
- Hosting community celebrations to give thanks for the harvest.¹³

Table 1: Iñupiaq Values.¹⁴

Iñupiaq	English	Value
<i>Paaqjaktautainniq</i>	<i>Avoidance of Conflict</i>	The Iñupiaq way is to think, act, speak, and live positively.
<i>Nagliktuutiqagniq</i>	<i>Compassion</i>	Though the environment is harsh and cold, our ancestors learned to live with warmth, kindness, caring, and compassion.
<i>Paammaagiigniq</i>	<i>Cooperation</i>	Together we have an awesome power to accomplish anything.
<i>Ixagiigniq</i>	<i>Family and Kinship</i>	As Iñupiaq people, we believe in knowing who we are and how we are related to one another. Our families bind us together.
<i>Qinuinniq</i>	<i>Humility</i>	Our hearts command that we act on goodness without a reward in return. This is part of our cultural fiber.
<i>Quvianguniq</i>	<i>Humor</i>	Indeed, laughter is the best medicine!
<i>Anuniallaniq</i>	<i>Hunting Traditions</i>	Reverence for the land, sea, and animals provide the foundation for our hunting traditions.
<i>Inupiuraallaniq</i>	<i>Knowledge of Our Language</i>	With our language we have an identity. It helps us to find out who we are in our mind and in our heart.
<i>Piqpakkutiqagniq suli Qiksiksrautiqagniq Utuqqanaanun Allanullu</i>	<i>Love and Respect for our Elders and One Another</i>	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.
<i>Qiksiksrautiqagniq Inuuniagvigmun</i>	<i>Respect for Nature</i>	Our Creator gave us the gift of our surroundings. Those before us placed ultimate importance on respecting this magnificent gift for future generations.
<i>Signatainniq</i>	<i>Sharing</i>	It is amazing how sharing works. Your acts of giving always come back.
<i>Ukpiqqutiqagniq</i>	<i>Spirituality</i>	We are a spiritual people.

¹³ Village of Nuiqsut residents, personal communications 2010 NSB Reconnaissance.

¹⁴ North Slope Borough. *North Slope Borough Comprehensive Plan*. Prepared by URS Corporation for the North Slope Borough. 2005. Pgs 2-7.

2.1.2 Nuiqsut Cultural Heritage

In 1979, Nuiqsut community leaders prepared a document entitled *Nuiqsut Paisanich Heritage: A Cultural Plan*, commonly referred to as the *Paisanich*¹⁵. It describes principles and strategies for Nuiqsut village self-determination and for the protection of the *Kuukpikmiut* culture and its subsistence resources. By a joint resolution, the Nuiqsut City Council, the Native Village of Nuiqsut, and the Kuukpik Corporation adopted the *Paisanich* in 1979. In 1995, village leaders presented it to the Borough Planning Commission, and by Resolution 95-05, the Commission endorsed the *Paisanich* as “the guiding principles for Nuiqsut development” and stated that it “will serve as the beginning point in the development of the village comprehensive plan.” The *Paisanich* is undergoing an update that is expected to be completed during fall/winter 2016. This Comprehensive Plan builds on the values, principles, and strategies outlined in the original *Paisanich*, and will be updated in the future with input from the updated *Paisanich*. Chapter 4 describes how the Plan’s goals address the principles and objectives of the *Paisanich*.

As noted in the 1979 *Paisanich*, the people of Nuiqsut constantly renew the lifeblood of their culture through “this place” which includes the village and the surrounding area where people live, hunt, fish, trap, and gather plants. The resettlement of Nuiqsut affirmed the persistence and continuity of Iñupiaq culture in general and the Kuukpikmiut society in particular^{16 17}.

The stated objectives of the 1979 *Paisanich* are to:

1. Control the pace and magnitude of change to promote stable and beneficial socioeconomic conditions in the village;
2. Protect the natural environment and wild resources from adverse effects of industrial and technological activities;
3. Establish the historical/cultural/subsistence resources and values of the village as major considerations in land-use planning, development, and operations;
4. Adapt imposed landownership and jurisdiction to the traditional law of free access and use by the homeland people; and
5. Perpetuate traditional activities to assure transmission of cultural values to future generations (p. 42 of *Paisanich*).

¹⁵ Village of Nuiqsut, North Slope Borough Planning Commission and North Slope Borough Commission on History and Culture. *Nuiqsut Paisanich Heritage: A Cultural Plan*. Prepared by Arctic Environmental Information and Data Center. Ed. Judy Brogan. 1979.

¹⁶ Ibid

¹⁷ Hoffman, D., Libbey, D., and G. Spearman. *Land Use Values Through Time in the Nuiqsut Area*. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska Fairbanks and North Slope Borough, for the NPR-A Planning Team, 1978 and revised 1988.

The *Paisanich* identifies ways to reach these objectives, including development of cooperative agreements, participation in the management of lands and seas beyond direct village control, and use of the NSB zoning and state and federal laws to improve local conditions and values related to culture and natural resources. The document also encourages development of new authorities to increase local influence on plans and decisions at the borough, state, and federal level.

The *Paisanich* identifies the four critical matters to be addressed in Nuiqsut's management program, summarized here:

1. Set high standards of protection for land and resource uses that complement federal and state laws and guidelines. To the extent possible, the village should be its own regulator and enforcer, with assistance from the Borough's public safety office when required¹⁸.
2. Appropriate a water supply from the Colville River and adjacent water bodies adequate for village uses and for fish and wildlife habitat.
3. Work with the Borough and the Alaska Department of Natural Resources (ADNR) to develop a strong land classification scheme east of the Colville River.
4. Cooperate with state and federal agencies to maintain navigability of the Nechelik Channel of the Colville River (p. 53 of *Paisanich*).

Cultural Resources: The *Kuukpikmiut* have occupied the area for millennia using seasonal camps along the banks of the Colville River and its tributaries. The current village is located near the historic trading place of Nigliq where Natives from across the Arctic gathered seasonally to trade fur, fish and other goods.

The *Paisanich* notes that the *Nuiqsut Traditional Land Use Inventory* lists a hundred major settlements and camps that stretch along the coast and follow major drainages inland. In 1977, scientists inspected and documented 14 of these sites dating from the early 1900s which include sod homes, ice cellars, quarries, graves, warehouses, dog holes, tent rings, refuse piles, and hunting, fishing, trapping, and gathering and food preparation artifacts¹⁹. These sites provide insight to the history of the *Kuukpikmiut* society before European contact and through subsequent periods of early exploration, commercial whaling, trading,

¹⁸ The City of Nuiqsut has indicated that although protecting land and natural resources is critical, neither the City of Nuiqsut nor the Native Village of Nuiqsut currently have sufficient resources for enforcement authority. The only enforcement type of regulation for the area is exercised through *Kuukpik Subsistence Oversight Panel (KSOP)*.

¹⁹ These sites are named Puviksuq, Pisiktagvik, Nigliq/Woods' Inaat (also called Niglik or Nerlik), Agki Creek, Qayaqtusilik, Itqiliqpaat, Tiragroak, Nuiqsapiat, Niglinaat, Nanuq, Putu, Anajuk, Nigliviik, and Uyagavik.

trapping, reindeer herding and post-World War II military construction²⁰. This inventory of sites is continuously updated as information about traditional, historic and archaeological sites becomes available.

2.1.3 The Iñupiaq Language

Language is an expression of one's culture and values, and it is used to communicate a people's social and intellectual legacy. A continuum of Inuit languages range across the Arctic, and in Northern Alaska there are four major dialects of Iñupiaq. Iñupiaq proficiency has diminished due to early school policies that prohibited speaking Iñupiaq in class and the pervasive influence of English-speaking radio and television programming. According to the 2010 NSB Census, there has been a clear decline in the speaking proficiency of Iñupiaq in Nuiqsut. The local school, however, now offers Iñupiaq classes from early childhood through the 8th grade. The Borough also places great importance on expanding fluency in Iñupiaq to promote traditional culture and values. The Borough's dedication to the Iñupiaq heritage is demonstrated by the NSB Department of Iñupiat History, Language, and Culture (IHLIC) and one of its primary objectives of leading Iñupiaq language revitalization efforts.

2.2 The Physical Environment

This section provides information about the physical environment, including geography and soils, vegetation, fish and wildlife, climate, air quality, and natural hazards²¹.

2.2.1 Geography and Soils

Geography: Nuiqsut is situated adjacent to a steep bank that rises 15-20 feet above the Nigliq (also Nechelik) Channel of the Colville River.²² It lies 381 miles northwest of Fairbanks, 154 miles southeast of Barrow, and 57 miles west of Deadhorse, the terminus of the Dalton Highway. The community is located at the eastern edge of the federal National Petroleum Reserve-Alaska (NPR-A) which is under the jurisdiction of the U.S. Secretary of the Interior and managed by the Bureau of Land Management (BLM). The Colville River

²⁰ Hoffman, D., Libbey, D., and G. Spearman. *Land Use Values Through Time in the Nuiqsut Area*. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska Fairbanks and North Slope Borough, for the NPR-A Planning Team, 1978 and revised 1988.

²¹ Unless otherwise noted, material in Section 2.1.1 – 2.1.4 has been amended from the North Slope Borough *Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve-Alaska*. Prepared by Glenn Gray and Associates and URS Corporation for the North Slope Borough Department of Planning & Community Services. June 2014. www.north-slope.org/departments/planning-community-services/oil-and-gas-technical-report.

²² While sometimes labeled as the Nechelik Channel on maps, it is referenced as the Nigliq Channel in the remainder of this Plan, the locally preferred name.

provides access to the nearby marine resources of the Beaufort Sea and to interior fishing and hunting areas.

Three broad physiographic regions make up the NSB: the Arctic Mountains, the Arctic Foothills, and the Arctic Coastal Plain. The Arctic Mountains region is located at the southern end of the Borough at the Brooks Range. Just north of this area, tundra-covered foothills make up the Arctic Foothills region. The Arctic Coastal Plain is the northernmost physiographic region in the Borough, and includes the area surrounding Nuiqsut.

While the Arctic Coastal Plain consists of mostly flat, treeless tundra, there are some low hills known as pingos. About 20 percent of the Coastal Plain is covered by freshwater lakes that freeze in the winter, although there are fewer lakes in its western part. Most lakes are oriented to the north and northwest of the plain due to the effect of winds acting on melting ice. An area of sand dunes is located between the Kuk and Colville rivers.

The Colville River, the largest river in Alaska's Arctic, borders Nuiqsut and forms the eastern boundary of the northeast NPR-A. It flows approximately 400 miles from its headwaters in the DeLong Mountains at the western end of the Brooks Range to its delta at Harrison Bay in the Beaufort Sea. With its many large tributaries, the Colville River comprises a 24,000 square mile drainage basin that makes up 30 percent of the North Slope. As the river nears the coast, it cuts side channels that weave around sandbars and islands. In 1977, the Secretary of the Interior designated the Colville River Special Area and expanded its boundaries in 2013 to a total of 2.44 million acres.

The largest lake north of the Brooks Range, the 211,000-acre Teshekpuk Lake, is located about 50 miles west of Nuiqsut. It spans a distance of 20 miles at its longest point and is 20 feet deep. It lies entirely within the NPR-A. In 1977, the Secretary of the Interior also designated the Teshekpuk Special Area to protect the area's habitat values for waterfowl, shorebirds and the Teshekpuk Lake Caribou Herd. The area was expanded to 3.65 million acres in 2013. During the spring, thousands of caribou crowd the area to calve, and during the summer they seek relief from insects. Millions of ducks, geese, sandpipers, and other birds stay at the lake to mate, nest, and raise their young²³.

Soils: The village is underlain by mixtures of marine and alluvial clay, silt, and sand. Soils in the area were deposited by wind and water. Continuous permafrost covers most of the North Slope, including the Nuiqsut area, and it extends several hundred feet beneath the village. The top foot of soil is comprised of windblown silts and organic vegetative cover of grasses, sedges, lichens, and mosses. Between the top vegetation and the frozen permafrost lies a layer of soil called the "active layer" which thaws in summer to a depth of between 2 and 4

²³ North Slope Borough. *Coastal Management Program, Areas Meriting Special Attention Phase 1 Report*. June 1989.

feet. Since permafrost restricts the percolation of water past surface layers, ponds, lakes and wetlands are formed. As a result, most of the area around Nuiqsut is considered to be wetlands even though the area is also considered a polar desert (see Climate, Section 2.2.4 of this Plan).^{24 25}

Differential thaw of the active layer results in subsidence as cracks fill with water and freeze and thaw repeatedly. This activity creates a characteristic polygonal pattern of ice wedges, troughs, and ridges visible throughout the Coastal Plain from aircraft.

If kept frozen, permafrost soils can form an extremely strong and stable foundation. Permafrost soils are highly unstable when disturbed. Heat transfer from buildings, underground utilities or summer sun exposure can thaw the permafrost and cause settlement, sinking, or collapse. Thawing permafrost causes damage to roads, settlement under buildings, and flooding of ice cellars, all of which are costly to repair or replace²⁶.

²⁴ U.S. Department of the Interior, Bureau of Land Management. *National Petroleum Reserve-Alaska Integrated Activity Plan Record of Decision*. February 21, 2013. https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A_FINAL_ROD_2-21-13.pdf

²⁵ The BLM estimates that more than 95% of the NPR-A may be considered wetlands.

²⁶ Ferrians, O., Kachadoorian, R. and G. Greene. *Permafrost and Related Engineering Problems in Alaska*. Geological Survey Professional Paper 678. United States Government Printing Office. Washington D.C. 1969.

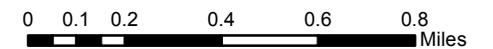


- Estuarine and Marine Wetland
- Freshwater Pond
- Freshwater Emergent Wetland
- Lake
- Freshwater Forested/Shrub Wetland
- Riverine
- Nuiqsut Spur Road



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NUIQSUT, ALASKA WETLANDS MAP



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Figure 3

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2.2.2 Vegetation

A variety of vegetation types cover the tundra along with a mix of wetlands, alluvial plains, shallow ponds, and thaw-lakes. The tundra around Nuiqsut supports herbaceous plants, mosses, lichens, and small willows/shrubs. The amount of moisture is a major determinant for the type of plant communities that occur in the North Slope. The BLM classifies ground cover in the adjacent NPR-A into seven categories: water, aquatic, flooded tundra, wet tundra, moist tundra, shrub, and barren ground.

The BLM estimates that shrubs represent over 44 percent of the vegetation cover in the NPR-A. Tussocks (raised vegetation clumps of grasses and sedges) cover about 65 percent of the area. The dominant species in tussocks, commonly known as cotton grass (*Eriophorum vaginatum*), provide an important food for caribou. Tussocks are sensitive to disturbance from off-road travel and ice roads. Wet areas are the least vulnerable to off-road winter travel because they freeze before the tundra is opened to travel.

Nine plants considered rare on Alaska's North Slope may be found in the NPR-A: Whitlow-grass, Adam's Whitlow-grass, oriental Junegrass, Drummond's bluebell, arctic poppy, Sabine grass, Alaskan bluegrass, circumpolar cinquefoil, and grassleaf sorrel.

The role of fungi and microbial life is important in the Arctic. Fungi reduce organic material to sugars and mineral nutrients that are distributed to plants through mycorrhizae²⁷. Eighty percent of plants in the Arctic depend on this source of food. Lichens, an association between fungi and algae, are a critical food source for caribou, muskox, and other animals²⁸. As described in more detail in Section 2.2.4, vegetation communities are changing in response to warming temperatures.

2.2.3 Fish and Wildlife

The Colville River Delta supports a rich biological community due to the confluence of the ocean and river waters and vegetative habitat, even though the river remains frozen for eight months of the year. The delta ecosystem supports a wide variety of mammals, birds, fish, and vegetation that are basic subsistence food sources for local residents. The tundra ecosystem of the North Slope supports several caribou herds, an important food source for Nuiqsut and other communities.

Towards the coast, shallow embankments meet salt marshes, thaw lakes, and rivers in a rich estuarine environment. Coastal winds and ocean currents form a dynamic sea-ice system

²⁷ A symbiotic relationship between a fungus and a plant.

²⁸ CAFF (Conservation of Arctic Flora and Fauna). *Arctic Flora and Fauna: Status and Conservation*. www.caff.is/assessment-series/167-arctic-flora-and-fauna-status-and-conservation. Helsinki: Edita. 2001.

which includes open-water leads used by migrating sea mammals. Cross Island provides a critical resource for staging the annual fall Nuiqsut bowhead whale hunt.

The lands and waters surrounding Nuiqsut support a broad range of fish and wildlife, including:

- Land mammals, such as caribou, moose, muskox, fox, wolf, wolverine, ermine, squirrels, lemmings, and voles;
- Marine mammals, including polar bear, bowhead and beluga whales, walrus, and bearded and ringed seals;
- Many waterfowl, seabird and shorebird species, such as ptarmigan, owl, geese, swans, ducks, eiders, brants, loons, plovers, gulls, songbirds, and raptors; and
- Fish such as Arctic char, broad whitefish, burbot, pike, salmon, grayling, least and Arctic cisco, flounder, and lake trout²⁹.

Due to their local importance for subsistence, two species are discussed in more detail below: Bowhead whales and caribou.

Bowhead Whale (*Balaena mysticetus*): The bowhead whale is an extremely important subsistence species for the people of the North Slope. Bowhead whale migration is tied to the ice pack; the whales migrate north along the eastern Chukchi Sea during the spring as they head toward the Beaufort Sea to summer in Canadian waters. They begin their return migration in September to winter in the Bering Sea. Bowhead whales may live to be more than 211 years old³⁰. They weigh a ton at birth and grow up to 60 feet weighing more than 120,000 pounds. Females produce a single 9-12 foot calf every two to three years. Commercial whaling seriously depleted populations of this species by 1915, but they have recovered and sustain a healthy subsistence hunt.

Bowheads feed on plankton using specialized plates called baleen. One of the two primary feeding areas in the Alaska Beaufort Sea is located between Kaktovik/Barter Island and the Canadian border.

Caribou (*Rangifer tarandus*): Caribou occupy the lichen and moss-rich Arctic Coastal Plain, and during the summer they travel in large herds to calve, feed, and escape mosquitoes. To take advantage of seasonally-available forage, caribou migrate between their calving

²⁹ North Slope Borough. *Coastal Management Plan Final Draft Amendment. Chapter 7: Resource Inventory, Analysis and Designated Areas.* July 2007.

³⁰ Rozell, Ned. *Bowhead Whales May Be the World's Oldest Mammals.* Article #1529. Alaska Science Forum. Geophysical Institute, University of Alaska, Fairbanks. 2001.

areas and summer and winter ranges. Winter diet consists predominantly of lichens with a shift to vascular plants in spring.

There are three major herds on the North Slope that migrate through the Nuiqsut Area of Influence: the Teshekpuk Lake Herd, Central Arctic Herd, and the Western Arctic Herd. The range of the fourth herd, the Porcupine Caribou Herd, is located to the east of the Nuiqsut Area of Influence. The migration patterns of these herds are summarized below.

- **Teshekpuk Herd (TCH):** In 2013, the population was estimated to be 32,000, half of the 2008 population. This herd migrates throughout the North Slope with its primary range being west of the Colville River in the NPR-A and a peripheral range extending south of the Brooks Range and east into the Arctic National Wildlife Range. Caribou begin migrating from winter ranges across northern Alaska to the Teshekpuk Lake area during May. By early June, most of the cows move into calving areas around the lake. After calving, most of the herd moves north of Teshekpuk Lake to the coast for insect relief. The herd usually begins its fall migration during October and November and winters on the Coastal Plain. Some animals winter on the eastern area of the plain, the central Brooks Range, or as far south as the Nulato Hills. Beginning in the early 2000s, most of the herd began wintering between Teshekpuk Lake and Anaktuvuk Pass.
- **Central Arctic Herd (CAH):** In 2013, 70,000 CAH caribou were counted, although this number may have included intermingling members of other herds. While the CAH is usually found near the Arctic coast between the Colville and Canning Rivers, its range extends from the northern foothills of the Brooks Range to the Beaufort Sea, and from the Ikpikpuk River eastward to the Hulahula River. Pregnant cows arrive on the Coastal Plain in early May through early June, and calving occurs between the last week of May and the second week of June. Other caribou arrive by early July. The summer range extends from Fish Creek just west of the Colville River and eastward along the coast to the Katakturuk River. The southern fall migration occurs between mid-August and early November, primarily within the Itkillik, Kuparuk, Sagavanirktok, and Ivishak river valleys. While its winter range changes over time, the herd typically uses windswept upland areas or areas of lighter snow cover where caribou can dig through the snow to feed on lichens, reindeer moss, and dried sedges. On the northern side of the range, the CAH is usually found east of the Dalton Highway in the area of the upper Sagavanirktok River foothills and some as far east as the Canning River. Since the mid 1990's, many CAH have wintered on the south side of the range from Chandalar Shelf to as far east as Arctic Village. Movement within the North Slope between the summer and winter range

is inconsistent but predominantly occurs in north-south direction along river corridors through mountain passes.

- **Western Arctic Herd (WAH):** This herd ranges over 140,000 square miles of northwestern Alaska, including the mountains, foothills, Arctic Plain, and coastline of the North Slope west of the Trans-Alaska pipeline. During a July 2013 census, about 235,000 caribou were counted, a decline of 90,000 during the previous two years³¹. Spring migration from the Brooks Range to the coast generally begins in April. Substantial numbers of the WAH spend the summer in the DeLong Mountains and Utukok Uplands. The Etivluk, Anaktuvuk, and Chandler river valleys are particularly important WAH as spring migration corridors for pregnant females heading westward toward the Utukok Uplands calving area. Calving occurs between the last week of May and the second week of June, and other caribou arrive by early July. During late-June to mid-August, the herd seeks relief from insects along sandbars, spits, river deltas, barrier islands, mountain foothills, snow patches, and sand dunes where stiff winds prevent insects from concentrating. A gradual southward fall migration generally occurs after the insect season ends in mid-August. During recent years, caribou have begun their southerly migration later in the season and pause at different locations, sometimes staying in one place for two or three weeks at a time. The winter range varies from year-to-year, but since the mid-1970s it has been located south of the Brooks Range along the northern fringe of the boreal forest. However, between 1983 and 2005, up to 29 percent of radio-collared WAH caribou wintered on the North Slope south of the coastal plain and west of the Dalton Highway.

2.2.3.1 Endangered and Threatened Species

The federal Endangered Species Act protects both threatened and endangered species. The Act defines *endangered species* as “any species which is in danger of extinction throughout all or a significant portion of its range.” The term *threatened species* is defined as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range”³². As indicated in Table 2, two federal government agencies manage endangered and threatened species in the region: the U.S. Fish and Wildlife (USFWS) within the U.S. Department of the Interior (USDI) and the National Marine Fisheries Service within the U.S. Department of Commerce.

³¹ Alaska Department of Fish and Game, Division of Subsistence. *Alaska's Economies and Subsistence*. Accessed September 16, 2014. www.adfg.alaska.gov/static/home/library/pdfs/subsistence/ak_economies_subsistence.pdf

³² U.S. Department of the Interior, U.S. Fish & Wildlife Service. *Glossary of Terms*. Accessed March 14, 2014. www.fws.gov/midwest/endangered/glossary/index.html

Table 2: Threatened and Endangered Species Within the Nuiqsut Area of Influence.^{33 34 35 36}

Threatened Species	Responsible Agency
Steller's eider (<i>Polysticta stelleri</i>)	U.S. Fish and Wildlife Service
Spectacled eider (<i>Somateria fischeri</i>)	U.S. Fish and Wildlife Service
Polar bear (<i>Ursus maritimus</i>) ³⁷	U.S. Fish and Wildlife Service
Bearded seal (<i>Erignathus barbatus</i>) Beringia and Okhotsk populations	National Marine Fisheries Service
Ringed seal (<i>Phoca hispida</i>)	National Marine Fisheries Service
Endangered Species	Responsible Agency
Eskimo curlew (<i>Numenius borealis</i>)	U.S. Fish and Wildlife Service
Bowhead whale (<i>Balaena mysticetus</i>)	National Marine Fisheries Service

Three migratory bird species within the Nuiqsut Area of Influence are classified as threatened by the Secretary of the Interior under the Endangered Species Act. The Spectacled eider (listed in 1993) and the Steller's eider (listed in 1997) are both medium-sized sea ducks. The Eskimo curlew was listed in 1967.

The Bowhead whale was first protected under the 1931 League of Nations Convention due to commercial whaling that led to a steep decline in the population. In 1973 it was listed as endangered under the Endangered Species Act. The International Whaling Commission regulates annual quotas of harvests for bowhead whales and the Alaska Eskimo Whaling Commission enforces them.

The USFWS listed the polar bear as a threatened species in May 2008. Although the USFWS designated critical habitat for polar bears in December 2010, the U.S. District Court for the

³³ U.S. Department of the Interior, U.S. Fish & Wildlife Service. *Glossary of Terms*. Accessed March 14, 2014. www.fws.gov/midwest/endangered/glossary/index.html

³⁴ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. *Endangered, Threatened and Candidate Species under NMFS Authority in Alaska*. Accessed February 21, 2014. www.alaskafisheries.noaa.gov/protectedresources/esa/ak_nmfs_species.pdf

³⁵ U.S. Department of the Interior, U.S. Fish & Wildlife Service. *Endangered Species Listing*. Accessed February 21, 2014. www.fws.gov/alaska/fisheries/endangered/listing.htm

³⁶ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center. *NOAA Technical Memorandum NMFS-AFSC-212, Status Review of the Ringed Seal* by B. P. Kelly, J. L. Bengtson, P. L. Boveng, M. F. Cameron, S. P. Dahle, J. K. Jansen, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, and J. M. Wilder. December 2010.

³⁷ Approximately 187,000 square miles of land and water have been designated as critical habitat.

District of Alaska issued an order vacating the designation. Currently there is not a critical habitat designated for polar bears³⁸.

In February 2013, the National Marine Fisheries Service listed the Beringia and Okhotsk populations of bearded and the Arctic population of ringed seals as threatened. This listing was due to loss of sea ice habitat which supports rearing of pups, resting, and molting activities.

2.2.4 Climate

Long, cold winters with persistent wind and short, cool summers characterize the local climate. The sun does not drop below the horizon from May through July and does not rise above it from mid-November until mid-January. During winter months, however, there are periods of twilight resulting from refraction of the sun's rays. Cloudiness is prevalent in summer and autumn and is least prevalent in winter and spring.

Temperatures in Nuiqsut range from -56° Fahrenheit (F) in winter to 78°F in summer. Average temperatures are above freezing only from June through September. Average monthly temperatures are below 0°F from December through March. The coldest temperatures of the year occur during February and can be as low as -56°F. High winds are common in Nuiqsut. The mean annual wind speed is estimated to be about 11 miles per hour (mph) with the prevailing wind coming from the east—northeast. Winds with steady speeds of 35 mph often occur. The wind chill conditions of extreme cold combined with winds can result in frostbite and hypothermia, making adequate protective clothing essential for human survival.

Rainfall is light in Nuiqsut, averaging about 5-6 inches per year. While snow may occur during any month of the year, snow cover usually persists between October and May. The average annual snowfall is estimated to be about 20 inches. During the long winter, snowdrifts caused by persistent winds create problems for safety, mobility, and the structural integrity of buildings. Snowdrifts make the alignment of buildings and their entries relative to the prevailing wind direction critical design factor. Also, snow fences are used to reduce snowdrift hazards.

Climate Change Impacts: A changing climate is affecting the natural environment, and Nuiqsut residents have changed their behavior to adapt to those changes, as documented in Alaska Native Tribal Health Consortium's report *Climate Change in Nuiqsut, Alaska:*

³⁸ U.S. Department of the Interior, U.S. Fish & Wildlife Service. *Endangered Species Listing*. Accessed February 21, 2014. www.fws.gov/alaska/fisheries/endangered/listing.htm

“Residents report unprecedented changes to the weather, seasons, land and seascape, plants, wildlife and infrastructure with important implications for public health”³⁹.

While there are year-to-year variations, a warming trend that began about 30 years ago continues today in the Arctic⁴⁰. This trend has reduced snow and ice cover which adds to the warming because areas without snow and ice absorb more heat. The Scenarios Network for Alaska and Arctic Planning (SNAP) predicts that by the end of the century, June temperatures will rise 2-3°F and October-March temperatures will increase by 20-25°F⁴¹. The length of the summer season is expected to increase from three to six weeks⁴².

The most apparent effects of climate change in Nuiqsut include subsidence (ground sinking) and failing ice cellars. Subsidence occurs under homes, roads, and other structures from thawing of the underlying permafrost. Many structures lack adequate insulation between the underlying permafrost, which accelerates subsidence.

A wide range of other climate change impacts affecting the North Slope has been observed or predicted by residents and scientists. As a whaling village, many of the coastal impacts of climate change, described below, affect Nuiqsut residents’ subsistence activities.

- **Sea Ice:** Multi-year sea ice has declined 50 percent since 2005. During 2012, new record lows were observed for the extent of sea ice and snow cover and higher permafrost temperatures. The sea ice in September 2013 represented the lowest cover since satellite records began in 1979. This reduction in ice negatively affects habitat for species such as ringed seals, walrus, and polar bears. A reduction in sea ice could also affect the entire marine ecosystem through changes to plankton, plants, and animals on the low end of the food chain.
- **Vegetation:** Vegetation cover changes include an increase in above-ground plant biomass by as much as 26 percent since 1982⁴³, and the extent of shrub cover has increased during the past 50 years⁴⁴. Along the northern coast, low elevation areas have been inundated by saltwater which has resulted in sedimentation and subsidence. As a

³⁹ Alaska Native Tribal Health Consortium (ANTHC). Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. p. 2. Accessed July 14, 2015. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf.

⁴⁰ U.S Department of Commerce, National Oceanic and Atmospheric Administration. *Arctic Report Card: Update for 2013*. Accessed February 21, 2014. www.arctic.noaa.gov/reportcard/exec_summary.html

⁴¹ U.S. Department of the Interior, Bureau of Land Management. *NPR-A Climate Change Analysis: An Assessment of Climate Change Variables in the National Petroleum Reserve in Alaska* by SNAP: Scenarios Network for Alaska and Arctic Planning. University of Alaska. Accessed March 24, 2014. www.snap.uaf.edu/attachments/NPRA_Climate_Change_Analysis_2011.pdf

⁴² Ibid

⁴³ U.S Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). *Arctic Report Card: Update for 2013*. Accessed February 21, 2014. www.arctic.noaa.gov/reportcard/exec_summary.html

⁴⁴ Sturm, M., Racine, Ch. and K. Tape. *Climate Change: Increasing Shrub Abundance in the Arctic*. Nature 411, 546-547. May 31, 2001.

result, species formerly dominant in these areas have been replaced by salt tolerant species which in turn has resulted in black brant using this new habitat for molting rather than inland areas⁴⁵.

- **Storms:** Residents report an increase in frequency and intensity of storms⁴⁶.
- **Erosion:** Thawing permafrost and the loss of sea ice cover are resulting in increased erosion along the coast. For instance, the rate of erosion east of Point Barrow has doubled in the past 50 years from 20 feet to 50 feet per year⁴⁷. The loss of landfast sea ice combined with thawing permafrost is expected to increase wind and erosion⁴⁸. Predicted levels of erosion may compromise landfills and hazardous waste sites and damage archaeological sites.
- **Permafrost:** The active layer of permafrost, that is, the soil layer that thaws during the summer, is predicted to become much deeper by midcentury. As permafrost soils thaw and temperatures rise, water in lakes and ponds may diminish through evaporation and drainage.
- **Acidification:** Arctic marine waters are becoming more acidic as a result of absorption of carbon dioxide which could affect species that depend on calcium to build shells or skeletons as well as the species that prey upon them.
- **Fire:** As a result of increasing shrub cover, drying and lightning, there will likely be higher fire incidence on the North Slope⁴⁹.
- **Species Changes:** Climate change has led to some changes in species composition, species distribution, and migration. A warming climate affects the foundation of the food web on land and in the ocean which in turn affects higher trophic levels. North Slope residents have reported an increase in new species in the region as well as a greater numbers of species that were seldom observed (e.g., king and silver salmon, porcupine, beaver, lynx, and coyotes). In addition, decreasing sea ice is affecting polar bear habitat⁵⁰.

⁴⁵ Tape, K., Flint, P., Meixell, B., and B. Gaglioti. *Inundation, Sedimentation, and Subsidence Creates Goose Habitat along the Arctic Coast of Alaska*. In Environ. Res. Lett. 8. 2013.

⁴⁶ Alaska Native Tribal Health Consortium (ANTHC). Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. Accessed July 14, 2015. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf.

⁴⁷ U.S. Department of the Interior, Bureau of Indian Affairs. *Department of the Interior Announces Final Rule for Land into Trust for Alaska Native Tribes*. December 18, 2014. Accessed February 6 2015. www.bia.gov/cs/groups/public/documents/text/idc1-028734.pdf

⁴⁸ U.S. Department of the Interior, Bureau of Land Management. *NPR-A Climate Change Analysis: An Assessment of Climate Change Variables in the National Petroleum Reserve in Alaska* by SNAP: Scenarios Network for Alaska and Arctic Planning. University of Alaska. Accessed March 24, 2014. www.snap.uaf.edu/attachments/NPRA_Climate_Change_Analysis_2011.pdf

⁴⁹ Ibid

⁵⁰ Amstrup, S., DeWeaver, E., Douglas, D., Marcot, B., Durner, G., Bitz, C. and D Bailey. 2010. Greenhouse Gas Mitigation Can Reduce Sea-Ice Loss and Increase Polar Bear Persistence. Published in Nature. December 15, 2010. Accessed June 10, 2015. www.nature.com/nature/journal/v468/n7326/full/nature09653.html.

- **Health of Subsistence Resources:** Residents report changes to the health of fish and behavior of marine mammals⁵¹.
- **Insect Harassment:** Nuiqsut residents report that increased numbers of mosquitoes are harassing caribou and causing them to travel to the coast for relief earlier than in the past.
- **Methane:** Permafrost thawing is causing increased release of methane into the atmosphere from lakes and tundra.

The changing climate has the potential to greatly change the way of life in Nuiqsut. Below are some of current and potential opportunities and threats to Nuiqsut residents from climate change:

- **Food Security:** Changes in the food chain or migration patterns of fish and wildlife could pose future risks to food security. Residents report an increased number of ice cellars are failing and filling with water.⁵² In 2014, an early snow melt prevented the use of snow machines to harvest geese⁵³. Drying of fish and other subsistence resources may not be possible during prolonged wet periods.
- **Health Impacts:** New diseases and parasites can pose risks to humans and animals.
- **Threats to Infrastructure:** Increased flooding, erosion, and thawing permafrost threatens the integrity of roads, buildings, and utilities. Buried water and sewer connections have recently surfaced⁵⁴.
- **Safety:** Delayed fall freezing and early spring break-up of rivers and lakes is causing more hazardous tundra travel in the fall and ice travel in the spring. Longer ice-free periods will produce greater waves because of wind energy over a longer fetch (distance from which waves can be generated). An increase in wildfires would also threaten the community.

⁵¹ Alaska Native Tribal Health Consortium (ANTHC). Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. Accessed July 14, 2015. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf.

⁵² A 2014 survey reported that seven ice cellars are currently in use, and ones located near the river are warming or filling with water (ANTHC 2014).

⁵³ Alaska Native Tribal Health Consortium (ANTHC). *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. Center for Climate and Health. Accessed July 14, 2015. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf. 2014.

⁵⁴ Ibid.

- **New Opportunities:** A longer ice-free season will provide a longer boating season, expand opportunities for gardening, extend the time period available for obtaining drinking water, and increase the construction season⁵⁵.

Nuiqsut residents have adapted to climate change impacts through keen observation of ice, wind, currents, and ecosystem changes. Specific adaptation measures include: Use of personal locator beacon devices as subsistence users travel further from the village, implementation of altered work schedules to allow hunting when resources are available, use of freezers when ice cellars fail, and dietary changes to consume more plentiful wildlife or store-bought foods.

Planning ahead can position the community to more effectively adapt to change as summarized in the following bullets.

- New roads and structures can be designed and constructed to accommodate thawing permafrost.
- New infrastructure can be located in areas of the community that are thaw-stable or not impacted by erosion.
- New strategies are being considered to address failing ice cellars, including location of new cellars in more stable areas and using new methods for ice cellar construction⁵⁶ or use of thermosiphons such as an ice cellar constructed in Kaktovik in 2014.
- Regular updates to the All Hazards Mitigation Plan can provide a “living plan” that identifies evolving threats and appropriate responses⁵⁷.
- Locals can participate in programs to monitor changes, such as River Watch and Local Environmental Observer (LEO) programs⁵⁸.
- See also Appendix: Climate Change Impacts and Adaptation Strategies, for ideas on how to respond to climate-related changes in subsistence resources and activities.

2.2.5 Air Quality

During the 1990s, residents of Nuiqsut expressed concern about air quality impacts of the proposed Alpine Development Project. In response to these concerns, and as a condition of a state permit, ConocoPhillips Alaska, Inc. (CPAI) implemented the Nuiqsut Ambient Air

⁵⁵ Alaska Native Tribal Health Consortium (ANTHC). *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. Center for Climate and Health. Accessed July 14, 2015. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf. 2014.

⁵⁶ Ibid.

⁵⁷ Ibid.

⁵⁸ Ibid.

Quality Monitoring Program in cooperation with the Alaska Department of Environmental Conservation (ADEC). Since 1999, the ambient air quality data for Nuiqsut has been measured by CPAI consultants for certain pollutants (i.e., nitrogen dioxide, sulfur dioxide, and particulates)^{59 60 61 62 63}. The data is also provided to ADEC, BLM, and Environmental Protection Agency (EPA) to assess the air quality. A Nuiqsut resident is employed to routinely check on the station and report any issues or concerns. CPAI plans to continue the monitoring program while the Alpine complex is operational⁶⁴.

In 2010, the Alaska Native Tribal Health Consortium (ANTHC) began an independent air quality study at the request of the Nuiqsut Tribal Council. The ANTHC study involved the following components:

- Review of air monitoring data collected by CPAI between January 2008 and December 2010.
- Collection of 45 air samples at four locations between July 2010 and May 2011 to complete a volatile organic compound (VOC) profile of 62 compounds.
- Collection of 40 water samples in and around the community and near the Alpine Development Project.
- Completion of 11 semi-directed interviews with community members.
- Completion of a community air quality assessment during September 2010 to characterize threats by seven common air pollution sources⁶⁵.

Through its interviews, ANTHC found that community members had significant concerns about air quality impacts from oil and gas development. As summarized in the following bullets, the ANTHC did not find evidence that industrial development is causing harmful levels of air pollution:

⁵⁹ ConocoPhillips Alaska, Inc. *Nuiqsut Ambient Air Quality Monitoring Program, Second Quarter 2010 Data Summary, April 1 through June 30, 2010* by AECOM. October 2010.

⁶⁰ ConocoPhillips Alaska, Inc. *Nuiqsut Ambient Air Quality Monitoring Program, First Quarter 2010 Data Summary, January 1 through March 31, 2010* by AECOM. August 2010.

⁶¹ ConocoPhillips Alaska, Inc. *Final – Revision 01 Nuiqsut Ambient Air Quality Monitoring Program, Fourth Quarter 2009 Data Summary, October 1 through December 31, 2009* by AECOM. July 2010.

⁶² ConocoPhillips Alaska, Inc. *Final Nuiqsut Ambient Air Quality Monitoring Program, First Quarter 2008 Data Summary, January 1 through March 31, 2008* by AECOM. May 2009.

⁶³ ConocoPhillips Alaska, Inc. *Final Nuiqsut Ambient Air Quality Monitoring Program, Second Quarter 2007 Data Summary, April 1 through June 30, 2007* by ENSR Corporation. 2008.

⁶⁴ Thomas, Brad. Air Quality Permit Manager, ConocoPhillips Alaska, Inc. July 15, 2015. Personal Communication.

⁶⁵ Alaska Native Tribal Health Consortium (ANTHC). *Impact of Oil Development on Air Quality in an Alaska Native Village* by Dobson, Jennifer and Ritter, Troy L. Alaska Native Tribal Health Consortium, Division of Environmental Health and Engineering. November 8, 2010.

- Twenty-eight of the 45 air samples (62.2 percent) contained VOCs, but none of the samples exceeded air quality standards.⁶⁶
- The VOCs associated with crude oil development that were detected were very low concentrations.
- Three of the 40 water samples (7.5 percent) had VOCs, but none of the samples exceeded ADEC water quality standards.
- Between 2008 and 2010, CPAI air quality monitoring recorded three instances where National Ambient Air Quality Standards were exceeded (two instances in the summer of 2009 and one occurrence in the summer of 2010). The ANTHC study found that windblown dust from natural sources was the likely cause of these exceedances.

The ANTHC study recommended three future actions: 1) Application of dust palliative and water to roads prior to high wind events, 2) completion of future studies,⁶⁷ and 3) more public education about air pollution, including quarterly presentations to the community about results of ongoing air quality monitoring.

2.2.6 Hazards and Emergency Management

This section addresses both natural hazards and emergency management.

2.2.6.1 Natural Hazards

The NSB has identified a number of natural hazards facing Nuiqsut in the Nuiqsut Local All Hazard Mitigation Plan and the North Slope Borough Local All Hazard Mitigation Plan^{68 69}. Unless otherwise noted, the information in this section was obtained from these two hazard plans.

Natural hazards that pose risks to the community include minor flooding, erosion, wind, ice storms, permafrost thaw, snow drifts, ice damming/jamming and tundra fires. Weather-related hazards pose some of the biggest threats to the community. While climate change is not a natural hazard, the Nuiqsut Local All Hazard Mitigation Plan notes that “climate change, along with its peripheral effects, is easily the single largest risk to the community”⁷⁰.

⁶⁶ Standards include those of the Environmental Protection Agency (EPA), National Institute for Occupation Safety and Health (NIOSH), and Occupational Safety and Health Administration (OSHA).

⁶⁷ Recommended studies include pollution of lichens and moss, tissue sampling of subsistence foods, pollution transport modelling, further sampling of benzene and ethylbenzene, and sampling of snow for VOCs.

⁶⁸ North Slope Borough. *City of Nuiqsut Local All Hazard Mitigation Plan*. Prepared by Joe Stankiewicz, Risk Management Division. 2004.

⁶⁹ North Slope Borough. *North Slope Borough Local All Hazard Mitigation Plan* by Joe Stankiewicz, North Slope Borough Risk Management Division. 2005.

⁷⁰ North Slope Borough. *City of Nuiqsut Local All Hazard Mitigation Plan*. Prepared by Joe Stankiewicz, Risk Management Division. 2004, p. 19. 2004.

Flooding: Flooding has not significantly damaged infrastructure within City boundaries, but minor impacts have occurred from periodic flooding. In 1973, the tundra at the east end of town was flooded, including the gravel source and the boat dock. In June 2004, the Nigliq Channel rose to within 10 feet of the top of the bank, and waters inundated the road to the landfill. Snowmelt in the Upper Colville River was partly attributed to the flooding.

Erosion: Erosion poses an important threat to the community, especially at the Nigliq Channel located at the eastern edge of the village and the gravel source road. The channel bank is used for summer boat storage, fishing, river access, and winter snow machine use. Erosion on the west bank of the channel extends 100 x 30 feet with an estimated 3 to 5 feet per year of erosion⁷¹. Erosion has been worsened by water discharges from the water tank as well as from excavation of mammoth tusks from the bank. Erosion on the north edge of the village has the potential to affect sewer outflow lines. In addition, the road to the boat dock often washes out during break up. As a result, gravel needs to be placed over the culverts each year.

Wind: High winds, greater than 60 mph, occur frequently in the community and occasionally cause damage to community infrastructure. In the winter of 1997, several homes and the health clinic received minor damage. During a 2002 winter storm, a transformer and power lines were knocked down and damage was done to the NSB Coordinator's office. Also, microburst winds pose a threat to aircraft.

Ice Storms: Although infrequent, ice storms can occur during September and October and have damaged transformers during at least three winters.

Permafrost Thawing: As temperatures rise, permafrost soils have been thawing to deeper depths in the summer leading to flooding of ice cellars. Thawing permafrost also has the potential to drain lakes. Residents report that warmer summers and more moderate winters appear to be causing ground settling, and that these problems have been occurring in the village since the 1990s.

Snow Drifts: While heavy snow is a rare event, drifting snow inhibits operation of aircraft and vehicles, including school buses, ambulances, and fire trucks.

Extreme Cold: Ice fog conditions and extreme cold can stop transportation to and within the community for days.

Ice Damming/Jamming: An accumulation of ice can form where the slope of a river changes from steeper to milder or where moving ice meets an intact ice cover. The obstructing ice

⁷¹ U.S. Army Corps of Engineers, Alaska District. *Alaska Baseline Erosion Assessment: Erosion Information Paper* — Nuiqsut, Alaska February 23, 2009.

can cause flooding upstream and, if it breaks suddenly, flash flooding downstream. The release of water and ice can damage buildings, infrastructure and wildlife habitat downstream.

Tundra Fires: As a result of climate change, scientists predict there will be an increase in tundra fires⁷². A 1993 lightning strike caused a fire near Wainwright which took two weeks to extinguish. The greatest risk from wildfires occurs June through September.

The Nuiqsut Local All Hazard Mitigation Plan recommends the following actions to address hazards facing the community:

- Assess and improve redundancy in the electrical system to reduce the number and severity of power outages,
- Implement a standardized power plant operator curriculum,
- Provide Incident Command System training to residents,
- Develop and conduct annual emergency response exercises,
- Obtain and store emergency supplies in the community,
- Provide annual hazardous waste operations and emergency response standard (HAZWOPER) training to community members,
- Provide annual oil spill response training to the community,
- Conduct an annual fuel spill response exercise,
- Raise the road to the landfill and armor it to prevent flooding damage⁷³, and
- Construct a snow fence near the airport to reduce snow drifts.

2.2.6.2 Emergency Management

In addition to the all hazard mitigation plans, the three-volume Emergency Operations Plan applies to each community in the Borough⁷⁴. The Native Village of Nuiqsut has developed an Emergency Operations Plan that is currently under review by the NSB and State of Alaska Homeland Security and Emergency Management Department. The plan must be in place for the City to receive Federal Emergency Management Agency (FEMA) funding in the event of an emergency. A recently updated NSB-wide Hazards Mitigation Plan qualifies the borough to receive mitigation funds from FEMA⁷⁵.

⁷² U.S. Department of the Interior, Bureau of Land Management. *NPR-A Climate Change Analysis: An Assessment of Climate Change Variables in the National Petroleum Reserve in Alaska* by SNAP: Scenarios Network for Alaska and Arctic Planning. University of Alaska. Accessed March 24, 2014. www.snap.uaf.edu/attachments/NPRA_Climate_Change_Analysis_2011.pdf

⁷³ An upgrade to a portion of the landfill road has already been permitted by the Corps of Engineers and NSB. Kuukpik Corporation would provide the improvements using NSB-owned gravel.

⁷⁴ North Slope Borough. *North Slope Borough Emergency Operations Plan*. Three Volumes. 2008.

⁷⁵ Kilioni, Hina. Disaster Coordinator. North Slope Borough Department of Administration and Finance. Division of Risk Management. December 17, 2015. Email communication.

2.2.6.3 Contaminated Sites

The Alaska Department of Conservation defines a contaminated site as “a location where hazardous substances, including petroleum products, have been improperly disposed.” Contaminated sites that have not been cleaned up have the potential to threaten public health or the environment and can potentially cause economic hardship to people and communities. ADEC identified 39 contaminated sites in the Nuiqsut area. The majority of these sites include facilities at Point Lonely Distant Early Warning (DEW) Line, such as the landfill, pads, and drum storage or Umiat, such as the airstrip complex and test wells. The only contaminated site within the Nuiqsut city boundary is at the power plant. All the contaminated sites within the Nuiqsut area are listed in Table 3. Additional information on these contaminated sites including closure details and cleanup chronology can be found on the ADEC Contaminated Sites Program website⁷⁶.

Table 3: Contaminated Sites, Nuiqsut Area.

No.	Site Name	Location	Status	Site Type
1	Kogru River / Formerly Used Defense Sites (FUDS) Main Cantonment Area	West Side of Harrison Bay	Cleanup Complete	Military Installation - Radar/Radio Relay Station
2	Umiat Former Air Force Station	North Bank Colville River	Open	Military Installation - Base/Post/Other
3	Umiat Airstrip Complex (FUDS)	North Bank Colville River	Open	Airport/Airfield
4	Umiat Main Gravel Pad (FUDS)	South of the Airstrip	Open	Oil Exploration/Onshore
5	Umiat Landfill and Seasonal Slough	Unknown	Open	Landfill/Dump
6	ConocoPhillips Itkillik River Unit #1 (ARCO)	7.5 miles Up Itkillik River	Cleanup Complete - Institutional Controls	Oil Production/Onshore ⁷⁷
7	BLM East Teshekpuk Drill Site	52 miles WNW of Nuiqsut; Eastern Peninsula in Teshekpuk Lake	Cleanup Complete	Oil Exploration/Onshore

⁷⁶ State of Alaska, Department of Environmental Conservation, Division of Spill Prevention and Response, Contaminated Sites Program. Accessed August 7, 2015.

<http://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search>

⁷⁷ ConocoPhillips Alaska provided a comment during the public review period for this plan that the site type for ConocoPhillips Itkillik River Unit #1 should be Oil Exploration/Onshore instead of Oil Production/Onshore.

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No.	Site Name	Location	Status	Site Type
8	BLM Cape Halkett Drill Site	~104 miles SE of Barrow	Open	Oil Exploration/Onshore
9	Lonely AFS Dewline - Diesel Tank SS10	Point Lonely	Cleanup Complete	Military Installation - Radar/Radio Relay Station
10	Lonely AFS Dewline - NABeach Diesel SS03	Point Lonely	Open	Military Installation - Radar/Radio Relay Station
11	Lonely AFS Dewline - Hangar Pad SS13	Point Lonely	Cleanup Complete	Airport/Airfield
12	Lonely AFS Dewline - Landfill LF007	Point Lonely	Open	Landfill/Dump
13	Lonely AFS Dewline - Diesel Spills SS05	Point Lonely	Cleanup Complete	Military Installation - Base/Post/Other
14	Lonely AFS Dewline - POL Storage SS04	Point Lonely	Open	Military Installation - Base/Post/Other
15	Lonely AFS Dewline - Garage SS09	Point Lonely	Open	Maintenance Yard/Shop
16	Lonely AFS Dewline - Landfill LF011/SS06	Point Lonely	Open	Landfill/Dump
17	Lonely AFS Dewline - Sewage Disposal SS01	Point Lonely	Cleanup Complete	Water/Wastewater Facility
18	Lonely AFS Dewline - Drum Storage SS02	Point Lonely	Cleanup Complete	Military Installation - Radar/Radio Relay Station
19	Lonely AFS Dewline - Module Train SS12	Point Lonely	Open	Military Installation - Radar/Radio Relay Station
20	Umiat Test Wells Nos. 2 & 5 (FUDS)	2 miles N. of Umiat Airstrip	Open	Oil Exploration/Onshore
21	Umiat Test Well No. 04 (FUDS)	~2 miles North of Umiat	Open	Oil Exploration/Onshore
22	Umiat Test Well No. 06 (FUDS)	~1.5 miles NE Umiat Airstrip	Open	Oil Exploration/Onshore
23	Umiat Test Well No. 08 (FUDS)	~2 miles North of Umiat	Open	Oil Exploration/Onshore
24	Umiat Test Well No. 10 (FUDS)	~2 miles North of Umiat	Open	Oil Exploration/Onshore
25	Umiat Test Well No. 11 (FUDS)	~3 miles NE of Umiat	Open	Oil Exploration/Onshore

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No.	Site Name	Location	Status	Site Type
26	Umiat Lake (FUDS)	~1-2 miles NE of Umiat	Open	Oil Exploration/Onshore
27	Umiat Test Well No. 01 (FUDS)	4.5 miles W & 2.5 miles N. of	Cleanup Complete	Military Installation - Base/Post/Other
28	Umiat Test Well No. 07 (FUDS)	~0.75 mile NE of Umiat	Open	Oil Exploration/Onshore
29	Umiat Test Well No. 03 (FUDS)	~2 miles NE of Umiat	Open	Oil Exploration/Onshore
30	Umiat Test Well No. 09 (FUDS)	~1.5 miles NW of Umiat	Open	Oil Exploration/Onshore
31	ConocoPhillips West Sak 18	North Slope	Cleanup Complete - Institutional Controls	Oil Production/Onshore ⁷⁸
32	Camp Lonely Landfill	1 mile West of Pt. Lonely	Open	Landfill/Dump
33	Camp Lonely AOC Bulk Fuel Tank Storage Area	1 mile West of Pt. Lonely	Open	Oil Exploration/Onshore
34	Camp Lonely AOC Incinerator Utility Building Area	1 mile West of Point Lonely	Open	Oil Exploration/Onshore
35	Camp Lonely AOC Vehicle Maintenance Shop Area	1 mile West of Point Lonely	Open	Maintenance Yard/Shop
36	Lonely AFS Dewline - AOC 1,2,&3	Point Lonely Dewline	Cleanup Complete	Military Installation - Base/Post/Other
37	Kogru River / FUDS Western Landfill Cell 4	W Side of Harrison Bay; 100 miles W of Deadhorse	Cleanup Complete	Landfill/Dump
38	Kogru River / FUDS Western Landfill Cells 1, 2, and 3	W Side of Harrison Bay; 100 miles W of Deadhorse	Open	Landfill/Dump
39	NSB Nuiqsut Power Plant	Utilidor NE of Washateria; N of Warm Storage Bldg.	Open	Power Generation

⁷⁸ ConocoPhillips Alaska provided a comment during the public review period for this plan that the site type for ConocoPhillips West Sak 18 should be Oil Exploration/Onshore instead of Oil Production/Onshore.

2.2.7 Subsistence Activities

Subsistence hunting, fishing, and gathering play an important role in the lives of Nuiqsut residents. Subsistence activities provide food security and cultural sustenance. The sharing of subsistence resources with family members, elders, those who cannot hunt or fish, and other community members is central to the Iñupiat culture and a source of pride and identity by those who give and those who receive those gifts.

The Alaska National Interest Lands Conservation Act (ANILCA) defines subsistence use as:

“The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.”

The NSB zoning and land use code (Title 19) defines subsistence as “an activity performed in support of the basic beliefs and nutritional needs of the residents of the Borough and includes hunting, whaling, fishing, trapping, camping, food gathering, and other traditional and cultural activities”⁷⁹.

Subsistence Area: The Kuukpikmiut’s traditional subsistence range covers a 34,500 square mile area generally bound by the following areas⁸⁰:

- Teshekpuk Lake at about Dease Inlet to the west,
- East of Prudhoe Bay to about the Sagavanirktok River,
- North to the whaling migratory routes around Cross Island, and
- South to the foothills of the Brooks Range (See Figure 3).

Hunters also commonly join Barrow residents for sea mammal hunting and occasionally go to Kaktovik and Wainwright for this purpose.

The advent of snow machines allows local hunters the ability to cover large distances in short periods of time. A Nuiqsut hunter can cover 100-150 miles a day in a snow machine compared to a third of that distance with a dog sled team.

⁷⁹ North Slope Borough. Municipal Code §19.20.020.

www.municode.com/library/ak/north_slope_borough/codes/code_of_ordinances

⁸⁰ Stephen R. Braund & Associates. *Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow*. MMS OCS Study Number 2009-003. 2010.

Hunters may work in wage employment during the weekdays and hunt and fish in the evenings or on weekends. This situation emphasizes the need for speedy land or water craft to make efficient use of limited time for hunting and fishing. The frozen tundra and rivers support snow machine travel for eight months of the year (October through May). When water travel is feasible, typically June through October, a motorboat can accommodate a crew, gas, and provisions for a two to three week hunting and fishing excursion. Some of these boats are used to harvest bowhead whales.

Participation in Subsistence Activities: Subsistence activities provide food, clothing, food for dogs, and handicrafts for sale. Many studies have documented the customary and traditional use of subsistence resources by Nuiqsut residents⁸¹. According to the 2010 NSB census, over 99 percent of Nuiqsut households surveyed used subsistence foods, and more than 66 percent depended on subsistence foods for half or more of their diet⁸². Compared to the 2003 Borough census, more people believe subsistence efforts have stabilized. Almost 68 percent of those interviewed, however, believed travel distances have increased somewhat, and 29 percent believed travel distances have increased a lot.

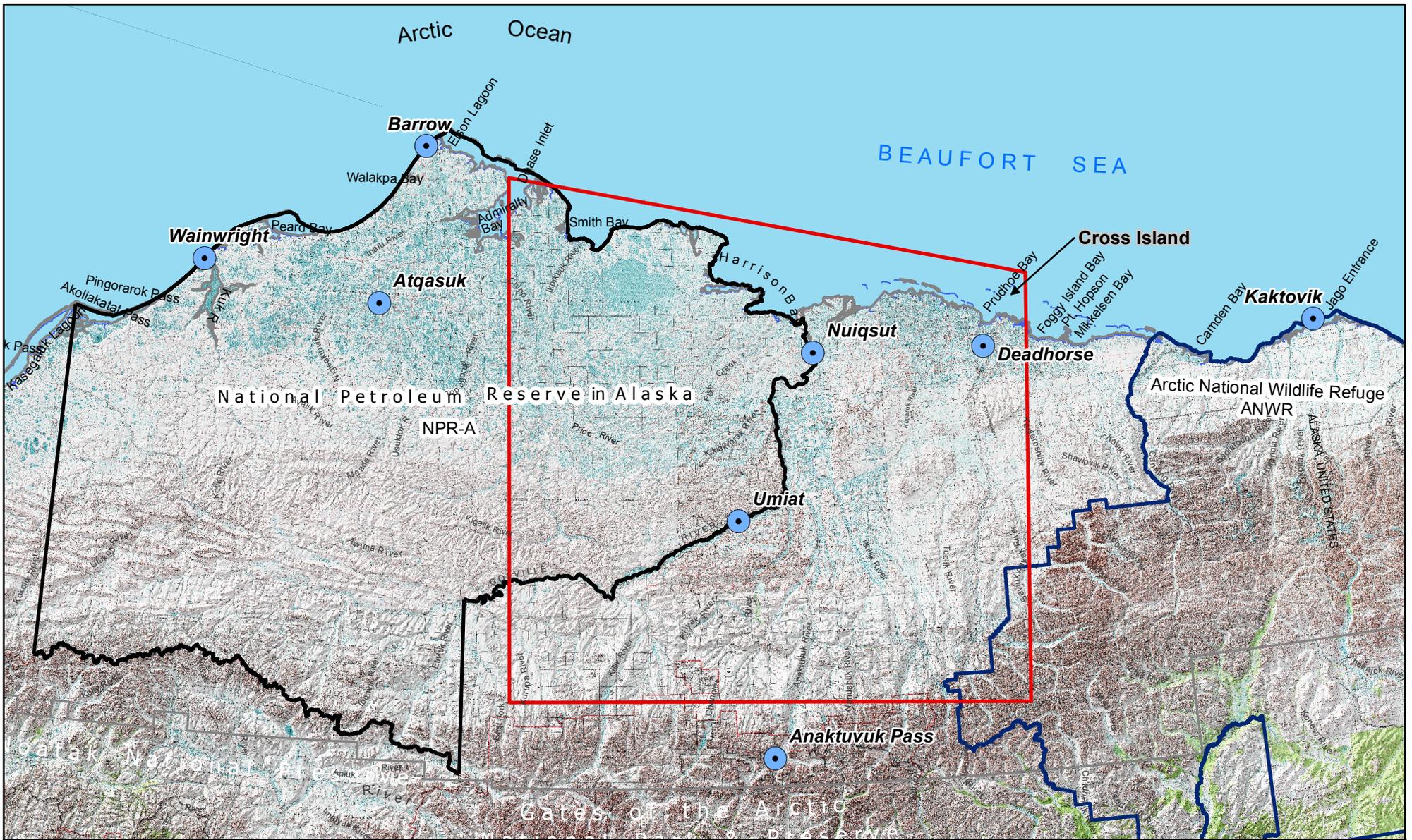
Sharing of the harvest is an important feature of the subsistence way of life; 87 percent of Nuiqsut households share food with others, and two thirds of households report giving more than half of their subsistence foods to others⁸³.

⁸¹ Alaska Department of Fish and Game 2003 and 2000; Brower and Opie 1998; Brown 1979; Burns 1990; Craig 1987; Galginaitis and Funk 2005; Galginaitis et al. 1984; George and Fuller 1997; George and Nageak 1986; George and Kovalsky 1986; Hall 1983; Hoffman et al. 1988; Impact Assessment, Inc. 1990; Kruse 1982; Kruse et al. 1981; Kruse et al. 1981; Moulton and Field 1988; Minerals Management Service 2003, 2001, 1998, 1996, 1990, 1986, and 1983; Nielson 1977; North Slope Borough 2004b, 1979, and 1978; Patterson 1974; Pedersen 2000, 1995a, 1995b, 1988, 1979; Pedersen et al. 2000; Stephen R. Braund & Associates 2010; U.S. Army Corps of Engineers 1997; and U.S. Department of the Interior 1998.

⁸² North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.
www.north-slope.org/your-government/census-2010

⁸³ Ibid

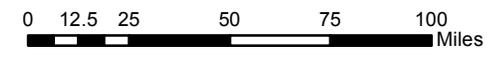
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- Area of Influence
- NPR-A Boundary
- ANWR Boundary
- NSB Boundary
- Village Points


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NUIQSUT, ALASKA LOCATION MAP



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Figure 4

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Subsistence Resources: The Nuiqsut subsistence harvest depends on migratory marine, terrestrial, and avian species. The primary species harvested include:

- **Marine Mammals:** Bowhead whales, bearded seal, ringed seal
- **Land Mammals:** caribou, moose
- **Fish:** Arctic cisco, broad white fish
- **Birds:** geese⁸⁴

Other species harvested by the community include walrus, polar bear, moose, wolf, wolverine, eider, crane, ptarmigan, eggs, Arctic char, burbot, broad whitefish, humpback whitefish, northern pike, pink salmon, and plants. Table 4 illustrates the percent of edible pounds harvested during a one-year period beginning in July 1994. It should be noted, however, that the marine mammal harvest during that year was less than usual because no Bowhead whales were harvested during that period.

Although Nuiqsut is not located on the coast, bowhead whaling is an important activity to the community. During the fall, whalers travel to Cross Island, the community's base for whaling operations. They remain there until they harvest their quota or until the fall migration ends.

Additional species Harvested:

- Marine mammals: Polar Bear, ringed seal.
- Birds and eggs: Eider (unidentified sp.), sandhill crane, ptarmigan, geese (unidentified species) and tundra swan.
- Fish: Arctic cisco, broad whitefish, least cisco and whitefish (unidentified species).
- Terrestrial mammals: Caribou, moose, red fox, arctic fox, wolverine and wolf.
- Plants: Blackberries, blueberries, cranberries and salmonberries.

⁸⁴ Stephen R. Braund & Associates. *Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow*. MMS OCS Study Number 2009-003. 2010.

Table 4: Important Subsistence Species for Nuiqsut 1985 – 2001.^{85 86}

Year	Category	Pounds Harvested	Percent Harvested
1985	Marine Mammals	13,355	8.3%
	Birds and Eggs	8,036	5%
	Fish	70,609	44.2%
	Terrestrial Mammals	67,866	42.5%
	Plants	169	.1%
1992	Marine Mammals	52,865	35.2%
	Birds and Eggs	3,924	2.6%
	Fish	51,955	34.5%
	Terrestrial Mammals	41,387	27.6%
	Plants	66	0%
1993	Marine Mammals	85,216	31.8%
	Birds and Eggs	4,325	1.7%
	Fish	90,490	33.8%
	Terrestrial Mammals	87,390	32.6%
	Plants	396	0.1%
1994-1995	Marine Mammals	1,504	1.8%
	Birds and Eggs	2,347	2.9%
	Fish	46,600	56%
	Terrestrial Mammals	32,686	39.3%
	Plants	91	0.1%
1995-1996	Marine Mammals	120,811	65.8%
	Birds and Eggs	2,179	1.2%
	Fish	16,953	9.3%

⁸⁵ Brower, H.K. and R.T. Opie. 1996. North Slope Borough Subsistence Harvest Documentation Project: Data for Anaktuvuk Pass, Alaska for the period July 1, 1994, to June 30, 1995. Technical Report. Department of Wildlife Management. North Slope Borough. Barrow. Revised version p. 44.

⁸⁶ Stephen R. Braund & Associates. Greater Mooses Tooth 1 Development Supplemental Environmental Impact Statement – Subsistence. Overview of Nuiqsut Subsistence Uses. <https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage¤tPageId=50912>. October 2013.

Year	Category	Pounds Harvested	Percent Harvested
	Terrestrial Mammals	43,554	23.7%
	Plants	78	0%
2000-2001	Marine Mammals	87,929	48%
	Birds and Eggs	5,124	2.8%
	Fish	28,008	15.2%
	Terrestrial Mammals	62,173	33.9%
	Plants	13	0%
2002-2003	Caribou	46,449	
2003-2004	Caribou	65,988	
2004-2005	Caribou	63,882	
2005-2006	Caribou	42,471	
2006-2007	Caribou	55,575	
2010	Caribou	55,107	
2011	Caribou	58,226	

Seasonality: While some species are harvested year round, many species are harvested seasonally. The following description of subsistence activities for Nuiqsut provides a seasonal summary of use, and Table 5 illustrates the harvest by season.

- **Spring:** Spring whaling on the coast draws some whalers to Barrow to participate as crew members or whaling captains. No spring whaling occurs near Nuiqsut. Furbearer harvest in the foothills and on the Coastal Plain becomes an important activity as the daylight and weather improves, and it continues until the snow is gone in May. Seals are taken on the sea ice April-May. Grayling, cod, and lake trout are taken with hook and line during the warmer weather. Long snow machine trips may occur to Barrow or Kaktovik or even farther to visit friends and relatives before the snow melts. Some caribou may be hunted in conjunction with these trips.
- **Summer:** Whitefish are taken in nets in the Colville River when the water clears after breakup in June. As the season progresses, fishing is conducted farther upriver and on Fish Creek. When waterfowl arrive, they are hunted periodically until their fall migration. In late summer, char and salmon begin running up the river, followed by

spotted seals. Some coastal fishing is done for whitefish and cisco. Children set traps for ground squirrels and fish for grayling with nets and rod and reel. Caribou hunting becomes the primary activity in late summer.

- **Fall:** Caribou hunting, fishing, and whaling are the most important subsistence activities in fall. Caribou migrate south from their respective calving grounds, but some remain in the area throughout the winter near Fish Creek and the surrounding region. Moose have recently moved into the region and are becoming an important resource, especially during October when bull males are mating and hunting of caribou is avoided. They are taken along the middle Colville River. Fishing for cisco and whitefish is done with nets before freeze-up in the rivers and continues to be a significant activity after freeze-up at fish camps on the Colville River and Fish Creek. Grayling and burbot are fished through the ice in later fall. Berries are picked during fishing and hunting trips, and sometimes driftwood and coal are collected. Whaling begins in late August to early September along the coast as far east as the Canning River. Seals, ducks, caribou, and sometimes polar bear are taken while whaling. Other sea mammal hunting is done for seals near the Colville River Delta.
- **Winter:** Activities slow down during the coldest and darkest part of winter. Trapping for foxes and hunting of wolves and wolverines occurs during this season. Caribou and moose have traditionally been taken during winter, but snow conditions at Umiat where moose congregate makes snow machine travel difficult. Seals are hunted on sea ice when open leads appear. As weather and light improve, trapping, caribou hunting, and fishing for burbot, grayling, and lake trout increase⁸⁷ ⁸⁸ ⁸⁹.

⁸⁷ Hoffman, D., Libbey, D., and G. Spearman. 1988. *Land Use Values Through Time in the Nuiqsut Area*. North Slope Borough and the Anthropology and Historic Preservation Section of the Cooperative Park Studies Unit, University of Alaska, Fairbanks, for the NPR-A Planning Team, 1978 and revised 1988.

⁸⁸ NPRA Task Force. *Final study and study reports, NPR-A 105(c)*. Study Report #3 Socioeconomic Profile. By University of Alaska, Arctic Environmental Information and Data Center. Anchorage. 1978.

⁸⁹ North Slope Borough. *Nuiqsut Synopsis. In Native Livelihood and Dependence. A Study of Land Use Values Through Time*. Prepared by Libbey, D., Spearman, G, and D. Hoffman for the North Slope Borough. NPR-A. Work Group 1. Field Study 1. 1979.

Table 5: Major Subsistence Resource Hunting Seasons for Nuiqsut.⁹⁰

Subsistence Resource	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Caribou	Medium							High			M	
Moose										High		
Wolf, wolverine	M	High							Low			
Geese						M	High	L				
Eider							L	High			L	
Seal							L	M	High		M	L
Bowhead Whale										L	High	L
Arctic Cisco	High										M	High
Arctic Char/Dolly Varden	L							L	M	High		L
Broad Whitefish	L						L	High			Medium	
Burbot	High					Low						High
White = No harvest activity						L= Medium harvest activity						
M=Medium harvest activity						H= Highest harvest activity						

Source: Stephen R. Braund & Associates. *Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow*. MMS OCS Study Number 2009-003. 2010.

2.2.7.1 Subsistence Vulnerabilities

Nuiqsut hunters constantly modify their subsistence strategies to respond to changes. The availability of subsistence resources in the community’s Area of Influence and access to those areas may change in the future due to the effects of climate change and expansion of oil and gas development. The remainder of this section addresses categories of vulnerability the community currently experiences or may experience in the future.

Costs of Subsistence: Although there is an absence of economic tools to place a monetary value of subsistence, it is an important component of the local economy, especially considering the high cost of living. Subsistence activities, however, require substantial cash to purchase costly transport (snow machines, all-terrain vehicle [ATVs], boats, sleds, and fuel), tools (ammunition, firearms, nets, floats, and harpoons), and food preparation and storage materials (knives, smokers, freezers, pots, and pans). The 2010 NSB Census revealed

⁹⁰ Stephen R. Braund & Associates. *Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow*. MMS OCS Study Number 2009-003. 2010.

that the average household expenditures for subsistence equipment, supplies, and support was \$7,062. For the most part, whaling captains spend the most on subsistence-related expenditures. Cash income from dividends and local employment provides the means to purchase tools, equipment, and supplies.

Industry: Impacts from industrial activities that affect wildlife behavior include noise (aircraft, vehicles, and drilling activities), off-road travel, pipelines and roads, fences, and nighttime glare from lights.

Safety: Changes in the migration of caribou cause hunters to travel greater distances and incur more safety risks.

Climate: Late season freeze-up can limit snow machine access to the tundra for caribou hunts. In the future, warmer summers may breed a greater number of mosquitoes or other pests which harass caribou populations, altering the timing and route of their travels.

Family food cellars built in permafrost soils have traditionally served as storage for subsistence harvest foods. These ice cellars (*sigl-uaq*) offer convenience, ample space, proper refrigeration, and economical storage of subsistence foods, particularly whale meat and muktuk. Over the last decade, residents report that some ice cellars have failed due to thawing permafrost⁹¹. The walls of thawing cellars become friable and begin to crack, and some cellars have been flooded or collapsed. Failing ice cellars create economic hardships for families who cannot afford to purchase freezers large enough to store muktuk and other portions of the whale that are often cut into 60 to 80 pound slabs. While electric freezers are a viable alternative for fish and caribou meat, residents pay higher electric bills and lose limited living space in their homes to accommodate the freezers. Transporting freezers to the village via ice road or air add an additional expense. Residents also note that the flavor of foods stored in ice cellars is more familiar and appealing than food stored in electric freezers which can be subject to freezer burn.

Activities in Distant Areas: Because many of the species harvested by Nuiqsut residents migrate great distances, impacts in areas far from the community could affect food security. Marine mammals travel as far away as the Bering Sea, the Canadian Beaufort Sea, and hundreds of miles north into the Arctic Ocean. Caribou also migrate large distances, some as far south as the Seward Peninsula.

Air Traffic: Residents have expressed concern about the impacts of excessive air traffic on wildlife and subsistence activities. Noise and shadows from low-flying aircraft can scare and

⁹¹ Alaska Native Tribal Health Consortium. Center for Climate and Health. *Climate Change Effects on Traditional Inupiaq Food Cellars*. Brubaker, Michael, Jacob Bell and Alicia Rolin. Bulletin No. 1. June 26, 2009.

scatter caribou, causing them to divert from their migration route, making harvesting the animals difficult.

There are requirements in place to mitigate air traffic disturbance on wildlife and subsistence users by the North Slope Borough, State of Alaska, BLM and FAA. It is not just oil and gas industry-related flights, such as transporting both workers and cargo and conducting seismic surveys that disturb wildlife and hunters. Scientists conducting habitat assessments and other baseline environmental studies make-up air traffic in the Nuiqsut region. Other types of air traffic within the Nuiqsut Area of Influence include commercial travel, such as passenger and freight planes for those visiting or living in Nuiqsut; recreational air travel, primarily hunting, fishing, hiking and boating excursions for non-residents; and search and rescue exercises and operations. This is not an inclusive list of all air traffic in the Nuiqsut region⁹².

The 2014 North Slope Borough Oil and Gas Technical Report indicates that the most prevalent purpose of air traffic within in the NPR-A is scientific research, as indicated in Table 6 from data compiled from BLM land use permits. The Report also indicates that very limited information is available on air traffic. Table 6 provides the type and number of aircraft takeoffs and landings during the summer within the NPR-A during 2011 and 2012. Because the BLM does not track landings and take-offs for activities that do not require a land use permit, the information provided below represents only some of the NPR-A air traffic. Recreation-related air traffic is higher than indicated in Table 6 because many types of recreational use do not require a BLM land use permit. Additionally, industrial airport activity is not included because data are not available. However, the thousands of flights over the village’s hunting grounds represents a serious subsistence vulnerability which warrants serious consideration and collaboration by all parties to mitigate their impact to the community. The Kuukpik Subsistence Oversight Panel (KSOP) was created to protect the village’s subsistence lifestyle and represents subsistence users within the community. KSOP can facilitate and guide the development of mitigation measures to address this issue.

Table 6: Summer Aircraft Takeoffs and Landings Permits for the NPR-A (2011-2012).⁹³

Purpose	2011	Percent of all Air Traffic	2012	Percent of all Air Traffic
Recreational	24	1	63	2
Oil and Gas	702	33	1,585	41
Scientific/Research	1,418	66	2,217	57
TOTAL	2,144	100	3,865	100

⁹² North Slope Borough. Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve-Alaska. Prepared by Glenn Gray and Associates and URS Corporation for the North Slope Borough Department of Planning & Community Services. June 2014. www.north-slope.org/departments/planning-community-services/oil-and-gas-technical-report.

⁹³ Ibid

Wage Income: Loss of wage and dividend income in the future is likely to result from decreased oil production. This situation could reduce the ability to afford modern hunting equipment.

Despite significant vulnerabilities to subsistence, the Kuukpikmiut have demonstrated a tremendous capacity to adapt to change. They have persevered through famines, severe climatic conditions and the comings and goings of wage labor during the eras of commercial whaling, fur trading, reindeer herding, military installations, and now oil development. Through these changes, the Kuukpikmiut retained their hunting, fishing, gathering, and sharing skills and social networks. In the face of new circumstances and vulnerabilities, it is important that village elders continue to share traditional knowledge with youth, including information about traditional tools and equipment, the variability of ecosystems and weather, wildlife harvesting skills, ice conditions, and environmental stewardship.

2.3 Socio-Economic Profile and Public Facilities

This section begins with an overview of population statistics and continues with information about housing followed by a discussion on public facilities and services. It concludes with an overview of the local economy.

2.3.1 Population

The village of Nuiqsut was settled in 1973 with 145 people in 27 families. U.S. Census data were not collected for the community until the 1980. Nuiqsut experienced steady population growth from the time it was re-settled until 2000. Since 2000, Nuiqsut's population has decreased slightly.

The number of residents in the village varies seasonally. During the school year, 12 teachers and their families reside in Nuiqsut, but many leave during the summer. In addition, subsistence activities take residents out of the village for weeks at a time throughout the summer. When school starts and freeze-up begins, the local population swells again.

Tables 7 and 8 illustrate census population counts and other socioeconomic data, respectively. Figure 5 illustrates the population changes over the forty year period.

Table 7: Nuiqsut Population, 1974 to 2015.^{94 95 96}

Year	Population	Data Source
1974	145	NSB Census
1980	208	U.S. Decennial Census
1982	302	NSB Census
1990	354	U.S. Decennial Census
2000	433	U.S. Decennial Census
2003	416	NSB Census
2010	415	NSB Census
2015	449	State of Alaska Certified Population

Table 8: NSB Census 2010 Populations Characteristics.⁹⁷

Characteristic	Number	Percent
Total 2010 Population	415	100
Female	182	48.7
Male	192	51.3
Iñupiat	334	87.7
Persons ages 16 to 64 (labor force)	282	61.4
Median age of total population	23	
Total number of households	125	
Average number of people per household	3.0	

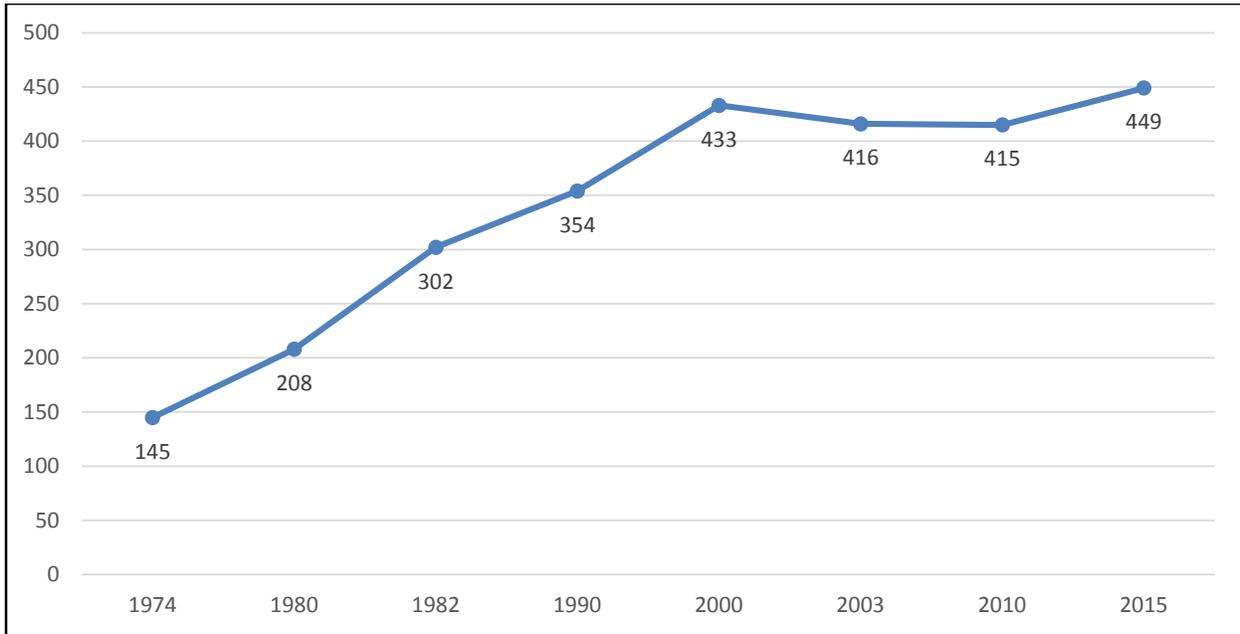
⁹⁴ U.S. Department of Commerce, U.S. Census Bureau. Decennial Census 1980, 1990, 2000.

⁹⁵ Alaska Department of Commerce, Community and Economic Development Division of Research and Analysis. *Population Adjustment*. www.commerce.alaska.gov/web/dcra/ResearchAnalysis/PopulationAdjustment.aspx. Accessed December 12, 2015.

⁹⁶ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015. www.north-slope.org/your-government/census-2010

⁹⁷ Ibid

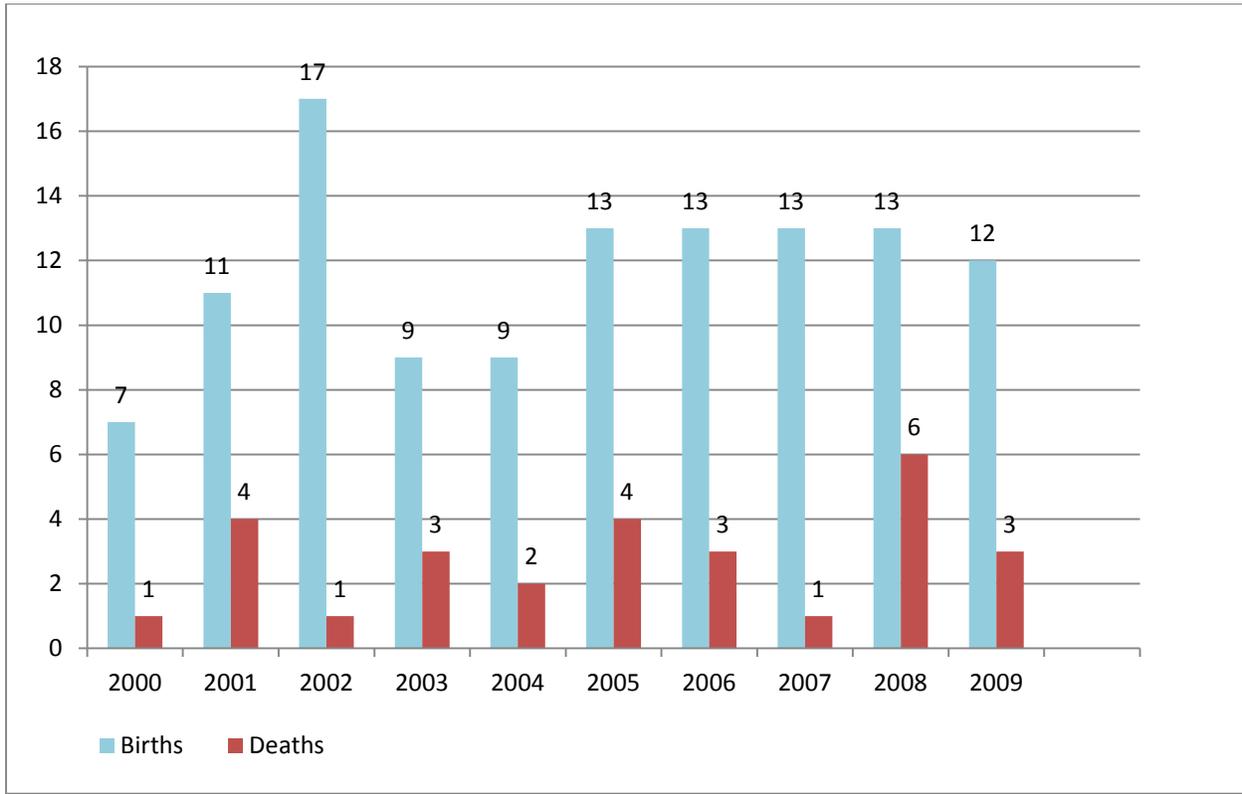
Figure 5: Nuiqsut Population Change



Births and Deaths: The strongest component of population growth in Nuiqsut is natural increase, that is, more births than deaths. Births have risen steadily in Nuiqsut from 7 in 2000 to 12 in 2009, and in each year births have exceeded deaths. Deaths in the village ranged from one in the year 2000 to three in 2009 with a peak of six deaths in 2008. Growth over this period has been associated with a natural increase and a total of 89 more births than deaths during the 2000 to 2009 time period when data is available from the Alaska Bureau of Vital Statistics, as illustrated below in Figure 6⁹⁸.

⁹⁸ Alaska Department of Public Health, Division of Vital Statistics. 2010. Birth Rates and Death Rates by Census. Accessed September 21, 2015. www.hss.state.ak.us/dph/bvs/birth_statistics/Birth_Rates_Census/body17.html.

Figure 6: Births and Deaths in Nuiqsut, 2000 - 2009⁹⁹

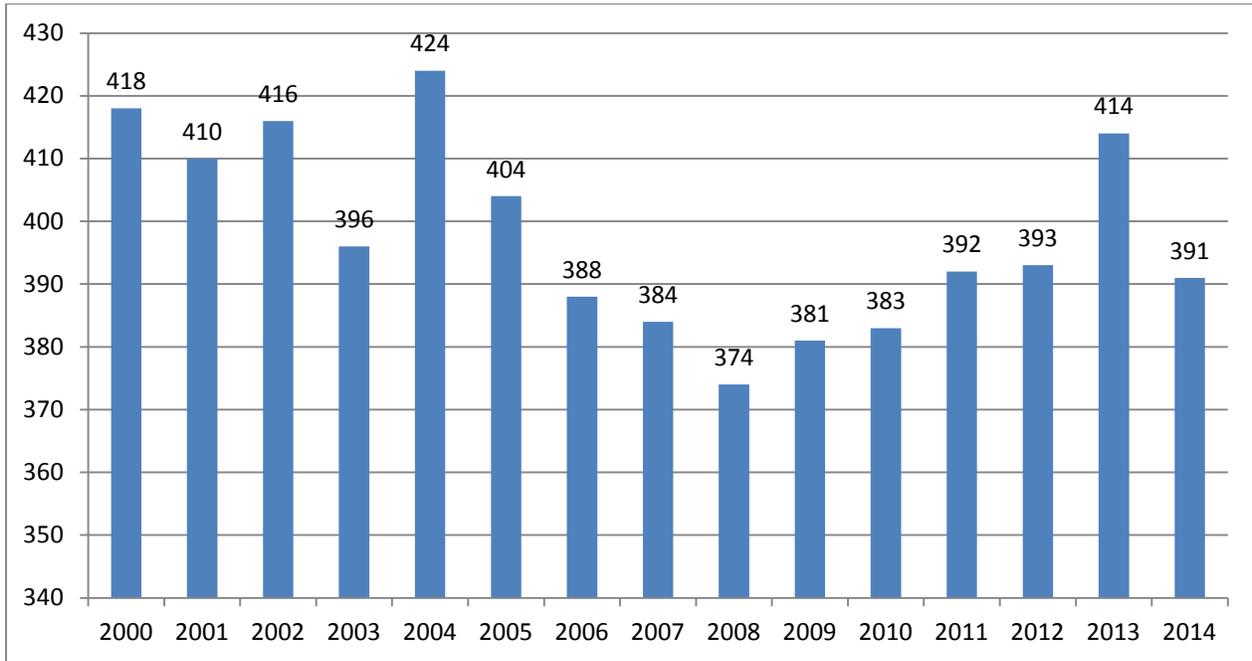


In-Migration and Out-Migration: Data are not collected on the numbers of people moving in or out of the community (in-migration and out-migration) so estimates must be made from other indicators. Out-migration is usually related to high school graduates leaving to attend college, workers seeking employment elsewhere, or persons moving to areas closer to other family members or friends. In-migration relates to new residents moving into the village, often to live with family members or for employment.

One potential indicator of in- and out-migration in Nuiqsut is the number of people who qualify for the annual Alaska Permanent Fund dividend. Alaska Permanent Fund staff track the dividend recipients by mailing addresses. Figure 7 illustrates the number of residents who successfully applied for the Permanent Fund Dividend Program between 2000 and 2014 with a mailing address in Nuiqsut. In 2000, 418 persons with Nuiqsut mailing addresses applied for Permanent Fund dividends and by the end of the decade, 383 persons had applied, representing a decline of 35 persons qualifying for the dividend over the 10-year period. While there was an increase in 2013 to 414 residents, qualified applicants decreased to 391 by 2014.

⁹⁹ Alaska Department of Public Health, Division of Vital Statistics. 2010. Birth Rates and Death Rates by Census. Accessed September 21, 2015.
www.hss.state.ak.us/dph/bvs/birth_statistics/Birth_Rates_Census/body17.html.

Figure 7: Nuiqsut Permanent Fund Enrollment, 2000 – 2014¹⁰⁰



Population Projection: 2015-2035: If recent trends continue into the next two decades following the 2015 census, population growth in Nuiqsut will be slow, ranging from a high of 0.5 percent annual growth rate to a negative growth rate reflecting a 0.5 percent annual decline in population, as shown in Table 9 below.

Table 9: Five-, 10- and 20-Year Population Projections.¹⁰¹

Base Year 2015 NSB Census	Annual Growth Rate	5-Year Forecast 2020	10-Year Forecast 2025	20 Year- Forecast 2035
450	High Growth (+0.5%)	460	470	490
450	No Growth (0%)	450	450	450
450	Negative Growth (-0.5%)	440	430	410

¹⁰⁰ Alaska Permanent Fund Corporation. *Annual Reports 2000-2014*. Website accessed 13 July 2015.

www.apfc.org/home/Content/publications/reportArchive.cfm

¹⁰¹ Base population number was determined to be 449 by the North Slope Borough 2015 Economic Profile and Census Survey; for the purpose of this projection, numbers were rounded up.

2.3.2 Housing

Nuiqsut residents, like all other North Slope communities, struggle with a lack of safe, affordable and sufficient housing. Recent efforts by TNHA are alleviating some of the housing issues.

Existing Housing Conditions: According to the 2013 U.S. Census¹⁰², the majority of Nuiqsut's housing stock, 85.6 percent, was constructed during the 1970s and 1980s. Only four new homes were constructed between 2000 and 2009 and another five have been constructed over the past five years^{103 104}. The U.S. Census estimates that in 2013, there were 128 housing units of which 27 were vacant, the condition of which is unknown. In 2010, over half of residents owned their homes free of obligations, which represents a 75 percent increase since 2003. In 2013, the average household size in Nuiqsut was 4.01 people while the comparable figure for the entire Borough was 3.48 and 2.75 for Alaska as a whole¹⁰⁵.

Table 10: Housing Statistics 2013.¹⁰⁶

Housing Statistic	Number	Percent
Total number of housing units	128	100
Occupied housing units	101	78.9
Vacant housing units	21	16.4
Owner-occupied housing units	71	55.4
Renter-occupied housing units	30	23.4

Vacancies and Overcrowding: According to the 2010 NSB Census, 93.4 percent of housing in Nuiqsut was single family homes, 1.9 percent were two to three units, and one building had five or more units¹⁰⁷. The U.S. American Community Survey (ACS) estimates a vacancy rate of between 3.2 percent yet anecdotal evidence indicates that Nuiqsut does not have enough housing for all its residents. The Nuiqsut City Council believes housing overcrowding is a critical issue facing the village¹⁰⁸. While new housing units have recently been built by

¹⁰² U.S. Department of Commerce, U.S. Census Bureau. *2009 – 2013 American Community Survey 5-Year Estimates – Nuiqsut City*. Accessed July 15, 2015. www.census.gov/programs-surveys/acs/data.html

¹⁰³ Garoutte, Claude. Construction Services Project Manager of TNHA. July 15, 2015. Pers. Comm.

¹⁰⁴ U.S. Department of Commerce, U.S. Census Bureau. *2009 – 2013 American Community Survey 5-Year Estimates – Nuiqsut City*. Accessed July 15, 2015. www.census.gov/programs-surveys/acs/data.html

¹⁰⁵ Ibid

¹⁰⁶ Ibid

¹⁰⁷ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015. www.north-slope.org/your-government/census-2010

¹⁰⁸ Arnold, Cindy. Nuiqsut City Administrator. July 22, 2015. Personal Communication.

TNHA, the City Administrator indicates that many residents make too much money to qualify for purchase of those homes due to the federal funding involved in the projects. Overcrowding was also cited as a weakness during the 2010 and 2015 SWOT exercise completed for this plan.

The HUD defines an overcrowded dwelling as one in which more than one person per habitable room resides in the house and a severely overcrowded dwelling as one with one and a half or more people per habitable room. The 2014 Alaska Housing Finance Corporation Housing Assessment estimates that 21.4 percent of the population residing in the seven remote North Slope villages reside in overcrowded conditions¹⁰⁹. The 2010 U.S. Census estimates that of the 101 occupied homes in Nuiqsut in 2013, 42 percent were either overcrowded or severely overcrowded, approximately seven times the national average. A recent unpublished white paper prepared by TNHA that identifies the major housing issues facing North Slope communities and analyzes potential solutions indicates that there are 120 Alaska Native American Indian households in Nuiqsut that are overcrowded¹¹⁰.

Housing Conditions: Nuiqsut does not have local licensed contractors or skilled tradespersons who can assist residents in building new housing or in maintaining or repairing home systems. Skilled carpenters, electricians, plumbers, and other tradespersons are flown in to the village for new construction, weatherization upgrades, or when repairs are needed. TNHA has found it is too costly to maintain or repair rental housing in the villages. As a result, TNHA sold all of its rental units to community residents¹¹¹.

Current Housing Activities: In collaboration with HUD, TNHA built a five-unit housing development for village elders. Because a portion of the funding was provided by HUD, there were income limits on senior households to occupy the units. Native Elders who are Kuukpik Corporation shareholders earn an annual income from dividends which often exceeds the HUD income eligibility criteria for senior housing and, therefore, they could not

Figure 8: TNHA house with sliding steel posts attached to pads



Source: TNHA Facebook Page. www.facebook.com/TNHABarrow

¹⁰⁹ Alaska Housing Finance Corporation, Cold Climate Housing Research Center. Prepared by: Wiltse, N., Madden, D., Valentine, B., Stevens, V. *2013 Alaska Housing Assessment*. www.ahfc.us/efficiency/research-information-center/housing-assessment

¹¹⁰ Tagiugmiullu Nunamiullu Housing Authority. Unpublished white paper. *North Slope Borough Housing: A Brief Analysis of Issues and Options with Budgetary Quotes*. 2015.

¹¹¹ Garoutte, Claude. Construction Services Project Manager of TNHA. July 15, 2015. Pers. Comm.

occupy the units. In response, the NSB purchased the elder housing from HUD, also eliminating the HUD subsidy to maintain the housing.

TNHA designed and constructed five low-cost energy efficient single family homes in Nuiqsut within the last two years (see Figures 8 and 9). The concept and design was based on homes already constructed in other North Slope villages in coordination with the Cold Climate Housing Research Center (CCHRC). The design of the five homes, named TNHA Sustainable Housing Project Generation V, focused on creating a super-insulated house with a monolithic envelope to dramatically reduce fuel use while incorporating innovative features such as an adjustable, portable foundation designed to respond to unstable ground, solar hot water collection, and integrated heating and ventilation. Because the homes use an individual water and sewer system, the cost of connecting the homes to the water and sewer system is eliminated. The homes also feature a wooden parking deck to reduce the need for gravel.

Current and Future Housing Needs: TNHA estimates, based on HUD's Office of Native American Programs data, that there is a current need for 68 additional housing units in Nuiqsut alone.

Figure 9: One of Five New TNHA homes in Nuiqsut



Source: TNHA Facebook Page. www.facebook.com/TNHABarrow

It is noted that the 2015 population of 450 from the 2015 NSB Census is accommodated in 101 housing units. This represents an average household size of 4.45 persons per dwelling unit. Using the HUD standard of one person per habitable room for a 3-bedroom, the household size for a non-crowded dwelling should be 3. Based on that criterion, the current deficiency in housing for the village is 49 dwelling units. The projected housing need for Nuiqsut is based on the population projections noted in Table 9. For a high growth scenario of .05 percent annual population increase, carrying forward the current 101 occupied units, an additional 52 homes would be needed in 2020; 3 more homes will be needed by 2030 and 7 more would be needed by 2035. The total need in 2035 is estimated to be 163 homes to accommodate a population of 490 persons.

2.3.3 Public Facilities and Services

This section provides a summary of public facilities and services in the community, including utilities and transportation infrastructure. The NSB provides many of the public services available in the community. Table 11 lists critical facilities and infrastructure in the community¹¹².

Public Health Services: Nuiqsut has a NSB-operated Health Clinic staffed by two health aides. It is open weekdays and during an emergency. The Fire Department operates an ambulance that serves the clinic. Eye doctors come to the village twice a year in May and July, and dentists and medical doctors visit the village every three months for a one-week stay.

Table 11: Critical Facilities and Infrastructure in Nuiqsut.

Critical Facilities
Police Station
Fire Station
Municipal Services Shop
Nuiqsut City Hall
Nuiqsut Trapper School
Water Treatment Facility
Kuukpik Corporation Facility
Wastewater Treatment Facility
Airport
Nuiqsut Health Clinic
Fuel Tank Farm
Search & Rescue Facility
Critical Infrastructure
Telephone and Power Lines
Roads
Water treatment, Storage and Distribution Lines
Wastewater Collection System
Natural gas power plant

¹¹² North Slope Borough. *2003 Economic Profile and Census Report Volume IX*. 2004.

Public Safety Service: The NSB Police Department staffs a 24-hour police station with two officers. There are two jail cells within the Nuiqsut police station.

Search and Rescue Service: The NSB Search and Rescue Coordinator lends personal locator beacons to hunters and others traveling outside of the village. If a beacon is activated in an emergency, an alert is sent to the local search and rescue volunteers. If needed, a helicopter is dispatched from the NSB Search and Rescue headquarters in Barrow. Local volunteers and NSB maintain vehicles and equipment to locate residents in need, including four-wheel drive vehicles, snow machines, and boats. The current vehicle and storage facility is not heated and a replacement prefabricated structure awaits assembly and installation on two parcels provided to the NSB by the City.

Fire Suppression and Emergency Medical Assistance Service: The NSB Fire Department operates a fire station in Nuiqsut that includes fire response equipment and an ambulance. The Fire Department provides a pumper apparatus capable of pumping 1,250 gallons per minute (gpm) of water and a pumper/water tender apparatus capable of pumping 750 gpm for a total of 2,000 gpm. There are 31 fire hydrants in the community. The Fire Department provides 24-hour emergency medical assistance to residents. Replacement of the fire station floor and ramp in 2010 extended the life of the building for another 15 to 20 years. A generator for the station was installed in 2014.

Educational Services: The NSB School District operates the Trapper School, pictured in Figure 10, which provides education from early childhood through grade 12. In 2010, the Borough completed a five million dollar upgrade of the school buildings, including weatherization improvements. In addition to providing education services for children in Nuiqsut, the School District provides a number of services, including:

- Bus service for students,
- An early childhood education program for three- and four-year old children that operates five hours each weekday,
- Iñupiaq classes from the early childhood education level through eighth grade that is also open to students in other grade levels, and
- A culture camp each fall.

Figure 10: Nuiqsut Trapper School



Source: AK Dept. of Commerce, Community and Economic Development; Division of Community and Regional Affairs' Community Photo Library

Between 2004 and 2010, the high school graduation rate dropped and the dropout rate has increased by from 5.3 percent to 13.1 percent¹¹³. The school had 78 students in the 2010/2011 school year (SY)¹¹⁴. The school experienced a steady and significant decline since 2001 in 2010 to 2011 SY enrollment of 78 students¹¹⁵. The State of Alaska indicated that there was an enrollment of 114 students for the 2013/2014 SY and estimates that 116 students were enrolled for the 2014/2015 SY¹¹⁶, an increase of 36 students over a five year period.

Given their close proximity to Alpine, Trapper School students can become involved in a unique program to learn about employment at the oil field. After graduation, residents can participate in internships designed to provide training and experience needed for employment. The NSB is remodeling an existing building to accommodate an early learning center. The City of Nuiqsut has agreed to take the lead in attempting to obtain funding for operational expenses. There is some uncertainty as to how much assistance the Borough will provide in the first couple of years after the center opens and how many children will be able to attend¹¹⁷.

Iļisaġvik College maintains a satellite computer station at the NSB Village Coordinator's Office that offers a variety of online courses for community residents. The City Administrator indicated that many community members are not aware of the program and that more access to training resources would be valuable to the community's youth¹¹⁸.

Water: The Borough funded installation of a piped water system was constructed in 2001. In 2010, 94 percent of the homes had piped running water and 6 percent had water delivered¹¹⁹. Some of the homes in the subdivision north of town near the ballpark and in outlying areas of the village rely on water deliveries by the NSB every other week. There is a monthly flat rate of \$69 per structure for water service. The 2010 NSB Capital Improvement Program includes funds for design work to extend potable water and sewage

¹¹³ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

¹¹⁴ Alaska Department of Education and Early Development. Report Card to the Public. Accessed September 9, 2015. <https://education.alaska.gov/ReportCardToThePublic/Report/2013-2014/36/360050>.

¹¹⁵ Strack, Al. Trapper School Principal. September 2010. Personal Communication.

¹¹⁶ Alaska Department of Education and Early Development. Nuiqsut Trapper School, North Slope Borough School District. https://education.alaska.gov/DOE_Rolodex/SchoolCalendar/Home/SchoolDetails/360050#

¹¹⁷ Arnold, Cindy. Nuiqsut City Administrator. July 22, 2015. Pers. Comm.

¹¹⁸ Ibid.

¹¹⁹ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

service to homes in the new subdivision north of town and west of town. The water delivery truck is 10 years old and is expected to require replacement within the next five years¹²⁰

Drinking water is pumped from nearby Freshwater Lake from a floating intake and pumped to the treatment plant. The pump and intake structure are removed seasonally. The water is filtered, chlorinated, and stored in two tanks with a combined storage capacity of 7.8 million gallons. The north tank is filled during one year, and the south tank the next year, although the community sometimes uses more than one tank a year¹²¹. In 2008, the village water distribution system consisted of about 23,000 linear feet of water lines. The average consumption of water per person is 33 gallons per day. The lake is anticipated to serve the village for a minimum of 20 years.

Sewer Service: In 2010, 90 percent of homes were connected to the sewer system and 10 percent used holding tanks. The NSB treats wastewater by extended aeration and chlorination in a secondary treatment facility before being transferred via pipeline north of the village into a small pond on the tundra for evaporation. The sewer system was constructed in 2001, and most structures are connected to the village sewer system. A few homes in the subdivision north and west of town and in outlying areas rely on septic tanks. The NSB empties the tanks and transports waste to a sewer lagoon at the landfill. The sewage haul truck is 20 years old and in need of replacement¹²². Design work funded by the NSB Capital Improvement Program was underway in 2014 to extend the potable water and sewer service to those homes. The design for water and sewer connections to blocks 10 and 11 are complete; additional funding is needed for the construction phase. The City of Nuiqsut identified the extension of water and sewer to the three new platted subdivisions as one of their priority projects for the Capital Improvement Program. The demand for wastewater treatment and disposal is estimated to be slightly less than 35 gallons per person per day. The treatment plant has a design capacity of 64.5 gallons per person per day. With regular maintenance and upgrades, the system is expected to serve the village for more than 20 years.

Solid Waste Service: The NSB collects refuse and disposes of it at the Class III landfill located approximately one mile northwest of the village. Trash removal is free of charge as is the disposal of vehicles or other trash at the landfill. Built in 1986 with four cells, the landfill currently operates with three cells¹²³. The landfill facility includes a salvage area, burn cage, septic tank/honey bucket lagoon, and a used drum storage area.

¹²⁰ Brown, Gordon. Nuiqsut Public Works Manager. December 7, 2010. Personal Communication.

¹²¹ North Slope Borough. *North Slope Borough Utility Master Plan and Emergency Utility Plan*. June 2008.

¹²² Brown, Gordon. Nuiqsut Public Works Manager. December 7, 2010. Personal Communication.

¹²³ Ibid.

The solid waste generated by each person on a daily basis is estimated at 5.1 pounds. The landfill is expected to serve the community through 2027, provided no substantial new commercial development alters the normal waste volume or type. Use of the landfill by non-residents for waste not generated by the community could threaten the Class III status and capacity of the facility¹²⁴.

Natural Gas: Electricity is generated by the NSB using natural gas from the Alpine Development Project. In exchange for use of Kuukpik Corporation lands for oil and gas development facilities, ConocoPhillips provides natural gas to Nuiqsut at no charge, which is piped to the community through the Nuiqsut Gas Pipeline operated by the NSB. The Borough funded the installation of the natural gas pipeline from the Alpine production facility to the village and the conversion of the village power generators from diesel fuel to natural gas. It supports the operation and maintenance of the power plant and distribution systems.

Power: The natural gas power generation plant includes six generators in total: two 910 kilowatt (kW) and one 450 kW diesel generators, one 455 kW and two 820 kW natural gas generators. Due to seasonal population changes, the average electricity demand increases from a low in June of 760 kW to a peak load of 1,015 kW during some winter days. The peak load requires full use of one of the natural gas generators and partial use of a second generator. Using the generators at less than full capacity puts a strain on the equipment. In the summer months when demand is low, one of the 820 kW natural gas generators is used, rather inefficiently, or the back-up diesel generator is used at greater expense. The Borough sought and was granted NPR-A Impact Mitigation Fund grant to acquire the smaller 455 kW natural gas generator to make summer and winter operations more efficient and to reduce carbon emissions and equipment repairs.

The Alaska Power Cost Equalization (PCE) Program subsidizes rural energy costs. Because Nuiqsut receives natural gas from the nearby Alpine facility, the electric rate for Nuiqsut residences is significantly lower than most rural Alaska community at \$0.08 per kWh. However, because commercial facilities are charged at a higher rate, there are a very small number of entities in Nuiqsut that qualify for the PCE program, such as the AC grocery store¹²⁵.

While Nuiqsut residents enjoy affordable home power and home heating, conservation measures can improve the livability of homes. Future energy conservation strategies may include: 1) weatherization of all structures, 2) conversion to more energy efficient equipment, lighting, and appliances, 3) conversion to electric vehicles, and 4) installation of

¹²⁴ Nicolos, Tom. Program Manager, Airports and Landfills, North Slope Borough Public Works Department. December 16, 2015. Personal Communication.

¹²⁵ William, Jeff. Power Cost Equalization Program Manager. Alaska Energy Authority. December 16, 2015. Personal Communication.

wind turbines and generators to serve as a back-up to the natural gas power plant and well as a long-term power source for when the non-renewable natural gas resource is depleted. Based on a 2008 NSB study, Nuiqsut is a fair location for village-scale wind energy generation of electricity¹²⁶. The study recommended that an anemometer be installed to collect wind data to determine if wind generation would be an economic alternative or could serve as a back-up to the current natural gas electric power generation system. No plans have been made to install wind turbines at this time.

Home Heating: Most homes have been converted to natural gas heating systems that are connected to a distribution system built by the NSB and maintained by the Nuiqsut Utility Cooperative (NUC). The Borough, through arrangements with Kuukpik Corporation, provides free natural gas for home heating with a small fee added to cover operating costs of the NUC. For those homes still reliant on diesel fuel, the Kuukpik Corporation provides a delivery service.

Vehicle Bulk Fuel: Diesel fuel and gasoline are brought to Nuiqsut by The Kuukpik Corporation brings diesel fuel and gasoline to the village via the ice road that connects to the Dalton Highway through the Spur Road. In an emergency, fuel is flown into the community.

In February 2015, the price of diesel fuel in Nuiqsut was \$5 per gallon. There are several diesel fuel storage tanks interspersed throughout the village. Gasoline for non-subsistence use was \$5 in February 2015.

Communication Services: Telecommunications services in Nuiqsut include a fully digital local exchange telephone system, broadband internet service, cellular telephone, cable television, public radio broadcast, and a public teleconferencing center. Interconnection with the regional and global telecommunications network is via satellite circuits. The Arctic Slope Telephone Association Cooperative provides in-state and long-distance telephone service. AT&T Alascom, Alaska Cellular Service, and GCI provide long-distance telephone service. GCI provides internet service. The Alaska Teleconferencing Network provides NSB teleconferencing services to the village.

Quintillion, an Alaska company formed for the purpose of building, owning, and operating terrestrial and submarine fiber optic cables in Alaska, is proposing to develop a subsea communication network linking six Alaska communities to provide high-speed internet and communication capabilities. The Quintillion Fiber Optic Project will consist of a main trunk line offshore following the northern and western coast of Alaska between Prudhoe Bay and Nome with branch lines extending to the communities of Nome, Kotzebue, Point Hope, Wainwright, Barrow, and Oliktok Point (Prudhoe Bay). The fiber optic cable will tie into an existing terrestrial fiber optic cable that will be completed in Deadhorse in 2015. While the

¹²⁶ North Slope Borough. North Slope Borough Utility Master Plan and Emergency Utility Plan. June 2008.

fiber optic cable will not have a branch line to Nuiqsut, there is a possibility of connecting terrestrially at a later date¹²⁷.

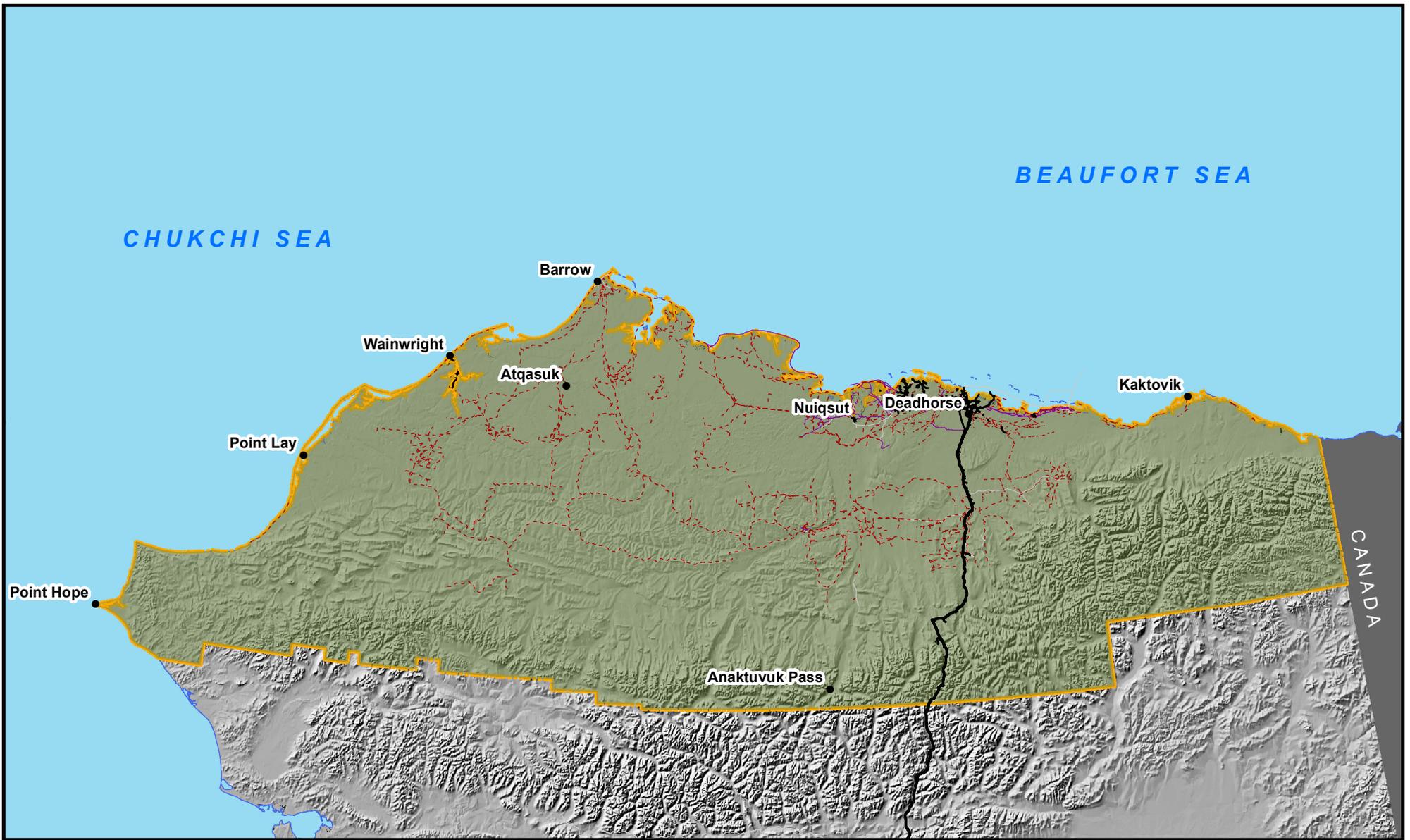
Postal Service: The City of Nuiqsut operates a Post Office in the Community under contract with the U.S. Postal Service. Many communities in rural Alaska benefit from the Alaska Bypass Mail Program that provides subsidies to air carriers and allows shippers to bypass the post office by delivering goods directly to the airlines. Nuiqsut is not part of the program. At the request of Kuukpik Corporation, The Alaska Federation of Natives (AFN), a resolution was passed in 2015 requesting that Nuiqsut and other rural Alaska communities included in the program.

2.3.4 Transportation System

Residents use a variety of means to travel within and outside of the village. This section summarizes off-road travel, current roads, possible future roads, water travel, and air travel. Figure 11 illustrates the transportation system that links North Slope villages.

Off-Road Travel: Off-road travel occurs by boat, ATVs, snow machines, and by cars and trucks on village roads and on seasonal ice roads. Snow machines and boats provide transportation over long distances, often for participation in subsistence activities. During the winter, Nuiqsut residents travel eastward on a 17-mile ice road to the Dalton Highway via the oilfield Spine Road. Nuiqsut is the only North Slope village that is connected via ice road to the rest of Alaska, the U.S. and Canada for approximately a four month period each year. Major winter trails connect Nuiqsut with Deadhorse, Anaktuvuk Pass, and Atqasuk. Nuiqsut residents have expressed concerns about limitations that could be placed on travel through the oil fields during times of heightened security.

¹²⁷ Moretti, Whitney. Environmental/Permitting Specialist, UMIAQ. July 2015. Personal Communication.



-  Highway
-  Surface Roads
-  Ice Roads
-  Trails
-  NSB Boundary



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Regional Surface Transportation

North Slope Borough, Alaska



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Figure 11

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Current Roads: The village has about 10 miles of gravel roads which are generally 24 feet wide within 100-foot rights-of-way. A few roadways have 60-foot rights-of-way¹²⁸. Roads lead north to the landfill, to the south to Freshwater Lake and to the east to the boat ramp. The majority of community travel patterns are between residences or to the post office, Kuukpik Store, airport, health center, landfill, and school.

Transportation modes within the village include foot traffic, bicycles, cars, trucks, ATVs, and snow machines. Sidewalks have not been constructed in the village. The Borough provides trucks, labor, and water for dust suppression during the summer months. The NSB Health Clinic provides a van and driver for elders' travel around town, and the NSB School District provides school bus service for students.

There are two bridges in the village: One at a creek along the road to the Nigliq Channel boat launch and one over a creek along the road to Freshwater Lake. The culverts and roadbeds at these crossings often wash out during spring break-up from ice and meltwater. A metal bridge across these creeks would solve these problems.

In addition to the bridges, residents have identified improved dust control as a community priority to prevent impacts to health and stored subsistence foods. In the summer of 2004, the NSB implemented a pilot project which involved applying a dust suppressant, and residents and NSB maintenance staff reported a significant reduction in dust shortly after application¹²⁹. NSB Public Works does not use any additives in their dust control efforts currently¹³⁰.

In March 2014, the U.S. Army Corps of Engineers (USCOE) approved permits for a 5.8-mile road connecting the community to the CD-5 Access Road¹³¹ ¹³². The Kuukpik Corporation constructed the road, which begins at the Nuiqsut landfill access road¹³³ ¹³⁴. The Kuukpik Corporation owns this 24-foot wide privately owned and maintained road and 10-acre gravel pad which is located at the junction with the CD-5 road.¹³⁵ The road has several purposes: It provides villagers access to the Alpine Development Project for training and job

¹²⁸ North Slope Borough. *North Slope Borough Comprehensive Transportation Plan*. Prepared by ASCG Inc. for the North Slope Borough. August 2005.

¹²⁹ Ibid

¹³⁰ Atos, Raymond. North Slope Borough Division Program Manager, Village Services/Equipment Maintenance. July 17, 2015. Personal Communication.

¹³¹ DeMarban, A. *Nuiqsut Road to Alpine Oil Patch Receives Key Go-Ahead*. Alaska Dispatch News. March 12, 2014. Accessed May 4, 2015. www.adn.com/article/20140312/nuiqsut-road-alpine-oil-patch-receives-key-go-ahead

¹³² DeGeorge, Lynn. ConocoPhillips – Alaska Senior Environmental Coordinator. July 22, 2015 and October 6, 2015. Personal Communication.

¹³³ Ibid

¹³⁴ Major, Mark. 2014. Consultant to Kuukpik Corporation. November 24, 2014. Personal Communication.

¹³⁵ The road is not designed as an industrial road like the 32-foot wide CD-5 road.

opportunities and access to subsistence areas. It also improves health and safety by providing a secondary connection between the Nuiqsut and Alpine airports in the event someone requires immediate evacuation. When it opens, Kuukpik plans to provide access to permanent Nuiqsut residents to use the spur road, which connects to ConocoPhillips' gravel oil field service roads for Alpine and some of its satellites in the Colville River Delta and in NPR-A and to winter ice roads connecting to the Spine Road.

Gravel: Significant exploration for gravel occurred in the 1970s and 1980s in the Nuiqsut area; there were not any sources found close to the village other the ASRC Gravel Mine Site. ASRC owns a material site approximately 4.5 miles east of Nuiqsut across the Nigliq Channel and Colville River that was originally permitted by the USCOE in 1997. Due to the cost of permitting and reclamation, the pit is only re-opened for large projects. The current permit allowed mining for 1.2 million cubic yards (CY) and expires on September 30, 2018. ConocoPhillips purchased 600,000 CY of gravel for use at CD-5, a satellite of the Alpine facility. Kuukpik Corporation mined 400,000 CY of material to construct both a storage pad and the 5.8 mile Nuiqsut Spur Road to connect the village of Nuiqsut with CD-5¹³⁶. These projects have been completed in 2015.

Additional mining was authorized within the existing USCOE permit by increasing the total gravel amount to allow the NSB to utilize two NPR-A grants for the gravel mining. The intent of the grant funds was to stockpile gravel to allow construction of a road to the Colville River, which has been a project long sought after by the village and the NSB. One NPR-A grant was for \$2.1 million and a later, smaller one was issued for an additional \$550,000. Both grants were spent on gravel mining and stockpiling in 2014/2015 and the gravel has been staged with the existing stockpile located on the leased land on the Nigliq Channel. A total of 65,600 cubic yards of gravel is now available for the Colville River Road construction. This is about half of the entire amount of gravel needed for the road construction.

In addition to the NPR-A grants, the NSB Public Works Department utilized \$3 million of general bond money for mining and stock piling of gravel to be used for local maintenance needs within the village. Due to this additional effort, another 75,000 cubic yards of gravel is now stockpiled, combined in the same pile as the Colville River gravel on the Nigliq Channel¹³⁷.

There are two gravel stockpiles located on the shore of the Nigliq Channel near Nuiqsut. The stockpiles are located on leased land from Kuukpik. One is a small gravel stockpile approximately 20,000 cubic yards in size which is a remnant of earlier dredging efforts. Material is no longer dredged from the Nigliq Channel. Owned by the NSB, the material is

¹³⁶ North Slope Borough. *Areawide Gravel Resources Project Analysis Report*. Prepared by UMIAQ, LLC for the North Slope Borough Department of Capital Improvement Program Management. 2014.

¹³⁷ Green, Ken. North Slope Borough Department of Capital Improvement Program Management, Program Administrator. December 14, 2015. Personal Communication.

generally 1-inch minus gravelly sand acceptable for road, airport, and boat ramp repairs. Because of bond financing limitations, this gravel cannot be sold by the Borough to residents for personal uses, such as fill for driveways or to shore up homes.

The second stockpile contains the Colville River Road gravel, and the additional gravel mined for NSB PW maintenance needs for maintenance projects within the village, as explained earlier in this section. There is also a stockpile of gravelly sand with silt at the landfill that is used to cover solid waste. Lastly, the Kuukpik Corporation has a stockpile of gravel for its projects.

CD-5 Access Road: In 2011, after long delays in obtaining approvals, CPAI received a key permit from the USCOE for the Colville Delta 5 (CD-5) project, including a road to this satellite drill site that also connects with the Alpine Development Project located on the west side of the Colville River delta about 6 miles from CD-4. During 2014, CPAI installed four bridges and completed the gravel footprint. Other than winter ice roads, there is not a road connection to other North Slope oil developments. Figure 12 shows the CD-5 access road within the Colville River Unit. For clarity, it is worth noting that the thicker blue lines in Figure 12 illustrate seasonal ice roads and the black lines show the proposed Greater Mooses Tooth 1 (GMT1) gravel road and pad. This page is intentionally left blank.

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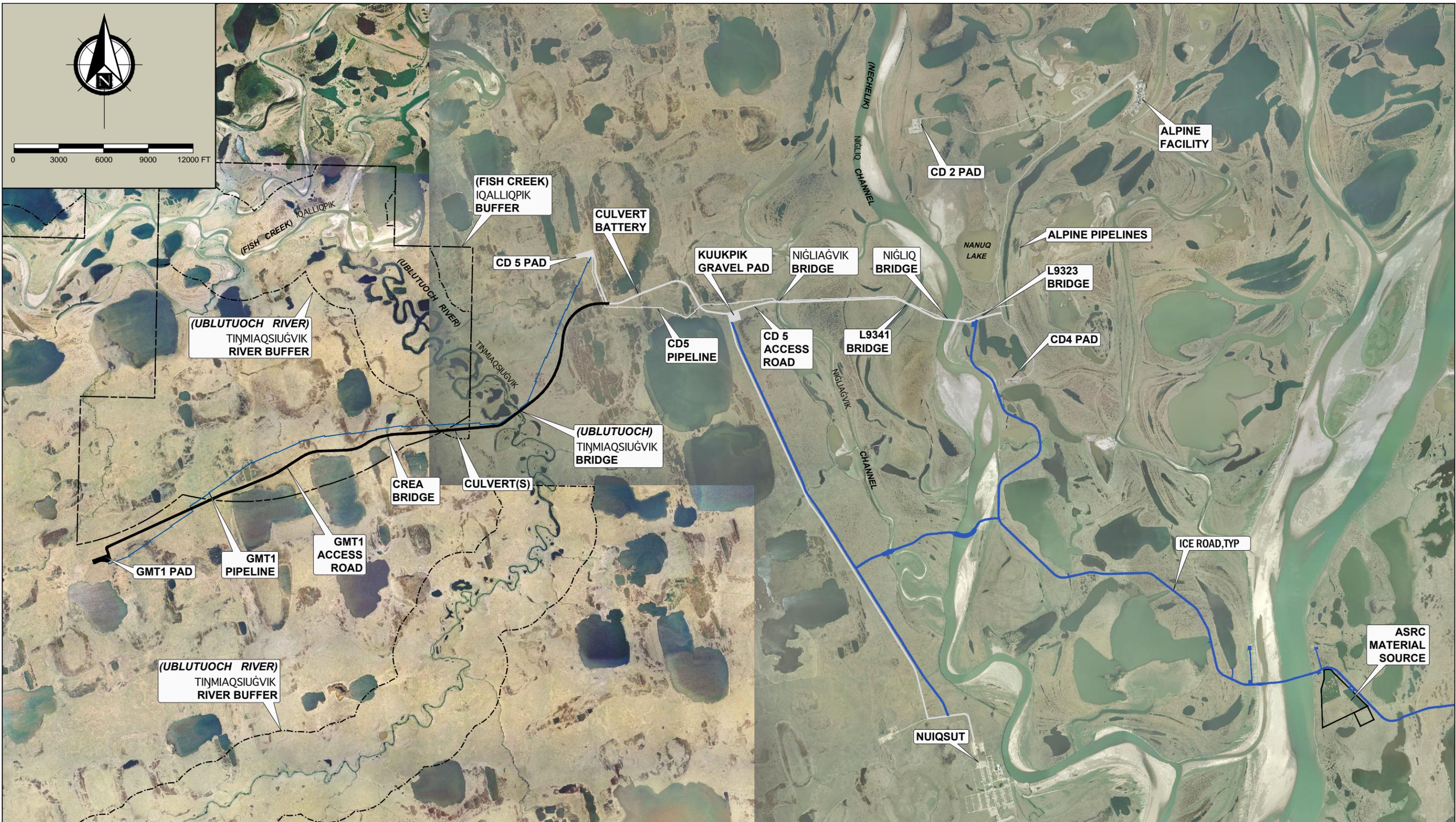


Figure 12

AUG 2014



PROPOSED GMT1 DEVELOPMENT

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Future Roads: Two roads within the vicinity of the community were in the planning stage during early 2015, and a road connecting the community to the Dalton Highway has been discussed. The first road would connect the community to the Colville River so boats are able to launch directly into the river.¹³⁸ A USCOE permit for the 4-mile road that was obtained in 1996 has now expired. The Native Village of Nuiqsut has applied for an additional USCOE permit but it has yet to be issued. Only partial funding for the Colville River Road has been obtained. This road will solve existing access problems to the Colville River caused by siltation of the Nigliq Channel. The road would extend the existing Freshwater Lake Road to the Colville River.

Additional roads are needed to provide access to lots within a new subdivision located just off the road to Freshwater Lake. The Nuiqsut City Council has identified extension of roads to the new subdivision southeast of the village as a priority for the Capital Improvement Program.

There have been discussions about constructing a year-round road to connect the community with a proposed road between Umiat and the Dalton Highway. This would facilitate transport of goods and vehicles to the village and would also provide a more economical means of getting whaling equipment and supplies to Cross Island and for transporting whale harvests back to the village.

While the Alaska Department of Transportation and Public Facilities (ADOTPF) considered a road connecting Umiat to the Dalton Highway under its Roads to Resources program, the State of Alaska discontinued its plans for the road in October 2014¹³⁹. Linc Energy is exploring the possibility of constructing a road from Umiat to the Kuparak River Unit that conceivably could be connected to Nuiqsut. Some Nuiqsut residents have expressed concern about negative impacts to subsistence resources and uses if the public, in particular sport/trophy hunters, were allowed access to a road connecting the community to the Dalton Highway.

Water Travel: After spring break-up, residents travel through the Colville River Delta to the Beaufort Sea. Nuiqsut is located inland several miles west of the main channel of the Colville River, and 10 miles south of the head of the Colville River Delta at Harrison Bay. The Nigliq Channel runs by the eastern edge of the village and provides limited access to the Colville River. During the July 2010 community meeting for this plan, some residents commented that the channel often becomes clogged with silt, restricting boat traffic. The partially-

¹³⁸ The City of Nuiqsut identified gravel acquisition for this road as its number one priority for the 2014 Capital Improvement Project funding (City of Nuiqsut 2014).

¹³⁹ Cole, Dermot. 2015. *After \$35 million, State Pulls Plug on Umiat Road Project*. Anchorage Dispatch News. January 2, 2015. Accessed March 30, 2015. www.adn.com/article/20150102/after-35-million-state-pulls-plug-umi-at-road-project.

funded extension to the Freshwater Lake Road described above will provide direct access to the river.

There is a new boat ramp at the Nigliq Channel that was funded by the NPR-A Impact Grant Program in 2010 and constructed in 2015, although there is an undeveloped sand bank area from which residents launch their boats. A roll-down boat ramp has been completed using funds from the NPR-A Impact Grant Program.

Nuiqsut does not have barge traffic or other marine shipping service from the coast through the Colville River because the Nigliq Channel is too shallow. Instead, residents wait for annual construction of the winter ice road spur that provides access to the Dalton Highway in order to bring in vehicles and other large goods. Residents often arrange to have goods delivered to Prudhoe Bay by truck, or less often, by barge, and then transported by truck in winter via the Spine Road and winter ice road.

Air Travel: The existing gravel runway, owned and operated by the NSB, is 4,600 feet long by 90 feet wide. The airport is equipped with a rotating beacon, approach lights, high-intensity runway lights and visual-approach slope indicator systems. The runway is not attended or monitored. RAVN Alaska operates daily flights to and from Barrow and Deadhorse carrying passengers, cargo, and mail. It can be difficult to travel in and out of Nuiqsut given the amount of passenger and cargo traffic to the community¹⁴⁰. A building owned by the NSB is used by the airline as a convenience terminal for passengers. It has restroom facilities and a passenger waiting area.

In 2014 the City of Nuiqsut identified improvements to the airport as its third highest priority for NSB Capital Improvement Program (CIP) funding. Needed improvements include perimeter fencing, an extension to the runway, a building for snow removal equipment, a roller, and a gravel stockpile¹⁴¹ ¹⁴². Recently completed improvements include replacing Visual Approach Slope Indicators (VASI) with Precision Approach Path Indicators (PAPI) and updating the lighting controls. An airport layout plan has also been completed¹⁴³. During the 2010 SWOT exercise some residents expressed the desire to expand the Nuiqsut airport and runway to serve as a “regional hub” of aviation transport for the community as well as for nearby oil and gas companies. The purpose of this consolidated landing strip is to minimize air traffic around the tundra with landing strips at the various drill sites. During the 2015 SWOT exercise, members of the community expressed a desire to have the gravel runway replaced with paving and others expressed a need to have the runway expanded to

¹⁴⁰ Arnold, Cindy. Nuiqsut City Administrator. July 22, 2015. Personal Communication.

¹⁴¹ North Slope Borough. *North Slope Borough Comprehensive Plan*. Prepared by URS Corporation for the North Slope Borough. October 2005.

¹⁴² Nicolos, Tom. North Slope Borough Department of Public Works Division Manager, Airports and Landfills. July 23, 2015. Personal Communication.

¹⁴³ Ibid

accommodate medivac aircraft in the event of a community-scale emergency and need for multiple evacuations. These residents expressed concern that expanding the airport to serve as a regional hub for the oil companies would introduce a great number of visitors to the village which could reduce the livability of the community. The viability of a regional airport at Nuiqsut is not known at this time, and the increased traffic such a hub might impose on the village infrastructure, services, culture, and livability should be evaluated as well.

CPAI owns and operates a 5,000 feet long gravel airstrip at the Alpine oil field near pad CD-1 that is used to support oil field activities. This airstrip can be accessed by Nuiqsut residents during emergencies, making it the only North Slope village with road access to two airstrips.

2.3.5 Private Infrastructure and Business

This section provides an overview of private facilities in the community and in nearby oil developments.

Private Buildings and Facilities: Private buildings and infrastructure include churches and various businesses, including the Kuukpik Corporation offices, the AC grocery store, fuel station, a construction camp/hotel, the Nanuq Inc. construction services company, and various telecommunication facilities.

Oil and Gas Industry Facilities: There are four on-shore oil and gas developments within the vicinity of the village of Nuiqsut and three off-shore drilling rigs located within the Kuukpikmiut whaling Area of Influence (see Table 12 below and Figure 12).

Table 12: Oil and Gas Development Projects and Ownership.¹⁴⁴

Oil and Gas Development	Primary Developer	Location
Alpine, including Greater Moose's Tooth	Conoco Phillips of Alaska, Inc. (CPAI)	On-shore
Kuparuk River Unit	CPAI	On-shore
Meltwater drillsite	CPAI	On-shore
Tarn drillsite	CPAI	On-shore
Endicott	Hilcorp	Off-shore
Northstar	Hilcorp	Off-shore
Oooguruk	Caelus Energy	Off-shore
Nuna satellite oil pad	Caelus Energy	On-shore
Nikaitchuq	Eni	Off-shore
Mustang (Road and drilling and production pad. Not yet producing oil)	Brooks Range Petroleum	On-shore

¹⁴⁴ U.S. Department of the Interior, Aggregate Effects of Oil Industry Operations on Inupiaq Subsistence Activities, Nuiqsut, Alaska: A History and Analysis of Mitigation and Monitoring.

The Alpine oil field is located 8 miles north of Nuiqsut. It began production in 2000 by ARCO Alaska which was purchased by Phillips Petroleum Company which became Conoco Phillips-Alaska Inc. (CPAI). In 2003, CPAI and Anadarko began the process to expand the Alpine development to several satellite fields. CPAI designated their production pads as CD-1 through CD-7. However, pads CD-6 and CD-7 are now referred to as Greater Moose's Tooth 1 and 2. CD-1 and CD-2 are part of the original Alpine field. In 2006, CD-3 (called Fiord) and CD-4 (called Nanuq) began oil production. CD-5 (Alpine West) was conveyed to the Kuukpik Corporation and ASRC and began oil production in 2015. The Greater Mooses Tooth 1 satellite oil field has obtained all permits and has been funded by ConocoPhillips and Anadarko for construction starting in December 2016.

In November 2000, CPAI began production of the Alpine oil field located 8 miles north of Nuiqsut in the Colville River Delta. CPAI operates the field and has 78 percent ownership; Anadarko Petroleum owns 22 percent of the project. The main Alpine field and its two satellites produce oil and gas from four different reservoirs: Alpine, Nigliq, Nanuq, and Kugaruk. Horizontally-drilled wells extend significant distances from the production pads. The first production pad, CD-1, includes a Central Processing Facility for processing crude oil before it is transported by pipeline to Pump Station 1 on the Trans-Alaska Pipeline System. Alpine satellite production pads CD-2, CD-3, and CD-4 lay approximately 8, 14 and 5 miles from Nuiqsut, respectively. Prospective future developments proposed for Alpine include expansion west into NPR-A lands with anticipated production from the planned CD-5 development and from the GMT unit. The planned production pads, GMT-1 and GMT-2, are located 10-15 miles northeast of Nuiqsut and are also referred to as Lookout and Rendezvous. These developments would be 10 to 15 miles northwest of the village.

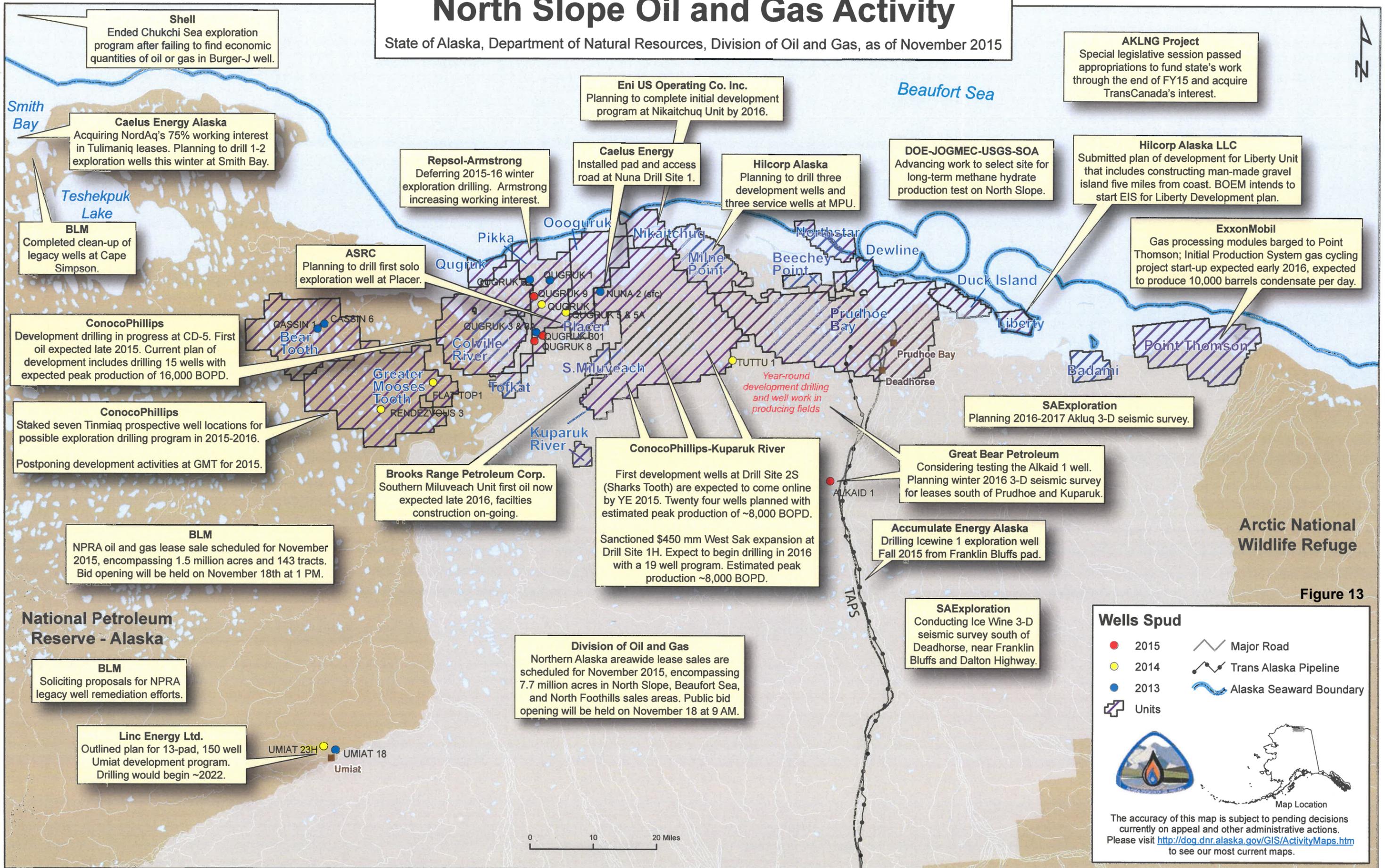
The Tarn oil field (DS 2L and 2N) is located west of Nuiqsut and southeast of Prudhoe Bay. ARCO Alaska discovered the Tarn prospect in 1991 and began producing oil in 1998. Currently, CPAI operates the Tarn field and shares ownership with British Petroleum (BP), Chevron and ExxonMobil. Tarn is a satellite of the Kugaruk River Unit.

The Meltwater oil field (DS 2P) is located east of Nuiqsut and south of the Tarn field. Meltwater is a satellite of the Kugaruk River Unit. Discovered in 2000, Meltwater was put into production by CPAI and BP in 2001. As a requirement of its permit, CPAI submitted a Caribou Mitigation Plan for this project in order to minimize disturbances to caribou with a focus on maternal females, including displacement from preferred habitats and movement impediments during calving, insect seasons and seasonal migrations.

The Endicott, Northstar and Ooguruk man-made oil production islands lie within the Nuiqsut whaling areas. Their activities create marine traffic, noise and vibrations that affect Bowhead whales' migration routes and, therefore, the ability, costs and safety of whalers of Cross Island, the Kuukpikmiut traditional whaling area.

North Slope Oil and Gas Activity

State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of November 2015



Shell
Ended Chukchi Sea exploration program after failing to find economic quantities of oil or gas in Burger-J well.

Caelus Energy Alaska
Acquiring NordAq's 75% working interest in Tulimaniq leases. Planning to drill 1-2 exploration wells this winter at Smith Bay.

BLM
Completed clean-up of legacy wells at Cape Simpson.

ASRC
Planning to drill first solo exploration well at Placer.

ConocoPhillips
Development drilling in progress at CD-5. First oil expected late 2015. Current plan of development includes drilling 15 wells with expected peak production of 16,000 BOPD.

ConocoPhillips
Staked seven Tinmiaq prospective well locations for possible exploration drilling program in 2015-2016. Postponing development activities at GMT for 2015.

BLM
NPRA oil and gas lease sale scheduled for November 2015, encompassing 1.5 million acres and 143 tracts. Bid opening will be held on November 18th at 1 PM.

National Petroleum Reserve - Alaska

BLM
Soliciting proposals for NPRA legacy well remediation efforts.

Linc Energy Ltd.
Outlined plan for 13-pad, 150 well Umiat development program. Drilling would begin ~2022.

Eni US Operating Co. Inc.
Planning to complete initial development program at Nikaitchuq Unit by 2016.

Caelus Energy
Installed pad and access road at Nuna Drill Site 1.

Repsol-Armstrong
Deferring 2015-16 winter exploration drilling. Armstrong increasing working interest.

Hilcorp Alaska
Planning to drill three development wells and three service wells at MPU.

DOE-JOGMEC-USGS-SOA
Advancing work to select site for long-term methane hydrate production test on North Slope.

AKLNG Project
Special legislative session passed appropriations to fund state's work through the end of FY15 and acquire TransCanada's interest.

Hilcorp Alaska LLC
Submitted plan of development for Liberty Unit that includes constructing man-made gravel island five miles from coast. BOEM intends to start EIS for Liberty Development plan.

ExxonMobil
Gas processing modules barged to Point Thomson; Initial Production System gas cycling project start-up expected early 2016, expected to produce 10,000 barrels condensate per day.

Brooks Range Petroleum Corp.
Southern Miluveach Unit first oil now expected late 2016, facilities construction on-going.

ConocoPhillips-Kuparuk River
First development wells at Drill Site 2S (Sharks Tooth) are expected to come online by YE 2015. Twenty four wells planned with estimated peak production of ~8,000 BOPD.

Sanctioned \$450 mm West Sak expansion at Drill Site 1H. Expect to begin drilling in 2016 with a 19 well program. Estimated peak production ~8,000 BOPD.

Great Bear Petroleum
Considering testing the Alkaid 1 well. Planning winter 2016 3-D seismic survey for leases south of Prudhoe and Kuparuk.

Accumulate Energy Alaska
Drilling Icewine 1 exploration well Fall 2015 from Franklin Bluffs pad.

SAExploration
Conducting Ice Wine 3-D seismic survey south of Deadhorse, near Franklin Bluffs and Dalton Highway.

Division of Oil and Gas
Northern Alaska areawide lease sales are scheduled for November 2015, encompassing 7.7 million acres in North Slope, Beaufort Sea, and North Foothills sales areas. Public bid opening will be held on November 18 at 9 AM.

SAExploration
Planning 2016-2017 Aklug 3-D seismic survey.

Wells Spud

- 2015
- 2014
- 2013
- Units
- Major Road
- Trans Alaska Pipeline
- Alaska Seaward Boundary



The accuracy of this map is subject to pending decisions currently on appeal and other administrative actions. Please visit <http://dog.dnr.alaska.gov/GIS/ActivityMaps.htm> to see our most current maps.

Figure 13

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The Endicott oil field is located eight miles east of Prudhoe Bay and approximately four miles off-shore in the Beaufort Sea. Endicott was discovered in 1978 by Sohio Alaska Petroleum Company. In 1982 a consortium of eight companies sought permits to build a 197-acre gravel island and a 4.9 mile causeway connecting the island to the mainland. Endicott began production in 1987. Today, Hilcorp is the primary operator of Endicott.

The Northstar is a 5-acre island located approximately six miles off-shore in the Beaufort Sea and 12 miles northwest of Prudhoe Bay operated by Hilcorp. This prospect was discovered in 1984 by Shell Western E&P, Inc. BP Exploration originally proposed the creation of the self-contained production island as an expansion of the remains of the Seal Island creation by Shell Oil during the exploratory activities in the 1980's. Oil production began from the Northstar unit in 2001. Oil is produced and processed on the island and is transported by an undersea pipeline to the Trans-Alaska Pipeline. Northstar does not have a permanent access road and transportation to the island depends on the season and weather conditions with access by ice road in winter and helicopter and hovercraft during open water seasons.

Oooguruk is a 10.85-acre gravel island in the Beaufort Sea located about 2.5 miles northwest of the Colville River Delta. ARCO Alaska discovered the prospect in 1992 and the field began producing oil in 2008. Caelus Energy is the operator and owns 70% of Oooguruk and the Italian Eni Petroleum Company owns the remaining 30%. Oil produced at Oooguruk is piped to the mainland where CPAI processes the oil at its Kuparuk facility.

Oooguruk also now includes the Nuna project, an onshore oil development filed located on the south side mouth of the main channel of the Colville River. Nuna has an estimated 105 million barrels of reserves proven to date. During the winter of 2014/2015, Nuna's gravel access roads and a 20-acre production pad were constructed. Startup at Nuna is planned in the fourth quarter of 2017¹⁴⁵.

Nikaitchuq is an off-shore facility on an artificial island named Spy Island built by Eni Petroleum in the Beaufort Sea in 2010. It is located inside the natural barrier island also named Spy Island about four miles north of Oliktok Point and 35 miles northeast of Nuiqsut. It is a drilling site for the Nikaitchuq field development¹⁴⁶.

The Mustang Project is located in the Southern Miluveach Unit, which is off the southwest corner of the Kuparuk River Unit and approximately 16.8 miles from Nuiqsut. A road to the

¹⁴⁵ Bradner, Tim. 2015. Caelus Aims to Unlock Vast Torok Oil Resource. Alaska Journal of Commerce. September 9, 2015. Accessed December 8, 2015. www.alaskajournal.com/business-and-finance/2015-09-16/caelus-aims-unlock-vast-torok-oil-resource#.VnHZTkorKyw

¹⁴⁶ Eni. 2015. Eni: Achieved the 25 Thousand Barrels Per Day Production Milestone at Nikaitchuq Oil Field in Alaska. June 19, 2014. Accessed December 9, 2015. www.eni.com/en_IT/media/press-releases/2014/06/2014-06-19-Nikaitchuq.shtml.

Mustang prospect and 19-acre production pad were completed in the spring of 2013 and are operated and used by the Brooks Range Petroleum Corporation. The unit is expected to be producing in 2016¹⁴⁷. During the July 2010 community meeting, residents commented on impacts to their viewshed from Alpine development. They said that the structures of the Alpine complex are visually prominent in the landscape along with flames and smoke from flaring and the night lights of the complex.

Many residents support resource development in their Area of Influence when its design and operation does not adversely affect subsistence resources and uses or their health and safety. Residents have expressed concerns about industry-related restrictions to access to subsistence resources, air pollution, and disturbances that could impact habitat or migration of fish or wildlife¹⁴⁸.

Local Businesses: There are eight active businesses with a Nuiqsut address were licensed by the State of Alaska: Arctic Slope Supply Hauling, Kuukpik Corporation, Kuukpik Fuel Pump station, Kuukpikmiut Subsistence Oversight Panel, Lil Mo's Village Supply, Nuiqsut Utilities Cooperative, Qannik & Ullaq Pop Shop, and Utuqqanaaqagvik Senior Housing¹⁴⁹. The Kuupik Corporation operates a camp within Nuiqsut. The City of Nuiqsut assesses a 7 percent bed tax on lodging.

2.3.6 Economy

As in other North Slope villages, both subsistence activities and cash contribute to the economy. The subsistence portion of the local economy includes harvesting plants and animals, trade of subsistence resources within and outside of the village, bartering food and services, and sharing food with elders and others who cannot participate in harvest activities. The cash economy involves earned income, dividends, and government payments. The remainder of this section continues with an overview of the contribution subsistence to the local economy followed by a discussion of employment income and other income.

2.3.6.1 Subsistence Contribution to the Economy

While no methods exist to quantify the economic value of subsistence, it undoubtedly contributes a significant amount through provision of goods and services. Considering the high costs of goods, fuel, and transportation, subsistence harvests reduce food costs by providing a local source of nutrition. In addition to its economic contribution, subsistence provides cultural identity and spiritual sustenance. This brief section on the economic

¹⁴⁷ Alaska Industrial Development and Export Authority. Mustang Road and Production Pad. Accessed December 9, 2015. www.aidea.org/Portals/0/PDF%20Files/PFS_MustangRoad.pdf

¹⁴⁸ Kuukpik Corporation. Correspondence to the U.S. Corps of Engineers. March 6, 2002 and October 19, 2009.

¹⁴⁹ Alaska Department of Commerce, Community and Economic Development. Community Database Online. Accessed 4 February 2015. <http://commerce.state.ak.us/cra/DCRAExternal>

benefits of subsistence supplements the information provided in Section 2.2.4 about other aspects of subsistence.

Some financial aspects of subsistence have been quantified. For example, the NSB Census includes data about subsistence-related expenses¹⁵⁰. Subsistence users incur significant expenses for fuel and equipment, including snow machines, ATVs, boats, motors, and nets. In 2010, the average household expenditure for subsistence was \$7,062. The 2010 NSB Census indicates that 64 percent of households spent more than \$3,000 a year, and 4 percent spent over \$20,000. The most active harvesters and whaling captains spend the most on subsistence. Also, the Alaska Department of Fish and Game (ADFG) has found that households with high incomes harvest more subsistence resources than lower income households¹⁵¹.

2.3.6.2 Employment

Between 2003 and 2010, the labor force increased by 67 people or 39.6 percent¹⁵² ¹⁵³. Of the estimated 232 persons in the labor force in 2010, 94 held full-time, year-round jobs. Sixty-two persons in the labor force (ages 16 to 64) either worked part-time or seasonally, while 94 had full-time, year-round jobs. Major employers are shown in Figure 14. Seventy-six labor force residents were unemployed, representing a 29.3 percent unemployment rate (up from 19.8 percent in 2003). This unemployment rate is three times higher than the 9.4 percent national unemployment rate. When asked about the reasons for unemployment, 40 percent of Nuiqsut residents said they could not find a job, 21 percent could not work because of family responsibilities, and 15 percent were disabled or in poor health. Considering this low employment level, subsistence and income from other sources such as dividends are critical.

Top employment industries in 2010 were: 1) local government (55.1 percent); 2) other (16.9 percent); 3) construction (8.7 percent); 4) professional and business services (6.8 percent); and trade, transportation, and utilities (6.3 percent)¹⁵⁴. The three main employers are the NSB (45.8 percent), Kuukpik Corporation (19.3 percent), and the Borough School District

¹⁵⁰ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. 2010 Economic Profile and Census Report. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

¹⁵¹ Alaska Department of Fish and Game. Division of Subsistence. *Alaska's Economies and Subsistence*. Accessed September 16, 2014. www.adfg.alaska.gov/static/home/library/pdfs/subsistence/ak_economies_subsistence.pdf

¹⁵² North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. 2010 Economic Profile and Census Report. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

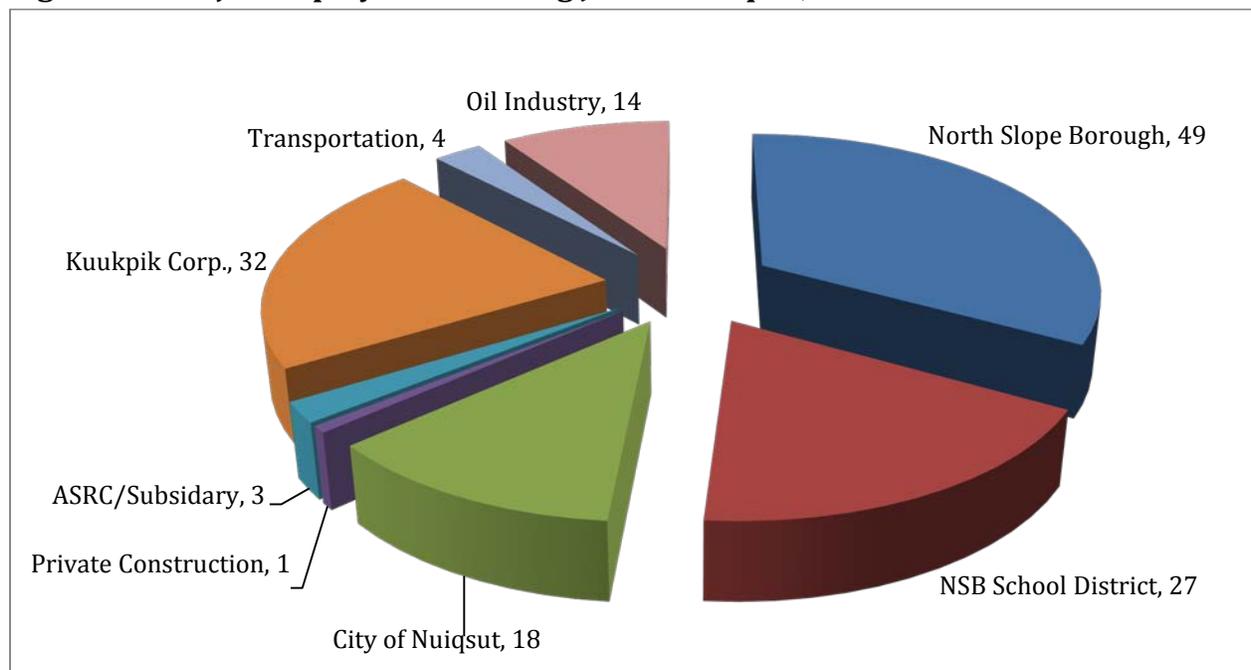
¹⁵³ The labor force includes everyone 16 – 64 years old who is working or available for work.

¹⁵⁴ Alaska Department of Labor and Workforce Development. 2014. Accessed 15 March 2014.

<http://live.laborstats.alaska.gov/alari>

(15.3 percent). Since the 2003 NSB census, there has been an increase in public employment and a decline in private employment¹⁵⁵.

Figure 14: Major Employers Providing Jobs in Nuiqsut, 2010¹⁵⁶



Many residents are eligible for dividends from the ASRC and the Kuukpik Corporation as well as from the Alaska Permanent Fund.

- The Alaska Permanent Fund provides an annual dividend to each qualifying resident which varies from year-to-year depending on investment income. In 2014 it was \$1,884, \$900 in 2013, \$878 in 2012, and \$1,174 in 2011.
- In December 2015, approximately 384 Nuiqsut residents were enrolled as shareholders in the Kuukpik Corporation which dispenses quarterly dividends to shareholders. Shareholders receive a quarterly dividend of \$30 to \$50 per share. Under half of all shareholders have 100 shares. Those with 100 share could receive annual income from dividends between \$12,000 and \$20,000¹⁵⁷. However, children born after December 18, 1971 acquire shares by inheritance or gift only and those shareholders likely hold less than 100 shares. Holders of less than 100 shares receive fewer dividends, proportionately. This has created disparity within the community. The Kuukpik Corporation is aware of this issue and is considering increasing the

¹⁵⁵ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

¹⁵⁶ Ibid

¹⁵⁷ Pardue, Margaret. Account Manager, Kuukpik Corporation. December 9, 2010. Personal Communication.

number of shares to include younger community members. Another source of contention is that some shareholders are no longer living in Nuiqsut yet receive dividends.

- ASRC has 261 Nuiqsut-enrolled shareholders, each with 100 shares. In 2014, the Corporation began providing dividends quarterly instead of twice annually. Dividends for 2014 were approximately \$5,000 for the year.

A Nuiqsut household comprised of four persons, each enrolled in ASRC with 100 shares each, eligible for the Alaska Permanent Fund dividend and two members enrolled in the Kuukpik Corporation with 100 shares each could generate \$48,800 to \$64,800 from 2014 dividends.

Some households earn supplemental income from sale of handmade art and crafts. In 2003, 17 percent of village households earned an average annual income of \$480 from art and crafts sales.^{158 159}

Oil field work has the potential to increase local income, especially since a road now connects the community with the Alpine Oil Development Project. The Kuukpik Corporation has agreements with CPAI regarding bidding for contracts for construction services for any resource development taking place on Kuukpik Corporation lands, including the CD-5 project. Construction workers from outside the village would likely be housed in the Kuukpik Corporation's hotel in the village, but permanent workers would be housed at the oil field complex. If past employment trends continue, direct employment of Nuiqsut residents by CPAI is expected to remain low and steady over the next 20 years. In 2010, Nuiqsut residents were employed by CPAI or its contractors in the following positions: subsistence resource monitor, vehicle maintenance technician, drilling rig workers, oil spill response technicians, water treatment technicians, cooks, ice road laborers, ice road monitors, ice road drivers, security worker, and electrical/plumbing technician.

2.4 Community Health and Quality of Life

The NSB conducted a health survey as part of its 2010 NSB Census survey. The NSB Department of Health and Social Services analyzed the survey results and prepared a Baseline Community Health Analysis and report in 2012¹⁶⁰. For the NSB Census, each village

¹⁵⁸ North Slope Borough. Prepared by: Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich. *2010 Economic Profile and Census Report*. Accessed May 11, 2015.

www.north-slope.org/your-government/census-2010

¹⁵⁹ Information about the percent of households earning supplemental income from arts and crafts was not included in the 2010 NSB Census. Such income was grouped in the "other sources" category which represented .08% of total village income.

¹⁶⁰ North Slope Borough Department of Health & Social Services. *Baseline Community Health Analysis Report*. Prepared by Jana McAninch, MD, MPH for the North Slope Borough Department of Health and Social Services. www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf. July 2012.

was surveyed for health conditions using a self-reporting process by heads of households with the health indicators noted below.

- Adults in Nuiqsut were less likely to report “very good or excellent” general health condition than were adults in other North Slope communities, combined. Thirty-nine percent of Nuiqsut adults reported being in very good or excellent health compared to 46 percent of all NSB adults and 56 percent of all Alaskan adults, combined.
- Twenty-two percent of Nuiqsut adults reported that their general health condition was “fair to poor”, compared to 16 percent of all NSB adults, combined, and 14 percent of all Alaskan adults.
- The most prevalent medical conditions for Nuiqsut adults were high blood pressure (17 percent of adults suffering from this), high cholesterol (12 percent) and heart disease (7 percent). Twenty-five percent of adults reported that they experience daily pain or arthritis that limits their activities or that requires prescription pain medication. Seven percent of adults experience chronic breathing problems such as asthma, emphysema or a cough that won’t go away.
- Reported adult tobacco smoking was high (62 percent of adults), significantly higher than the rest of NSB adults combined (49 percent) or of adult Alaskans, combined (22 percent).
- Thirty-eight percent of adults in the village were reported to be overweight (Body Mass Index [BMI] of 25 – 29.9 kilogram [kg]/square meter) and 33 percent of adults were reported to meet the criteria for obesity, based on national BMI standards (over 30 kg/square meter). The incidence of overweight adults in Nuiqsut was greater than that for NSB adults, combined, reported to be 33 percent, and the incidence of obesity in Nuiqsut adults was less than for NSB adults as a whole, reported to be 39 percent.
- The estimated diabetes rate was low among Nuiqsut adults (3 percent), lower than NSB adults, combined at 6 percent.
- One quarter of households in Nuiqsut reported that at least one member at times did not have enough to eat. Thirty-eight percent of the households surveyed reported that they found it difficult at times to get the food they needed to eat healthy meals. Of these, over half stated that they were not able to get enough subsistence meals to eat healthy meals.
- Only 9 percent of adults reported that they wear a helmet when riding a snow machine or four-wheeler.
- Twenty-eight percent of households in Nuiqsut stated that a member had been hurt by drugs or alcohol within the past 12 months¹⁶¹.

¹⁶¹ North Slope Borough Department of Health & Social Services. *Baseline Community Health Analysis Report*. Prepared by Jana McAninch, MD, MPH for the North Slope Borough Department of Health and Social Services. www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf. July 2012.

- Fifty-five percent of households with children reported their children to be in very good to excellent health, compared with 63 percent of all NSB households with children.
- The most frequent chronic health problems for children in Nuiqsut were ear infections (18 percent) and chronic breathing problems such as asthma, emphysema, or a cough that won't go away (8 percent).
- Forty-three percent of children ages 14 to 18 reported that they smoked tobacco, compared to 16 percent of all NSB children of that age.

Lower respiratory disease can be aggravated by air pollutants that are commonly linked to oil development activities as well as road dust and poor air quality in homes. The NSB has had consistently higher rates of death due to respiratory disease since at least 1996¹⁶². The mortality rate of NSB residents due to chronic pulmonary disease is 130 out of 100,000 compared to 45 out of 100,000 persons for the U.S. as a whole¹⁶³.

Nuiqsut residents' consistently report their *perception* that air quality in and around the village is poor due to pollutant emissions from nearby oil development¹⁶⁴. As a result of these concerns, several studies of ambient air conditions and on-going tests for typical oil industry pollutants in the air near Nuiqsut have been conducted. These studies monitor particulate matter (PM10 and PM 2.5), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO2), ozone (O3), and VOCs. CPAI-sponsored monitoring equipment intermittently failed to collect Prevention of Significant Deterioration (PSD) quality data for criteria pollutants and meteorology data., Retrieved data from the equipment during the 2006 to 2012 period were reported to indicate that the air quality located in and around the village meet Federal Environmental Protection Agency (EPA) standards^{165 166 167}. However, a 2010 finding by the ANTHC found that levels of airborne pollutants are high around

¹⁶² North Slope Borough Department of Health & Social Services. *Baseline Community Health Analysis Report*. Prepared by Jana McAninch, MD, MPH for the North Slope Borough Department of Health and Social Services. www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf. July 2012.

¹⁶³ The measurement of persons per 100,000 population is a standard criteria. The NSB does not have 100,000 population so the data for NSB is extrapolated to match this measurement criteria. This data is derived from the article by Aaron Wernham, *Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope*, *EcoHealth*, 4, 500-513, October 2007

¹⁶⁴ Alaska Native Tribal Health Consortium (ANTHC). *Impact of Oil Development on Air Quality in an Alaska Native Village* by Dobson, Jennifer and Ritter, Troy L. Alaska Native Tribal Health Consortium, Division of Environmental Health and Engineering. November 8, 2010.

¹⁶⁵ Alaska Department of Health and Social Services. Division of Public Health, Section of Epidemiology. *Investigation of Respiratory Illness in Nuiqsut: Interim Report*. Prepared by Serstad JE, Jenkerson SA. November 2003.

¹⁶⁶ ConocoPhillips, *Nuiqsut Ambient Air Quality Monitoring Program Quarterly Reports*, 2004 to 2008.

¹⁶⁷ Alaska Native Tribal Health Consortium (ANTHC), Division of Environmental Health and Engineering. *Impact of Oil Development on Air Quality in an Alaska Native Village* by Dobson, Jennifer and Ritter, Troy L. Published in *American Public Health Association Journal*. November 8, 2010.

Nuiqsut and recommended continued monitoring and study. The phenomena of “arctic haze” or the “regional transport” of pollutants from lower latitude industrial pollution sources are believed to contribute to local air quality degradation¹⁶⁸.

A 2007 report on the first integrated Health Impact Assessment of Oil Development near Nuiqsut found that there has been inadequate monitoring of hazardous air pollutants in the area and, given the high consumption of fish and game from the area, there is reason for concern that emissions from oil development could expose residents to unacceptable levels of contaminants¹⁶⁹. This concern is due to direct contact with contaminants or the bioaccumulation of subsistence fish and game which have been exposed to contaminants. The NSB Wildlife Management Department regularly tests the flesh, meat, and organs of sample harvests of fish, game, and birds to monitor the presence of contaminants that may expose residents to harm¹⁷⁰. Clearly, on-going monitoring and analysis of ambient air quality and drinking water sources in and around the village is warranted. The invention and use of monitoring equipment that is reliable and durable in arctic conditions is also warranted.

The NSB Census survey did not query residents about the incidence of cancer. A separate study of such incidences would have to be conducted for Nuiqsut separately from the NSB Census. However, it is noted again that there exists the phenomenon of “bioaccumulation” in which a pollutant becomes magnified or more pervasive as it filters up the food chain. This explains why humans who consume the animals, who consumed plants that absorbed airborne pollution, have a higher level of harmful chemicals and radioactivity in their bodies than the lower biotic forms that they consumed. The NSB Wildlife Management Department consistently monitors the health of wildlife consumed by Borough residents and posts these results on their website.

Arctic Haze: Toxins such as dichloro-diphenyl-trichloroethane (DDT), polychlorinated biphenyl (PCBs), dioxin, pesticides, heavy metals, and radioactive particles are carried by both air and ocean currents thousands of miles to the colder arctic ecosystem. The cold Arctic environment is a “sink” or settling area for these contaminants which circulate around the globe northward in air and ocean currents. They settle out in Arctic waters, sea ice, and land, where they remain for long periods and break down very slowly because of the colder

¹⁶⁸ Alaska Native Tribal Health Consortium (ANTHC), Division of Environmental Health and Engineering. *Impact of Oil Development on Air Quality in an Alaska Native Village* by Dobson, Jennifer and Ritter, Troy L. Published in American Public Health Association Journal. November 8, 2010.

¹⁶⁹ Wernham, Aaron. *Inupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska’s North Slope*. EcoHealth, 4, 500-513, October 2007.

¹⁷⁰ North Slope Borough Department of Wildlife Management. www.north-slope.org/departments/wildlife-management/studies-and-research-projects. Accessed June 15, 2015.

climate. The effects of these toxins are magnified as they are ingested by animals, rising up the food chain.

Persistent Organic Pollutants (POPs) are chemical contaminants that enter the marine waters from industrial sources around the world. Storms and currents carry the chemicals to the Arctic and enter the food chain of marine mammals which, of course, are consumed by indigenous peoples. POPs accumulate in the fatty tissues of fish, amphibians, reptiles, birds, and mammals. These chemicals build up through the food chain in a process known as bioaccumulation. As one animal consumes another in the food chain, the levels may become even higher in that animal in the process known as biomagnification. Lichen is a rootless tundra plant that derives its mineral nutrition from airborne dust. On land the airborne POPs “sink” onto the tundra, lichen, and other plant life and are eaten by caribou which, in turn, are consumed by the Kuukpikmiut. In the water, the toxins are found in plankton, which are eaten by fish. Fish become a food source for seals and polar bears which, in turn, become a food source for people. Animals at the top of the food chain tend to accumulate the highest levels of POPs.

These POP toxins are called Persistent Organic Pollutants because they are persistent: they travel long distances; they persist long after they are released at their source and move from air and water into spoil, plants, animals, and humans; they magnify in living organisms and accumulate in fat, organs, and muscles; they can reduce the animal’s ability to conceive and carry offspring; they decrease the animal’s ability to fight off disease; they can impair brain function; and a number of POPs are carcinogenic, causing cancers. Migratory birds can have 100 times higher concentrations of POPs compared to birds that do not migrate. In the Arctic, human exposure to toxins occurs primarily through eating of subsistence foods.

The most frequent measured POPs in marine animals are DDT and PCBs. Levels of POPs reflect the level in the food chain upon which they feed. Baleen whales feed off microscopic plants (plankton) and animals (zooplankton) that constitute the lower trophic levels of the food chain. Consequently, baleen whales generally have lower contaminant levels than toothed whales which feed off fish or larger prey from the middle food chain levels. The highest levels of contaminants occur in dolphins and porpoises because they feed at a high food chain level, have a small body size and a high metabolic rate. Polar bears which consume seals tend to have the highest exposure to contaminants.

Consumption of marine mammals could increase exposure of villagers to POPs which, over time, could have harmful health effects, particularly if combined with other contaminants such as alcohol and/or tobacco.

However, the good news is that major airborne contaminant transport pathways tend to lead elsewhere, such as Canada and Greenland. The North Slope receives some contaminants

from Asia but, to date, levels are still relatively low¹⁷¹. The scientific analysis that the NSB Wildlife Management Department regularly conducts have shown very low levels of POPs to be present in many of the subsistence foods that we eat and they are below levels of public health concern. The Borough's Wildlife Management Department's studies continue to monitor and analyze subsistence animals for human dietary health benefits as well as for potential impacts of consuming toxins.

These studies find that hunting and harvesting marine and riverine animals and air and terrestrial animals is an important part of the Iñupiat lifestyle. It is not only an important part of their culture, passed down through the generations, but it also provides nutritious food. Traditional subsistence foods provide relatively inexpensive and readily available nutrients, essential fatty acids, antioxidants, calories, protein, and many health benefits. Some of these benefits include protection from diabetes and cardiovascular disease, improved maternal nutrition and neonatal and infant brain development. Severely limiting the consumption of traditional foods may result in harm because reduction of the consumption of foods that have health benefits may increase the consumption of less healthy "store bought" foods.

The Bowhead whale has among the lowest concentrations of organochlorine contaminants of any marine mammal studied in the world. It is a highly nutritious subsistence food.

The phenomenon of Arctic Haze, or marine and airborne pollution "sinking" in our waters and on our land is a hazard worthy of vigilant monitoring.

2.4.1 Climate Change

In 2014, the ANTHC published a document entitled *Climate Change in Nuiqsut, Alaska; Strategies for Community Health*. The report responded to residents' concerns about unprecedented changes to weather, seasons, landscapes, riverscapes, plants, and wildlife within their Area of Influence and the impacts of these changes to food and water security, safety, and mental health related to the stress of adapting to a new climate and a changing environment. In Nuiqsut temperatures have increased in every month of the year except July. It is becoming wetter with longer periods of rain. Lightening and wildfires are increasing with related risks of poor air quality, infrastructure damage and loss of caribou forage areas. Warming results in decreases in snow and ice which impedes some subsistence activities. Permafrost is thawing resulting in damaged or destroyed ice cellars for food

¹⁷¹ Interagency Collaborative Paper, *Contaminants In Alaska: Is America's Arctic At Risk?*, [Agencies Involved: U.S. Dept. of the Interior; State of Alaska Department of Environmental Conservation & Department of Health & Social Services; U.S. Environmental Protection Agency; National Oceanic & Atmospheric Administration; University of Alaska Institute for Circumpolar Health Studies; Alaska Federation of Natives; Alaska Native Science Commission; Alaska Inter-Tribal Council; Native American Fish and Wildlife Society; Alaska Native Tribal Health Consortium; Alaska Community Action on Toxics; North Slope Borough], September 2000.

storage as well as damage to homes. Potential health effects include increased risk of illness related to disruptions in basic services and loss of traditional food storage facilities (ice cellars) from erosion, thawing, and flooding. The report suggests adaptation strategies noted in Table 13.

Table 13: Climate Change Health Assessment Findings, Nuiqsut, Alaska.¹⁷²

Topic	Changes	Impacts	Health Effects	Adaptations
Climate	Increases in temperature, precipitation variability and extremes.	Travel disruptions, infrastructure damage, timing of seasons.	Supply shortages, accident and injury, mental stress.	Enhance systems for self-sufficiency and emergency preparedness.
Weather	More storms, extreme weather, and lightning.	Damage to infrastructure, travel challenges and disruptions.	Supply shortages, injury, poor air quality, mental stress.	Engineering for extremes, phased relocation.
River	Erosion, low river level, higher tides, increased turbidity flooding.	Land and infrastructure loss, travel disruptions.	Travel accident injury, loss of services.	Riverwatch, Bank protection, phased relocation.
Land	Rapid tree growth, new coastal wetlands, invasive plants.	Loss of tundra to woodlands, loss of berry plant habitat.	Food security, potential for new or increased allergens, mental health.	Monitor changes (LEO); inform clinics on new environmental health concerns; manage invasive plants.
Subsistence	Changes in harvest season. Changes in timing of migration, conditions for travel and the health and abundance of subsistence resources.	Fish illness. Loss of food storage facilities. Poor harvest due to travel problems or changes in wildlife health or behavior.	Food security. Injury. Mental stress.	Monitor subsistence events (LEO), perform comprehensive harvest survey, and encourage healthy food.
Ice Cellars	Warming temperatures, erosion.	Thawing and eroding cellars.	Loss of stored food and water (ice) resources. Foodborne illness.	Provide supplemental cooling systems, relocate cellars to better location. Community freezers.
Infrastructure	Warmer temperatures, erosion, flooding, lightening, wildfires.	Foundation failures, infrastructure loss, damage, service loss.	Loss or interruption of health critical services. Increase for injury or disease.	Monitor change, use adaptive engineering to address risks, align maintenance and repair schedules as appropriate.

Table source: Alaska Native Tribal Health Consortium, Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. 2014

¹⁷² Alaska Native Tribal Health Consortium (ANTHC), Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf.

2.4.2 Quality of Life Indicators

To develop and sustain a healthy person, family, and community, certain standards of living must be achieved and maintained. Living one's life according to Iñupiat values assures personal achievement of a healthy life. If an entire community lived according to those values, an ideal community and community life could be achieved. The Iñupiat values are noted on page 16 of this plan. A healthy community could be measured by the ideal characteristics noted below¹⁷³. The residents' Vision of the Future and the Comprehensive Plan goals, objectives and implementation strategies could strive to achieve such a healthy community.

Ideally, residents of Nuiqsut are physically healthy, live long lives, think well of themselves and others, are safe from harm and hazards, have the traditional and western education needed to take advantage of job opportunities, have the traditional knowledge and skills to engage successfully in subsistence activities, and are able to function well in society.

Ideally, residents would find healthy wildlife populations accessible to hunters, fishers, and gatherers in their traditional harvest areas. There would be continued interest in subsistence activities by youth, people would have time and resources to engage in those activities, and Elders' traditional knowledge would be passed onto youth. As a result of continued harvest of sustainable resources, residents would continue to engage in cooperative activities, to share resources, to spend time with, and learn from, extended families and Elders in the community. They would extend this sharing of resources and knowledge to other communities. They would share knowledge and proficiency in their traditional language, art, crafts, dance, song, and oral history.

Ideally, there would be job opportunities in the village for everyone who wants to work and is able to do so. The jobs available would involve the type of work that people want to engage in and that could support a family. Household members would earn enough to meet the basic needs of the home and family. Housing is safe, sanitary, and affordable. Households would obtain traditional subsistence food and nutrition and could purchase "store bought" food and household goods they need and desire at affordable prices. Community services like water, sewer, and electricity would be available at affordable prices. The community is a pleasant place to live, safe from crime, drugs, alcohol, and other hazards, and residents feel satisfied with their environs.

¹⁷³ Kruse, Jack, *Indicators of Social, Economic, and Cultural Cumulative Effects Resulting From Petroleum Development In Alaska: A Review*. University of Alaska, January 18, 2006.

Ideally, residents are able to influence the management of village resources and wildlife resources. They are able to engage in educational development at all levels and are able to freely participate in government, public meetings, and other civic activities.

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Chapter 3: Land Use and Zoning

3.1 Land Ownership

The Kuukpikmiut have traditionally occupied seasonal settlements at Cross Island and along the Colville River and its tributaries. They also make subsistence use of the areas around Teshekpuk Lake occasionally. Although the 1884 Organic Act, which made Alaska a civil and judicial district, declared that indigenous people “shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them,” land title in Alaska was clouded until 1971 when Congress passed the ANCSA. This Act recognized the rights of Alaska Natives to a portion of the lands they traditionally occupied through land distribution to regional and village Native corporations. Today, most of the land around Nuiqsut is owned by the federal and state governments, ASRC, and the Kuukpik Corporation, the local village Native corporation. The rest of this section provides more details about land ownership in the 9.2 square miles of land with the city boundaries and approximately 34,500 square miles in the village’s Area of Influence.

3.1.1 Federal Lands

The federal government owns over half of the land within the NSB. Most federal land in the vicinity of Nuiqsut lies within the NPR-A. Other federal lands within the Borough include the Arctic National Wildlife Refuge and portions of the Gates of the Arctic National Park, Noatak National Preserve, the Alaska Maritime National Wildlife Refuge, and federal waters of the Outer Continental Shelf (OCS).

3.1.1.1 National Petroleum Reserve—Alaska (NPR-A)

The western, northern, and southern portion of the Nuiqsut Area of Influence lies within the boundaries of the 23 million-acre NPR-A. The NPR-A comprises more than a third of the NSB. Its boundary extends eastward from Icy Cape along the Chukchi Sea coast to the highest water mark on the western bank of the Colville River. Nuiqsut lies at the eastern edge of the NPR-A (see Figure 1).

In 1923, President Harding issued Executive Order No. 3797-A establishing the Naval Petroleum Reserve No.4, also known as Pet-4, to ensure a source of oil for the naval ships that had recently switched from coal-power to petroleum. In 1976, the Naval Petroleum Reserves Production Act (NPRPA) transferred management of the reserve to the BLM within the USDI and renamed it the NPR-A. In 1980, Congress passed the Appropriation Act which provided funds to begin oil and gas leasing within the NPR-A, opening it to exploration and development.

The BLM manages NPR-A lands and resources according to federal laws and regulations with direction provided by Integrated Activity Plans (IAP) that are usually accompanied by environmental impact statements (EIS). The December 2012 IAP/EIS and the associated February 2013 Record of Decision (ROD) provided the current management direction for the NPR-A, as summarized in the following bullets¹⁷⁴.

- **Areas Open for Leasing:** About 11.8 million acres of the 22.8 million acres of subsurface lands managed by BLM in the NPR-A are available for oil and gas leasing.
- **Areas Closed to Leasing:** About 11 million acres are not available for leasing, including special management areas noted below and some of Beaufort Sea waters in Dease Inlet and those near Barrow.
- **Infrastructure:** Infrastructure, including pipelines, would be allowed in over 14 million acres. Non-subsistence permanent infrastructure is prohibited in 8.4 million acres of 11 million acres closed to leasing, including 1.1 million acres in and around Teshekpuk Lake and 7.3 million acres in the southwestern part of the refuge.
- **Special Areas:** The ROD doubles the size of the Teshekpuk Lake Special Area, expands the Utukok River Uplands Special Area, and creates a new 107,000-acre Peard Bay Special Area.
- **Buffer Areas:** The ROD creates a 0.5 mile buffer on either side of segments of 12 rivers.
- **Measures:** Stipulations and Best Management Practices (BMPs) identified in the preferred alternative of the Final IAP/EIS have been incorporated into the ROD. These measures address a number of issues and include requirements for studies, monitoring, and visual resource management.

The NPRPA authorizes creation of special areas in the NPR-A that contain significant subsistence, recreational, fish and wildlife, historical, or scenic value. These Special Areas lie within the Nuiqsut Area of Influence. The five special areas in the NPR-A are described below¹⁷⁵.

- **Teshekpuk Lake Special Area:** Designated in 1977, the primary purpose of this area is to protect habitat that is important for high numbers of waterfowl and shorebirds that nest, stage, and molt in this area, and for calving, migration, and insect relief habitat for the Teshekpuk Caribou Herd. The area was expanded in 1998 to include the Pik Dunes. The 2013 ROD doubled this special area to 3.65 million acres.

¹⁷⁴ U.S. Department of Interior, Bureau of Land Management. *National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement*. https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/41003/43153/Vol1_NPR-A_Final_IAP_FEIS.pdf. November 2012.

¹⁷⁵ North Slope Borough. *Health Indicators in the North Slope Borough, Monitoring the Effects of Resource Development Project*. Prepared by Habitat Health Impact Consulting for the North Slope Borough Department of Health and Social Services. June 2014
www.north-slope.org/assets/images/uploads/NSB_Indicators_Report_August_4_printable_FINAL.pdf

- **Colville River Special Area:** The Secretary of the Interior designated this area in 1977 to protect the Arctic peregrine falcon which was listed as an endangered species (it has since been removed from this status). The area was enlarged in 1998 and now encompasses 2.44 million acres of the Colville, Kogosukruk, and Kikiakrorak rivers, including bluffs and riparian habitat. It is considered one of the most important regional habitats in North America for raptors. The lower portion of this area includes the North Slope's highest concentration of moose, raptors, and passerine birds.
- **Utukok River Uplands Special Area:** In 1977 the Secretary of the Interior designated this area in the southwestern NPR-A to protect habitat used by the Western Arctic Caribou Herd for calving and insect relief. At that time the herd was in decline – it peaked in 2003 and has been declining since then at a rate of 4-6 percent a year. The 2013 ROD expanded this area to 3.87 million acres.
- **Kasegaluk Lagoon Special Area:** This 97,000-acre area was created in 2004 because of its importance for marine mammal habitat and also for its unique habitat. It includes extensive lagoons and barrier islands.
- **Peard Bay Special Area:** Established in 2013, this 107,000-acre area was created to protect three types of habitats: Haul-out areas for marine mammals, near shore waters for marine mammals, and a high-use staging and migration area for shorebirds and waterbirds.

In 1998, the BLM established the NPR-A Subsistence Advisory Panel to provide an opportunity for subsistence users of Anaktuvuk Pass, Atqasuk, Barrow, Nuiqsut, Point Lay, and Wainwright to raise issues and concerns and to advise NPR-A land managers about potential impacts to subsistence resource habitat and activities related to proposed oil and gas exploration and development.

In response to comments received on the 2012 draft IAP/EIS, the BLM committed to establish the NPR-A Working Group to enhance input by local residents on implementation of the IAP. This working group includes members from local governments, Native corporations, and tribes.

3.1.1.2 Other Federal Lands and Waters

The 19.6 million-acre Arctic National Wildlife Refuge (ANWR) is the second largest federal holding within the NSB next to the NPR-A. Located at the eastern end of the Borough between the Canning River and the Canadian border, ANWR is managed by the USFWS.

Additional federal lands in the NSB include two units managed by the National Park Service and two small components of the Alaska Maritime National Wildlife Refuge located near Point Hope and Cape Lisburne. The National Park Service manages the nearly eight million-acre Gates of the Arctic National Park and Preserve and the Noatak National Preserve, both

of which are partially located in the Borough. While not located within the Nuiqsut Area of Influence, these lands provide protection for important wildlife habitat and migratory corridors for wildlife used by Nuiqsut residents.

The OCS Lands Act established federal jurisdiction over submerged lands on the OCS which is seaward of the State's 3 nautical mile boundary from the coast. The OCS extends seaward 200 miles to the international boundary in the Arctic Ocean. The federal government offers areas within the OCS for oil and gas leasing. Spills, discharges, noise emissions, or other contaminants related to exploration and development of oil within those lease areas could impact marine resources within the Nuiqsut Area of Influence, including Harrison Bay, Cross Island, and other areas of the Beaufort Sea. Oil and gas revenues have funded federal programs and periodic revenue sharing programs.

3.1.2 State Lands

The State of Alaska owns lands and waters within the NSB, including submerged lands. The federal Submerged Lands Act of 1953 recognizes title by states to the submerged, navigable lands within their boundaries at the time of statehood. These lands include onshore navigable waterways and offshore marine waters extending 3 nautical miles seaward from the coast.

The State of Alaska owns most of the area between NPR-A and ANWR, including the Prudhoe Bay and Kuparuk oil and gas fields. Other state lands are located in the western portion of the Borough to the west of the NPR-A. The ADNR's 2008 *Northwest Area Plan* provides management direction for state lands in the Lisburne Region¹⁷⁶. Although an area plan has not been developed for other state lands in the NSB, in 2014 the ADNR began development of what will be called the *North Slope Management Plan*, which has not been completed. ADNR has previously designated land use classifications for some state lands on the North Slope through past planning efforts.¹⁷⁷ The State-owned lands along the mouth of the Colville River Delta and along the Tanagwok Channel of the Colville River are managed for multiple uses under the Miscellaneous Land Uses category specified in state regulations (11 AAC 96). Uses allowed in State areas designated as Miscellaneous Land Use include hunting, commercial recreation camps, mineral extraction, tundra travel, landing strips, and shipping.

¹⁷⁶ Alaska Department of Natural Resources. Division of Mining, Land and Water. Resource Assessment and Development Section. *Northwest Area Plan for State Lands*. October 31, 2008.

dnr.alaska.gov/mlw/planning/areaplans/northwest.

¹⁷⁷ These classifications may be viewed on the agency's Alaska Mapper program:

dnr.alaska.gov/MapAK/browser?map_select=&gsid=C1CED1691C807D7B4278DFCA32426C96.tomcat-90.

3.1.3 Native Corporation Lands

Unless conveyed with other restrictions, ANCSA entitles regional Native corporations to select lands for which they have surface and subsurface rights. Generally, village corporations are entitled to the surface rights to lands they select with the subsurface rights going to the regional Native corporation. ANCSA entitled the Kuukpik Corporation to select approximately 148,000 acres of land in the Nuiqsut area¹⁷⁸. The 1980 ANILCA reserved submerged lands under the Colville River and its channels, however, for the State of Alaska, so these lands were not available to the Kuukpik Corporation for selection.

Most of the Kuukpik Corporation's land selections have been completed. There are 2,040.8 acres remaining to be conveyed to the Kuukpik Corporation under ANCSA 12(a) and 12(b) from U.S. Department of Interior's BLM¹⁷⁹. Lands selected by the Kuukpik Corporation under ANCSA extend north along the main channel of the Colville River and along the Nigliq Channel as well as coastal areas of Harrison Bay running west from the Delta and a small area at Atigaru Point.

While Alaska regional Native corporations generally retain subsurface rights for village corporation land, ANCSA retained all subsurface rights to land within the NPR-A for the federal government. ANCSA, however, provided ASRC with selection rights to subsurface resources on alternative lands outside of NPR-A. ANILCA allowed ASRC to trade these subsurface rights to land outside the NPR-A for subsurface rights within its boundaries, provided that the selected lands lay within 75 miles of the village lands and that the lands would be made available for commercial development. ASRC selected the subsurface rights to lands in what is now the GMT Unit oil field. ASRC holds title to approximately five million acres of land on the North Slope, most of which are rich in subsurface oil, gas, coal, and base metals.

The provisions of ANCSA require that all land conveyed to Native corporations be accomplished with patents (deeds) which require surveys by registered surveyors who place monuments (metal pins or stakes) on the lot corners. Completing survey work can delay conveyance of land title for many years due to the limited season when surveys can occur. The absence of clear title to lands in and around villages throughout the Borough often stymies land acquisition for new housing, community facilities, and economic development.

ANCSA exempted Native lands from property tax for a 20-year period from 1971, unless the land was leased or developed. Congressional legislation in 1991 and 2004 extended this

¹⁷⁸ Alaska Department of Commerce, Community and Economic Development. *Community Database Online*. Accessed February 4, 2015. commerce.state.ak.us/cra/DCRAExternal.

¹⁷⁹ Chinn, Ramona. 2015. Supervisory Land Law Examiner. U.S. Bureau of Land Management. Personal Communication. July 23, 2015.

property tax exemption for undeveloped Native lands in perpetuity¹⁸⁰. Lands developed by the Kuukpik Corporation, however, or other for-profit corporations are subject to property tax.

3.1.4 Lands Held in Trust by the Federal Government

Certain lands are held in trust by the federal government and not subject to state or local regulations. Individual Alaska Natives were entitled to acquire land under the Alaska Native Allotment Act of 1906 and the Alaska Native Townsite Act of 1926. Under the Allotment Act, Alaska Natives were eligible to receive up to 160 acres of vacant and unappropriated land if they could demonstrate use and occupancy of the land. There are approximately 10 Native allotments within 10 miles of Nuiqsut and another 18 within 25 miles of Nuiqsut. Within the Area of Influence, there are approximately 135¹⁸¹. Native allotments were granted to Alaska Natives for subsistence purposes; these land allotments preceded the 1971 ANCSA but were validated by the 1980 ANILCA on a case-by-case basis. Nuiqsut is not an Alaska Native townsite so it does not have any restricted lots within the City. A landmark 2014 rule by the USDI allows federally-recognized Alaska tribes to place land they own into trust so they may apply for grants previously only available to Native Americans in other states¹⁸². Due to limitations on regulation of lands held in trust by the federal government, NSB zoning and land use regulations as well as taxation does not apply to such lands.

3.1.5 Municipal Lands

The City of Nuiqsut owns land within the city boundaries, and the NSB owns land in the village and in the Nuiqsut Area of Influence. Section 14(c)(3) of ANCSA provided for transfer of land from the village corporations to municipalities for community expansion and rights-of-way for public use. The Kuukpik Corporation has conveyed approximately 1,280 acres of land to the City of Nuiqsut under this provision and it has entered into an agreement for the conveyance of the City's full entitlement of land for public purposes. The City of Nuiqsut municipal boundaries encompass about 9.2 square miles (5,888 acres)¹⁸³.

The Kuukpik Corporation has also conveyed some lands within the city limits to shareholders for home sites in new subdivisions. Private ownership of lots in the village is

¹⁸⁰ Congressional Research Service. *Alaska Land Transfer Acceleration Act: Background and Summary*. Library of Congress. January 2005. Accessed March 22, 2015. www.lbbllawyers.com/ancsa/RL32734.pdf.

¹⁸¹ U.S. Department of the Interior, Bureau of Land Management. *Spatial Data Management System Land & Resources Map Interface*. Accessed July 17, 2015. <http://sdms.ak.blm.gov/sdms/>.

¹⁸² U.S. Department of the Interior. *Department of the Interior Announces Final Rule for Land into Trust for Alaska Native Tribes*. December 18, 2014. Accessed February 6, 2015. www.bia.gov/cs/groups/public/documents/text/idc1-028734.pdf.

¹⁸³ Alaska Department of Commerce, Community and Economic Development. *Community Database Online*. Accessed December 14, 2015. www.commerce.alaska.gov/dcra/DCRAExternal/community

sometimes complicated by the lack of clear title or deed due to unresolved inheritance or probate matters and the difficulty in obtaining surveys to determine land boundaries.

The NSB cannot use bond financing to build, operate, and maintain facilities on land for which it does not own or have a long-term lease. As a result of this restriction, if a village seeks a Borough-financed community facility, the land is often conveyed to the Borough for construction of the facility.

The Alaska Municipal Land Entitlement Act authorizes municipalities to select state land. Under this act, the NSB is eligible to select 89,850 acres, but the City of Nuiqsut is not eligible for land selection. The Borough has received less than 13,000 acres, and most of these lands are located in the Prudhoe Bay area. The State of Alaska is in the process of adjudicating the Borough selected lands, including roughly 10,000 acres of land near Nuiqsut. Through the North Slope Area Plan, State lands will be classified based on their long term use and additional lands may be selected by the NSB in the future to satisfy their entitlement.

3.2 Zoning and Land Use Regulation

The NSB regulates development on all lands within the Borough under its zoning and land use regulations in Title 18 (subdivisions) and Title 19 (zoning) of the Borough municipal code with the exception of Native allotment land and restricted townsite lots. Establishing zoning districts for different kinds of uses and developments is an important land use management tool. In addition to districts that apply to Barrow exclusively, there are five different types of zoning districts: village, conservation, scientific research, resource development, and transportation corridor. All areas within the Borough have been assigned to a zoning district, as depicted on the official zoning map. The Assembly must approve any proposed changes to the official zoning map after review by the Planning Commission. The Assembly may create new, special zoning districts, upon recommendation by the Planning Commission, such as hazard zones or drinking water buffer zones.

Chapter 19.40 describes the purpose of each zoning district and which activities require an administrative approval, a development permit, or a conditional development¹⁸⁴. Chapter 19.70 specifies development standards, called policies in Title 19, which are included in five categories: Village district polices, economic development polices, offshore development policies, coastal management and area-wide policies, and transportation corridor policies¹⁸⁵.

¹⁸⁴ Activities listed as a conditional development require approval by the NSB Planning Commission.

¹⁸⁵ Although the Alaska Coastal Management Program was terminated in 2011, the NSB's enforceable policies were incorporated into Title 19 and these standards apply during NSB permit reviews.

Currently, all area within the Nuiqsut city limits is zoned as a Village District. Within Nuiqsut's Area of Influence, oil and gas developments are zoned as Resource Development Districts, and the remaining area is zoned as a Conservation District. Table 14 describes uses that are allowed in these three districts.

3.2.1 Village District – NSBMC § 19.40.060

Areas within the official boundaries of the City of Nuiqsut are zoned as a Village District (Figure 2). Although there have been discussions of including other types of zoning within NSB villages, Barrow is the only community in the NSB that includes multiple zoning districts.

Section 19.70.020 requires that projects within the Village District meet the following policies:

- (A) Development and uses will not be allowed which grossly violate guidelines on the rate or amount of growth adopted by a village as a part of its Comprehensive Development Plan;
- (B) Development and uses in a village are required to be consistent with the relevant adopted village Comprehensive Development Plan;
- (C) Development and uses are encouraged which provide or materially contribute to lower-cost fuel or power; and
- (D) Development and uses are encouraged which provide local employment in the villages.

3.2.2 Conservation District – NSBMC § 19.40.070

The Conservation District includes all areas within Nuiqsut's Area of Influence other than those zoned as Village District or Resource Development District, including areas to the south, east, and west. The Conservation District is intended to conserve the natural ecosystem for plants and animals upon which many Borough residents depend for subsistence. Subject to this overall intent, this District accommodates limited resource exploration and development. Major resource development project areas must be rezoned to the Resource Development District.

In addition to policies related to individual districts, Title 19 also requires projects to be evaluated by additional policies, including Economic Development Policies (§ 19.70.030), Offshore Development Policies (§ 19.70.040), Coastal Management Policies (§ 19.70.050), and Transportation Corridor Policies (§ 19.70.050). It should be noted that NSB's Coastal Management Policies remain in effect even though the statewide program has ended.

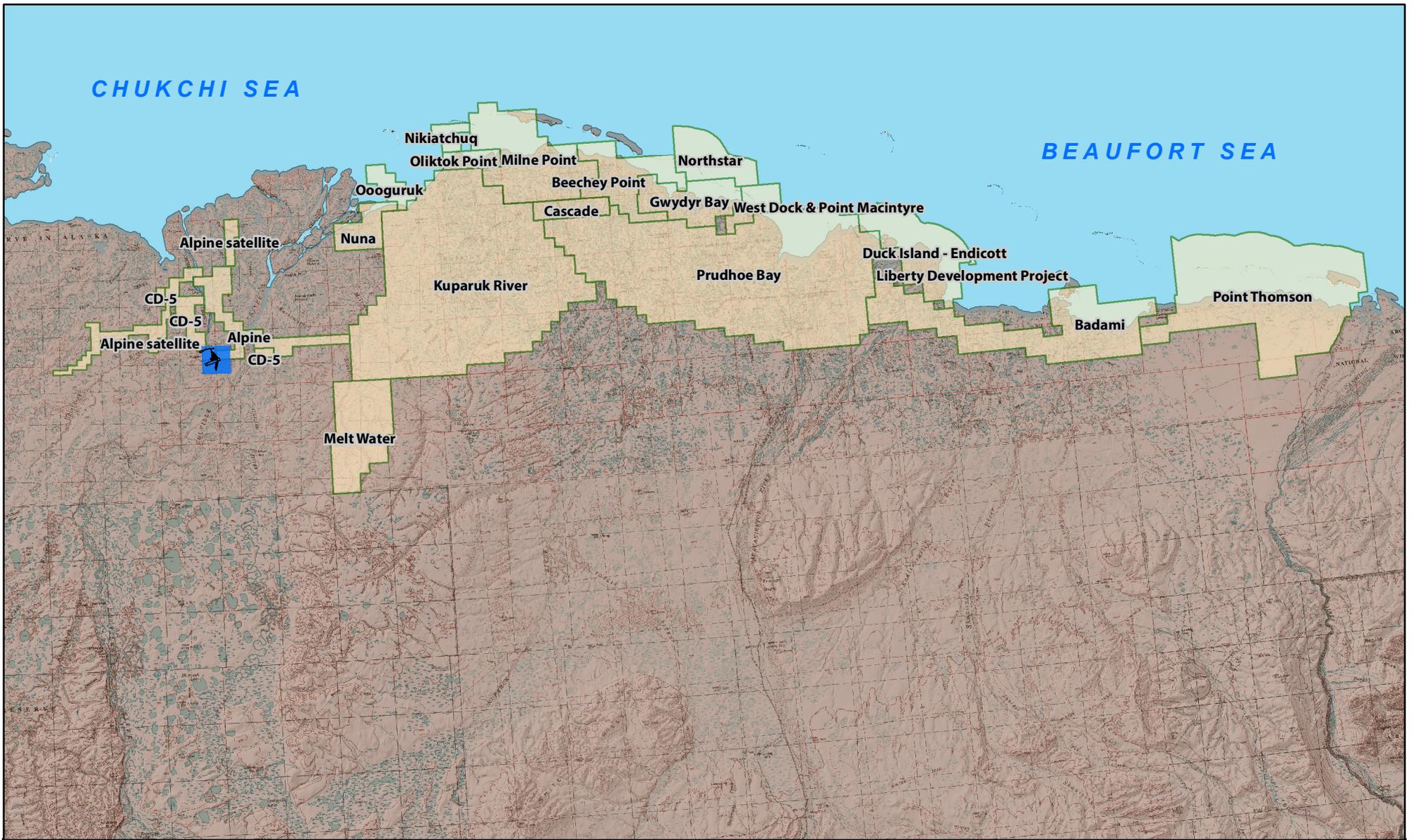
There may be additional state and federal permits required for proposed projects.

3.2.3 Resource Development District - § 19.40.080

The Resource Development District includes areas approved for development, including those near Nuiqsut such as the Alpine Development Project and its satellites (Figure 15)¹⁸⁶. The purpose of this district is to accommodate large-scale resource extraction and related activities and to address cumulative impacts. Developments in this district are not intended to permanently or seriously impair the surrounding ecosystem. Master plans are required to be submitted with an application for rezoning to a Resource Development District and must include maps, schedules, requested policy changes, and other information required by NSBMC § 19.60.070. Developments in Resource Development Districts must meet the policies in NSBMC § 19.70. Activities described in the Master Plan may be approved administratively once that plan is approved. Figure 15 shows the Resource Development Districts in the NSB.

¹⁸⁶ North Slope Borough. *Official Zoning Map of the North Slope Borough Resource Development Districts*. Adopted by the NSB Assembly on July 10, 2012.

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- Nuiqsut Village Boundary
- Resource Development Districts
- Conservation District



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NUIQSUT, ALASKA ZONING DISTRICTS MAP



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Figure 15

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Table 14: Uses Allowed in the Village, Conservation and Resource Development Districts.¹⁸⁷

Village District (§ 19.40.060)		
Administrative Approval ¹⁸⁸	Development Permit ¹⁸⁹	Conditional Use Permit ¹⁹⁰
1) Placement of fill in accordance with a Corps general permit.	Public facilities, commercial development & any use or structure within the watershed for the community's drinking water.	Resource extraction & any projects elevated to the Planning Commission. ¹⁹¹
Conservation District (§ 19.40.070)		
Administrative Approval	Development Permit	Conditional Use Permit
1) Temporary use (including fuel storage) of existing gravel airstrips in support of pre-exploration activities; 2) Archaeological surveys; 3) Tundra travel; and 4) Minor alterations to existing development.	1) Commercial recreation; 2) Ice roads and ice pads; 3) Exploration, prospecting or limited development in anticipation of resource extraction; and 4) Offshore development in compliance with the policies of § 19.70.040.	All development elevated by the Land Administrator under § 19.50.020.
Resource Development District (§ 19.40.075)		
Administrative Approval	Development Permit	Conditional Use Permit
1) All activities indicated in an approved master plan; 2) Minor alterations; 3) Exploration, prospecting or limited development in anticipation of resource extractions; and 4) Ice roads or pads.	1) Major alterations to existing development; and 2) Development not indicated on the Master Plan.	1) All development elevated by the Administrator pursuant to § 19.50.020

¹⁸⁷ North Slope Borough. Municipal Code.

www.municode.com/library/ak/north_slope_borough/codes/code_of_ordinances

¹⁸⁸ No public notice is required for an administrative approval.

¹⁸⁹ The Planning Department may issue development permits after a public notice and review.

¹⁹⁰ The NSB Planning Commission must approve all conditional use permits.

¹⁹¹ Administrator may elevate a permit decision to the Planning or Zoning Commission if: the proposed activity would have significant or negative impacts, conflict with adopted Borough policies, or issues were raised during the review that merit consideration by the Planning Commission (NSBMC § 19.50.020).

3.2.3.1 Alpine Oil and Gas Complex Resource Development District:

In 2005, the NSB re-zoned the Conoco Phillips (CPAI) Alpine Development Project from the Conservation District to the Resource Development District and adopted an Alpine Development Master Plan. Several satellite developments encompass the Alpine project (see Section 2.3.5 for details of this project). The Alpine facilities cover approximately 221 surface acres¹⁹² and produces from about 25,000 acres (39 square miles) of reservoir¹⁹³. Its closest drill site to Nuiqsut is about 8 miles to the north. The Alpine development began oil production in 2000 and now consists of numerous well sites and facilities. CPAI received approval on December 1, 2015 from the North Slope Borough Assembly to rezone CD-6, renamed Greater Moose's Tooth 1 (GMT-1), totaling 3,971 acres from Conservation District to Resource Development District. The 11.8-acre GMT-1 gravel pad will have 33 drilling and injection wells, a 7.6 mile gravel access road and an 8.4-mile elevated pipeline connecting GMT-1 to the Alpine CD-5 facility. Approximately 9,869 acres of the Alpine Satellite project are being returned to the Conservation District due to project changes and community input.

3.3 Current Land Use

When the area was settled in the 1970s, the current site of the community was chosen above the banks of the Nigliq Channel, a branch of the Colville River. The settlers built the community using a grid system with the main street, Pausanna Street, laid out in a north-south orientation. The community was built among a series of tundra ponds that drain easterly to the Nigliq Channel. As a result, areas of unbuildable tundra exist between the northern and southern sections of town. Typical residential lots are nearly half-acre in size about 100 by 200 feet. Each block has an unimproved 50 foot right-of-way down the center, and the streets have either a 60-foot or 100-foot right-of-way. Figures 16 and 17 illustrate the current land use patterns within the village.

The area between Second and Fourth avenues is made up of mixed uses and includes single-family homes, multi-unit housing for teachers, Kuukpik Corporation headquarters office, , AC grocery store, Trapper School, fuel tanks, water tanks, water treatment plant, electric power plant, children's playgrounds, City Hall/Kisik Community Center and the Neil T. Allen Memorial Fire Station. The Post Office is on Pausanna Street

The ballfield is situated in the area north of Fourth Avenue. *Nalukataqs* are also held there. To the east, there is a block of single-family homes and to the west, there is the 100-bed

¹⁹² BP, 1999, First Alaska-Built Sealift Modules Bound for Alpine, BP Press Release, July 9, 1999

¹⁹³ Alaska Department of Administration. Alaska Oil and Gas Conservation Commission. *Alpine Oil Pool*. http://doa.alaska.gov/ogc/annual/current/18_Oil_Pools/Colville%20River%20-%20Oil/Colville%20River.%20Alpine%20-%20Oil/Text_Summary.pdf

Kuukpik Hotel that provides temporary accommodations for oil and gas workers, research scientists, government workers, and other visitors.

North of the hotel, Nigliq Street leads to a cluster of industrial buildings, outdoor storage yards, and the sewage treatment plant. The landfill is located approximately 1 mile north and west of the village. It has a small burn cage and a cell for sewage disposal from “honey buckets.”

North and east of the landfill is the Spur Road, a private road leading to the CD-5 access road which connects to the existing Alpine road system.

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	AIRPORT		EDUCATION		POST OFFICE
	RESIDENTIAL		FIRE STATION		SENIOR CENTER
	RELIGIOUS		MEDICAL CLINIC		UTILITIES
	COMMERCIAL		OFFICE		VACANT
	CEMETERY		MIXED USE		Nuiqsut Spur Road
	COMMUNITY CENTER		POLICE STATION		

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NUIQSUT, ALASKA LAND USE MAP

0 0.04750.095 0.19 0.285 0.38
Miles

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907-852-0333



Figure 17

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Along the western edge of the village, between Third and Fourth Avenues and west of Nagliq Street, is a one-block area where the village cemetery is located.

South of the drainage channel located between Second and Third Avenues are five blocks of predominantly residential use with mostly single-family homes. Other facilities located in this area include the NSB liaison office, Iḷisaḡvik College satellite office, Uyagagvic Health Clinic, NSB Police Station and Public Safety Office, and a TNHA five-unit elder housing development.

South of First Avenue is a mixture of residential, commercial, and industrial public facility uses with single-family homes, NSB storage, and Public Works warehouses. The airport is located south of that area, consisting of a small NSB terminal building, outdoor storage, aircraft loading/unloading area, and the runway.

South and east of the runway is a road to the Nigliq Channel and a boat ramp and launching area for boats traveling to the Colville River. Just west of the boat launch is a gravel stockpile. Further southeast is the Freshwater Lake where the village derives its drinking water. During the summer, water is pumped from the lake to the NSB-maintained water treatment plant in the center of the village and then stored in water tanks for use throughout the winter months when the lake is frozen.

The Native Village of Nuiqsut supports extending the road to Freshwater Lake approximately 4 miles south and eastward to the Colville River. This road would provide boat access to the river and to Harrison Bay and Cross Island for subsistence hunting and fishing for residents whose boats cannot navigate the shallow Nigliq Channel. Residents report that they often must drag their boats across sandbars in the Channel, sometimes damaging propellers in the shallow waters. During whaling season, shallow waters make it difficult to bring the harvest to the village which can result in spoiled and wasted meat.

Nuiqsut has a number of community gathering places which include City Hall and Kisik Community Center. Other more informal gathering places include the children's playgrounds, the boat launch at the Channel, and the ball field where the *Nalukataq* whale harvest celebrations take place.

Visible from the community, Alpine CD-4 satellite drill site is located about 4 miles to the north. Further north are several other Alpine drill sites, pipelines and support facilities. The new CD-5 satellite is located about 8 miles to the northwest of the village.

3.4 Future Land Use Projections

Although village housing, utilities, roads, and community facilities are built, additional housing and improvements to utilities and roads are needed now or will be needed in the future. Currently, additional housing is needed to reduce overcrowding. The degree of overcrowding could be reduced by rehabilitating older, vacant homes and redeveloping burned and dilapidated housing within the village core as well as construction of new housing units, for a total of approximately 34 additional homes. Expansion of oil and gas industry activities in the area is expected to continue. Consideration on how this increase may affect both subsistence resources and the potential need for additional or expanded facilities to accommodate more travelers traversing Nuiqsut is needed.

The remainder of this section includes a discussion of additional facilities and improvement residents have identified. The future land uses are shown in the general areas depicted on Figure 18.

Multi-Family Housing: The community would benefit from construction of multi-family housing (e.g., duplexes, triplexes, and fourplexes) in areas already served by water, sewer, power, communications, and roads. Multi-family housing should be developed in the new subdivision (located west and south of the cemetery and bounded by First Avenue on south and Second Avenue on the north) when electricity and water and sewer utilities are provided. Roads and electric power lines are already provided to this subdivision. Duplex or triplex structures can be integrated into the existing lots to accommodate extended families that are now crowded into single-family dwellings. Appropriate cold climate design can assure energy-efficient homes and avoid subsidence. Such multi-unit residential development of these lots would maximize use of the land and infrastructure.

Mixed Use: A need exists for new services that could be provided by local small businesses, including hair salons, tailoring/alterations, vehicle repair, electronic equipment and appliance repair, food preparation, counseling, and child care. These kinds of businesses can be operated out of homes or from shops attached to a home without generating excessive noise, traffic, parking congestion or trash.

With the addition of new zoning district options in Title 19, mixed use zoning districts could be designated within the village center where businesses are easily accessible and conveniently located near other businesses and public services. In a mixed use district, multi-density housing and businesses would be allowed as principal uses. Areas of the village that could be designated as mixed use districts or mixed use sub-districts within the Village District are identified below and are shown on Figure 18:

- The six-lot area located west of the Community Service Center and bordered by Pausanna Street on the west, Sulook Street on the north and Third Avenue on the south, and
- The nine-lot area bounded by Third Avenue to the north, Second Avenue to the south, Anaktuvuk Street to the east and Cemetery Street to the west. Portions of this area which serve as a drainage and greenbelt, however, would not be suitable for development. Structures in this area should be designed to avoid impeding drainage.

In addition to designation of mixed use districts, residents may wish to operate small businesses from their homes in other districts, provided they do not generate noise, traffic, or trash. The exception may be a child care center which would generate traffic at certain times in the morning and evening as parents drop off and pick up their children before and after work. During both the 2010 and 2015 SWOT exercise, residents cited the need for day care to enable parents to work. A day care center is under construction as an addition to the Kisik Community Center building; this facility will accommodate 14 to 20 children and a long-term operator has yet to be determined for the Center.

Recreational Facilities: During both the 2010 and 2015 SWOT exercises, residents cited a desire for more indoor and outdoor recreational facilities. There are two playgrounds for children as well as a ballfield. Currently, ice skaters use one of the ponds in the greenbelt between Second and Third avenues during the winter. Residents expressed an interest in having a larger gymnasium and indoor swimming pool. Other uses such as a bowling center or movie theater were mentioned as desirable, but the necessary level of business to support such activities has not yet been determined.

Power Plant Backup: There are diesel engines that can be used as a short-term back up to the natural gas-generated electric power plant.

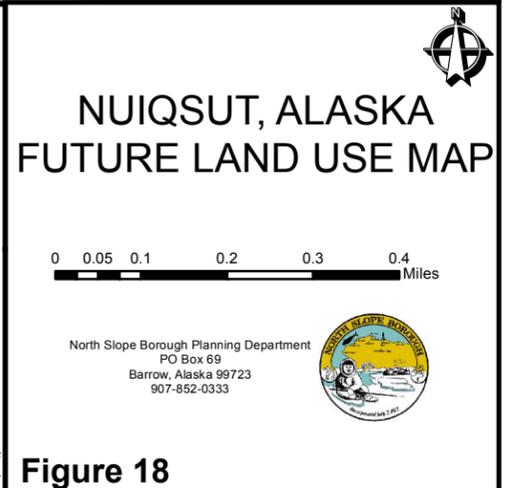
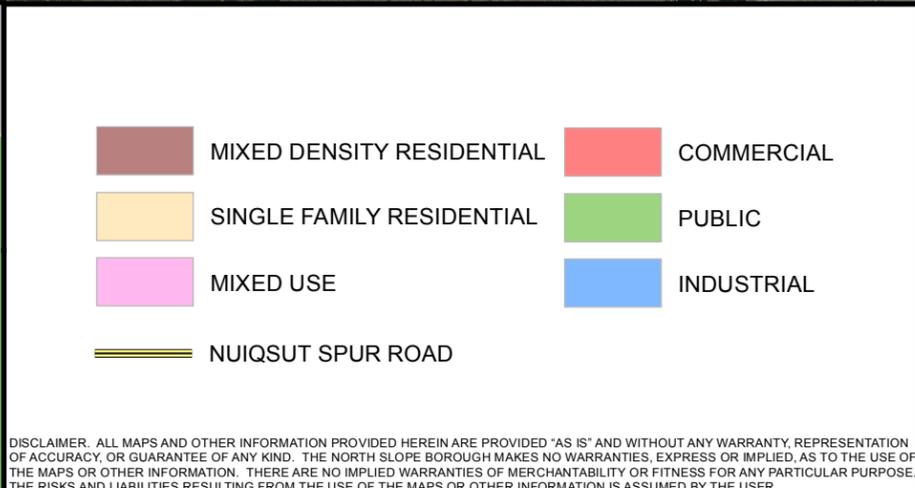
Colville River Road: A 4-mile extension to the Freshwater Lake Road to the Colville River has been partially funded. In addition to a boat launch, other facilities at the road terminus would be needed, including a parking area for trucks and boat trailers and a portable toilet or other type of sanitation facility.

Airport Improvements: Residents have identified needed improvements for the airport, including extension of the landing strip to accommodate larger aircraft such as 747 jets. At a minimum, residents would like the landing strip to be paved. The area north of the landing strip, south of First Avenue, could be developed with commercial and industrial uses which would also serve as a buffer between the runway and residential areas. Storage yards and structures or small scale processing or light industrial uses would be appropriate for this buffer zone.

Subsistence. Nuiqsut residents repeatedly voice the community's need and commitment to protecting their subsistence resources and lifestyle. The Nuiqsut Area of Influence map, depicted in Figure 4, illustrates the subsistence resource area for Nuiqsut residents. Because the nearby Colville River Delta supports such a wide variety of mammals, birds, fish, and vegetation that are basic subsistence food sources, its continued protection is imperative. Additionally, the tundra ecosystem surrounding Nuiqsut and across the North Slope, supports caribou herds, an important subsistence food source. Cross Island in the Beaufort Sea is an important community base for whaling. These resources are central to the Nuiqsut residents and Iñupiat traditions. Oil and gas activity will continue to affect subsistence areas, including migration routes and hunter's access to lands. Keeping subsistence conflicts at the forefront of decision making will aid in preserving these resources for current and future generations.

Balance. The City of Nuiqsut is unique amongst communities on the North Slope and the vast majority of rural Alaska communities as well. Industrial development has flourished in the region and has surrounded Nuiqsut on three sides. While industrial development brings benefits – the proximity to another airport for emergency evacuations, larger Native village corporation shareholder dividends (which does not necessarily benefit all residents) and the proximity to seasonal employment to name a few – there are also drawbacks – such as reduced access to subsistence areas, potential of a significant environmental disaster, the loss of a viewshed.

The fundamental element of any community is the residents. Residents must be able to work together to overcome challenges facing their community. Without communication and cooperation, issues remain unresolved and polarization grows. Nuiqsut is at a crossroads. Industrial development has had a significant social impact on the community, in some instances creating a division of amongst those that feel strongly about protecting subsistence resources against those in favor of continued substantial industrial development. These opposing viewpoints could immobilize the community. Or residents could seek common ground, a balance, to work together for the betterment of the community.



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Chapter 4: Goals, Objectives and Implementing Strategies

The goals, objectives, and strategies in this plan are intended to reflect community values; address the SWOTs identified during the community meeting held during development of this plan; and address village-related issues presented in the 2005 Borough Comprehensive Plan. The goals express community values, the objectives further refine those goals, and the strategies highlight specific actions recommended by residents in planning sessions or identified in the *Paisanich* document. The nine goals presented in this chapter are not listed in priority order.

Each goal is accompanied by one or more objectives that further describe the intent and substance of the goal. The background section for each goal references issues identified in the *Paisanich* or the NSB Comprehensive Plan.

Each objective has one or more strategies that described actions to be taken. Strategies may establish a specific course of action to be accomplished by residents, village leadership, NSB staff, various permitting, funding entities, or other organizations. Village members participating in the formation of the goals, objectives, and policies include the Nuiqsut City Council, the Native Village of Nuiqsut Tribal Council, the Trapper School Student Council, Nuiqsut elders, Nuiqsut whalers, NSB School District Nuiqsut staff, NSB staff providing services in the village, and the Kuukpik Corporation board members. Village leadership references the elected Nuiqsut City Council, the Native Village of Nuiqsut Tribal Council and Kuukpik Corporation.

4.1 Goal 1 - Community Unity

Sustain community unity.

Nuiqsut residents identified community unity as a valued strength of the village: “Residents work together to thrive as a community.”

Background: This goal and associated Objective 1.1 address Objective 5 of the *Paisanich* to “Perpetuate traditional activities to assure transmission of cultural values to future generations.” Unity involves coming together to discuss and resolve community concerns or problems, share resources with residents in need, enjoy games and cultural events, and plan and implement projects to improve the quality of life. Facilities that host community gatherings are important assets to the community and should be maintained properly and

Goals are broad statements that describe long-term desired outcomes.

Objectives provide more specific information of what can be done to achieve a goal.

Implementing Strategies describe specific steps that will be taken to reach an objective.

upgraded when necessary. Residents seek the support of these facilities by the City Council, Tribal Council, Kuukpik Corporation, ASRC, and other regional corporations and NSB through capital investment and operation and maintenance resources, and from grants, and contributions from private industry.

Objective 1.2 of the Comprehensive Plan addresses Objectives 1, 2 and 3 of the *Paisanich*:

“Control the pace and magnitude of change to promote stable and beneficial socioeconomic conditions in the village;

Protect the natural environment and wild resources from adverse effects of industrial and technological activities; and

Establish the historical/cultural/subsistence resources and values of the village as major considerations in land-use planning, development, and operations.”

Objective 1.2 also addresses the following *Paisanich* framework for action:

“Through local initiatives and in alliance with supportive institutions, the village of Nuiqsut can influence the future of its cultural landscape in these major ways:

1. Consolidate village-centered powers of government, landownership, and administration to protect the village power proper and its near environs;
2. Strengthen existing and devise new cooperative agreements and administrative techniques that lead to strong village participation in the management of lands and seas beyond direct village control;
3. Seek application of existing authorities, such as North Slope Borough zoning ordinances and state and federal laws, that:
 - a. Improve socioeconomic conditions
 - b. Control environmental pollution
 - c. Protect natural and cultural resources and values
 - d. Recognize traditional land use rights and privileges
4. Seek new authorities that increase village influence on plans and decisions at regional, state, and federal levels.”

This Goal 1 supports Goal 4 and Policy 4 of the NSB Comprehensive Plan:

“Goal 4: Increase local voice in decision making to maintain local land rights. Policy 4: Seek out and include local resident recommendations during general and project specific planning activities¹⁹⁴.”

¹⁹⁴ North Slope Borough. *North Slope Borough Comprehensive Plan*. Prepared by URS Corporation for the North Slope Borough. October 2005. pp. 2-15

Table 15: Goal 1 – Sustain Community Unity.

Objectives	Implementing Strategies
1.1. Support community gatherings, cultural activities, whaling activities, and active recreation which foster intergenerational communication, strengthen Iñupiaq values, and promote healthy communities.	a. The City Council and NSB will coordinate with the Tribal Council, Kuukpik Corporation, and other funding entities to ensure that the community has both an indoor and outdoor <i>qalgi</i> (gathering place) such as an open field, outdoor recreation area, traditional trading center, cultural arts/dance center, or community center or gym. These facilities will include improvements such as drinking water, trash receptacles, wind screens, restrooms, lighting, parking, and storage.
1.2. Facilitate the interaction of Elders and youth in the schools, local leadership venues, hunting and food preparation activities, and other similar activities to foster understanding and for Elders to pass on traditional knowledge, values and skills to youth.	A. Trapper School and Iļisagvik College leadership and teachers will host cultural camps and classes with feature Elders sharing knowledge about subsistence activities, songs, dances, language, values, and other cultural resources to strengthen community unity and cultural perseverance.
	b. Village leadership will identify Elders who would serve as teachers of cultural heritage and subsistence activities to youth in the schools, civic events, and will facilitate such exchange of information at civic events.
1.3. Foster collaboration among village leadership, as well as relevant private and public entities, in designing and implementing programs and projects benefiting the community.	a. Village leadership will keep each other informed of proposed projects, programs as well as research and funding opportunities so that there may be collaboration, as applicable, and the sharing of resources and resulting synergies in implementing projects that benefit the community.

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Objectives	Implementing Strategies
1.3. Foster collaboration among village leadership, as well as relevant private and public entities, in designing and implementing programs and projects benefiting the community (continued).	b. Village leadership and relevant Borough agencies will seek to ensure that all stakeholders in the community are made aware of and their input is solicited regarding proposed research and development projects located within the community's Area of Influence.
	c. Village leadership and relevant Borough agencies will seek to ensure that relevant State and Federal agencies and private entities are made aware of research and development projects located within the community's Area of Influence. When appropriate, sufficient time will be allowed these agencies and private entities to comment on proposed projects that may affect their interests or lands.
1.4. Seek a common community vision for preservation of subsistence and industrial development.	a. Gain a clear understanding of where residents stand on the issue(s).
	b. Seek assistance from an unbiased mediator to facilitate discussion without being perceived to take one side over another.
	c. Hold community meeting(s) for discussion on the issues that divide the community. Include discussion on the effects of community division and consensus building – a community decision is not necessarily optimal or that everyone agrees. It may be a decision or way forward that residents can “live with”.
	d. Consider attempting to reach a consensus in smaller groups to facilitate agreement in a larger one.

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Objectives	Implementing Strategies
1.4. Seek a common community vision for preservation of subsistence and industrial development (continued).	e. Establish a working group comprised of representatives from each of the village leadership entities to strategize on ways to achieve community consensus.

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4.2 Goal 2 - Subsistence Resources and Activities

Protect subsistence resources and activities.

Subsistence is a way of life for a majority of residents in Nuiqsut and it is important to protect both subsistence resources and uses. Wildlife and their habitat are life- and culture-sustaining resources to Nuiqsut residents. It is imperative that these resources, and access to them, are protected and nurtured for generations to come. Residents must teach subsistence knowledge and skills to youth so it can be passed on to future generations. This knowledge includes traditional hunting, fishing, and gathering skills; understanding of the land, air, and waters; and an understanding of actions needed for the protection of wildlife and its habitat.

Goal 2 and its associated objectives address the objectives and framework for action of the *Paisanich* as noted above in Objective 1, as well as Critical Matter Numbers 1 and 3 of the *Paisanich*:

Critical Matter Numbers 1 and 3 of the *Paisanich* state:

1. "The village should set high standards of protection for its own land and resource uses. These standards should complement federal and state laws and guidelines within an enlightened regional management system . . . To the extent possible, the village should be its own regulator and enforcer, with assistance from the borough's public safety office when required."
3. "Village and Borough should work closely with the State Department of Natural Resources to strengthen the protective features of the State's land classification scheme east of the Colville River. At present, all of this state land is classified as Resource Management except for the pipeline utility corridor and specific industrial sites around Prudhoe Bay. The multiple-use Resource Management classification is compatible with oil and gas development. Some protection is provided by an overlay Special Land Use stipulation, which requires a special permit for surface-disturbing activities. All of the present retention classifications (lands to be retained in state ownership) are multiple-use categories; however, one classification, Wildlife Habitat, is more compatible with the cultural landscape than the others. The current land classification situation makes urgent the need for cooperative management agreements and borough zoning and activity ordinances to control industrial uses. In addition, joint land use planning should aim for reclassification of critical areas as Wildlife Habitat."

Goal 2 and its associated objectives address the following policy of the NSB Comprehensive Plan¹⁹⁵:

“Economic development activities within villages should avoid or minimize uses of areas and resources important to subsistence and traditional activities.” [Policy 2.2.4.58, pp. 2-33]

Regarding Objectives 2.1, 2.3, 2.6, and 2.7, at times there are numerous scientific studies and oil company exploration projects that utilize helicopters to survey lands and to provide transit for work crews to and from sites within the Nuiqsut subsistence Area of Influence. There are also commercial hunting tours that use helicopters to transport guests and supplies in and out of the area. This air traffic is noisy and creates shadows that frighten wildlife; both cause them to scatter, depleting their energy and creating stress. These disturbances cause caribou to avoid traditional migratory routes which then cause resident hunters to travel farther, at greater hazard and costs, to harvest their food.

Regarding Objective 2.8, warmer temperatures have caused cracks in the permafrost surrounding ice cellars. The cracks have allowed water from nearby ponds to seep into and flood ice cellars. This warming of the ice cellars has also caused meat to spoil and the fat from muktuk to separate from the skin, wasting food. Objective 2.8 proposes strategies to address this problem.

¹⁹⁵ North Slope Borough. *North Slope Borough Comprehensive Plan*. Prepared by URS Corporation for the North Slope Borough. October 2005.

Table 16: Goal 2 – Protect Subsistence Resources and Activities.

Objectives	Implementing Strategies
2.1. Provide stewardship for the land and subsistence resources, and promote Native culture and the traditional lifestyle.	a. Village leadership will work with North Slope Science Initiative staff to enhance communication and coordination with research organizations to identify best available technologies and management practices to sustain healthy subsistence wildlife resources. Applicable staff members work in the Planning and Community Services, Law, Wildlife Management, and Health departments. Coordination should also occur with non-Borough entities such as the North Slope Science Initiative (NSSI), National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), U.S. Bureau of Ocean Energy Management (BOEM), Alaska Department of Fish and Game, University of Alaska, industry researchers, and others.
	b. Village leadership and NSB staff will seek effective documentation of local and traditional knowledge of wildlife habitat, migratory patterns, weather, currents, ice conditions, and the like, and will communicate that knowledge to state and federal resource management agencies and to staff of public and private science projects and programs.
	c. When changing conditions warrant, village leadership will work with the NSB staff to formulate adaptive land and resource management practices, measures and permit stipulations to ensure adequate stewardship of land, water, and wildlife resources.
2.2. Support responsible resource development that avoids or minimizes impacts on subsistence resources.	a. Village leadership will work with the NSB, state, and federal permitting agencies to discourage harmful resource development in or near sensitive biotic resources, such as major rivers, lakes, or marine areas and other important habitat. Village leadership will encourage the NSB Planning Department to require adequate mitigation measures when oil and gas activities on Borough permits to avoid or minimize potential adverse impacts to biologically-sensitive areas, especially when environmental analyses have indicated that the activities may cause adverse environmental impacts.
	b. Village leadership will work with relevant agencies and industry representatives to monitor development projects to ensure mitigation measures are effective.

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Objectives	Implementing Strategies
2.2. Support responsible resource development that avoids or minimizes impacts on subsistence resources (continued).	c. Village leadership will work with the NSB Commenting Committee when reviewing and commenting on state or federal actions, environmental impact studies and permit applications for industrial activity proposed on or near sensitive habitat within Nuiqsut’s Area of Influence.
	d. Village leadership will work with relevant agencies and industry representatives to ensure industrial development proposed for waterbodies in the Nuiqsut Area of Influence adheres to best available technologies (BATs) and best management practices (BMPs) to avoid, minimize or if necessary, remediate contaminated or disturbed sites resulting from the activity.
	e. Applicants for new or expanded development within the Nuiqsut Area of Influence will be encouraged to provide written measures that specify avoidance procedures or mitigation measures for potential adverse impacts, particularly impacts to water, wildlife, vegetation, soil, and human health.
	f. Village leadership will work with permitting agencies and industry representatives to obtain commitments for contributing financial resources to a subsistence mitigation fund or similar program to mitigate impacts, such as displacement of wildlife and the resulting hardships to residents who must travel greater distances with increased safety risks to obtain subsistence resources.
2.3. Air, land or water travel by tourists, sport hunters, researchers, or industry should minimize disturbance to wildlife, particularly during sensitive or critical periods such as migration, calving, breeding, nesting, or harvesting periods.	a. Village leadership will work with the North Slope Science Initiative staff and the NSB Wildlife Management Department staff to use local and traditional knowledge and scientific information to develop guidelines for non-subsistence hunters and travelers within the Nuiqsut Area of Influence. The guidelines will educate users on how to avoid harassment of wildlife, follow proper hunting and travel etiquette, avoid potential safety hazards, and prevent damage to habitat. Village leadership will encourage the NSB to publish and distribute these guidelines.
	b. Village leadership will continue to collaborate with permitting agencies and tour operator representatives in monitoring the tour operators’ activities and ensure enforcement of permit stipulations, including appropriate procedures for travel within wildlife habitat.

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Objectives	Implementing Strategies
2.4. Ensure trapping, hunting, and fishing rights are available for Nuiqsut residents now and for generations to come.	a. Village leadership will work with NSB Wildlife Management Department staff to ensure that NSB and local hunters' voices are present at federal (particularly the USFWS) and state (particularly the Alaska Fish & Game) agency meetings to support the continued hunting of subsistence wildlife within the Nuiqsut Area of Influence.
	b. Village leadership will work with state and federal agencies to monitor, and when necessary, intervene in proposed state and federal government agency changes to hunting regulations that may be applied to residents (e.g. number and length of permits, changes in bag limits, access limits, and other new restrictions or lessening of restrictions that may occur as a result of changes to wildlife population numbers or behaviors). They will seek to ensure that regulations are consistent with both scientific principles and local and traditional knowledge.
	c. Village leadership will coordinate with NSB Wildlife Management Department staff to provide current information on wildlife populations to federal and state agencies to support the continued hunting of subsistence wildlife within the Nuiqsut Area of Influence.
2.5. Ensure that private industry operating procedures, regulations or protocols do not restrict Village residents' access to subsistence lands and waters.	a. Village leadership will work with state and federal permitting agencies to ensure security measures and procedures used by the operation do not unduly restrict or reduce access to wildlife by Nuiqsut subsistence hunters.
	b. In order to minimize displacement of wildlife, village leadership will encourage use of land use permit stipulations for new and expanding industrial activity will require, to the greatest extent feasible, minimizing the footprint of the industrial and support uses. When possible, industry will be encouraged to co-locate or share facilities, such as roads and pipeline corridors, to achieve minimal impact on subsistence land and waters.

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Objectives	Implementing Strategies
2.6. Use of helicopters and low-flying aircraft within the Area of Influence should be regulated and operated in such a way as to minimize disturbance to wildlife.	a. Village leadership will work with permitting agencies to include stipulations for industry, scientific or sport hunting helicopter travel over subsistence lands and waters to minimize the number and frequency of flights during wildlife migratory, nesting, brooding, denning, or fledging periods in order to avoid harassment to wildlife and subsistence hunters.
	b. Village leadership will work with permitting agencies to develop stipulations that require communications with a village-designated Nuiqsut resident coordinator, such as the Village Liaison or Fire Chief, to inform them of the schedule and routes of upcoming flights as well as the number and color of the aircraft. The coordinator would communicate this information by very high frequency (VHF) radio to subsistence users known to be in the area(s) of those flights. Any complaint of harassment to wildlife or hunters will be communicated to the village representative who will communicate this information to the NSB Planning Department for follow-up activities.
	c. Improved tracking of aircraft takeoffs and landings will provide more information on which to determine the extent of air traffic disturbance and methods that could be used to mitigate its impact.
2.7. Support appropriate scientific research in Nuiqsut and its Area of Influence and coordinate scientific research to minimize disturbance to wildlife, land and waters.	a. Village leadership will work with permitting agencies to implement permit requirements for all researchers to advise the Village Liaison and Village leadership of field research activities within the Nuiqsut Area of Influence prior to their commencement.
	b. Village leadership will work with the North Slope Science Initiative and NSB Wildlife Management Department to require applicants for research activities to provide results of research and relevant information to village leadership and the NSB Wildlife Management Department.
	c. When changing conditions warrant, village leadership will work with permitting agencies to implement adaptive land and resource management practices, measures, and permit stipulations to assure proper stewardship of land, water, and wildlife resources.

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Objectives	Implementing Strategies
2.8. Protect and enhance food storage ice cellars.	a. Village leadership will seek local or regional grant-writing expertise to seek funding for rehabilitating or repairing damaged or failing ice cellars or creating new ice cellars for individual or village cooperative use.
	b. Village leadership will work with NSB staff to develop building setback standards or permit stipulations to protect existing ice cellars from damage related to new construction in close proximity to the cellars.
	c. Village leadership will work with grant writing expertise to seek funding to investigate the feasibility of installing thermo-siphon equipment on ice cellars or other and measures to keep existing ice cellars cold and dry.

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4.3 Goal 3 - Meaningful Participation

Seek meaningful participation in civic affairs and in the permitting of external activities that influence wildlife, subsistence activities, and community life.

Residents seek more meaningful participation in government and industry public involvement processes and in using traditional and current knowledge about the lands, air, and waters that may be affected by external activities.

Residents spend considerable time meeting with, and testifying before, government planning and permitting agencies and companies proposing development to ensure activities do not impair subsistence uses or resources. Residents report that actions by some government agencies and development companies do not adequately reflect the comments they made in writing or during public meetings. They express concern that hours they spend preparing for and presenting testimony is wasted because their comments are ignored.

Goal 3 and associated Objective 3.1 address the following objectives and Critical Matter 1 of the *Paisanich* copied below:

1. “Control the pace and magnitude of change to promote stable and beneficial socioeconomic conditions in the village;
2. Protect the natural environment and wild resources from adverse effects of industrial and technological activities; and
3. Establish the historical/cultural/subsistence resources and values of the village as major considerations in land-use planning, development, and operations.”

“Through local initiatives and in alliance with supportive institutions, the village of Nuiqsut can influence the future of its cultural landscape in these major ways:

1. Consolidate village-centered powers of government, landownership, and administration to protect the village power proper and its near environ;
2. Strengthen existing and devise new cooperative agreements and administrative techniques that lead to strong village participation in the management of lands and seas beyond direct village control;
3. Seek application of existing authorities, such as North Slope Borough zoning ordinances and state and federal laws, that:
 - Improve socioeconomic conditions,
 - Control environmental pollution
 - Protect natural and cultural resources and values,
 - Recognize traditional land use rights and privilege; and

4. Seek new authorities that increase village influence on plans and decisions at regional, state, and federal levels.”

The *Paisanich* Critical Matter Number 1 states: “The village should set high standards of protection for its own land and resource uses. To the extent possible, the village should be its own regulator and enforcer, with assistance from the Borough’s public safety office when required.”

Goal 3 and Objective 3.1 address the following policy of the NSB Comprehensive Plan: “Include villages in the notification and decision-making process before permits are issued” [Policy 2.2.20, pp. 2-21].

Table 17: Goal 3 – Seek Meaningful Participation.

Objectives	Implementing Strategies
<p>3.1. Village leadership will work with State, Federal, NSB and industry representatives to ensure that activities proposed for land, air and waters located within the Nuiqsut Area of Influence maintain a healthy environment and assure ease of access to subsistence resources by Nuiqsut residents.</p>	<p>a. Village leadership will review and comment on state and federal resource planning and management documents as well as state, federal, and NSB permit applications for activities proposed for land, air, and waters located within the Nuiqsut Area of Influence to impart local knowledge of these resources, ways to protect them during and after the proposed activities, and ways to assure ease of access by subsistence users. NSB will incorporate this knowledge into the formulation of permit stipulations and the enforcement of those stipulations.</p>
<p>3.2. Village leadership will work with NSB, State, and Federal regulators and industry to promote the use of best available technologies (BATs) and best management practices (BMPs) that minimize, to the greatest extent practicable, toxic and harmful industrial emissions that degrade local air, land and water quality.</p>	<p>a. The City Council and NSB will continue to communicate with state and federal agencies with jurisdiction for surface and subsurface resources within the Nuiqsut Area of Influence and with applicants seeking approval for a new development or significant expansion of an existing development, requesting that they:</p> <ol style="list-style-type: none"> 1) Provide information to residents that is complete and in a clear and understandable manner for proposed projects or planned actions that may affect local resources or uses at the earliest possible time in advance of final decision making; 2) Provide ample time for local review, consideration, and comment by community leadership on a proposed development or action; and 3) Prepare and distribute to the community in a timely fashion a document summarizing their response to comments received by residents, or schedule follow-up community meetings to inform the community if and how comments were considered in the final project design or agency action.

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Objectives	Implementing Strategies
<p>3.2. Village leadership will work with NSB, State, and Federal regulators and industry to promote the use of best available technologies (BATs) and best management practices (BMPs) that minimize, to the greatest extent practicable, toxic and harmful industrial emissions that degrade local air, land and water quality (continued).</p>	<p>b. Village leadership will continue to work with the NSB on proposed major capital projects in the village and its Area of Influence to pursue strategies that ensure meaningful participation in the planning, funding, design, construction, operation, and maintenance of those facilities.</p>
	<p>c. Village leadership will continue to work with permitting agencies and industry representatives in developing mitigation measures and permit stipulations for industry located within the Nuiqsut Area of Influence to avoid negative impacts of industry on village life and on subsistence activities. Village leadership will continue to work closely with NSB and other government permitting agencies to ensure that permit stipulations for projects located within the village Area of Influence are properly and adequately enforced.</p>
	<p>d. Village leadership will work with regional corporations to provide training to residents, including young adults, to ensure meaningful local engagement, review, and comment. Training should include, but not be limited to, making sure village leadership understand regulatory agencies' roles and functions and understand how to best coordinate community comments on permit applications, and communicate those comments to the reviewing agencies in a timely fashion.</p>
	<p>e. Village leadership will work with NSB staff to ensure meaningful participation in the timely review and update of land and resource plans and programs, including cultural resources.</p>
	<p>f. Village leadership will work with NSB staff, funding agencies and appropriate health professionals to conduct and update baseline studies documenting current health conditions and characteristics of village residents. Such studies will measure and analyze both outdoor and indoor air quality.</p>

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Objectives	Implementing Strategies
<p>3.2. Village leadership will work with NSB, State, and Federal regulators and industry to promote the use of best available technologies (BATs) and best management practices (BMPs) that minimize, to the greatest extent practicable, toxic and harmful industrial emissions that degrade local air, land and water quality (continued).</p>	<p>g. For new or expanded industrial development within the Nuiqsut Area of Influence, village leadership will work with permitting agencies to develop permit stipulations requiring submission of data about project-related emissions that could impact village residents or the subsistence foods they depend on. If the NSB determines that project emissions may adversely impact residents or their food sources, permit stipulations should require the applicant to conduct a Health Impact Assessment (HIA) that identifies potential impacts and appropriate mitigation measures.</p>
	<p>h. Village leadership will work with NSB Planning Department staff and relevant government agencies to implement permit stipulations that require the use of BATs and BMPs in their operations in order to minimize adverse impacts to valued resources within the Nuiqsut Area of Influence.</p>

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4.4 Goal 4 - Adequate Housing

Support the provision of adequate housing for households of all income levels.

In Nuiqsut, it is common for three generations to share a three-bedroom home, resulting in overcrowding. As explained in Section 2.3.2, 94 percent of homes in Nuiqsut were considered by TNHA to be overcrowded in 2010. TNHA no longer wishes to maintain rental housing and has sold its rental units. Without a supply of rental housing, it will be difficult for young adults and new families to find entry level housing. The costs of construction are high as is the cost to extend roads, water, sewer, and power utilities to new lots. As a result, it will be important to facilitate the development of new housing in areas that are already served by roads, power, water, sewer, and communications utilities.

Goal 4 and associated Objective 4.1 address the following policies of the NSB Comprehensive Plan (NSB 2005):

“Document housing needs for each village and incorporate into village comprehensive plans or the Borough Comprehensive Plan (Policy 2.2.7.101, pp. 2-47).

Emphasize compactness in community development during project planning to minimize operations and maintenance costs of community infrastructure (Policy 2.2.1.14, pp. 2-18)”.

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Table 18: Goal 4 – Support the Provision of Adequate Housing for All Income Levels.

Objectives	Implementing Strategies
4.1. Support efforts by the village, TNHA, other non-profit organizations, and private parties to provide safe, sanitary, affordable, and energy-efficient housing of all types within the village.	a. Village leadership will work with the NSB to determine if changes are warranted to the Title 19 Zoning Code to encourage construction of new housing. The purpose of these changes are to promote in-fill housing development on vacant lots and the rehabilitation or redevelopment of dilapidated structures to higher-density housing in areas already served by water, sewer, and other utilities. This effort may involve creation of new types of zoning districts that promote mixed uses and higher densities in areas already served by utilities by making them allowed as-of-right with administrative approval. It is noted that for multi-family structures, an adjacent area for storage of subsistence vehicles, equipment, and food (ice cellars) will be necessary.
	b. Village leadership will work with the Mayor’s Housing Office and housing developers to identify potential lots within the water and sewer service areas that are suitable for duplex or higher density housing development.
	c. Village leadership will collaborate with the NSB Housing Office and TNHA to seek funding and expertise to survey, establish clear title, and to transfer ownership of suitable buildable lots to TNHA or another non-profit housing developer to build energy-efficient homes.
	d. Housing for all income levels, particularly working families, should be provided.
	e. Village leadership will work with grant-writers, TNHA, other non-profit and for-profit housing developers, the Alaska Housing Finance Corporation (AHFC), and other financial institutions and foundations to seek affordable financing for homeowners to expand their homes to alleviate overcrowding.
	f. Village leadership and grant-writers will seek funds to continue retrofits to install insulation, passive ventilation systems (<i>Qingok</i>), and other alternative building techniques that reduce energy consumption in existing houses.
	g. Village leadership will work with state and federal agencies to get Federal funds and knowledge to build, repair, and maintain new energy efficient, arctic climate appropriate housing; the Native Village of Barrow has an example of such a program.

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Objectives	Implementing Strategies
4.2. Provide energy-efficient, arctic climate appropriate, and affordable housing in shareholder subdivisions.	a. Village leadership will seek funds to build new arctic-climate and energy efficient homes on shareholder lots where roads and utilities exist or can be provided on a cost-effective basis. b. Village leadership will seek cost effective methods to provide utilities to new shareholder lots, such as through Special Assessment District funding or other methods.

4.5 Goal 5 - Economic Development

Facilitate economic development activities that meet both day-to-day employment needs of residents and those of future generations.

Residents seek greater opportunities for year-round, fulltime employment. Residents see hundreds of out-of-state workers traveling to and from oil and gas industry facilities on a regular basis yet very few residents are employed by those companies.

During community meetings, residents often expressed the need for jobs and job training along with the need for day care to enable families with children to work. Residents prefer employment opportunities that are compatible with subsistence resources and activities and provide sustained and meaningful employment to residents. Residents seek employment in nearby industry and support services so that they may remain in the village and raise their families thereby sustaining their culture and the health and vitality of their family and community.

The purpose of Goal 5 and associated objectives 5.1 and 5.2 is to facilitate new business opportunities within the village, some of which could be operated out of homes. This goal addresses Objective 1 of the *Paisanich* which states: "Control the pace and magnitude of change to promote stable and beneficial socioeconomic conditions in the village."

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Table 19: Goal 5 – Facilitate Economic Development.

Objectives	Implementing Strategies
5.1. Designate land and provide adequate infrastructure in appropriate locations for community business activities.	a. The village leadership will work with the NSB Planning Department to determine if amendments to the Title 19 zoning and land use code is needed to encourage economic opportunities related to new local businesses, alternative energy systems, eco-tourism, cultural-tourism, scientific research activities, and commercial recreation.
	b. The village leadership will work with the NSB Planning Department to determine if amendments to Title 19 are needed to establish new types of zoning districts to reflect relevant Nuiqsut Land Use Plan designations for tourism-related activities such as lodging, bed and breakfast establishments in homes, campgrounds, sanitary and shower facilities, food service, tourism operations, commercial recreation operations, arts and crafts shops, or museums.
	c. Village leadership will seek funds from government entities, corporations, and private foundations to study the feasibility of establishing new businesses related to energy conservation, renewable energy sources, and greenhouse agriculture.
5.2. Facilitate the establishment of community-serving businesses and services.	a. Village leadership will work with the NSB to determine if amendments to Title 19 zoning land use code is needed to provide flexible zoning and development standards to facilitate development of the following community-serving uses: Greenhouses, sale of locally grown or hunted foods, a cultural center/museum, an appliance and small vehicle repair shop, and various tourism-related facilities, and services such as lodging, restaurants, and tours.
	b. Village leadership will work with the NSB School District and Iḷisaġvik College to provide education, training, and certification program to residents who seek to learn construction trades, vehicle repair, and maintenance skills, and other service and repair skills that are useful to have available locally.
5.3. Seek greater employment by residents in oil and gas industries located within the Nuiqsut Area of Influence.	a. Village leadership will continue to work with industry representatives and the NSB School District and Iḷisaġvik College to (1) identify job opportunities in area industry; (2) to recruit and train residents to fill these jobs; (3) to require an effective hiring outreach, training, and internship program for these jobs by industry applicants as an NSB permit stipulation.

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Objectives	Implementing Strategies
5.4. Ensure quality design and build by contractors doing business within the Nuiqsut Area of Influence.	a. Sponsors of design and build projects located within the Nuiqsut Area of Influence shall ensure that contractors provide designs, products, and builds that are arctic climate appropriate and that actually operate in the manner that was promised in the contract scope of work. Contractors must be held accountable for the quality of their work.

4.6 Goal 6 - Community Facilities

Maintain efficient public infrastructure, schools, community facilities, and transportation systems.

Nuiqsut has significant existing infrastructure, community facilities, and transportation systems (e.g., a gravel road network, piped water and sewer systems, electric power, drainage systems, and an airport runway). It will be important, however, to maintain this infrastructure and expand it to improve the quality of life in the community. For instance, better access to the Colville River is needed, and improvements to the Freshwater Lake Road is needed to address flooding.

Goal 6 and associated Objective 6.1 address the following the critical matters found on page 53 of the *Paisanich*:

“Critical Matter Number 4: Nuiqsut’s location on the Nigeluk (Nechelik) Channel of the Colville River was based on easy access to the river’s main channel for fishing and hunting. Recent closure of the channel to boat navigation by shallows and resultant unthawed ice has critically reduced access to subsistence sites. Village and Borough must quickly initiate a program to reopen this channel, in cooperation with concerned federal and state agencies.”

Goal 6 and associated Objective 6.5 address the following policies of the NSB Comprehensive Plan:

“Create a land use, development phasing, and improvement financing plan for the construction of roads and utilities in the Borough communities (Policy 2.2.1.11, pp. 2-16).

Develop cooperative agreements between the Borough, cities, tribes, and the corporation to expand roads and utilities to support housing construction (Policy 2.2.7.101, pp. 2-46).

Require those developing outside of current utility service areas to pay their fair share for extending service (Policy 2.2.1.15, pp. 2-21).

Require developers to pay their fair share for extending utilities and building roads (Policy 2.2.1.11, pp. 2-16).

Identify and map hazard zones in each village (Policy 2.2.5.59, pp. 2-34).

Develop alternative energy sources for Borough communities, such as coal, natural gas and wind power (Policy 2.2.7.97, pp. 2-45).”

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Table 20: Goal 6 – Maintain Public Infrastructure.

Objectives	Implementing Strategies
<p>6.1. The NSB should continue to maintain water, sewer, natural gas electric power, communication, and transport infrastructure in good operating condition and seek to increase energy efficiency and lower the energy costs of these facilities.</p>	<p>a. Village leadership will continue to monitor safe and affordable drinking water supply, treatment, and distribution facilities for current and future anticipated village needs.</p>
	<p>b. The NSB and village leadership will continue to support the provision of natural gas-generated electricity and home heating. Investments to assure this inexpensive energy source is cost-effective.</p>
	<p>c. The village leadership will work with the NSB to update the local hazard mitigation plan to identify village roads, utilities, and community facilities that may be vulnerable to damage caused by thawing permafrost, erosion, or flooding. The plan should include an analysis of the threat these impacts pose to the current location of facilities or to the entire village over the next 20 years or longer and identify appropriate actions to address these threats.</p>
	<p>d. Village leadership will provide a natural gas fueling station in the village.</p>
<p>6.2. Restrict development in hazardous areas, such as on or near contaminated sites or erosion-prone sites and require appropriate design and construction methods and materials for development on permafrost.</p>	<p>a. The village leadership will work with the NSB to determine if amendments to the Title 19 zoning and land use code are warranted to address development on erosion-prone areas, such as along the Nigliq Channel embankment. Such amendments could require projects to avoid erosion-prone areas unless those projects are engineered, designed, and constructed to mitigate any potential hazards to banks and downstream lands and waters.</p>
	<p>b. The village leadership will work with permitting agencies to determine how permit stipulations can be developed to require the design of new structures to minimize foundation settlement from melting permafrost.</p>
	<p>c. Village leadership will continue to work with the NSB staff to identify and map contaminated sites near the village, such as industrial dump sites, and determine if new requirements are needed to prohibit development on or near those sites until they are adequately remediated.</p>
	<p>d. The City Council will work with the NSB, TNHA, and the CCHRC to develop energy-efficient housing that uses alternative energy technologies.</p>

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Objectives	Implementing Strategies
<p>6.3. Upgrade the Nuiqsut airport landing strip with paving and expand as necessary to assure access by aircraft suitable for emergency medical evacuations and to serve the community's needs over the next 20 years.</p> <p>If deemed feasible and desirable by the community, establish the Nuiqsut airport as the air travel hub of the region.¹⁹⁶</p>	<p>a. Village leadership will work with the NSB and Federal Aviation Administration (FAA) and to forecast the air traffic needs of area industry and the community, including medivac needs, and will design and build the landing strip to accommodate those projected needs.</p>
	<p>b. Village leadership will coordinate with industry representatives, NSB and state and federal agencies to investigate the feasibility of improving the Nuiqsut airport to serve as a regional hub (e.g., investigating the types of air traffic volume, aircraft types, runway size and dimensions, telecommunication facilities, storage, and other support facilities and services that would be needed). If a regional hub airport is deemed feasible and desirable, the village leadership will work with the NSB, industry user representatives, ADOTPF, and the FAA to collaborate on the design and funding of a regional airport at or near Nuiqsut and any support facilities and services needed for proper operation and maintenance of this facility.</p>

¹⁹⁶ ConocoPhillips of Alaska, Inc. (CPAI) expanded their Alpine Development Project by developing a satellite field in NPR-A called CD-5. CPAI constructed a bridge over the Nigliq Channel of the Colville River and Kuukpik built and owns a private spur road from the village to the CD-5 road. This road linking the community to the drill site provides an opportunity exists to expand the Nuiqsut runway to serve as the regional airport hub serving the nearby oil and gas industry in addition to accommodating current and future village travel needs and potential expansion of local tourism businesses. It is acknowledged that industry traffic through the village will change the character and livability of the village.

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Objectives	Implementing Strategies
6.4. Expand the external road systems when deemed feasible and desirable by the community.	a. When deemed desirable by the community, Village leadership, NSB, and ADOTPF will work with industry representatives to build road access to the Dalton Highway for access to and from Cross Island to support whaling activities.
	b. Village leadership will work with ADOTPF staff to review and comment on any proposed “Road to Resources” road to Umiat from the Dalton Highway, particularly with respect to impacts to caribou migration patterns or other subsistence resources and potential cumulative social impacts related to greater public access to the Nuiqsut Area of Influence.
	c. If deemed feasible and desirable by the community, village leadership with work with local, state, and federal permitting agencies and funding organizations to support construction of a road to Umiat connecting to the Alaska Department of Transportation’s “Road to Resources” Foothills Road to the Dalton Highway.
6.5. Support schools in providing quality education for youth and adults.	a. Support Trapper School and its Parent Advisory Council in seeking strategies, tools, and resources to reduce student drop-out rates and in providing healthy cultural and recreational activities for youth and adults.
	b. Support Ilisagvik College in providing on-site and distant learning classes and training for residents to learn construction, trades, vehicle maintenance and repair skills, and repair of appliances used by residents.
	c. Work with industry representatives for mitigation funds to expand training and certification programs which qualify residents seeking oil and gas industry jobs.
	d. Continue to provide daycare services with funding that makes the care affordable.
	e. Village leadership will seek to reinstate the DARE program in the school and support effective healthy alternatives to alcohol, drugs, and smoking use by youth and adults.
6.6. Research and adopt appropriate strategies to minimize the negative impacts of climate change to the village.	a. Research and prepare an adaptation plan and strategy for minimizing the impacts of climate change to stream bank erosion, subsidence in the townsite, hazardous ice travel, damage to ice cellars, and similar impacts.

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4.7 Goal 7 – Establish Future Land Use Designations

Establish future land use designations in and around the village to accommodate a balance of housing, commerce, services, and sustainable subsistence resources.

The intent of this goal is to determine if different zoning districts or land use designations would improve land management in and around the community particularly as it pertains to facilitating affordable housing, the provision of local-serving businesses, and providing local employment opportunities.

Comprehensive Plan Goal 7 and Objective 7.1 address the following policies of the 2005 NSB Comprehensive Plan:

“Develop community comprehensive plans to address existing and future growth and development needs. [Policy 2.2.1.14, pp. 2-18]

Establish means for communities to assume greater land use control, as well as corresponding fiscal responsibilities. [Policy 2.2.1.12, pp. 2-18]

Determine which communities desire zoning and enforcement mechanisms by conducting a survey in each village. [Policy 2.2.1.13, pp. 2-18]

Develop land use zones that encourage use of existing facilities and infrastructure in villages that desire zoning. [Policy 2.2.1.14, pp. 2-18]

Document sensitive subsistence use areas to avoid development in critical areas. [Policy 2.2.3.38, pp. 2-27]

Consider maintaining important subsistence areas as Conservation Districts, or rezone as Subsistence Districts. [Policy 2.2.1.17 and 18, pp. 2-19]

Review development plans for opportunities to decrease inefficient development. [Policy 2.2.1.26, pp. 2-21]

Encourage land uses that maximize the use of existing infrastructure. [Policy 2.2.1.26, pp. 2-21]

Economic development activities within villages should avoid or minimize uses of areas and resources important to subsistence and traditional activities. [Policy 2.2.4.58, pp. 2-33]”

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Table 21: Goal 7 – Establish Future Land Use Designations.

Objectives	Implementing Strategies
<p>7.1. Implement measures to protect subsistence resources while accommodating community-serving businesses, resource extraction industry and public facilities.</p>	<p>a. Village leadership will work with the NSB Planning Department to determine if amendments to the Title 19 zoning map and zoning code would be appropriate to establish a new type of zoning district for more effective protection of subsistence uses and resources (e.g., Subsistence Resource Conservation District) and determine the feasibility of establishing such a district for areas around the community of Nuiqsut.</p> <p>Village leadership will work with the NSB Planning Department and Nuiqsut residents to identify land areas and waters within the Nuiqsut Area of Influence that are critically important for subsistence and whether additional standards, such as prohibition from certain uses, are needed in Title 19 to protect those specific areas.</p>
	<p>b. Village leadership will work with the NSB Planning Department to determine if additional areas should be rezoned for public industrial use such as airport facilities, landfill, greenhouses, and industry-related indoor and outdoor (non-subsistence) storage areas.¹⁹⁷</p>
	<p>c. Village leadership will request the Planning Commission and Assembly to initiate amendments to the NSB Zoning Map and Zoning Code, as appropriate, to reflect the recommendations of the Future Land Use Map of this Plan.</p>

¹⁹⁷ While areas within the village district (i.e., within the city boundaries) can accommodate local industries, areas outside of the city boundaries, such as public airports, do not meet the criteria for any type of existing NSB zoning district.

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4.8 Goal 8 – Protect Historic and Cultural Resources

The rich culture and history of the area are important to the people of Nuiqsut, and they define who they are.

Goal 8 and associated Objective 8.1 address the following policy of the NSB Comprehensive Plan:

“Identify important cultural and traditional resources and activities in the vicinity of proposed resource development and incorporate into planning for impact avoidance and mitigation. [Policy 2.2.4.49, pp. 2-31]”

Table 22: Goal 8 – Protect Historic and Cultural Resources.

Objectives	Implementing Strategies
8.1. Continue to ensure that important cultural and traditional resources and activities located within proposed resource development areas are avoided and protected, and if disturbed or damaged, are properly mitigated.	a. The NSB is encouraged to continue requiring Traditional Land Use Inventory (TLUI) review and clearance for resource development and scientific research projects. If historic or cultural resources are found within the proposed development area, adequate mitigation measures will be required as permit stipulations.
	b. The City and NSB will install bilingual Iñupiaq and English signage in public spaces throughout the community to encourage the learning and use of Iñupiaq to preserve the language and the cultural values it expresses.

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4.9 Goal 9 – Arctic Appropriate Design and Construction

Ensure quality and arctic-appropriate design and construction of projects and products.

Table 23: Goal 9 – Ensure Quality Arctic-Appropriate Projects.

Objectives	Implementing Strategies
9.1 Projects located within the Nuiqsut Area of Influence will be properly designed and built with quality products and workmanship to withstand the harsh arctic climate.	a. Sponsoring agencies will hold contractors accountable for providing quality design, materials, and construction work and contracts will not be closed out until such work is inspected and deemed compliant with the contract work scope.

4.10 Consistency with the NSB Comprehensive Plan

In addition to the Borough Comprehensive Plan policies cited earlier in this chapter, the preceding goals and objectives of the Nuiqsut Comprehensive Plan are consistent with the following policies of the 2005 NSB Comprehensive Plan.

“Develop community comprehensive plans to address existing and future growth and development needs. [Policy 2.2.1.14, pp. 2-18]

Establish means for communities to assume greater land use control, as well as corresponding fiscal responsibilities. [Policy 2.2.1.12, pp. 2-18]

Determine which communities desire zoning and enforcement mechanisms by conducting a survey in each village. [Policy 2.2.1.13, pp. 2-18]

Develop land use zones that encourage use of existing facilities and infrastructure in villages that desire zoning. [Policy 2.2.1.14, pp. 2-18]

Document housing needs for each village and incorporate into village comprehensive plans or the Borough Comprehensive Plan. [Policy 2.2.7.101, pp. 2-47]

Emphasize compactness in community development during project planning to minimize operations and maintenance costs of community infrastructure. [Policy 2.2.1.14, pp. 2-18]

Document sensitive subsistence use areas to avoid development in critical areas. [Policy 2.2.3.38, pp. 2-27]

Consider maintaining important subsistence areas as Conservation Districts, or rezone as Subsistence, Districts. [Policy 2.2.1.17 and 18, pp. 2-19]

Include villages in the notification and decision making process before permits are issued. [Policy 2.2.20, pp. 2-21]

Review development plans for opportunities to decrease inefficient development. [Policy 2.2.1.26, pp. 2-21]

Encourage land uses that maximize the use of existing infrastructure. [Policy 2.2.1.26, pp. 2-21]

Create a land use, development phasing, and improvement financing plan for the construction of roads and utilities in the Borough communities. [Policy 2.2.1.11, pp. 2-16]

Develop cooperative agreements between the Borough, cities, tribes, and the corporation to expand roads and utilities to support housing construction. [Policy 2.2.7.101, pp. 2-46]

Require those developing outside of current utility service areas to pay their fair share for extending service. [Policy 2.2.1.15, pp. 2-21]

Require developers to pay their fair share for extending utilities and building roads. [Policy 2.2.1.11, pp. 2-16]

Identify important cultural and traditional resources and activities in the vicinity of proposed resource development and incorporate into planning for impact avoidance and mitigation. [Policy 2.2.4.49, pp. 2-31]

Economic development activities within villages should avoid or minimize uses of areas and resources important to subsistence and traditional activities. [Policy 2.2.4.58, pp. 2-33]

Identify and map hazard zones in each village. [Policy 2.2.5.59, pp. 2-34]

Develop alternative energy sources for Borough communities, such as coal, natural gas and wind power. [Policy 2.2.7.97, pp. 2-45]”

4.11 Potential 5-, 10-, and 20-Year Capital Asset Needs

Although population growth is expected to be low over the 20 years, there are a number of capital projects that the community currently desires or will need over this time period. Those projects are identified in Table 24. While the projects are not prioritized and may require greater detail, including cost estimates, the requesting or sponsoring entity will develop additional information when necessary (i.e., City Council, Tribal Council, or NSB).

Potential Funding Sources for Capital Projects: Funding for research and capital projects identified in this plan would likely come from state and federal funding sources, oil and gas industry representatives, Regional Native Corporations, the NSB CIP, the NPR-A Impact Mitigation Grant Program, and other grant sources.

Petroleum-related revenue strongly influences the availability of state funding for municipalities. The State of Alaska estimates that petroleum will contribute between 65 percent and 75 percent of General Fund unrestricted revenue for fiscal years 2015-2025¹⁹⁸. Additional restricted revenues from oil and gas activities are deposited in the Alaska Permanent Fund. Potential decreases in oil production will affect both the State of Alaska and the NSB budgets.

The Borough’s revenue is largely dependent on taxes from oil and gas infrastructure, and this revenue diminishes as facilities age. This revenue also affects the Borough’s bonding rating (i.e., the interest rate on borrowing money). Since bonds are the primary funding source for NSB capital projects, it is increasingly important that the community of Nuiqsut begin seeking alternative funding for capital projects such as from the Native Village of Nuiqsut, state, or federal agencies.

The NPR-A Impact Mitigation Grant Program receives funding from 50 percent of money received by the federal government from sales, rentals, bonuses, and royalties from federal

¹⁹⁸ Alaska Department of Revenue. Revenue Sources Book 2015 Fall. Accessed December 12, 2015. www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1226r

NPR-A oil and gas leases. The state must give a priority for use of these funds to subdivisions of the state most directly impacted by development of the leases¹⁹⁹. Nuiqsut, Barrow, Wainwright, Atqasuk, and the NSB receive funding from the program. Annual funding for affected municipalities from the program has varied since its inception, ranging from \$0 to \$28,000,000, depending on the amount of revenue generated by leasing.

Each community must submit qualifying grant applications to the Alaska Department of Commerce, Community and Economic Development to receive funding. With limited funds, proposals are highly competitive and require demonstration of community support for a project.

The City of Nuiqsut believes that a significant inequity exists in NPR-A funding. The combined total of direct and indirect funds that have been awarded to benefit Nuiqsut residents is similar to that awarded directly and indirectly for the City of Barrow. The City of Nuiqsut maintains that the impacts of oil and gas exploration and development on Nuiqsut are disproportionately much greater and that NPR-A funding should reflect that significant impact difference.

The City of Nuiqsut, by Resolution No. 2014-02, prioritized the following capital projects for funding by the North Slope Borough Capital Improvements Program: 1) acquisition of gravel for the road to the Colville River, 2) a study for design of a bridge or hardened culvert on the road to the existing boat ramp, and 3) airport improvements and expansion. In addition to those priorities noted by the City Council, the following projects are also needed: (1) The Public Works Heavy Equipment Shop has structural failure and needs to be replaced; (2) the community power grid is being upgraded but needs additional work and funding; (3) the power plant expansion is currently under-funded; and (4) the water/sewer connection project underway is under-funded.

Table 24 provides a list of capital projects that may be needed or desired in Nuiqsut over the next 5-, 10-, or 20-year period. It is assumed that current NSB facilities, such as buildings and large vehicles or equipment, will continue to receive normal maintenance and upgrades by the Borough to ensure safe and efficient operations for their remaining design life. This list does not include vehicles or “rolling stock” such as graders, water trucks, or buses. Some of the facilities and assets identified in the table would likely be sponsored and funded by NSB general obligation bonds, while others would be sponsored and funded wholly or in part by the City of Nuiqsut, BLM for the NPR-A, the Denali Commission, industry, and other entities.

¹⁹⁹ Alaska Department of Commerce, Community and Economic Development. National Petroleum Reserve-Alaska Impact Mitigation Grant Program Report to the Second Session of the Twenty-Eighth Alaska Legislature. January 2014. http://treasury.dor.alaska.gov/Portals/0/docs/blue_book/appendix_BO_v3_8.pdf.

Table 24: Potential Capital Asset Needs for 2015 to 2035.

Asset	1 - 5 Year Period	6 - 10 Year Period	11 - 20 Year Period
Housing	Identify overcrowding in households and estimate the number of homes to rehabilitate and construct to eliminate overcrowding.		
	Identify buildable lots within the existing utility network and survey and identify ownership (clear titles) for those lots.		
	Build sufficient housing to eliminate current overcrowding.	Building sufficient energy-efficient housing to accommodate growth.	Building sufficient energy-efficient housing to accommodate growth.
	Continue weatherization efforts to lower costs for all housing.		
Electric power plant upgrade	Upgrade the natural gas generator to allow for greater efficiencies of the natural gas system.		
Roads	Build a new 4-mile road to the Colville River south and east from the terminus of Freshwater Lake Rd.		
	Build a road extension to the new subdivision on the southeast area of the village.		
	Build a bridge over Freshwater Lake Road where it floods each spring. Build a bridge over the creek on the road to the boat launch.	Build a road to tie into the Dalton Highway to provide access to the Cross Island whaling area.	
Day Care Center	Expand the daycare center as needed to support working parents.		
Riverine Travel		Build a boat ramp on the Colville River at the terminus of the new road to the river.	

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Asset	1 - 5 Year Period	6 - 10 Year Period	11 - 20 Year Period
Sewer Service	Major equipment upgrades.	Extend lines to new subdivisions as needed to eliminate overcrowding and/or accommodate growth.	Extend lines to new subdivisions as needed to eliminate overcrowding and/or accommodate growth.
	Repair honey bucket cell liner and dike erosion damage.		
Washateria	Provide a washateria within the community; this may include showers for tourists.		
Water Service		Extend lines to new subdivisions as needed to eliminate overcrowding and/or accommodate growth.	Analyze long-term needs for the local potable water supply, treatment, and distribution for the village.
Public Works	Replace heavy equipment shop floor or replace the building if deemed more economically feasible.		
Campground	Build a campground with sanitation facilities, showers, and drinking water for tourists.		
Airport	Study the feasibility of paving the airport runway and, if funded by FAA, complete this project.	Study the feasibility and desire by the residents to expand the Nuiqsut airport runway and airport facilities to serve as a regional airport for the Alpine Development Project.	
Erosion	Analyze infrastructure and community facilities vulnerabilities to melting permafrost, erosion, or flooding due to climate change.	Design and build measures to avoid or mitigate against erosion hazards.	

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Asset	1 - 5 Year Period	6 - 10 Year Period	11 - 20 Year Period
Erosion (continued)	Evaluate erosion threats to the Niglik Channel bank and implement avoidance measures as necessary.		
	Analyze the desirability and feasibility of cooperative ice cellars and build them if feasible.		
Gravel	Assist in providing gravel to build the access road to the Colville River.	Provide a gravel source for new roads, repair of underground pipes, runway maintenance, and for sale to residents for driveways and to repair subsidence damage.	
Police	Provide a river boat for contraband inspection and enforcement.		
	Provide a drug-sniffing dog for contraband inspection and enforcement.		
SA-10 at Prudhoe Bay	Provide a public parking lot for residents to use when bringing vehicles to the village from the Dalton Highway.		
Trapper School	Although not a capital asset, the community needs assistance in providing a licensed driver for the school bus.		
Climate Change Impacts	Research and develop a risk management and climate-change related impact avoidance and adaptation plan.	Implement the climate change adaptation plan.	Continue to implement the climate change adaptation plan as necessary.

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Chapter 5: Implementation and Plan Revision

The Nuiqsut Comprehensive Plan is intended to be a living document. Because situations change, the Objectives tables in Chapter 4 have been designed to be stand-alone documents that can be updated to reflect current priorities and opportunities. The City Council and Borough may wish to update the tables each year as part of the joint process to develop an annual work plan and priorities for capital projects.

This Plan is a guide that provides direction for the village leadership when collaborating with the Borough, state, and federal agencies, and other organizations. For example, individual land use proposals can be evaluated against the future land use maps in Chapter 4. Such proposals may include housing subdivisions, transportation projects, recreational facilities, sanitation facilities, or other infrastructure. The designations in the future land use maps can also be reviewed when Title 19 is updated to determine if amendments are warranted to the types of zoning districts and the actual designations on the official zoning map.

Generally, community comprehensive plans have a 20-year outlook, and ideally, they are reviewed every two years and updated every five years. Regularly updating the Objectives tables in Chapter 4 will make it easier to complete the next update of the entire plan.

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References

- Alaska Consultants. 1983. Background for Planning, City of Nuiqsut. Prepared for the North Slope Borough. June 1983.
- Alaska Department of Commerce, Community and Economic Development. 2015. Community Database Online. Accessed 4 February 2015. <http://commerce.state.ak.us/cra/DCRAExternal>.
- _____. 2015. Division of Research and Analysis. *Population Adjustment*. www.commerce.alaska.gov/web/dcra/ResearchAnalysis/PopulationAdjustment.aspx. Accessed December 12, 2015.
- _____. 2014. National Petroleum Reserve-Alaska Impact Mitigation Grant Program Report to the Second Session of the Twenty-Eighth Alaska Legislature. January 2014. [http://treasury.dor.alaska.gov/Portals/0/docs/blue book/appendix BO v3 8.pdf](http://treasury.dor.alaska.gov/Portals/0/docs/blue%20book/appendix%20BO%20v3%208.pdf).
- _____. Division of Community and Regional Affairs. Community Photo Library.
- Alaska Department of Education and Early Development. 2015. Nuiqsut Trapper School, North Slope Borough School District. Accessed September 9, 2015. https://education.alaska.gov/DOE_Rolodex/SchoolCalendar/Home/SchoolDetails/360050#.
- _____. 2014. Report Card to the Public. Accessed September 9, 2015. <https://education.alaska.gov/ReportCardToThePublic/Report/2013-2014/36/360050>.
- Alaska Department of Fish and Game. 2014. Division of Subsistence. *Alaska's Economies and Subsistence*. Accessed 16 September 2014. [www.adfg.alaska.gov/static/home/library/pdfs/subsistence/ak economies subsistence.pdf](http://www.adfg.alaska.gov/static/home/library/pdfs/subsistence/ak_economies_subsistence.pdf).
- _____. 2014. Western Arctic herd declines, in *Caribou Trails*, Summer 2014, Issue 15.
- _____. 2003. Unpublished Nuiqsut subsistence harvest data, 1993. Division of Subsistence.
- _____. 2000. Community Profile Database, Volume 5, Arctic Region, Division of Subsistence, Alaska Department of Fish and Game, Juneau.
- Alaska Department of Health and Social Services. 2003. Division of Public Health, Section of Epidemiology. *Investigation of Respiratory Illness in Nuiqsut: Interim Report*. Prepared by Serstad JE, Jenkerson SA. November 2003.
- Alaska Department of Labor and Workforce Development. 2014. Accessed 15 March 2014. <http://live.laborstats.alaska.gov/alari>.
- Alaska Department of Natural Resources. 2015. Division of Oil and Gas. *North Slope Oil and Gas Activity Map*. November 2015. Accessed December 7, 2015. www.dog.dnr.alaska.gov/GIS/ActivityMaps.htm.
- _____. 2008. Division of Mining, Land and Water. Resource Assessment and Development Section. *Northwest Area Plan for State Lands*. October 31, 2008.

- Alaska Department of Public Health, Division of Vital Statistics. 2010. Birth Rates and Death Rates by Census. Accessed September 21, 2015.
www.hss.state.ak.us/dph/bvs/birth_statistics/Birth_Rates_Census/body17.html.
- Alaska Department of Revenue. 2015. Revenue Sources Book 2015 Fall. Accessed December 12, 2015. www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1226r
- Alaska Housing Finance Corporation. 2013. Cold Climate Housing Research Center. Prepared by Wiltse, N., Madden, D., Valentine, B., Stevens, V. *2013 Alaska Housing Assessment*.
www.ahfc.us/efficiency/research-information-center/housing-assessment
- Alaska Industrial Development and Export Authority. 2015. Mustang Road and Production Pad. October 2015. Accessed December 9, 2015.
www.aidea.org/Portals/0/PDF%20Files/PFS_MustangRoad.pdf
- Alaska Native Tribal Health Consortium (ANTHC). 2014. Center for Climate and Health. *Climate Change in Nuiqsut, Alaska: Strategies for Community Health*. Accessed July 14, 2015.
www.anthc.org/chs/ces/climate/bbs/upload/ClimateChangeIn-Nuiqsut-Alaska-Strategies-for-Community-Health-2.pdf.
- _____. 2010. Division of Environmental Health and Engineering. *Impact of Oil Development on Air Quality in an Alaska Native Village*. Jennifer Dobson, Troy L. Ritter. November 8, 2010.
- _____. 2009. Center for Climate and Health. *Climate Change Effects on Traditional Iñupiaq Food Cellars*. Brubaker, Michael, Jacob Bell and Alicia Rolin. Bulletin No. 1. June 26, 2009.
- Amstrup, S., DeWeaver, E., Douglas, D., Marcot, B., Durner, G., Bitz, C. and D Bailey. 2010. Greenhouse Gas Mitigation Can Reduce Sea-Ice Loss and Increase Polar Bear Persistence. Published in Nature. December 15, 2010. Accessed June 10, 2015.
www.nature.com/nature/journal/v468/n7326/full/nature09653.html
- Arctic Slope Regional Corporation. *Who We Are*. Accessed December 28, 2015.
www.asrc.com/Pages/default.aspx.
- Arnold, Cindy. Nuiqsut City Administrator. July 22, 2015. Personal Communication.
- Bradner, Tim. 2015. Caelus Aims to Unlock Vast Torok Oil Resource. Alaska Journal of Commerce. September 9, 2015. Accessed December 8, 2015. www.alaskajournal.com/business-and-finance/2015-09-16/caelus-aims-unlock-vast-torok-oil-resource#.VnHZTkorKyw.
- Brower, H.K. and R.T. Opie. 1996. *North Slope Borough Subsistence Harvest Documentation Project: Data for Anaktuvuk Pass, Alaska for the period July 1, 1994, to June 30, 1995*. Technical Report. Department of Wildlife Management. North Slope Borough. Barrow. Revised version.
- Brown, Gordon. 2010. Telephone conversation with Nuiqsut Public Works Manager. December 7, 2010.
- Burch, E. 2005. *Alliance and conflict: the world system of the Iñupiaq Eskimos*. University of Calgary Press.

- Burns, John. 1990. Proceedings of a Technical Workshop on Fishes Utilized in Subsistence Fisheries in National Petroleum Reserve-Alaska: Barrow, Alaska October 26-28. Prepared for North Slope Borough Department of Wildlife Management. Fairbanks.
- CAFF (Conservation of Arctic Flora and Fauna). 2001. *Arctic Flora and Fauna: Status and Conservation*. Website accessed July 14, 2015. www.caff.is/assessment-series/167-arctic-flora-and-fauna-status-and-conservation. Helsinki: Edita.
- Chinn, Ramona. 2015. Supervisory Land Law Examiner. U.S. Bureau of Land Management. Personal Communication. July 23, 2015.
- City of Nuiqsut. 2014. Resolution No. 2014-02.
- Cole, Dermot. 2015. *After \$35 million, State Pulls Plug on Umiat Road Project*. Anchorage Dispatch News. January 2, 2015. Accessed March 30, 2015. www.adn.com/article/20150102/after-35-million-state-pulls-plug-umiat-road-project.
- Congressional Research Service. 2005. *Alaska Land Transfer Acceleration Act: Background and Summary*. Library of Congress. January 2005. Accessed March 22, 2015. www.lbblawyers.com/anca/RL32734.pdf.
- ConocoPhillips. 2014. CD5 Construction. Website accessed 8 October 2014. www.alaska.conocophillips.com/Documents/Fact Sheet CD5 Construction final.pdf
- _____. 2010. Nuiqsut Ambient Air Quality Monitoring Program, First Quarter 2010 Data Summary, January 1 through March 31, 2010 by AECOM. August 2010.
- _____. 2010. Nuiqsut Ambient Air Quality Monitoring Program, Second Quarter 2010 Data Summary, April 1 through June 30, 2010 by AECOM. October 2010.
- _____. 2009. Final Nuiqsut Ambient Air Quality Monitoring Program, First Quarter 2008 Data Summary, January 1 through March 31, 2008 by AECOM. May 2009.
- _____. 2009. Final – Revision 01 Nuiqsut Ambient Air Quality Monitoring Program, Fourth Quarter 2009 Data Summary, October 1 through December 31, 2009 by AECOM. July 2010.
- _____. 2008. Final Nuiqsut Ambient Air Quality Monitoring Program, Second Quarter 2007 Data Summary, April 1 through June 30, 2007 by ENSR Corporation. 2008.
- Craig, P.C. 1987. *Subsistence Fisheries at Coastal Villages in the Alaskan Arctic*. 1970-1986. Technical Report No. 129. USDO, MMS Alaska OCS Region, Social and Economic Studies. Anchorage, Alaska.
- DeGeorge, Lynn. ConocoPhillips. Alaska Senior Environmental Coordinator. July 22, 2015 and October 6, 2015. Personal Communication.
- DeMarban, A. 2014. Nuiqsut Road to Alpine Oil Patch Receives Key Go-Ahead. Alaska Dispatch. March 12, 2014. Accessed May 4, 2015. www.adn.com/article/20140312/nuiqsut-road-alpine-oil-patch-receives-key-go-ahead.
- Eni. 2015. *Eni: Achieved the 25 Thousand Barrels Per Day Production Milestone at Nikaitchuq Oil Field in Alaska*. June 19, 2014. Accessed December 9, 2015. www.eni.com/en_IT/media/press-releases/2014/06/2014-06-19-Nikaitchuq.shtml.

- Ferrians, O., Kachadoorian, R. and G. Greene. 1989. *Permafrost and Related Engineering Problems in Alaska*. Geological Survey Professional Paper 678, United States Government Printing Office, Washington, 1969.
- Galginaitis, Michael and Dale Funk. 2005. Annual Assessment of Subsistence Bowhead Whaling Near Cross Island, 2003; ANIMIDA T Task 4 Annual Report. Prepared for the U.S. Department of the Interior, Minerals Management Service. OCS Study MMS 2005-025.
- Galginaitis, Michael S., Claudia Chang, Kathleen M. MacQueen, Albert A. Dekin Jr., and David Zipkin. 1984. *Ethnographic Study and Monitoring Methodology of Contemporary Economic Growth, Sociocultural Change and Community Development in Nuiqsut, Alaska* (Nuiqsut Case Study). Alaska Outer Continental Shelf Social and Economic Studies Program Technical Report No. 96. U.S. Department of the Interior, Minerals Management Service, Alaska Outer Continental Shelf Region: Anchorage, Alaska.
- Garoutte, Claude. 2015. Construction Services Project Manager. TNHA. July 15, 2015. Pers. Comm.
- George, J.C. and A.S. Fuller. 1997. Evaluation of Subsistence Harvest Data from the North Slope Borough 1993 Census for Eight North Slope Villages; for the calendar year 1992 Nuiqsut. Report by the Department of Wildlife Management, North Slope Borough. Barrow.
- George, J.C and R. Kovalsky. 1986. *Observations on the Kupigrvak Channel (Colville River) Subsistence Fishery, October 1985*. Department of Wildlife Management, North Slope Borough. Barrow, Alaska.
- George, J.C and B.P. Nageak. 1986. *Observations on the Colville River Subsistence Fishery at Nuiqsut, Alaska, for the Period July 4-November 1, 1984*. Department of Wildlife Management, North Slope Borough. Barrow, Alaska.
- Green, Ken. 2015. North Slope Borough Department of Capital Improvement Program Management, Program Administrator. December 14, 2015. Pers. Comm.
- Hall, E. 1983. *A Subsistence Study of Seven Lease Tracts in the National Petroleum Reserve in Alaska with Special Reference to the Proposed Brontosaurus Exploratory Well Site Area*. Report by Edwin Hall and Associates for ARCO Alaska, Inc. Anchorage, Alaska.
- Kilioni, Hina. 2015. Disaster Coordinator. North Slope Borough Department of Administration and Finance. Division of Risk Management. December 17, 2015. Email communication.
- Kruse, J. 2006. *Indicators of Social, Economic, and Cultural Cumulative Effects Resulting From Petroleum Development in Alaska: A Review*. University of Alaska, January 18, 2006.
- Kruse, J.A. 1982. *Subsistence and the North Slope Iñupiat: The Effects of Energy Development*. Institute of Social and Economic Research, University of Alaska. Anchorage.
- Kruse, John A., Judith Kleinfeld, and Robert Travis. 1981. *Energy Development and the North Slope Iñupiat: Quantitative Analysis of Social and Economic Change*. Man in the Arctic Program, Monograph No.1. Institute of Social and Economic Research, University of Alaska, Fairbanks, Alaska.

- Hoffman, D., Libbey, D., and G. Spearman. 1988. *Land Use Values Through Time in the Nuiqsut Area*. North Slope Borough and the Anthropology and Historic Preservation Section of the Cooperative Park Studies Unit, University of Alaska, Fairbanks, for the NPR-A Planning Team, 1978 and revised 1988.
- Impact Assessment, Inc. 1990. *Final Special Report: Subsistence Harvest Patterns: Nuiqsut*. Submitted to U.S. Department of the Interior, Minerals Management Service. OCS Study No. MMS 90-0038 Impact Assessment, Inc.
- Kuukpik Corporation. 2009. *Kuukpik Corporation Correspondence to the U.S. Corps of Engineers*. March 6, 2002 and October 19, 2009.
- Major, Mark. 2014. Consultant to Kuukpik Corporation. November 24, 2014. Personal Communication.
- Mikkelsen, Aslaug and Oluf Langhelle, eds. 2011. *Arctic Oil and Gas: Sustainability at Risk?* Routledge Explorations in Environmental Economics.
- Minerals Management Service. 2009. Synthesis: *Three Decades of Research on Socioeconomic Effects Related to Offshore Petroleum Development in Coastal Alaska*. Edited by Stephen R. Braund and Jack Kruse. Contract Number 1435-01-98-CT-30914; OCS Study MMS 2009-006. May 2009.
- _____. 2003. *Beaufort Sea Planning Area: Oil and Gas Lease Sales 186, 195, and 202*. Final Environmental Impact Statement. MMS 2003-001.
- _____. 2001. Alaska OCS Region. Environmental Studies Section. *The Bowhead Whale Subsistence Hunt and Outer Continental Shelf Oil and Gas Activities: A Research Design Workshop*. Final Summary Report.
- _____. 1998. *Beaufort Sea Planning Area. Oil and Gas Sale 170*. Final Environmental Impact Statement. MMS 98-0007
- _____. 1996. *Beaufort Sea Planning Area. Oil and Gas Sale 144*. Final Environmental Impact Statement. MMS 96-0012
- _____. 1990. *Beaufort Sea Planning Area. Oil and Gas Sale 124*. Final Environmental Impact Statement. MMS 90-0063.
- _____. 1986. *Beaufort Sea Sale 97*. Final Environmental Impact Statement. MMS 87-0069
- _____. 1983. Alaska OCS Region. Social and Economic Studies Program. *A Description of the Socioeconomics of the North Slope Borough*. Technical Report 85. September 1983.
- Moretti, Whitney. 2015. Environmental/Permitting Specialist. UMIAQ, LLC. Personal Communication. July 2015.
- Moulton, L.L. and L.J. Field. 1988. *Assessment of the Colville River Fall Fishery, 1985-1987*. Final Report. Prepared for ARCO Alaska, Inc., North Slope Borough and the City of Nuiqsut. Anchorage, Alaska. June 1988.
- Nicolos, Tom. 2015. Program Manager, Airports and Landfills. North Slope Borough Public Works Department. July 23, 2015 and December 16, 2015. Personal communication.

- Nielsen, J.M. 1977. *Beaufort Sea Study - Historic and Subsistence Site Inventory: A Preliminary Cultural Resource Assessment*. North Slope Borough, Barrow, Alaska.
- North Slope Borough. 2015. *North Slope Borough Municipal Code*.
www.municode.com/library/ak/north_slope_borough/codes/code_of_ordinances
- _____. 2014. *Areawide Gravel Resources Project Analysis Report*. Prepared by UMIAQ, LLC for the North Slope Borough Department of Capital Improvement Program Management.
- _____. 2014. *Health Indicators in the North Slope Borough, Monitoring the Effects of Resource Development Project*. Prepared by Habitat Health Impact Consulting for the North Slope Borough Department of Health and Social Services. June 2014. www.north-slope.org/assets/images/uploads/NSB_Indicators_Report_August_4_printable_FINAL.pdf.
- _____. 2014. *Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve-Alaska*. Prepared by Glenn Gray and Associates and URS Corporation for the North Slope Borough Department of Planning & Community Services. June 2014. www.north-slope.org/departments/planning-community-services/oil-and-gas-technical-report.
- _____. 2012. Official Zoning Map of the North Slope Borough Resource Development Districts. Adopted by the Assembly. July 10, 2012.
- _____. 2012. *Baseline Community Health Analysis Report*. Prepared by Jana McAninch, MD, MPH for the North Slope Borough Department of Health and Social Services. www.north-slope.org/assets/images/uploads/BaselineCommunityHealthAnalysisReport.pdf
- _____. 2010. *North Slope Borough 2010 Economic Profile and Census Report*. Prepared by Circumpolar Research Associates Shepro, C., Maas, C. and D. Gallaway with J. McAnich for the North Slope Borough. Accessed May 11, 2015. www.north-slope.org/your-government/census-2010
- _____. 2008. *North Slope Borough Emergency Operations Plan*. Three Volumes.
- _____. 2008. *North Slope Borough Utility Master Plan and Emergency Utility Plan*. June 2008.
- _____. 2007. *Coastal Management Plan Final Draft Amendment. Chapter 7: Resource Inventory, Analysis and Designated Areas*. July 2007.
- _____. 2005. *North Slope Borough Local All Hazard Mitigation Plan*. Prepared by Joe Stankiewicz, North Slope Borough Risk Management Division.
- _____. 2005. *North Slope Borough Comprehensive Plan*. Prepared by URS Corporation for the North Slope Borough. October 2005.
- _____. 2005. *North Slope Borough Comprehensive Transportation Plan*. Prepared by ASCG Inc. for the North Slope Borough. August 2005.
- _____. 2004. *City of Nuiqsut Local All Hazard Mitigation Plan*. Prepared by Joe Stankiewicz, North Slope Borough Risk Management Division.
- _____. 2004. *North Slope Borough 2003 Economic Profile and Census Report*. Volume IX. North Slope Borough Department of Planning and Community Services
- _____. 1995. *Resolution 95-05: Establishing the Guiding Principles for Nuiqsut Development*. North Slope Borough Planning Commission. June 30, 1995.

- North Slope Borough. 1989. *Coastal Management Program, Areas Meriting Special Attention Phase 1 Report*. June 1989.
- _____. 1979. *Nuiqsut Synopsis. In Native Livelihood and Dependence. A Study of Land Use Values Through Time*. Prepared by Libbey, D., Spearman, G, and D. Hoffman for the North Slope Borough. NPR-A. Work Group 1. Field Study 1.
- _____. 1978. *The Nuiqsut and Teshekpuk Lake Area Traditional Land Use Inventory*. North Slope Borough, Commission on Iñupiat History, Language and Culture, Barrow, Alaska
- Norton, David W. ed. *Fifty More Years Below Zero: Tributes and Meditations for the Naval Arctic Research Laboratory*. October 2001.
- NPRA Task Force. 1978. *Final study and study reports, NPR-A 105(c)*. Study Report #3 Socioeconomic Profile. By University of Alaska, Arctic Environmental Information and Data Center. Anchorage. 186 pp.
- Pardue, Margaret. 2010. Account Manager, Kuukpik Corporation. December 9, 2010. Personal Communication.
- Patterson, A. 1974. *Subsistence Harvests in Five Native Regions*. Joint Federal-State Land Use Planning Commission for Alaska. Anchorage, Alaska.
- Pedersen, S. 2000. *Large Mammal Subsistence Harvest Study, Nuiqsut 1999-2000*. Draft Results. Division of Subsistence, Alaska Department of Fish and Game, Fairbanks, Alaska.
- _____. 1995a. *Nuiqsut. Chapter XXIV In An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska*. OCS Study MMS 95-010. Technical Report No. 160. U.S. Department of the Interior, Minerals Management Service, Alaska Outer Continental Shelf Region, Social and Economic Studies Program. Anchorage, Alaska.
- _____. 1995b. *Overview of Recent Sociocultural Studies in Nuiqsut and Kaktovik, Alaska*. Report to Minerals Management Service Synthesis Meeting, Anchorage, Oct. 23, 1995. U.S. Department of the Interior, Minerals Management Service, Alaska Outer Continental Shelf Region, Social and Economic Studies Program. Anchorage, Alaska.
- _____. 1988. *Subsistence Land and Resource Use in Nuiqsut, Alaska 1985-1987*. Draft Manuscript. Division of Subsistence, Alaska Department of Fish and Game, Fairbanks, Alaska.
- _____. 1979. *Regional Subsistence Land Use: North Slope Borough, Alaska*. Occasional Paper No. 21, Conservation and Environmental Protection, North Slope Borough and Anthropology and Historic Preservation, Cooperative Park Studies Unit, Univ. of Alaska, Fairbanks, Alaska.
- Pedersen, S.R. Wolfe and R. Caulfield. 2000. *Subsistence Economies and Oil Development: Case Studies from Nuiqsut and Kaktovik, Alaska*. Alaska Department of Fish and Game, Division of Subsistence and University of Alaska, Department of Alaska Native and Rural Development. Coastal Marine Institute, University of Alaska and U.S. Dept. of Interior, Minerals Management Service. Anchorage, Alaska.
- Rozell, Ned. 2001. *Bowhead Whales May Be the World's Oldest Mammals*. Article #1529. Alaska Science Forum. Geophysical Institute, University of Alaska. Fairbanks.

- Stephen R. Braund & Associates. 2013. *Greater Mooses Tooth 1 Development Supplemental Environmental Impact Statement – Subsistence. Overview of Nuiqsut Subsistence Uses.* <https://eplanning.blm.gov/epl-front office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage¤tPageId=50912>. October 2013.
- _____. 2010. *Subsistence Mapping of Nuiqsut, Kaktovik and Barrow.* MMS OCS Study Number 2009-003.
- Strack, Al. 2010. Trapper School Principal. September 2010. Personal Communication.
- Sturm, M., Racine, Ch. and K. Tape. 2001. *Climate Change: Increasing Shrub Abundance in the Arctic.* Nature 411, 546-547. May 31, 2001.
- Tagiugmiullu Nunamiullu Housing Authority. 2015. Unpublished white paper. *North Slope Borough Housing: A Brief Analysis of Issues and Options with Budgetary Quotes.*
- _____. 2015. Facebook Page. www.facebook.com/TNHABarrow.
- Tape, K., Flint, P., Meixell, B., and B. Gaglioti. 2013. *Inundation, Sedimentation, and Subsidence Creates Goose Habitat along the Arctic Coast of Alaska.* In Environ. Res. Lett. 8.
- Thomas, Brad. 2015. Air Quality Permit Manager, ConocoPhillips Alaska, Inc. July 15, 2015. Personal Communication.
- U.S. Army Corps of Engineers. 2009. Alaska District. *Alaska Baseline Erosion Assessment: Erosion Information Paper — Nuiqsut, Alaska.* February 23, 2009.
- U.S. Department of Commerce. 2014. National Oceanic and Atmospheric Administration, National Marine Fisheries Service. *Endangered, Threatened and Candidate Species under NMFS Authority in Alaska.* Accessed February 21 2014. www.alaskafisheries.noaa.gov/protectedresources/esa/ak_nmfs_species.pdf
- _____. 2013. National Oceanic and Atmospheric Administration. *Arctic Report Card: Update for 2013.* Accessed February 21, 2014. www.arctic.noaa.gov/reportcard/exec_summary.html
- _____. 2010. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center. *NOAA Technical Memorandum NMFS-AFSC-212, Status Review of the Ringed Seal* by B. P. Kelly, J. L. Bengtson, P. L. Boveng, M. F. Cameron, S. P. Dahle, J. K. Jansen, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, and J. M. Wilder. December 2010.
- _____. 2010. U.S. Census Bureau. *2010 Census.* Accessed 6 February 2015. www.census.gov/2010census.
- _____. 2009. U.S. Census Bureau. *2009 – 2013 American Community Survey 5-Year Estimates – Nuiqsut City.* Accessed July 15, 2015. www.census.gov/programs-surveys/acs/data.html.
- _____. 2009. U.S. Census Bureau. *2009 – 2013 American Community Survey 5-Year Estimates – Nuiqsut City.* Accessed July 15, 2015. www.census.gov/programs-surveys/acs/data.html.
- _____. 2000. U.S. Census Bureau. Decennial Census 1980, 1990, 2000.

- U.S. Department of the Interior. 2015. *Department of the Interior Announces Final Rule for Land into Trust for Alaska Native Tribes*. December 18, 2014. Accessed February 6, 2015. www.bia.gov/cs/groups/public/documents/text/idc1-028734.pdf
- _____. 2014. U.S. Fish & Wildlife Service. *Glossary of Terms*. Accessed March 14, 2014. www.fws.gov/midwest/endangered/glossary/index.html
- _____. 2014. U.S. Fish & Wildlife Service. *Endangered Species Listing*. Accessed February 21, 2014. www.fws.gov/alaska/fisheries/endangered/listing.htm
- _____. 2014. U.S. Fish & Wildlife Service. Listing of Polar Bear as a Threatened Species. Accessed February 21, 2014. www.fws.gov/alaska/fisheries/mmm/polarbear/esa.htm
- _____. 2013. Bureau of Land Management. *National Petroleum Reserve-Alaska Integrated Activity Plan Record of Decision*. February 21, 2013. https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A_FINAL_ROD_2-21-13.pdf
- _____. 2011. Bureau of Land Management. NPR-A Climate Change Analysis: An Assessment of Climate Change Variables in the National Petroleum Reserve in Alaska by SNAP: Scenarios Network for Alaska and Arctic Planning. University of Alaska. Accessed March 24, 2014. www.snap.uaf.edu/attachments/NPRA_Climate_Change_Analysis_2011.pdf
- _____. 2010. U.S. Fish & Wildlife Service *Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Polar Bear in the United States*. Federal Register 50 CFR Part 17 Final Rule. <http://alaska.fws.gov/fisheries/mmm/polarbear/criticalhabitat.htm>.
- _____. 1998. Bureau of Land Management. *Northeast National Petroleum Reserve-Alaska Draft Integrated Activity Plan and Environmental Impact Statement*. www.blm.gov/ak/st/en/prog/planning/npra_general/ne_npra.html
- _____. 2012. Bureau of Land Management. *National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement*. November 2012. https://eplanning.blm.gov/epl-front-office/projects/nepa/5251/41003/43153/Vol1_NPR-A_Final_IAP_FEIS.pdf.
- _____. 2008. *Colville River Special Area Management Plan*. July 2008.
- _____. 2008. Northeast National Petroleum Reserve-Alaska Supplemental Integrated Activity Plan Record of Decision, July 2008, U.S. Department of the Interior, Bureau of Land Management.
- Village of Nuiqsut, North Slope Borough Planning Commission and North Slope Borough Commission on History and Culture. *Nuiqsut Paisanich Heritage: A Cultural Plan*. Prepared by Arctic Environmental Information and Data Center. Ed. Judy Brogan. 1979.
- Wernham, Aaron. *Iñupiat Health and Proposed Alaskan Oil Development: Results of the First Integrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope*. EcoHealth, 4, 500-513, October, 2007.

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Appendix A: Adaptation to Climate Change Impacts for Nuiqsut Residents

Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p>Warmer weather causes thinner lake, river and sea ice.</p> <p>Thawing permafrost.</p>	<p>Flooding or damage to ice cellars result in food contamination and food insecurity. This forces families to eat non-traditional and less healthy/nutritious packaged “store bought” food flown in at great expense.</p>	<p>Each village establishes a communication system in which residents traveling to hunt, fish, and gather foods and travelers on the ice are required to carry emergency GPS tracking devices. Village Search & Rescue teams are properly equipped to rescue travelers in trouble.</p>
<p>Permafrost soils throughout the Arctic contain almost twice as much carbon as the atmosphere. Warming and thawing of these soils increases the release of carbon dioxide and methane through increased decomposition.</p> <p>Thawing permafrost delivers organic-rich soils to lake bottoms where decomposition in the absence of oxygen releases additional methane in these water bodies.²⁰⁰</p>	<p>Hunters would have to spend greater financial resources and more time, encompassing greater hazards, to find riverine and terrestrial species—beyond the 10 to 15 miles ideal distance—and into unsafe ice conditions.</p>	<p>Permit stipulations for shipping, Oil & Gas activities, commercial fishing, and/or tourism travel could require participation in a subsistence mitigation fund which would provide funds to hunters to cover the costs to purchase adequate boats, fuel, and equipment to find and harvest subsistence resources at the greater distance from their traditional migratory routes.</p>
	<p>Unknown ice thickness creates hazards for hunters and other winter travelers on snow machines. Traditional knowledge cannot be relied upon as the thinner ice conditions change seasonally and can be exacerbated yearly. Warmer water in lakes and streams cause fish to die in nets, fish texture “softer” and drying of fish is more difficult.</p>	<p>Conduct aerial “flyovers” of traditional routes with specialized equipment to measure the depth of ice. Post and advertising the findings and suggest the safest route to take on the ice for hunting expeditions and for traveling to common destinations such as the nearby village.</p>

²⁰⁰ Impacts of a Warming Arctic; and Climate Change Impacts in the United States.

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p>Warmer weather causes thinner lake, river and sea ice.</p> <p>Thawing permafrost.</p> <p>Permafrost soils throughout the Arctic contain almost twice as much carbon as the atmosphere. Warming and thawing of these soils increases the release of carbon dioxide and methane through increased decomposition.</p> <p>Thawing permafrost delivers organic-rich soils to lake bottoms where decomposition in the absence of oxygen releases additional methane in these water bodies.</p>	<p>Fresh water drains downward—loss of drinking water supply.</p>	<p>A village-specific adaptation plan would identify specific hazards associated with the thawing of permafrost in and near the village and would identify options for remedying impacts or avoiding these hazards. It would identify options and the costs and benefits of each option. It is noted that all fresh water lakes in the region are underlain by permafrost and, therefore all freshwater drinking supplies are vulnerable/susceptible to the draining of water and the release of methane. A potential option may be to build a water reservoir with an impenetrable cover and then pump fresh water from nearby sources into this man-made lake. This would protect the drinking water source from the thawing permafrost and from the escaping methane.</p> <p>NSB Wildlife biologists and subsistence hunters should observe the behaviors of tundra-dependent animals to determine if this is a significant problem. If it is, it may be necessary for the NSB to experiment and “grow” lichen and moss seeds and spread them around a traditional caribou migratory route or create a new migratory route with the plant life that they find suitable.</p> <p>Villagers can build new boat launch pads and docks where water depth allows use of propellers, along with parking areas for the trucks and roads to the new launch areas.</p>
	<p>Village water lines break, causing loss of service.</p>	
	<p>Methane gas escapes from the permafrost and rises into the atmosphere, the drinking water in lakes, and in rivers which affects the riverine life.</p>	
	<p>Rising sea levels can cause river levels to rise which can undermine riverine coastlines. This, along with thawing permafrost of the river banks, can cause increased sedimentation of the river and stream beds. Boats cannot be launched in shallow streams and tributaries and hunters must travel greater distances to launch.</p>	
	<p>Methane rising to tundra—may change the “taste” of lichen, moss, etc. for caribou and other land animals.</p>	

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
Warmer weather causes thinner lake, river and sea ice. Thawing permafrost.	Less stable ground; subsidence and differential settlement of structures. Sanitation and health problems result from broken sewer and water lines within the villages.	A community or co-op ice cellar could be built in a location convenient to hunters as well as to family members retrieving the foodstuff.
Permafrost soils throughout the Arctic contain almost twice as much carbon as the atmosphere. Warming and thawing of these soils increases the release of carbon dioxide and methane through increased decomposition.	Flooding and structural failure of ice cellars. This can result in food contamination and, if ice cellars need to be abandoned, can lead to food insecurity if there is no room in homes for storage of a freezer, due to overcrowding. This would lead families to be dependent on “store bought” food which lacks the nutrients of traditional, local foods.	Among other measures, the village corporation could assist the residents in procuring gravel to shore up homes and driveways and other buildings on their individual lots. The NSB could provide gravel to repair roads and other infrastructure. It may be fruitful to partner with research universities to create a new material that can be produced locally in each village that functions like or better than gravel.
Thawing permafrost delivers organic-rich soils to lake bottoms where decomposition in the absence of oxygen releases additional methane in these water bodies.	Salt-water intrusion into fresh water lakes causes potential drinking water contamination; some species dependent upon fresh water may move further inland for the fresh water (white-fronted geese) while other species (molting black brant) may shift toward the coast.	Hunters can adapt to the new species of bird and fish that adapt to the saltier lakes. Hunters may have to travel further to hunt terrestrial animals dependent upon fresh water lakes.
Warmer temperatures on the tundra. Caribou herds will face a variety of climate-related impacts resulting in changes in their migration routes, calving	Warmer weather inland causes drying of tundra which makes the land susceptible to lightning-caused fires which can spread for many miles. Warmer weather also causes lakes to dry up from evaporation, along with the thawing permafrost and resulting draining.	Increase fire-fighting capabilities for both wild fires and structures. Protect drinking water lakes or develop new reservoirs with lining that protects against leaks and methane releases from underlying permafrost.

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p>grounds, forage availability and drinking water sources as snow and river ice conditions change, permafrost thawing results in tundra subsidence and methane gas release into fresh water lakes, and warmer weather dries the tundra making it susceptible to wildfires.</p>	<p>Drier tundra soil cause berries to ripen early and spoil faster. Warmer weather increase insect harassment for berry harvesters.</p>	
	<p>Intrusion of non-native species that may cause environmental harm; some species such as salmon species and cold-tolerant crab may increase in abundance in arctic waters. This may attract commercial fishing industries to the arctic seas which could diminish subsistence resources.</p>	
	<p>Tundra ecosystems could change to spruce/aspen forests and grasses could be incorporated into the tundra. Shrubs entering the tundra could attract moose while decreasing the lichen for caribou.</p>	
	<p>Industrial development relying on ice roads for access to development sites could be stymied by a reduced supply of water to create the roads.</p>	
<p>Warmer temperatures on the tundra.</p>	<p>New plant species could attract new species of pests which could annoy caribou.</p>	
	<p>Declining or shifting wetlands could affect migratory or resident bird species.</p>	

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p>Caribou herds will face a variety of climate-related impacts resulting in changes in their migration routes, calving grounds, forage availability and drinking water sources as snow and river ice conditions change, permafrost thawing results in tundra subsidence and methane gas release into fresh water lakes, and warmer weather dries the tundra making it susceptible to wildfires.</p>	<p>A drier tundra: Although rain will increase, evapotranspiration and water drainage from cracks in the permafrost will cause a drier tundra that will be susceptible to more numerous and intense tundra fires releasing carbon and contaminants like mercury into the atmosphere.</p>	
	<p>Villages do not have the trained staff or equipment to extinguish wildfires which threaten homes, traditional foods, food sources for wildlife, and creates smoke which causes or exacerbates respiratory illness in humans and animals. Wildlife change their migratory routes in subsequent years due to the damage to their foodstuff and nesting/calving lands.</p>	
	<p>Slow recovery of vegetation or vegetative shifts after fires can profoundly affect wildlife. Lichens, a critical winter food for caribou, recover extremely slowly. Loss of food for caribou cause the herd to change routes which may be a greater distance from the village causing economic hardships (gas, equipment repair, time) and hazards (thinning ice) for subsistence hunters.</p>	

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
Increased inland rain.	Increased rain or snow events during winter cause a layer of ice to form over tundra vegetation preventing grazing by animals like caribou and muskoxen; this causes die-offs of these animals	
Early snow melt.	<p>Early snow melt on land exposes the mushy/marshy tundra and reduces the hunting season and tundra travel is too difficult. Early snow melt may alter subsistence species' migratory schedule and routes, causing hunters to travel greater distances to find the resource.</p> <p>Early snowmelt results in reduced days for oil & gas industry to traverse frozen ground for exploration, development, or transporting the resource to market. Limited season for ice roads.</p>	

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p><i>Acid Rain.</i></p> <p>Toxins such as DDT, PCBs, dioxin, pesticides and heavy metals are carried by both air and ocean currents thousands of miles to the colder arctic ecosystem. The cold Arctic environment is a “sink” or settling area for these contaminants which circulate around the globe northward in air and ocean currents. They settle out in Arctic waters, sea ice, and land, where they remain for long periods and break down very slowly because of the colder climate. The effects of these toxins are magnified as they are ingested by animals rising up the food chain. This is causing a health crisis among the Inuit people in the Arctic Circle.</p> <p>As a result, both land and sea dwelling animals ingest the toxins. On land the toxins are deposited into the plant life and eaten by Caribou, once source of food for the Inuit. In the water, the toxins are found in plankton, which fish in turn eat. These fish then become a source of food for seals and polar bears.</p>	<p>The North Slope is fortunate that major contaminant transport pathways tend to lead elsewhere, such as Canada and Greenland. The North Slope receives some contaminants from Asia but levels are still relatively low. Consumers of subsistence-harvested foods from the North Slope are fortunate that the scientific analysis that the NSB Wildlife Management Department conducts have shown very low levels of POPs to be present in many of the subsistence foods that we eat and are below levels of public health concern.²⁰² Their studies demonstrate that subsistence foods are healthy foods.</p>	<p>The NSB Wildlife Management Department continues to monitor and analyze subsistence animals for human dietary health benefits as well as for potential impacts of consuming toxins.</p>
		<p>Hunting and harvesting marine and riverine animals and air and terrestrial animals is an important part of the Iñupiat lifestyle. It is not only an important part of their culture, passed down through the generations, but it also provides food.</p>
		<p>Traditional subsistence foods provide relatively inexpensive and readily available nutrients, essential fatty acids, antioxidants, calories, protein, and many health benefits. Some of these benefits include protection from diabetes and cardiovascular disease, improved maternal nutrition and neonatal and infant brain development. Severely limiting the consumption of traditional foods may result in harm because reduction of the consumption of foods that have health benefits may increase the consumption of less healthy “store bought” foods.</p>

²⁰² North Slope Borough Northern Alaska Subsistence Food Research.

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Weather-related physical change	Potential impacts to the village	Adaptive Response Options
<p>These toxins are called Persistent Organic Pollutants (POPs) because they are persistent: they travel long distances; they persist long after they are released at their source and move from air and water into soil, plants, animals and humans; they magnify in living organisms and accumulate in fat, organs and muscles; they can reduce the animal's ability to conceive and carry offspring; they decrease the animal's ability to fight off disease; they can impair brain function; and a number of POPs are carcinogenic, causing cancers.</p> <p>Migratory birds can have 100 times higher concentrations of POPs compared to birds that do not migrate. In the Arctic, human exposure to toxins occur primarily through eating of subsistence foods. ²⁰¹</p>		<p>The bowhead whale has among the lowest concentrations of organochlorine contaminants of any marine mammal studied in the world. It is a highly nutritious subsistence food.</p>
<p>Higher levels of ultraviolet (UV) radiation. Due to greenhouse gas effects of the stratospheric ozone temperatures, UB radiation in the Arctic is projected to remain elevated.</p>	<p>Increased UV exposure can cause skin cancer, cataracts, and immune system disorders in humans.</p> <p>Elevated UV can disrupt photosynthesis in plants and can have detrimental effects on the early life stages of fish and amphibians.</p>	

²⁰¹ Contaminants In Alaska: Is America's Arctic At Risk? and Alaska's Climate Change Strategy: Addressing Impacts in Alaska; and Kraemer et al.

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Adaptation to Climate Change Impacts for Nuiqsut Residents		
Weather-related physical change	Potential impacts to the village	Adaptive Response Options
	Risks are greatest in the Spring when sensitive species are most vulnerable, and warming-related declines in snow and ice cover increase exposure for organisms normally protected by such cover.	
Multiple Impact Stresses.	Weather-influenced changes to the ecosystem cause overlapping stresses which amplify or exacerbate any one impact.	Vigilance and adaptation to changing conditions are required. Alaskan Native communities have for centuries adapted to scarcity and environmental variability and, thus, have developed deep cultural reservoirs of flexibility and adaptability; this tradition must continue.

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Appendix B: Response to Public Comments and Input

There has been extensive public outreach in Nuiqsut to solicit comments and feedback from Nuiqsut residents and village leadership. Efforts to increase public awareness of the plan and public participation include holding an introduction to planning and comprehensive plans workshop as well including a Strengths, Weaknesses, Opportunities and Threats (SWOT) exercise. Advertising for the meeting included posting notices throughout the village, announcements in the Arctic Sounder and visiting homes of village residents by the ASRC Nuiqsut representative. Following the community meeting, flyers/questionnaires were delivered to each post office box. Additional announcements were also made on a Facebook page and shared to Nuiqsut's community page. The draft plans were mailed to village leadership at the City of Nuiqsut, Native Village of Nuiqsut and Kuukpik Corporation. Additional copies were distributed throughout the community for review during the public comment period. The locations included: Native Village of Nuiqsut, City of Nuiqsut, Kuukpik Corporation, Uyagagvik Health Clinic, Trapper School, Kuukpik Nullagvik Hotel, ASRC office and the North Slope Borough Village Liaison's Office. The Planning Team also called into village leadership board/council meetings during the months of November and December to provide an introduction to the comprehensive plan and respond to questions.

The following table contains plan comments received during the public comment period and how each comment was addressed.

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Page of Draft	Comment	Page of Final	Action
Nuiqsut City Council Public Review Draft, November 30, 2015 (continued)			
1	Impact of Oil and Gas Activities. On page 1 of the Draft, the following statement is made: "The impact of oil and gas activities on subsistence may be more significant to Nuiqsut than other communities." This statement should be deleted and, in its stead, the following statement should be inserted: "Nuiqsut has been identified as the North Slope Village most directly impacted by oil and gas activities," Arctic Oil and Gas: Sustainability at Risk, edited by Aslaug Mikkelsen and Oluf Langhelle (2011 -Routledge), 394 pp.	15	The suggested replacement text has been inserted.
12, 72, 109	Boat Ramp. On pages 12, 72 and 109, references are made to the City's recently-completed, removable boat ramp. This boat ramp cost nearly \$500,000 and was funded by an NPR-A grant. This formal boat ramp provides access to the Nigliq Channel. This boat ramp is deployed in the summer months when the Nigliq Channel is ice-free. The references to the boat ramp should be amended to reflect its more substantial, permanent nature.	28 94 133	Page 28: A footnote has been added to this SWOT discussion item for clarity: <i>"The boat ramp discussion during the 2015 SWOT workshop included both the removable boat ramp and the need for a nonremovable boat ramp. The removable boat ramp is placed in a shallower portion of the river and props can become damaged. It was discussed that most residents prefer to launch their boats near the bend in the river where the river is deeper, upstream from the removable boat ramp. Because this area poses vehicular access difficulties, there was discussion that creating better access to this site would be preferable to building a permanent ramp that would likely be washed out by the current."</i> Page 94: the text has been changed from <i>"There is not a formal boat ramp at the Nigliq Channel"</i> to <i>"There is a new formal boat ramp at the Nigliq Channel that was funded by the NPR-A Impact Grant Program in 2010 and constructed in 2015"</i> . Page 133: the text has been changed in two places. The text in the 4 th paragraph has been changed from <i>"South and east of the runway is a road to the Nigliq Channel used as an informal ramp and launching area for boats traveling to the Colville River. Just west of the boat launch area is a gravel stockpile."</i> to <i>"South and east of the runway is a road to the Nigliq Channel and a boat ramp and launching area for boats traveling to the Colville River. Just west of the boat launch is a gravel stockpile."</i> The reference in paragraph 6 to <i>"the informal boat launch area"</i> has been changed to <i>"the boat launch"</i> .
19, 119	Regulator and Enforcer. At pages 19 and 119 of the Draft, the statement is made: "The Village should be its own regulator and enforcer, with assistance from the Borough's Public Safety Office when required." Neither the City nor the Native Village of Nuiqsut ("NVN") have the resources to provide some type of enforcement authority. The NVN has a 75-mile radius and, to date, the only "enforcement" type of regulation for the area is exercised through KSOP ("Kuukpik Subsistence Oversight Panel").	35	The quoted text is taken directly from the Nuiqsut Paisanich that indicates the protection of its own land and resources is a critical matter for Nuiqsut. The language can be replaced during the next Comprehensive Development Plan update, when the Paisanich has also been updated. A footnote has been added on page 35 to provide further explanation: <i>"The City of Nuiqsut has indicated that although protecting land and natural resources is critical, neither the City of Nuiqsut nor the Native Village of Nuiqsut currently have sufficient resources for enforcement authority. The only enforcement type of regulation for the area is exercised through Kuukpik Subsistence Oversight Panel (KSOP)."</i>
38	Emergency Management Plan. On page 38 of the Draft, reference is made to an Emergency Management Plan prepared by NVN. The statement is made: "The Plan is expected to be completed during the fall of 2015." This statement needs to be amended because the Plan has not yet been formally reviewed and approved by the City and the North Slope Borough. It should be noted that this Plan must be in place in the event of an emergency if the City expects to receive FEMA funds.	54	The following revisions have been made under Section 2.2.6.2: "The Plan is expected to be completed during the fall of 2015. The plan must be in place for the City to receive Federal Emergency Management Agency (FEMA) funding in the event of an emergency. A recently updated NSB-wide Hazards Mitigation Plan qualifies the borough to receive mitigation funds from FEMA."
59	Storage Facility. At page 59 of the Draft, reference is made to a "replacement pre-fabricated structure [which] awaits assembly and installation on two parcels provided to the NSV by the City." However, the City is unaware of any pre-fabricated structure in Nuiqsut awaiting assembly and installation.	79	The City of Nuiqsut has been made aware of the existence of pre-fabricated structure and the need for City land to assembly it. The statement remains unchanged.
60	Early-Learning Center/Daycare. On page 60 of the Draft, the statement is made: "The City of Nuiqsut has agreed to fund the operational expenses" of the Early-Learning Center/Daycare. This statement is incorrect. Rather, the City of Nuiqsut has agreed to take the lead in obtaining operational funding for the Early-Learning Center/Daycare. Therefore, the sentence that reads, "The City of Nuiqsut has agreed to fund operational expenses" should be deleted. In its stead, it should read: "The City of Nuiqsut has agreed to take the lead in attempting to obtain funding for operational expenses."	80	The suggested replacement text has been inserted.
63, 103	1) U.S. Postal Service. On page 63 of the Draft, the statement is made: "The U.S. Postal Service operates a Post Office in the Community." This statement should be deleted and, in its stead, it should read: "The City of Nuiqsut operates a Post Office in the Community under contract with the U.S. Postal Service." 2) On page 103 the location of the Post Office should be changed to Pausanna Street.	84 126	1) The suggested replacement text has been inserted. 2) The location of the Post Office has been updated.

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Nuiqsut City Council Public Review Draft, November 30, 2015 (continued)			
75	Shell. On the map at page 75 of the Draft, reference is made to Shell restarting its drilling operations in the Chukchi Sea during the summer of 2015. As we know, however, Shell has abandoned its exploration efforts in the Chukchi Sea. Therefore, this comment should be deleted from the map on page 75.	97	The map has been updated to reflect more current exploration efforts.
96	Native Allotments. On page 96 of the Draft, the statement is made: "NSB land use regulations do not apply to Native Allotments." If this is a statement of NSB policy, it should remain as is. However, the current state of the law would appear allow health and safety regulations to apply Native Allotments. See, Alaska Attorney General Opinion, File No. 366-247-85, January 23, 1985, "State regulatory jurisdiction over Native allotments and other restricted property." Also found at 1985 WL 70057 (Alaska A.G.) on the WESTLAW legal research platform.	120	The statement has been deleted.
110	Future Land Use Projections. On page 110 of the Draft, the statement is made: "Modest expansion of oil and gas industry activities in the area is expected to continue." This would appear to be an understatement. Instead, the word "modest" should be deleted and the sentence should read, "Expansion of oil and gas industry activities in the area is expected to continue."	134	The word <i>modest</i> has been deleted from the statement.
155	<p>NPR-A Funds. At the top of page 155, there is a discussion regarding NPR-A funding and the priority for that funding. Since the inception of the NPR-A program, \$32 Million has gone to Barrow and only \$8 Million has gone to Nuiqsut. It is beyond dispute that Nuiqsut is the most heavily and directly impacted of the communities receiving NPR-A mitigation funding. To that end, the City has written a letter to the Governor's Arctic Policy Advisor, Craig Fleener in Anchorage, pointing out the discrepancies in the allocation of impact mitigation funding. Therefore, this paragraph should be re-written to reflect the City's serious concerns about improper allocation of NPR-A impact mitigation funding.</p> <p>Follow-up comment after discussions between consultant and City of Nuiqsut: The City of Nuiqsut believes that a significant inequity exists in NPR-A funding when comparing Impact Mitigation awards between the City of Barrow and City of Nuiqsut for the following reasons: 1) Since the NPR-A Impact Mitigation program began in 1987, the State of Alaska has awarded a total of \$140 million to North Slope Borough municipalities, which includes the NSB itself. Of those funds, the City of Nuiqsut has received \$8,696,201 in direct funding, and the City of Barrow \$32,914,569. In addition, the NSB has received \$19,635,217 in funding dedicated to infrastructure projects in Nuiqsut (utilities; police, fire and school services). When adding the direct Nuiqsut NPR-A award amount of \$8,696,201 to the funds awarded to the NSB for Nuiqsut infrastructure projects, the total is \$28,331,418. When comparing this total of <u>direct</u> awards to Nuiqsut, in combination with <u>NSB awards for Nuiqsut infrastructure projects</u>, then Nuiqsut has only received about \$4.5 million less in NPR-A funding than the City of Barrow (about 86% of what Barrow has received). However, as a Home Rule Borough the NSB is responsible for providing and maintaining the infrastructure of NSB villages. And while it is within the borough's control to determine the quality of that infrastructure, Nuiqsut has no control over how those funds awarded to the NSB are used to directly offset the impacts of current and future oil and gas exploration and development within the NPR-A that directly impact the village. Those funds, to offset the impacts of oil and gas exploration and development, are represented by the <u>direct</u> NPR-A awards that Nuiqsut receives; which to this point in time have been only totaled \$8,696,201, constituting just 6% of the total NPR-A Impact Mitigation funds awarded through FY16. On the other hand, Barrow has received \$32,914,569, which constitutes 24% of the total. 2) Even if one argues that a \$4.5 million difference in funding over a 30-year period is negligible enough to represent equivalent funding, the City of Nuiqsut does not feel Barrow experiences, nor will it continue to experience equivalent levels of impacts from oil and gas exploration and development within their community.</p> <p>In summary, the inequity the City of Nuiqsut refers to in our comments is based on two components. The first is a comparison of direct funds awarded to Nuiqsut versus Barrow. The second, and even more significant, is that even if indirect funds for NSB infrastructure support are added to the direct funds awarded to Nuiqsut, which makes NPR-A funding appear equivalent for Barrow and Nuiqsut, the impacts of oil and gas exploration and development on Nuiqsut are disproportionately much greater than for Barrow. Given the inequity of impacts, the City fails to see how total NPR-A funding, however it's subdivide and characterized (direct versus indirect infrastructure support), should be equivalent.</p>	182	The following text has been included in Section 4.12 Potential 5-, 10-, and 20- Year Capital Asset Needs: <i>"The City of Nuiqsut believes that a significant inequity exists in NPR-A funding. The combined total of direct and indirect funds that have been awarded to benefit Nuiqsut residents is similar to that awarded directly and indirectly for the City of Barrow. The City of Nuiqsut maintains that the impacts of oil and gas exploration and development on Nuiqsut are disproportionately much greater and that NPR-A funding should reflect that significant impact difference."</i>

Page of Draft	Comment	Page of Final	Action
Nuiqsut City Council Public Review Draft, November 30, 2015 (continued)			
116-151	<p>Goals. At pages 116 through 151, goals for Nuiqsut are set forth. These goals are as follows:</p> <ol style="list-style-type: none"> 1) Community Unity [Pages 116 - 118] 2) Subsistence Resources and Activities [Pages 119 - 124] 3) Meaningful Participation [Pages 125 - 130] 4) Adequate Housing [Pages 131 - 134] 5) Economic Development [Pages 135 - 138] 6) Community Facilities [Pages 139 - 144] 7) Future Land Use Designations [Pages 145 - 148] 8) Protection of Historic and Cultural Resources [Pages 149 - 151] 9) Arctic Appropriate Design and Construction [Pages 151 - 152] <p>It is unclear, from the Draft, whether or not these goals are listed in a prioritized order.</p>	139	<p>The following text has been inserted on the first page of Chapter 4: <i>"The nine goals presented in this chapter are not listed in priority order."</i></p>
ConocoPhillips Alaska Public Review Draft, December 3, 2015			
38	<p>Section 2.2.6.1. Natural Hazards, Storm Surges.</p> <p>Please clarify the following statement: "Community residents have reported, however, that oil from local development projects has been deposited along the shoreline of historic fishing areas." ConocoPhillips is unaware of any reports of oil deposited along the shoreline as a result of our operations on the North Slope. If this statement is specific to historic operations at Umiq or other old exploration wells, this should be clarified in this section.</p>	53	<p>Due to its anecdotal nature, this statement has been deleted: <i>"Community residents have reported, however, that oil from local development projects has been deposited along the shoreline of historic fishing areas"</i>. Also deleted is the remaining text under the same heading <i>"Due to its upriver location, the community is not directly affected by storm surges"</i> and reference to storm surges as a natural hazard to the community in second paragraph under Section 2.2.6.1 Natural Hazards.</p>
39-40	<p>Section 2.2.6.3. Contaminated Sites, Table 3</p> <p>Two sites included in Table 3 (Site 6 - ConocoPhillips Ikillik River Unit #1 and Site 31 - ConocoPhillips West Sak 18) should be classified as Oil <u>Exploration</u>/Onshore versus Oil Production/Onshore. No production activities occurred at these locations.</p>	55	<p>Because the list of contaminated sites in the plan is directly from the Contaminated Sites Program at the Alaska Department of Environmental Conservation, the site type will remain unchanged. Footnotes have been inserted to indicate that ConocoPhillips has indicated that the information is incorrect.</p>

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46-47	Section 2.2.7 Subsistence. Table 4 contains outdated information on Important Subsistence Species for Nuiqsut. A more current table can be found in the Appendix G of the Greater Mooses' Tooth 1 Supplemental Environmental Impact Statement completed in October 2014. Tables G1 and G2 contain more recent subsistence harvest data for Nuiqsut. The GMT1 SEIS can be found at this link: https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=50912 (Appendix G is in Volume 4).	64-65	<p>More recent subsistence data has been added to the existing Table 4.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Category</th> <th>Pounds Harvested</th> <th>Percent Harvested</th> </tr> </thead> <tbody> <tr> <td rowspan="5">1985</td> <td>Marine Mammals</td> <td>13,355</td> <td>8.3%</td> </tr> <tr> <td>Birds and Eggs</td> <td>8,036</td> <td>5%</td> </tr> <tr> <td>Fish</td> <td>70,609</td> <td>44.2%</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>67,866</td> <td>42.5%</td> </tr> <tr> <td>Plants</td> <td>169</td> <td>.1%</td> </tr> <tr> <td rowspan="5">1992</td> <td>Marine Mammals</td> <td>52,865</td> <td>35.2</td> </tr> <tr> <td>Birds and Eggs</td> <td>3,924</td> <td>2.6</td> </tr> <tr> <td>Fish</td> <td>51,955</td> <td>34.5</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>41,387</td> <td>27.6</td> </tr> <tr> <td>Plants</td> <td>66</td> <td>0</td> </tr> <tr> <td rowspan="5">1993</td> <td>Marine Mammals</td> <td>85,216</td> <td>31.8</td> </tr> <tr> <td>Birds and Eggs</td> <td>4,325</td> <td>1.7</td> </tr> <tr> <td>Fish</td> <td>90,490</td> <td>33.8</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>87,390</td> <td>32.6</td> </tr> <tr> <td>Plants</td> <td>396</td> <td>0.1</td> </tr> <tr> <td rowspan="5">1994-1995</td> <td>Marine Mammals</td> <td>1,504</td> <td>1.8</td> </tr> <tr> <td>Birds and Eggs</td> <td>2,347</td> <td>2.9</td> </tr> <tr> <td>Fish</td> <td>46,600</td> <td>56</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>32,686</td> <td>39.3</td> </tr> <tr> <td>Plants</td> <td>91</td> <td>0.1</td> </tr> <tr> <td rowspan="5">1995-1996</td> <td>Marine Mammals</td> <td>120,811</td> <td>65.8</td> </tr> <tr> <td>Birds and Eggs</td> <td>2,179</td> <td>1.2</td> </tr> <tr> <td>Fish</td> <td>16,953</td> <td>9.3</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>43,554</td> <td>23.7</td> </tr> <tr> <td>Plants</td> <td>78</td> <td>0</td> </tr> <tr> <td rowspan="5">2000-2001</td> <td>Marine Mammals</td> <td>87,929</td> <td>48</td> </tr> <tr> <td>Birds and Eggs</td> <td>5,124</td> <td>2.8</td> </tr> <tr> <td>Fish</td> <td>28,008</td> <td>15.2</td> </tr> <tr> <td>Terrestrial Mammals</td> <td>62,173</td> <td>33.9</td> </tr> <tr> <td>Plants</td> <td>13</td> <td>0</td> </tr> <tr> <td>2002-2003</td> <td>Caribou</td> <td>46,449</td> <td></td> </tr> <tr> <td>2003-2004</td> <td>Caribou</td> <td>65,988</td> <td></td> </tr> <tr> <td>2004-2005</td> <td>Caribou</td> <td>63,882</td> <td></td> </tr> <tr> <td>2005-2006</td> <td>Caribou</td> <td>42,471</td> <td></td> </tr> <tr> <td>2006-2007</td> <td>Caribou</td> <td>55,575</td> <td></td> </tr> <tr> <td>2010</td> <td>Caribou</td> <td>55,107</td> <td></td> </tr> <tr> <td>2011</td> <td>Caribou</td> <td>58,226</td> <td></td> </tr> </tbody> </table> <p> Species Harvested that had been in the table have been incorporated into the text: Species Harvested: Marine mammals: Polar Bear, ringed seal. Birds and eggs: Eider (unidentified sp.), sandhill crane, ptarmigan, geese (unidentified species) and tundra swan. Fish: Arctic cisco, broad whitefish, least cisco and whitefish (unidentified species). Terrestrial mammals: Caribou, moose, red fox, arctic fox, wolverine and wolf. Plants: Blackberries, blueberries, cranberries and salmonberries. </p>	Year	Category	Pounds Harvested	Percent Harvested	1985	Marine Mammals	13,355	8.3%	Birds and Eggs	8,036	5%	Fish	70,609	44.2%	Terrestrial Mammals	67,866	42.5%	Plants	169	.1%	1992	Marine Mammals	52,865	35.2	Birds and Eggs	3,924	2.6	Fish	51,955	34.5	Terrestrial Mammals	41,387	27.6	Plants	66	0	1993	Marine Mammals	85,216	31.8	Birds and Eggs	4,325	1.7	Fish	90,490	33.8	Terrestrial Mammals	87,390	32.6	Plants	396	0.1	1994-1995	Marine Mammals	1,504	1.8	Birds and Eggs	2,347	2.9	Fish	46,600	56	Terrestrial Mammals	32,686	39.3	Plants	91	0.1	1995-1996	Marine Mammals	120,811	65.8	Birds and Eggs	2,179	1.2	Fish	16,953	9.3	Terrestrial Mammals	43,554	23.7	Plants	78	0	2000-2001	Marine Mammals	87,929	48	Birds and Eggs	5,124	2.8	Fish	28,008	15.2	Terrestrial Mammals	62,173	33.9	Plants	13	0	2002-2003	Caribou	46,449		2003-2004	Caribou	65,988		2004-2005	Caribou	63,882		2005-2006	Caribou	42,471		2006-2007	Caribou	55,575		2010	Caribou	55,107		2011	Caribou	58,226	
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68	<p>Section 2.2.3 Transportation</p> <p>Gravel: Please confirm this statement: “There is a larger stockpile of gravel <u>purchased by the BLM</u> for use in extending the Freshwater Lake Road to the Colville River. However, this gravel is not sufficient to build that road and more gravel will be needed to complete that project.” It is ConocoPhillips’ understanding that this gravel was purchased by the NSB for the project using grant funds from the NPRA Impact Grant Program not BLM. Details of grants issued under this program can be found at this link: https://www.commerce.alaska.gov/web/portals/4/pub/2015%20report%20to%20the%20legislature.pdf</p>	88-89	<p>The Gravel section has been updated to address several comments:</p> <p>Gravel: Significant exploration for gravel occurred in the 1970s and 1980s in the Nuiqsut area; there were not any sources found close to the village other than the ASRC Gravel Mine Site. than below the Colville River. ASRC and Kuupik Corporation owns a material site approximately 4.5 miles east of Nuiqsut across the Nigliq Channel and Colville River that was originally permitted by the U.S Corps of Engineers (USCOE) in 1997. Due to the cost of permitting and reclamation, the pit is only re-opened for large projects. The current permit allows allowed mining for 1.2 million cubic yards (CY) and expires on September 30, 2018. ConocoPhillips purchased 600,000 CY of gravel for use at CD-5, a satellite of the Alpine facility. Kuupik Corporation mined 500,000 CY of material to construct the 5.8 mile Nuiqsut Spur Road to connect the village of Nuiqsut with CD-5119F. <i>Both of these projects have been completed in 2015.</i></p> <p><i>Additional mining was authorized within the existing USCOE permit by increasing the total gravel amount to allow the NSB to utilize two NPR-A grants for the gravel mining. The intent of the grant funds was to stockpile gravel to allow construction of a road to the Colville River, which has been a project long sought after by the village and the NSB. One NPR-A grant was for \$2.1 million and a later, smaller one was issued for an additional \$550,000. Both grants were spent on gravel mining and stockpiling in 2014/2015 and the gravel has been staged with the existing stockpile located on the leased land on the Nigliq Channel. A total of 65,600 cubic yards of gravel is now available for the Colville River Road construction. This is about half of the entire amount of gravel needed for the road construction.</i></p> <p><i>In addition to the NPR-A grants, the NSB Public Works Department utilized \$3 million of general bond money for mining and stock piling of gravel to be used for local maintenance needs within the village. Due to this additional effort, another 75,000 cubic yards of gravel is now stockpiled, combined in the same pile as the Colville River gravel on the Nigliq Channel.</i></p> <p><i>There are two gravel stockpiles located on the shore of the Nigliq Channel near Nuiqsut. The stockpiles are located on leased land from Kuupik. One is a small gravel stockpile approximately 19,000 cubic yards in size in Nuiqsut near the Nigliq Channel which is a remnant of earlier dredging efforts. Material is no longer dredged from the Nigliq Channel. Owned by the NSB, the material is generally 1-inch minus gravelly sand acceptable for road, airport, and boat ramp repairs. Because of bond financing limitations, this gravel cannot be sold by the Borough to residents for personal uses, such as fill for driveways or to shore up homes.</i></p> <p><i>The second stockpile contains the Colville River Road gravel, and the additional gravel mined for NSB PW maintenance needs for maintenance projects within the village, as explained earlier in this section. There is also a stockpile of gravelly sand with silt at the landfill that is used to cover solid waste. There is a larger stockpile of gravel purchased by the BLM for use in extending the Freshwater Lake Road to the Colville River. However, this gravel is not sufficient to build that road and more gravel will be needed to complete that project. Lastly, the Kuupik Corporation has a stockpile of gravel for its projects.</i></p>
68	<p>Section 2.2.3 Transportation</p> <p>1) CD-5 Access Road: Last sentence in this paragraph states: “Figure 12 shows the CD-5 access road within the broader Proposed GMT.” The CD-5 drillsite is within the Colville River Unit, which is a separate operating unit from the Greater Mooses’ Tooth Unit. Please change sentence to “within the Colville River Unit.”</p> <p>2) Figure 12 (map on page 69): Please add a legend to this map that clarifies that the thicker blue lines are seasonal ice roads and black lines are proposed GMT1 gravel road and pad.</p>	89 89	<p>1) The replacement text for the CD-5 Access Road has been inserted.</p> <p>2) Figure 12: This a map provided by ConocoPhillips and we are unable to make changes. Ice roads are identified within the map as <i>Ice Road, Typ</i>. The following text has been added in CD-5 Access Road section on page 89 to the provide clarity to the map: “<i>For clarity, it is worth noting that the thicker blue lines in Figure 12 illustrate seasonal ice roads and the black lines show the proposed Greater Mooses Tooth 1 (GMT1) gravel road and pad.</i>”</p>
73-74	<p>Section 2.3.5 Private Infrastructure and Businesses</p> <p>1) Table 11: This table should be updated to reflect that Meltwater and Tarn are drillsites which are a part of the Kuparuk River Unit and not separate operating areas. In addition, the table should be updated to reflect recent change of operators at Endicott and Northstar (Hilcorp vs. BP) and Oooguruk (Caelus Energy vs. Pioneer).</p> <p>2) Page 74: The description of Tarn and Meltwater should both say they are satellites of the Kuparuk River Unit. The Tarn Project includes Kuparuk DS 2L and 2N and the Meltwater Project is Kuparuk DS 2P.</p>	95 96	<p>1) Current Table 12 has updated to reflect the information provided.</p> <p>2) The <i>italicized</i> text has been added to the Plan: Page 96, paragraph 3: “The Tarn oil field (<i>DS 2L and 2N</i>) is located west of Nuiqsut and southeast of Prudhoe Bay. ARCO Alaska discovered the Tarn prospect in 1991 and began producing oil in 1998. Currently, CPAI operates the Tarn field and shares ownership with BP, Chevron and ExxonMobil. <i>Tarn is a satellite of the Kuparuk River Unit.</i>” Page 96, paragraph 4: “The Meltwater oil field (<i>DS 2P</i>) is located east of Nuiqsut and south of the Tarn field. Meltwater is a satellite of the Kuparuk River Unit.”</p>
81	<p>Section 2.3.6.2 Employment</p> <p>For clarification in the last paragraph of this section regarding employment by residents at Alpine or CPAI project, it is important to note that CPAI begins working with Trapper School students by offering them the opportunity to participate in the Career Quest Program which provides exposure to various jobs at Alpine. After graduation, residents can participate in the various internships at Alpine which are designed to provide training and experience at key careers in the oil field. Recent experience shows that some residents tend to prefer the seasonal construction and ice road opportunities which allow them to work during the winter and participate in subsistence activities the rest of the year.</p>	80	<p>The following text has been inserted in Section 2.3.3 Educational Services “<i>Given their close proximity to Alpine, Trapper School students can become involved in a unique program to learn about employment at the oil field. After graduation, residents can participate in internships designed to provide training and experience needed for employment.</i>”</p>

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83	Section 2.4 Community Health and Quality of Life Nuiqsut Air Quality Monitoring Station: The second paragraph on page 83 references the CPAI operated air quality monitoring station. This station has been in operation since 1999 and since that time as EPA standards have been adopted the station has been upgraded to monitor all the primary air pollutants. (Note: Section 2.2.5 contains an accurate description of the station.) Currently, the station monitors particulate matter (PM10 and PM2.5), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO2) and ozone (O3).	105	The sentence has been updated to include PM 2.5 and CO2.
83	Section 2.4 Community Health and Quality of Life The draft plan states, "Although the CPAI-sponsored monitoring equipment frequently failed due to freezing conditions, retrieved data from the equipment during the 2006 to 2012 period were reported to indicate that the air and drinking water sources located in and around the village meet Federal EPA standards." First comment: the monitoring equipment does not monitor drinking water but monitors ambient air quality, so this statement needs to be clarified. The drinking water source for the village is monitored by the NSB so the author may be referencing this monitoring data. Second comment: the statement "Failed due to freezing temperatures" is an inaccurate statement. During 2006-2008, the station intermittently failed to collect Prevention of Significant Deterioration (PSD) quality data for criteria pollutants and meteorology data. To meet PSD quality standards, pollutant data must meet 80% recovery, and meteorological data must meet 90% recovery rates. Data was still collected, however if it didn't meet the recovery rates, then it would not be able to be used for air quality permitting applications. This does not imply that the data collected was in error or bad, but only that it could not be used for permitting as it wasn't complete enough. We overhauled our program, and since January 2009, we have met the data recovery criteria, with the exception of two times: 1) Ozone recovery at 78% in Q4 2012; and 2) NO2 recovery at 74% in Q1 2011.	105	Drinking water has been removed from the sentence beginning " <i>Although the CPAI-sponsored monitoring equipment frequently failed due to freezing conditions...</i> " The following sentence has been reworded: " Although the CPAI-sponsored monitoring equipment frequently intermittently failed to collect Prevention of Significant Deterioration (PSD) quality data for criteria pollutants and meteorology data. due to freezing conditions, retrieved Data retrieved from the equipment during the 2006 to 2012 period were reported to indicate that the air quality and drinking water sources located in and around the village meet Federal EPA standards."
93	Section 3.1.3 Native Corporation Lands 3 rd Paragraph on Page 93: Please confirm statement "ASRC is the largest private landowner in Alaska..." According to web search, Doyon Ltd. is the largest with 12.5 million acres granted under ANCSA.	117	The revised sentence now reads "ASRC is the largest private landowner in Alaska, holding title to approximately five million acres of land on the North Slope, most of which Most of ASRC lands are rich in subsurface oil, gas, coal, and base metals."
102	Section 3.2.3.1 Alpine Oil and Gas Complex Resource Development District The original Alpine development (Alpine Production Facility at CD1 and CD2) included 97 surface acres of gravel fill. The current surface acres of gravel fill is ~221 acres after the completion of the CD3, CD4 and CD5 satellite projects. The future GMT1 project will add an additional ~72 acres of gravel when constructed.	126	97 acres has been replaced with approximately 221 acres.
102	Section 3.2.3.1 Alpine Oil and Gas Complex Resource Development District CPAI removed the GMT-2 project from the recent rezone request for GMT-1, which was approved by the NSB Assembly on December 1, 2015. The approved rezone resulted in 3971 acres rezoned from Conservation District to Resource Development District; however, also returned 9869 acres to Conservation District which were rezoned in 2004 as part of the Alpine Satellite project but due to changes to the project based on community input were no longer needed as resource development.	126	The rezoning section has been updated and now reads: "In 2005, the NSB re-zoned the Conoco Phillips (CPAI) Alpine Development Project from the Conservation District to the Resource Development District and adopted an Alpine Development Master Plan. Several satellite developments encompass the Alpine project (see Section 2.3.5 for details of this project). The Alpine facilities cover approximately 97 221 surface acres and produces from about 25,000 acres (39 square miles) of reservoir. Its closest drill site to Nuiqsut is about 8 miles to the north. The Alpine development began oil production in 2000 and now consists of numerous well sites and facilities. The most recent addition is the 11.74-acre CD-5 gravel pad with a 6-mile gravel road connecting to the CD-4 Alpine facility. CPAI received approval on December 1, 2015 from the North Slope Borough Assembly to rezone The CD-6, and CD-7 proposal has been renamed Greater Moose's Tooth 1 and 2 (GMT-1 and GMT-2), totaling 3,971 acres from Conservation District to Resource Development District. The 11.8-acre GMT-1 gravel pad will have 33 drilling and injection wells, a 7.6 mile gravel access road and an 8.4-mile elevated pipeline connecting GMT-1 to the Alpine CD-5 facility. Approximately 9,869 acres of the Alpine Satellite project are being returned to the Conservation District due to project changes and community input. and CPAI is seeking an amendment to the Alpine Development Master Plan and a rezoning of 10,330 acres of land within that area from Conservation District to Resource Development District.

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116-151	On pages 116-151 the goals for Nuiqsut are described and enumerated. It is unclear, given the numerals assigned to each goal, whether they represent a hierarchical order of priority or not; and if they so, who has decided on this priority?	139	The following text has been inserted on the first page of Chapter 4: <i>"The nine goals presented in this chapter are not listed in priority order."</i>
1	Footnote 1 appears in the first sentence of the first paragraph of the body of the text, following "Kuukpikmuit." Since the footnote deals with Nuiqsut Paisanich, Kuukpik believes the footnotes should appear in the 4th sentence in that paragraph, after the first reference to Nuiqsut Paisanich. The footnote itself calls the document "Nuiqsut Heritage," which is wrong since the cover page says "Nuiqsut Paisanich, A Cultural Plan.	115 and throughout	The footnote has been moved to the fourth sentence and the text has been updated to reflect the correct name of the document. The document reference has also been updated throughout.
2	There are two page 2s in the draft. Both pages are intentionally left blank. Figure 1 (Nuiqsut, Alaska Vicinity Map) is inserted between these blank pages but there is no reference to Figure 1 in the text.	2 17	The page numbering error has been corrected. The location of Figure 1 has been moved and the following reference has been inserted into the text of Section 1.2: <i>"Figure 1 illustrates the location of Nuiqsut within the North Slope region."</i>
4	The text in the first passage of Subchapter 1.2 (Comprehensive Plan Scope and Process) talks about the boundary of Nuiqsut but does not specifically reference the 3 mile by 3 mile boundary that forms Nuiqsut and is shown on Figure 2 on Page 5.	17	The following text has been revised in Section 1.2 <i>"The city City of Nuiqsut is approximately three miles by three miles whose boundary-limits coincides with the Borough Village District zoning boundary shown in Figure 2."</i>
7	The vision statement includes a passage that states: <i>"Create a diverse economy that supports local businesses, regional cooperation and clean industries,"</i> The concern is with the word "clean". May want to replace "clean" with something like "environmentally responsible". If the text agreed to at the two meetings said "clean," Kuukpik understands if the Borough feels bound by that text.	23	The text was approved at the community meetings and must remain as written.
9	The passages describing the duties of the Planning Commission should include additional duties. It should include: -Reviews Planning Department permits and approvals. -Provides a forum for North Slope villages to voice concerns, to get questions answered on a wide range of topics, and to obtain information on activities planned to occur in their general area and in the area used for subsistence by each village.	24	The additional duties of the Planning Commission have been included in Section 1.4 under North Slope Borough heading: <i>"Reviews NSB Planning and Community Services Department permits and approvals and hears and decides conditional use permits and appeals of administrative permit decisions of the Planning Department. Provides a forum for North Slope village residents to voice concerns, receive answers to questions on a wide range of topics and obtain information on activities planned in a village's general vicinity and subsistence use area."</i>
10	1) The SWOT (Strengths, Weaknesses, Opportunities, and Threats) section item under strengths states: "Natural gas-generated electricity/inexpensive energy [6.1]". Suggest revising to read "Natural gas home/facility heating and natural gas-generated electricity/inexpensive energy [6.1]". 2) This section should also reference that Nuiqsut is the only North Slope village that is ice road connected to Alaska, the U.S. and Canada for approximately a 4 month period each year. 3) Additionally, Nuiqsut is the only North Slope village with road access to 2 airstrips for emergency purposes.	26 84 95	1) The current SWOT text came from the public meetings and was written on boards for review by residents. While the abbreviated bullet point may not fully capture the nuances of natural gas generated electricity, this information is further expounded in Section 2.3.3 Public Facilities and Services under the Natural Gas and Home Heating headings. Because this was included as a strength as voiced by residents in a public forum, it must remain as written. 2) The following text has been added to Section 2.3.4 Transportation System: <i>"Nuiqsut is the only North Slope village that is connected via ice road to the rest of Alaska, the U.S. and Canada for approximately a four month period each year."</i> 3) The following text has been added to Section 2.3.4 Transportation System under the heading Air Travel: <i>"This airstrip [the CPAI airstrip at Alpine] can be accessed by Nuiqsut residents during emergencies, making it the only North Slope village with road access to two airstrips."</i>
10	1) The SWOT section item under weaknesses states: "Need gravel for village public and private residents' use, particularly for repair of damage due to road subsidence and driveway wear 6.5]". This statement needs revision. Nuiqsut and Barrow are the only communities with ample gravel supplies nearby. The Borough has stockpiles in Nuiqsut of over 175,000 cubic yards, located at the edge of the community (though large amounts of that gravel are already dedicated to specified uses such as the Landfill Road Upgrade and the proposed Colville River Access Road). One possible revision would read "Need gravel for village private residents' use, particularly for repair of damage to driveways from wear [6.5]. 2) Also, note that a "[" is missing in the wording above.	26 26	1) The text came from the public meetings and was written on boards for review by residents. While the abbreviated bullet point may not fully capture the nuances of residential gravel needs, this information is further expounded under the Gravel heading in Section 2.3.4. Because this was included as a weakness as voiced by residents in a public forum, it must remain unchanged. 2) The change has been made to include the opening bracket.
11	Another weakness listed is: "Need year-round monitoring of spur road activities, particularly with regard to oil spills and damage to the adjacent environment by worker traffic [2.1]". This seems a bit premature and overbroad since the spur road has not even officially opened and is, in any event, a private road on private land.	27	The text came from the public meetings and was written on boards for review by residents. Because this was included as a weakness as voiced by residents in a public forum, it must remain unchanged.
13	In the threats section, it states: "Sport hunters scare away caribou, particularly the vanguard herd [2.1]". For clarity, it would be useful to define "the vanguard herd" as the lead animals in the migratory movement, deflection or death of which can divert the entire herd.	29	The definition of vanguard has been included as a footnote: <i>"The Merriam Webster definition of vanguard is "the forefront of an action or movement". The "vanguard herd" refers to the lead animals in a migratory movement, deflection or death of which can divert the entire herd."</i>

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16	There is a reference to the Kuukpik Corporation being formed in March, 1973. It was actually incorporated on April 19, 1973 and had 212 original shareholders. Kuukpik Corporation currently has about 384 shareholders. The last sentence of that paragraph should be revised to state: "Kuukpik Corporation has several subsidiaries and ventures involved with ice road construction, gravel mining and hauling, civil construction, drilling, seismic exploration, camps and catering, surveying, surveying, and security."	32	The Kuukpik Corporation formation date and original and current shareholder enrollment errors have been corrected. The suggested replacement text has been inserted.
18	Footnote 8 lists Kuukpik affiliates. It needs correction. Affiliates are Kuukpik/Umiaq/LCMF), Kuukpik/SAExploration (not listed), and others listed. Kuukpik/Carlisle needs to be eliminated, as it has dissolved.	32	The text has been replaced with: <i>Kuukpik Corporation companies include Nanuq, Inc. (ice road construction, gravel mining and placement, camp construction and maintenance and civil construction), Kuukpik Drilling, LLC (oil field exploration, development and production drilling), and Kuukpik Transportation Company (pipeline holding company). Kuukpik business ventures/affiliates include Kuukpik/Arctic Services LLC (camps and catering and maintenance), Kuukpik/NANA Management Services, LLC (oil field security), Kuukpik/UMIAQ/LCMF (civil engineering, architectural and surveying services), and Kuukpik/SAExploration (seismic and geophysical).</i>
19	In the cultural resources section, there appears to be a typo in the spelling of "Kuukpikmiut".	35	The typo has been corrected.
22	There is a period missing from the last sentence on this page.	35	The typo has been corrected.
23	Figure 3 does not show the spur road. Also, it is unclear what the black lines forming polygons, etc. on this map are intended to depict.	39	The black polygons on Figure 3 have been removed and the spur road has been added.
27	Typo in the first full paragraph—it should say "The range of the fourth herd..."	43	The typo has been corrected.
30	In Section 2.2.4 (Climate), the last passage under this main heading has confusing information. In one place, it states precipitation in Nuiqsut is light, averaging about 5-6 inches/year. Later in this passage, it states the average annual snowfall is estimated to be 20 inches. The precipitation section should note that it is talking about rainfall.	46	In the first sentence of the third paragraph of Section 2.2.4 Climate, the word <i>precipitation</i> has been replaced with <i>rainfall</i> .
32	The erosion section has a sentence that reads: "The loss of landfast sea ice combined with thawing permafrost is expected increase wind and erosion43." The word "to" is needed between "expected" and "increase".	48	The typo has been corrected.
34	The 3rd bullet on this page lists thermistors being used on an ice cellar in Kaktovik. It should state "thermosiphons" instead of thermistors.	50	The typo has been corrected.
36	Ice damming/jamming should be added to the list of natural hazards.	53	Ice damming/jamming has been included in the list of natural hazards in the second paragraph Section 2.2.6.1 Natural Hazards. Additionally, a heading for Ice Damming/Jamming has been created within Section 2.2.6.1.: <i>"Ice Damming/Jamming: An accumulation of ice can form where the slope of a river changes from steeper to milder or where moving ice meets an intact ice cover. The obstructing ice can cause flooding upsteam and, if it breaks suddenly, flash flooding downstream. The release of water and ice can damage buildings, infrastructure and wildlife habitat downstream."</i>
36	It should read "mammoth tusks."	53	The typo has been corrected.

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38	<p>1) It states: “Storm Surges: Due to its upriver location, the community is not directly affected by storm surges. Community residents have reported, however, that oil from local development projects has been deposited along the shoreline of historic fishing areas.” What local development projects have resulted in oil being deposited on the shoreline of historic fishing areas?</p> <p>2) In this same section, it states: “Raise the road to the landfill and armor it to prevent flooding damage”. Kuukpik has offered to improve a portion of the NSB landfill road using Borough gravel, and this upgrade has Corps of Engineers and Borough permits.</p> <p>3) In Section 2.2.6.2 (Emergency Management), it states: “The Native Village of Nuiqsut has developed an Emergency Operations Plan that is currently under review by the NSB and State of Alaska Homeland Security and Emergency Management Department. The Plan is expected to be completed during the fall of 201569.” While it is good that the NVN is working on such a plan, the City of Nuiqsut and Kuukpik Corporation should both be involved with this activity so the plan has more complete local input and buy in. Also, if the plan references use of the spur road, which is a private road, Kuukpik should certainly be involved with this portion of the planning activity.</p>	53 - 54 54 141	<p>1) Due to its anecdotal nature, the statement “<i>Community residents have reported, however, that oil from local development projects has been deposited along the shoreline of historic fishing areas</i>” has been deleted. Also deleted is the remaining text under the same heading “<i>Due to its upriver location, the community is not directly affected by storm surges</i>” and the reference to storm surges as a natural hazard to the community in second paragraph under Section 2.2.6.1 Natural Hazards.</p> <p>2) A footnote has been added to provide an update on the status of this recommendation: “<i>An upgrade to a portion of the landfill road has already been permitted by the Corps of Engineers and NSB. Kuukpik Corporation would provide the improvements using NSB-owned gravel.</i>”</p> <p>3) Cooperation on specific projects is beyond the scope of a comprehensive plan document. However, overall community cooperation is imperative for success. An objective and implementing strategy has been inserted in Goal 1 – Sustain Community Unity to emphasize the importance of coordination and communication for the betterment of the community. Objective: “<i>1.3. Foster collaboration among village leadership, as well as relevant private and public entities, in designing and implementing.</i>” Implementing strategies: “<i>a. Village leadership will keep each other informed of proposed projects, programs as well as research and funding opportunities so that there may be collaboration, as applicable, and the sharing of resources and resulting synergies in implementing projects that benefit the community.</i> <i>b. Village leadership and relevant Borough agencies will seek to ensure that all stakeholders in the community are made aware of and their input is solicited regarding proposed research and development projects located within the community’s Area of Influence.</i> <i>c. Village leadership and relevant Borough agencies will seek to ensure that relevant State and Federal agencies and private entities are made aware of research and development projects located within the community’s Area of Influence. When appropriate, sufficient time will be allowed these agencies and private entities to comment on proposed projects that may affect their interests or lands.</i>”</p>
39-41	Table 3, Contaminated Sites, Nuiqsut Area provides a list of the 39 known contaminated sites in the Nuiqsut area. A number of these sites include the term “FUDS” in the site name. No description is provided for this term. Kuukpik understands it to mean “Formerly Used Defense Sites.”	xiii, 55	The acronym FUDS has been added to the List of Abbreviations. Formerly Used Defense Sites has also been added to the first occurrence of the acronym as reference: <i>Kogru River / Formerly Used Defense Sites (FUDS) Main Cantonment Area.</i>
43	<p>1) Figure 4 shows the Nuiqsut Area of Influence. The area shown on this figure does not match the text on Page 42. The area shown on Figure 4 goes all the way to Eilson Lagoon next to Barrow while the text references the western boundary as being Teshekpuk Lake near Dease Inlet.</p> <p>2) Also, there is a typo in the spelling of Teshekpuk.</p>	61 58	<p>1) Figure 3 has been updated to reflect the text description.</p> <p>2) The typo in the spelling of Teshekpuk has been corrected.</p>
47	The text for fall subsistence activities states: “Whaling begins in mid-September along the coast as far east as the Canning River.” This text should be revised to read: “Whaling begins in late August to early September ...”.	66	The suggested text has been inserted.
56-57	The passages on these pages discuss housing and housing issues. Figures 8 and 9 show housing pictures but there is no reference in the text to these pictures.	77	Reference to the two photos has been inserted to reference the photos in the text: “ <i>TNHA designed and constructed five low-cost energy efficient single family homes in Nuiqsut within the last two years (see Figures 8 and 9)</i> ”
59	Figure 10 shows the Nuiqsut Trapper School but there is no reference in the text to this picture.	79	Reference to the photo has been inserted: “ <i>The NSB School District operates the Trapper School, pictured in Figure 10, which provides education from early childhood through grade 12.</i> ”
59-60	The final passage on Page 59 and continues to Page 60 reads as follows: “Between 2004 and 2010, the high school graduation rate dropped and the dropout rate has increased by from 5.3 percent to 13.1 percent ¹⁰² . The school had 78 students in the 2010/2011 school year (SY) ¹⁰³ . The school experienced a steady and significant decline since 2001 in 2010 to 2011 SY enrollment of 78 students ¹⁰⁴ . The State of Alaska indicated that there was an enrollment of 114 students for the 2013/2014 SY and estimates that 116 students were enrolled for the 2014/2015 SY ¹⁰⁵ .” This passage emphasizes the decline in student population from 2001 to 2010 but does not highlight the fact that the student population has increased from 78 students in 2010 to 114 students in 2014. The increase should be pointed out. This increased student population would affect things like staff needs, cleaning needs, water and power use, etc.	80	The revised sentence now reads: “ <i>The State of Alaska indicated that there was an enrollment of 114 students for the 2013/2014 SY and estimates that 116 students were enrolled for the 2014/2015 SY, an increase of 36 students over a five year period.</i> ”

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61	<p>The second passage in this solid waste service section states: "Use of the landfill by oil companies could threaten the Class III status and capacity of the facility¹¹³." The footnote references a personal communication from Matt Dunn in his prior role at CIPM in October, 2010. Kuukpik is not aware that any oil company has ever used the Nuiqsut landfill or has ever requested such use. Wouldn't the NSB have to approve such a use? The statement is true on its face but isn't portraying an accurate picture.</p>	82	<p>The statement under the heading Solid Waste Services in Section 2.3.3 Public Facilities and Services has been modified to read "<i>Use of the landfill by non-residents for waste not generated by the community oil companies could threaten the Class III status and capacity of the facility</i>". The reference has also been updated.</p>
62	<p>The Home Heating passage states: "Most homes have been converted to natural gas heating systems that are connected to a distribution system built and maintained by the NSB. The Borough provides residents free natural gas for a small fee." Kuukpik is the entity that is providing free natural gas for home heating, not the NSB. Suggest rewording to something like "Most homes have been converted to natural gas heating systems that are connected to a distribution system built by the NSB and maintained by the Nuiqsut Utility Cooperative (NUC). The Borough, through arrangements with Kuukpik Corporation, provides free natural gas for home heating with a small fee added to cover operating costs of the NUC."</p>	83	<p>The Home Heading text now reads: "Most homes have been converted to natural gas heating systems that are connected to a distribution system built and maintained by the NSB <i>and maintained by the Nuiqsut Utility Cooperative (NUC)</i>. The Borough, through arrangements with Kuukpik Corporation, provides free natural gas for home heating with a small fee added to cover operating costs of the NUC. residents free natural gas for a small fee. For those homes still reliant on diesel fuel, the Kuukpik Corporation provides a delivery service."</p>
62	<p>Further on Page 62, the Draft addresses electrical power costs. It states: "The Alaska Power Cost Equalization (PCE) Program subsidies [sic] rural household energy costs. The Borough sets the electricity rates for households who do not qualify for the PCE Program¹¹⁴. There is no more PCE in Nuiqsut because of the supply of natural gas which Kuukpik obtained from ConocoPhillips. The text quoted above should all be deleted since it doesn't apply in Nuiqsut. The text should state instead that "Because of the natural gas which ConocoPhillips provides in partial exchange for use of Kuukpik's land, the electric rate in Nuiqsut is \$0.08 per kW for both residential and commercial users, resulting in an average residential monthly charge of from \$_ to \$_, depending upon the size of the home and the number of appliances." The footnote in the draft references a NSB Utility Master Plan and Emergency Utility Plan from June 2008. Use of this now outdated Utility Plan is probably why the information in the Draft Comprehensive Plan is out of date.</p>	82	<p>The text regarding the PCE program under the Vehicle Bulk Fuel heading in 2.3.3 Public Facilities and Services has been moved under the Power heading. The text has also been revised to read: "The Alaska Power Cost Equalization (PCE) Program subsidies <i>subsidizes</i> rural household energy costs. <i>Because Nuiqsut receives natural gas from the nearby Alpine facility, the electric rate for Nuiqsut residences is significantly lower than most rural Alaska community at \$0.08 per kWh. However, because commercial facilities are charged at a higher rate, there are a very small number of entities in Nuiqsut that qualify for the PCE program, such as the AC grocery store. The Borough sets the electricity rates for households who do not qualify for the PCE Program. The rate is \$0.15 per kW resulting in an average residential monthly charge of from \$90 to \$135, depending upon the size of the home and the number of appliances. Assuming a large house with four residents and a full array of appliances and electronic equipment, the per person use of electricity is estimated at 8 kW per day. Based on current power use and an anticipated increase to accommodate new appliances and electric vehicles, the natural gas power plant capacity is expected to serve the community for the next 20 years.</i> Additionally, the first sentence in the next paragraph has been edited to provide consistency with the changes to the previous paragraph: "<i>While Nuiqsut residents enjoy affordable home power and home heating, conservation measures can improve the livability of homes. Energy conservation measures can lower costs and, therefore improve residents' quality of life. In an effort to assist residents in lowering their home heating costs, the Borough assists in weatherization upgrades.</i>"</p>
64	<p>1) The Off Road passage includes a discussion about Nuiqsut residents' use of village roads and seasonal ice roads. There is no reference to the spur road and its connection to the Alpine gravel road system. Kuukpik proposes the following additional sentence: "When it opens, Kuukpik plans to allow permanent Nuiqsut residents to use Kuukpik's private spur road, which connects to ConocoPhillips' gravel oil field service roads for Alpine and some of its satellites in the Colville River Delta and in NPR-A and, in winter, also provides a potential additional connection to ice roads connecting to the Spine Road." 2) Figure 11 is provided on Page 65 but there is no reference to this figure in the preceding text.</p>	87	<p>1) This comment is addressed in the Current Roads section. The Nuiqsut Spur section has been combined with the Current Roads section for clarity and the text now reads: "<i>In March 2014, the USCOE approved permits for a 5.8-mile road connecting the community to the CD-5 Access Road. The Kuukpik Corporation constructed the road, which begins at the Nuiqsut landfill access road. The Kuukpik Corporation owns this 24-foot wide privately owned and maintained road and 10-acre gravel pad which is located at the junction with the CD-5 road. The road has several purposes: It provides villagers access to the Alpine Development Project for training and job opportunities and access to subsistence areas. It also improves health and safety by providing a secondary connection between the Nuiqsut and Alpine airports in the event someone requires immediate evacuation. When it opens, Kuukpik plans to provide access to permanent Nuiqsut residents to use the spur road, which connects to ConocoPhillips' gravel oil field service roads for Alpine and some of its satellites in the Colville River Delta and in NPR-A and to winter ice roads connecting to the Spine Road.</i>" 2) A reference to Figure 11 exists in the first paragraph in Section 2.3.4. Transportation System. No change has been made to address this comment.</p>
67	<p>The Current Roads section does not include any reference to the spur road and its connection to the Alpine gravel road system. Kuukpik would add a new 4th sentence in the first full paragraph as follows: "When it opens, Kuukpik plans to allow permanent Nuiqsut residents to use Kuukpik's 5.8 mile, privately owned and maintained spur road, which connects to ConocoPhillips' gravel oil field service roads for Alpine and some of its satellites in the Colville River Delta and in NPR-A and to winter ice roads connecting to the Spine Road."</p>	87	<p>The Nuiqsut Spur section has been combined with the Current Roads section for clarity. The revised text is presented in the preceding comment.</p>

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67-68	<p>1) The Gravel section references the Kuukpik/ASRC gravel mine site and states: "ASRC and Kuukpik own a material site..." Kuukpik no longer has any ownership interest in the material site, so that text should be revised to say "ASRC owns a material site..."</p> <p>2) The Draft states that "Kuupik Corporation mined 500,000CY of material to construct the 5.8 mile Nuiqsut Spur Road to connect the village of Nuiqsut with CD-5120." The footnote references an Areawide Gravel Resources Project Analysis Report prepared by Umiaq in 2014. First, there is a typo in spelling Kuukpik. Next, Kuukpik only mined about 400,000 cubic yards in the past two winter seasons. Finally, there is no reference to the Storage Pad that was also constructed with this gravel.</p> <p>3) The first full passage on Page 68 describes the gravel stockpiles available in Nuiqsut. This information is inaccurate and outdated. The first gravel stockpile referenced in the first full paragraph on page 68 has about 35,000 cubic yards in it that are owned by the NSB and also contains about 20,000CY owned by Kuukpik. This stockpile was largely placed in 2007, though it may have some dredged gravel at the bottom of the pile. The NSB (not BLM) purchased 140,000 cubic yards of gravel in the 2014-2015 winter season, which is also stockpiled by the Nigliq Channel, to the northeast of the stockpile described above. Some of that gravel is intended for the proposed Colville River Access Road. Also, Kuukpik owns about 20-30,000 cubic yards of additional gravel in a small, separate stockpile that is also by the Nigliq Channel, just to the south of these other two stockpiles.</p> <p>4) Finally, there is a write-up on the spur road. Generally, the info shown is correct except for the length of the road. The spur road is 5.8 miles long, not 6.1 miles as stated.</p> <p>5) The map included after Page 68 needs a figure number. It is a map of the Proposed GMT-1 Development dated August 2014. There is no reference to GMT-1 in the preceding or following text.</p>	88	<p>The Gravel section has been updated to address several comments:</p> <p>Gravel: Significant exploration for gravel occurred in the 1970s and 1980s in the Nuiqsut area; there were not any sources found close to the village other the ASRC Gravel Mine Site. than below the Colville River. ASRC and Kuupik Corporation owns a material site approximately 4.5 miles east of Nuiqsut across the Nigliq Channel and Colville River that was originally permitted by the U.S Corps of Engineers (USCOE) in 1997. Due to the cost of permitting and reclamation, the pit is only re-opened for large projects. The current permit allows allowed mining for 1.2 million cubic yards (CY) and expires on September 30, 2018. ConocoPhillips purchased 600,000 CY of gravel for use at CD-5, a satellite of the Alpine facility. Kuupik Corporation mined 500,000 CY of material to construct the 5.8 mile Nuiqsut Spur Road to connect the village of Nuiqsut with CD-5119F. <i>Both of these projects have been completed in 2015.</i></p> <p><i>Additional mining was authorized within the existing USCOE permit by increasing the total gravel amount to allow the NSB to utilize two NPR-A grants for the gravel mining. The intent of the grant funds was to stockpile gravel to allow construction of a road to the Colville River, which has been a project long sought after by the village and the NSB. One NPR-A grant was for \$2.1 million and a later, smaller one was issued for an additional \$550,000. Both grants were spent on gravel mining and stockpiling in 2014/2015 and the gravel has been staged with the existing stockpile located on the leased land on the Nigliq Channel. A total of 65,600 cubic yards of gravel is now available for the Colville River Road construction. This is about half of the entire amount of gravel needed for the road construction.</i></p> <p><i>In addition to the NPR-A grants, the NSB Public Works Department utilized \$3 million of general bond money for mining and stock piling of gravel to be used for local maintenance needs within the village. Due to this additional effort, another 75,000 cubic yards of gravel is now stockpiled, combined in the same pile as the Colville River gravel on the Nigliq Channel.</i></p> <p><i>There are two gravel stockpiles located on the shore of the Nigliq Channel near Nuiqsut. The stockpiles are located on leased land from Kuukpik. One is a small gravel stockpile approximately 19,000 cubic yards in size in Nuiqsut near the Nigliq Channel which is a remnant of earlier dredging efforts. Material is no longer dredged from the Nigliq Channel. Owned by the NSB, the material is generally 1-inch minus gravelly sand acceptable for road, airport, and boat ramp repairs. Because of bond financing limitations, this gravel cannot be sold by the Borough to residents for personal uses, such as fill for driveways or to shore up homes.</i></p> <p><i>The second stockpile contains the Colville River Road gravel, and the additional gravel mined for NSB PW maintenance needs for maintenance projects within the village, as explained earlier in this section. There is also a stockpile of gravelly sand with silt at the landfill that is used to cover solid waste. There is a larger stockpile of gravel purchased by the BLM for use in extending the Freshwater Lake Road to the Colville River. However, this gravel is not sufficient to build that road and more gravel will be needed to complete that project. Lastly, the Kuukpik Corporation has a stockpile of gravel for its projects.</i></p>
71	<p>1) The Future Roads section discusses the proposed Colville River access road. The permitting information shown is out of date. The 1996 Corps permit expired. NVN applied for an additional Corps permit in 2014 and a public notice for the new permit was issued in June, 2014. This permit has yet to be issued.</p> <p>2) The second full paragraph is partly inaccurate. The new subdivision is just off the road to the Freshwater Lake. The proposed roads are mainly those within and around the subdivision that would provide access from Nuiqsut to all of the lots except for those that already front on the Freshwater Lake road.</p>	93 93	<p>1) The text has been updated to reflect the current status of the USCOE permit: "A USCOE permit for the 4-mile road <i>that was obtained in 1996 has now expired. The Native Village of Nuiqsut has applied for an additional USCOE permit but it has yet to be issued. Only partial funding for the Colville River Road has been obtained.</i>"</p> <p>2) The text has been updated to reflect that the future roads are within the subdivision: "<i>Additional roads are needed to provide access to lots within second proposed road would connect the community to a new subdivision located to the southeast of the village just off the road to Freshwater Lake.</i>"</p>
72	<p>1) At the end of the Water Travel section which starts on Page 71, it mistakenly references the Spur Road. It should read "Spine Road".</p> <p>2) This same sentence talks residents arranging for goods to be delivered to Prudhoe Bay by barge, then transported by truck to Nuiqsut via the Spine Road and ice road. Transport of goods by truck to Prudhoe Bay is more common for Nuiqsut residents than transport by barge to Prudhoe Bay.</p> <p>3) The text in the first Air Travel paragraph says "Freight is shipped to Nuiqsut by air under the Alaska Bypass Mail Program." That is wrong. Nuiqsut is not covered under the Alaska Bypass Mail Program. At Kuukpik's request, AFN passed a resolution in 2015 requesting that the U.S. Postal Service extend Bypass Mail to Nuiqsut, but the Postal Service has resisted adding new communities to those participating in the Bypass Mail Program for many years now. It presently seems unlikely that Kuukpik will be accepted by the Postal Service for the Bypass Mail Program.</p>	93 94 84	<p>1) Spur Road has been replaced with Spine Road under the Water Travel heading.</p> <p>2) The discussion of residents shipping goods to Nuiqsut has been updated to reflect the preference for using truck transport: "Occasionally Residents will often arrange to have goods delivered to Prudhoe Bay by truck, or less often by barge, and then transported by truck in winter via the Spur Spine Road and winter ice road."</p> <p>3) The reference to the Alaska Bypass Mail program has been stricken from the Air Travel section. The following text has been inserted under the revised heading Postal Service (formerly Post Office): "<i>Many communities in rural Alaska benefit from the Alaska Bypass Mail Program that provides subsidies to air carriers and allows shippers to bypass the post office by delivering goods directly to the airlines. Nuiqsut is not part of the program. At the request of Kuukpik Corporation, The Alaska Federation of Natives (AFN), a resolution was passed in 2015 requesting that Nuiqsut and other rural Alaska communities included in the program.</i>"</p>

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73	Table 11, Oil and Gas Development Projects and Ownership, is outdated. Hilcorp now owns and operates Endicott and Northstar. Also, Oooguruk is now owned and operated by Caelus. Oooguruk also now includes the Nuna satellite oil pad, which is located onshore at the south side mouth of the main channel of the Colville River. The list also omits the Nikaitchuq offshore island, owned by the Italian oil company, ENI, which is lies just offshore of Oliktok Point. Nikaitchuq is much closer to the Colville River and to Nuiqsut than either Endicott or Northstar. Brooks Range Petroleum has also constructed a road and a drilling and production pad at Mustang, just west of Tarn and Meltwater, though it is not yet producing oil. These additional sites and oil companies should be added to Table 11.	95	Current Table 12 has updated to reflect the information provided.
74	<ol style="list-style-type: none"> 1) In the carryover paragraph on pages 73 and 74, CD-5 is on land owned by ASRC and Kuukpik, not Kuukpik alone. 2) The Greater Moose's Tooth 1 satellite oil field has obtained all permits and has been funded by ConocoPhillips and Anadarko for construction starting in December 2016. 3) The Nuna satellite pad, the Nikaitchuq offshore island, and the Mustang pad should be added to the oil facilities described at pp. 73-77. 	<p>96</p> <p>96</p> <p>99</p>	<ol style="list-style-type: none"> 1) ASRC has been added to the sentence pertaining to ownership of the land for CD-5. 2) The text regarding Mooses Tooth under the heading Oil and Gas Industry Facilities has been updated to read as follows: <i>"The Greater Mooses Tooth 1 satellite oil field has obtained all permits and has been funded by ConocoPhillips and Anadarko for construction starting in December 2016. Greater Moose's Tooth 1 and 2 are going through the permitting process for development."</i> 3) Discussion of Nuna, Nikaitchuq and Mustang have been added: <i>"Oooguruk also now includes the Nuna project, an onshore oil development filed located on the south side mouth of the main channel of the Colville River. Nuna has an estimated 105 million barrels of reserves proven to date. During the winter of 2014/2015, Nuna's gravel access roads and a 20-acre production pad were constructed. Startup at Nuna is planned in the fourth quarter of 2017.</i> <i>Nikaitchuq is an off-shore facility on an artificial island named Spy Island built by Eni Petroleum in the Beaufort Sea in 2010. It is located inside the natural barrier island also named Spy Island about four miles north of Oliktok Point and 35 miles northeast of Nuiqsut. It is a drilling site for the Nikaitchuq field development.</i> <i>The Mustang Project is located in the Southern Miluveach Unit, which is off the southwest corner of the Kuparuk River Unit and approximately 16.8 miles from Nuiqsut. A road to the Mustang prospect and 19-acre production pad were completed in the spring of 2013 and are operated and used by the Brooks Range Petroleum Corporation. The unit is expected to be producing in 2016."</i>
75	The North Slope Oil and Gas Activity map is apparently Figure 12, but is unlabeled.	97	A figure number had been added to the North Slope Oil and Gas Activity map.
77	The ownership information stated for Endicott and Oooguruk is wrong. See above— Hilcorp and Caelus are the operators, respectively. Also, no operatorship data is provided for Northstar or Oooguruk. Finally, there is no data or reference to Nikaitchuq, which is an offshore and onshore field operated by ENI.	99	Owner and operator information has been updated. A description of Nikaitchuq has been added that read <i>"Nikaitchuq is an off-shore facility on an artificial island named Spy Island built by Eni Petroleum in the Beaufort Sea in 2010. It is located inside the natural barrier island also named Spy Island about four miles north of Oliktok Point and 35 miles northeast of Nuiqsut. It is a drilling site for the Nikaitchuq field development."</i>
80	<ol style="list-style-type: none"> 1) The paragraph about Kuukpik has many inaccuracies. At the present time, Kuukpik has about 384 shareholders, well under half of whom have 100 shares. So it is wrong in multiple respects for the draft to state that "Most shareholders have 100 shares and could receive annual income from dividends between \$12,000 and \$20,000." About a third of all shareholders live in Nuiqsut. Of those born after December 18, 1971, most hold less than 100 shares. 2) Figure 14, Major Employers Providing Full Time Year Round Jobs in Nuiqsut (2010), shows CPAI as providing 12 jobs. This figure seems to be incorrect since it is not believed that CPAI provides any jobs resident in Nuiqsut. Kuukpik doubts that CPAI employ as many as 12 Nuiqsut residents in full time positions at Alpine and elsewhere in 2010. The correct number is probably less than five. The footnote referenced on the table title lists a 2010 Economic Profile Report that was accessed on May 11, 2015 and prepared for the NSB. That should be cross-checked. 	<p>102</p> <p>102</p>	<ol style="list-style-type: none"> 1) The text has been revised to read: <i>"In March 2014 In December 2015, 325 approximately 384 Nuiqsut residents were enrolled as shareholders in the Kuukpik Corporation which dispenses quarterly dividends to shareholders. Shareholders receive a quarterly dividend of \$30 to \$50 per share. Most Under half of all shareholders have 100 shares. Those with 100 share and could receive annual income from dividends between \$12,000 and \$20,000. However, children born after December 18, 1971 acquire shares by inheritance or gift only and those shareholders may likely hold less than 100 shares.</i> 2) The source for Figure 14 has been verified and revealed several errors and the graphic has been updated. The Figure description has been updated to indicate that the information reflects employment, not necessarily full-time, year-round employment.
89	In the first full paragraph, the Kuukpikmiut make subsistence use of the areas around Teshekpuk Lake and to the west, but the language indicating that they occupy "seasonal settlements along Teshekpuk Lake..." is too strong. Local use is typically more intermittent and transitory than at either Cross Island or the Colville River Delta area with which the text groups the Teshekpuk Lake area. For instance, the whaling crews typically spend about three weeks or a month at Cross Island, and that or longer at seasonal settlements in and around the Colville River and its tributaries. The sentence is accurate as to Cross Island or the Colville River and its tributaries, but Teshekpuk Lake should be the subject of a separate sentence indicating it is typically used more occasionally.	113	The text in the first paragraph of Chapter 3: Land Use and Zoning has been amended to read: <i>"The Kuukpikmiut have traditionally occupied seasonal settlements along Teshekpuk Lake at Cross Island and along the Colville River and its tributaries. They also make subsistence use of the areas around Teshekpuk Lake occasionally."</i>

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92	Section 3.1.1.2 Other Federal Lands and Waters (which begins on Page 91), references the Coastal Impact Assistance Program as being a source for funding for the NSB. Research recently done by Kuukpik in connection with Hilcorp's Liberty Development and Production Plan indicated that there was no current funding for this program and no present prospects for funding.	115	The text referencing the Coastal Impact Assistance Program funds under Section 3.1.1.2 Other Federal Lands and Waters has been stricken and the tense has been changed to reflect funding uncertainty.
92-93	1) In Section 3.1.3 on Native Corporation Lands, at the top of p. 93, with ANCSA 12(b) acreage allocated to Kuukpik by ASRC, Kuukpik's total ANCSA entitlement is about 148,000 acres, not the 136,880 acres shown. 2) In the final sentence at the end of the next paragraph, the reference to Kuukpik having purchased other lands should be deleted entirely. 3) In the following paragraph, GMT-1 is a satellite oil field, not a gas field.	117 117 117	1) Kuukpik's ANCSA 12(b) entitlement has been changed to 148,000. 2) The statement regarding Kuukpik having purchased other lands has been deleted. 3) GMT-1 gas field has been replaced with GMT-1 oil field.
94	1) Kuukpik's understanding is that the City of Nuiqsut's boundaries contain 9 square miles, not the 9.2 miles shown. So that discrepancy should be checked. 2) Kuukpik may have conveyed more than 1280 acres under ANCSA 14(c)(3) for municipal purposes, so the text should say "1280 acres or more."	118 118	1) The City of Nuiqsut's size has been given a reference. 2) The text now reads: "The Kuukpik Corporation has conveyed approximately 1,280 acres of land to the City of Nuiqsut under this provision..."
102	Section 3.2.3.1 Alpine Oil and Gas Complex Resource Development District states: "The GMT-1 and 2 rezoning and the Alpine Master Plan amendment was approved by the NSB Assembly in October 2015. ¹⁷⁷ " The footnote references the July, 2015 rezone action presented to the NSB Planning Commission in August, 2015. First, it Kuukpik's understanding that GMT 2 was dropped from the rezone plans in July 2015, so this information is or certainly should be incorrect. Additionally, Kuukpik understands that CPAI delayed the Assembly action on the rezone until the December 2015 Assembly meeting, since the November Assembly meeting was being held in Pt. Hope. So again, the draft's statement that approval has occurred seems in error.	126	The discussion on the Alpine Complex has been updated: "In 2005, the NSB re-zoned the Conoco Phillips (CPAI) Alpine Development Project from the Conservation District to the Resource Development District and adopted an Alpine Development Master Plan. Several satellite developments encompass the Alpine project (see Section 2.3.5 for details of this project). The Alpine facilities cover approximately 97-221 surface acres and produces from about 25,000 acres (39 square miles) of reservoir. Its closest drill site to Nuiqsut is about 8 miles to the north. The Alpine development began oil production in 2000 and now consists of numerous well sites and facilities. The most recent addition is the 11.74-acre CD-5 gravel pad with a 6-mile gravel road connecting to the CD-4 Alpine facility. CPAI received approval on December 1, 2015 from the North Slope Borough Assembly to rezone The CD-6, and CD-7 proposal has been renamed Greater Moose's Tooth 1 and 2 (GMT-1 and GMT-2), totaling 3,971 acres from Conservation District to Resource Development District. The 11.8-acre GMT-1 gravel pad will have 33 drilling and injection wells, a 7.6 mile gravel access road and an 8.4-mile elevated pipeline connecting GMT-1 to the Alpine CD-5 facility. Approximately 9,869 acres of the Alpine Satellite project are being returned to the Conservation District due to project changes and community input. and CPAI is seeking an amendment to the Alpine Development Master Plan and a rezoning of 10,330 acres of land within that area from Conservation District to Resource Development District. However, as part of this rezoning application, CPAI would return 9,869 acres of Resource Development District land to Conservation District. The proposed 11.8-acre GMT-1 gravel pad would have 33 drilling and injection wells, a 7.6 mile gravel access road and an 8.4-mile elevated pipeline connecting GMT-1 to the Alpine CD-5 facility. A future proposal for a 14-acre GMT-2 gravel pad would have several wells and a 9-mile gravel road connecting this facility to GMT-1. The GMT-1 and 2 rezoning and the Alpine Master Plan amendment was approved by the NSB Assembly in October 2015.
103	At the end of Section 3.3 Current Land Use, it states: "North and west of the landfill is the Spur Road, a private road leading to the Alpine drill site CD-5." This passage should be revised to read: North and east of the landfill is the Spur Road, a private road leading to the CD-5 access road, which connects to the existing Alpine road system.	127	The suggested replacement text has been inserted.
105	The Area Use Map-Nuiqsut has a number of lease designations that need review and are, at a minimum, incomplete. Several notations refer to Anadarko leases, which may be correct, but those leases would be paired with overlapping ConocoPhillips leases. Kuukpik also thinks some of these leases, particularly to the south, have expired or been surrendered. Also, the Spur Road is not shown on this map.	129	The map was produced by the State of Alaska with assistance from the North Slope Borough. If an updated map becomes available when this Comprehensive Plan is updated, it will be included.
107	Figure 17 Nuiqsut, Alaska Land Use Map does not show the Spur Road.	131	Figure 17 has been revised to include the spur road.
109	In the fourth full paragraph, there are multiple gravel stockpiles, all of which are either south or southeast of the boat launch, not west.	88	This change has been made; the gravel section has been significantly revised.
115	In the final sentence on page 115, Kuukpik should be included along with the City and Native Village in the definition of "Village leadership" for multiple reasons, which are set out in the particular uses of the term "Village leadership" discussed below.	139	Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.

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121-124	Table 15, Goal 2-Protect Subsistence Resources and Activities uses the term “Village leadership” in almost every implementing strategy. However, Village leadership as defined on p. 115 does not include Kuukpik. That must be corrected, especially since over the past 20 plus years, Kuukpik has been far and away the most active village entity in protecting Nuiqsut’s subsistence resources through the public agency permitting process and through direct negotiations with oil companies. Even without that track record, however, as the ANCSA corporation for Nuiqsut and the owner of approximately 146,000 acres of key subsistence lands in the area, Kuukpik should most certainly be included. Just to take one example, under 2.2(f) of Table 15 on the need for “village leadership” to obtain mitigation funding from the oil industry, Kuukpik was the primary instigator of negotiations (and participated or attempted to participate throughout the ensuing negotiations) on the Borough’s Good Neighbor mitigation fund established for CD-4. Kuukpik directly negotiated with Pioneer Natural Resources and with ConocoPhillips to obtain (1) all three of the separate mitigation funding commitments now being received by Nuiqsut for Oooguruk, for CD-5, and for the Nigliq Channel Bridge and (2) the separate mitigation funding commitments for the future mitigation payments for Nuiqsut for GMT1 and GMT2.	139	Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.
127-129	Table 16, Goal 3-Seek Meaningful Participation again uses the term “Village leadership” and again Kuukpik is omitted by the definition of that term on p. 115. See above discussion, re Table 15. Omitting Kuukpik from that definition ignores Nuiqsut’s most effective local protector, is harmful, and should be corrected.	139	Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.
133-134	Table 17, Goal 4-Support the Provision of Adequate Housing for All Income Levels again uses the term “village leadership” and omits Kuukpik.	139	Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.
137-138	1) Table 18, Goal 5-Facilitate Economic Development again uses the term “village leadership” and omits Kuukpik, per the definition on p. 115. 2) Also, Objective 5.3 states: “Seek greater employment by residents in oil and gas industries located within the Nuiqsut Area of Influence.” The implementing strategy does not cite efforts by Kuukpik and CPAI to make this happen, such as the scholarship program and the longstanding Career Quest program at the Nuiqsut Trapper School, which was jointly initiated by Kuukpik and ConocoPhillips, as well as the Spur Road being a key element towards future jobs at Alpine.	139 148	1) Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4. 2) Implementing Strategy a. under Objective 5.3. now reads: “ <i>Village leadership will continue to work with industry representatives and the NSB School District and Iḷisaḡvik College to (1) identify job opportunities in area industry; (2) to recruit and train residents to fill these jobs; (3) to require an effective hiring outreach, training, and internship program for these jobs by industry applicants as an NSB permit stipulation.</i> ”
139	The write-up in Section 4.7 Goal 6-Community Facilities states (from the Paisinich): “Critical Matter Number 2: The village, in cooperation with the Borough, should appropriate a water supply from the Colville River and tributary and adjacent water bodies adequate for both village uses and preservation of fish, waterfowl, and other wildlife habitat.” Does the NSB (or some other entity) have water rights for the Freshwater Lake or the stream exiting the lake that is crossed by the access road? The text states that Objective 6.1 addresses this item but Objective 6.1 in Table 19 Goal 6-Maintain Public Infrastructure (which follows later) does not actually address this item from the Paisinich.	167	Because the Objectives in Goal 6 do not address the Paisinich Critical Matter Number 2 and because the Paisinich is currently undergoing an update that will be available for the next Plan revision, Critical Matter Number 2 has been deleted from Section 4.6 Goal 6 – Community Facilities.

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141-143	<p>1) Table 19, Goal 6-Maintain Public Infrastructure. Objective 6.1 again highlights the absurdity of omitting Kuukpik from the definition of “Village leadership.” Implementing Strategy 6.1(b) references the need for “village leadership” to support the provision of natural gas-generated electricity and home heating. As discussed in several spots elsewhere in the Draft Comprehensive Plan, it is Kuukpik which obtained the rights to natural gas from ConocoPhillips (see, e.g., p.62) and Kuukpik would have to be involved in any major expansion of the gas supply.</p> <p>2) The draft also has an implementing strategy on Objective 6.2 that states: “e. Village leadership will provide a natural gas fueling station in the village.” While this is likely a good concept, it looks like it was added on at the last minute – see the table. Also, this item appears to be better suited for placement under Objective 6.1 rather than 6.2.</p> <p>3) Again, this table (which continues on Page 142-143) uses the term “village leadership” which is defined on p. 115 to exclude Kuukpik.</p> <p>4) The footnote references CPAI construction of the CD 5 drill site and should state: “CPAI constructed a bridge over the Nigliq Channel of the Colville River and Kuukpik built and owns a private spur road from the village to the CD-5 road.”</p> <p>5) Finally, the implementing strategy for Objective 6.3 calls for investigating the “regional hub” concept for the Nuiqsut airport. The objective caveats this approach by saying: “If deemed feasible and desirable by the community, establish the Nuiqsut airport as the air travel hub of the region¹⁸⁰”. This footnote goes on to say that the hub would serve nearby oil and gas industry, which could only mean ConocoPhillips at Alpine and Alpine satellites such as CD-5 and GMT1. Kuukpik believes that the community of Nuiqsut would not support development of Nuiqsut as a hub, at least within the foreseeable future, because of the impacts on the community. Kuukpik in its written comments to BLM in connection with GMT-1 stated several times, most recently on April 22, 2014, that it would not make its private spur road available for industrial use in connection with the “Nuiqsut as a hub” concept for the foreseeable future. Without that road connection to Alpine through the spur road, Nuiqsut as an industrial hub is not feasible. BLM effectively dropped that alternative from BLM’s GMT-1 Supplemental EIS analysis as a result of Kuukpik’s position. In addition, the spur road was not designed or constructed as an industrial road. This section as currently drafted would have the Borough expending resources evaluating a prospect that is not presently feasible. The current text is largely phrased as though Nuiqsut wanted such development to occur, in spite of the caveat language “if deemed feasible and desirable by the community” that is also used. The section should be modified to reflect that while the prospect may not be permanently dead, it is certainly not presently viable or a priority.</p>	139 169 139 170 170	<p>1) Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.</p> <p>2) Implementing strategy e. under 6.2 has been moved and is now implementing strategy d. under 6.1.</p> <p>3) Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.</p> <p>4) The suggested replacement text has been inserted.</p> <p>5) The Nuiqsut Airport Layout Plan, approved in January 2014, indicates that the ultimate layout for the Nuiqsut airport includes paving the entire runway and a 911 ft. extension to total 5,500 ft. which could accommodate some 737s. In both the objective and implementing strategy the statement “If deemed feasible and desirable by the community” is included to indicate that there is prospect but not a certainty.</p>
147	Table 20, Goal 7 – Estbalish Future Land Use Designations- Again, this table uses the term “village leadership” which is defined on p. 115 to exclude Kuukpik.	139	Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.
151	At the bottom of this page, it states: “This page is intentionally left blank.” This statement is an error/typo, as the page is not blank.	N/A	The typo has been corrected.
154	Section 4.12, Potential 5, 10, and 20 Year Capital Asset Needs provides information on future capital needs for various Nuiqsut projects. This section states: “The State of Alaska estimates that petroleum will contribute between 82 percent and 89 percent of General Fund unrestricted revenue for fiscal years 2014-2023 ¹⁸² .” The footnote references the ADOR Revenue Sources Book from spring, 2014. While that statement may have been true in 2014, it certainly isn’t accurate today, as evidenced by the ongoing State budget crisis. The same source from spring, 2015 should be used, at a minimum.	181	The statement has been updated to reflect more current information. It now reads: “ <i>The State of Alaska estimates that petroleum will contribute between 65 percent and 75 percent of General Fund unrestricted revenue for fiscal years 2015-2025.</i> ”

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156-158	<p>1) Table 23, Potential Capital Asset Needs for 2015-2035 lists a number of projects and actions that will require capital during the stated time frame. Given the critical housing shortage in Nuiqsut, the entry under Roads to “Build a road extension to the new subdivision on the southeast area of the village” should be listed as a priority in the 1-5 Year Period portion of Table 20, not the 6-10 Year Period portion where it is presently listed in the draft.</p> <p>2) Under the Airport Entry in Table 23 on p. 157, see comments regarding Table 19 (pp. 141-143).</p>	183 139	<p>1) The road extension to the new subdivision capital asset need has been moved from the 6-1- Year Period to the 1-5 Year Period.</p> <p>2) Kuukpik Corporation was added to the list of village leadership in the third paragraph under Chapter 4.</p>
173-181	<p>Appendix B, Adaptation to Climate Change Impacts for Nuiqsut Residents lists Weather-Related Physical Changes, Potential Impacts to the Village, and Adaptive Response Options in a table format. On p. 175, one of the adaptive response options to thawing permafrost is listed as “Among other measures, the village corporation could assist residents in procuring gravel to shore up homes...” Under ANCSA, the regional corporation owns all gravel resources on ANCSA lands. In this case, Kuukpik does not even own the surface estate at the ASRC mine site, as ASRC owns the surface, as well. See discussion above re the Draft at 67-68. This sentence ought to refer to the regional corporation as the owner of the resource, rather than the village corporation.</p> <p>For clarity and in order for the table to be useful as a practical matter as a working document and future reference tool, in the Appendix B table, each Adaptive Response Option should be directly aligned with the Weather-Related Physical Changes and the Potential Impacts to which it applies. Some of the descriptions need to be expanded, even if that leads to a longer table. As the table now stands, for instance, the first category (from p.173 to p. 175) lists a broad range of 12 different physical changes (with internal duplication) and 11 different, related impacts and 9 different Adaptive Responses, all of which are lumped together in a big muddle. For instance, the reference to village corporations assisting with gravel (for driveways and homes) that is discussed above appears on page 175 adjacent to a “Potential Impact” that describes flooding and structural failure of ice cellars and the resulting impact on nutrition. At first glance, the associated Physical Change in the table is the amount of carbon being released from permafrost soils. This isn’t very user friendly in its current format. Neither relates in any obvious way to the need for “gravel to shore up homes and driveways and other buildings.” Commissioners, staff, and members of the public will be referring to this table during public meetings and need a table that is user friendly and easy to align. The actual intended link to a Physical Change in this example is presumably to the “Thawing Permafrost” entry which appears earlier in page 175, but that entry makes no reference to the resulting subsidence that is what triggers the need for “gravel to shore up homes and driveways and other buildings.” While it would lead to some duplication and a longer document, the table ought to separate Weather-Related Physical Changes into more individual categories, so that one Weather-Related Physical Change category would be “Thawing Permafrost, with Resulting Subsidence.” The Potential Impacts related to that change would be all listed for that Physical Change, then the Adaptive Response Options for that specific Physical Change. The goal is to have an easily useable, informative table, even if it’s longer as a result, not a table that has to be puzzled out to get the information.</p>	199	<p>The comments on the Adaptation to Climate Change Impacts for Nuiqsut Residents table (current Appendix A) are noted and appreciated. The table will be revisited during the next regular update of the Nuiqsut Comprehensive Development Plan.</p>

