

Nuiqsut Caribou Subsistence Monitoring Project: Results of 2009 Hunter Interviews

Prepared for
ConocoPhillips Alaska, Inc.

February 2010

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222
(907) 276-6117 (fax)
srba@alaska.net

EXECUTIVE SUMMARY

This report presents the first year of data for the Nuiqsut Caribou Monitoring Project, based on research conducted by Stephen R. Braund & Associates (SRB&A) under contract to ConocoPhillips Alaska, Inc. (CPAI). The purpose of the Nuiqsut Caribou Monitoring Project is to document the impacts of CD4 and other CPAI satellite developments on Nuiqsut residents' caribou hunting activities. The monitoring project is an ongoing, multi-year program meant to measure impacts over time. The intent of the project is to assemble data on impacts on caribou harvesting that lead to a common understanding of these impacts by the community of Nuiqsut, industry, and government oversight agencies. With the assistance of the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI), SRB&A formed a Nuiqsut panel of caribou experts, whose purpose is to assist with developing the monitoring plan, reviewing the results of the monitoring program, suggesting changes to the monitoring program, and identifying active caribou harvesters to interview.

Several types of data are relevant to a common understanding of caribou harvesting impacts: (1) hunter observations; (2) caribou distribution, abundance, herd size, habitat quality; (3) industry mitigation activities; and (4) historical subsistence use. This first annual report is based primarily on hunter observations. An important function of the report is to identify additional data monitoring components most relevant to developing a common understanding of these impacts.

In March and April 2009, SRB&A conducted interviews with 40 Nuiqsut caribou hunters regarding their caribou hunting activities in 2008. Hunters provided 2008 use areas, harvest locations, and harvest characteristics, in addition to observations about changes in harvest activities, impacts on hunting activities, conditions of harvested caribou, and changes in caribou migration, distribution, health/quality, and abundance. SRB&A also interviewed several elders and gathered information about long-term changes in caribou.

Caribou harvesters provided 136 caribou use areas and 181 caribou harvest locations for the 2008 study year, the majority of which were located along the Colville River and west of the community toward Fish Creek. Respondents reported changes in their 2008 harvest activities such as harvest amounts and trip frequency, duration, and timing, often attributing these changes to changes in caribou migration or resource availability, and disturbance from helicopter or airplane traffic.

In addition, Nuiqsut respondents provided general observations about changes in caribou in 2008, particularly related to migration and distribution. Hunters commonly attributed the causes of these changes to development-related activities or infrastructure, including pipelines and air traffic disturbance. Over half of Nuiqsut respondents reported observing one or more abnormalities in the caribou they harvested in 2008, particularly related to the health and size of caribou. Nuiqsut harvesters reported various impacts on harvest activities related to oil and gas development. These included impacts of helicopter, airplane, and other traffic, man-made structures, and regulations. The most commonly reported impacts were related to helicopters, airplanes, and man-made structures (e.g., pipelines). Ongoing data collection in 2010 and additional years will assist in gaining a greater understanding of the nature of these impacts and changes over time.

A review of the hunter observations contained in this report by CPAI identified additional monitoring tasks that will help lead to a common understanding of impacts by hunters, industry, and government oversight agencies. This common understanding will help identify effective mitigation.

ACKNOWLEDGMENTS

Stephen R. Braund & Associates (SRB&A) would like to thank the community of Nuiqsut for their cooperation and assistance in completing year one of the Nuiqsut Caribou Monitoring Project. In particular, we would like to give a special thanks to the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI) in helping form the Nuiqsut panel of caribou experts, providing space to conduct interviews, and assisting with contacting local residents. We would like to thank the panel of caribou experts for assisting with the development of the monitoring plan and identifying active caribou harvesters to interview and thank the North Slope Borough Department of Wildlife Management and Borough's Nuiqsut subsistence researcher for supporting and participating in the project. Lastly, SRB&A would like to thank the 40 Nuiqsut caribou hunters and elders who provided us with the information for year one of this study.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
ACKNOWLEDGMENTS	II
TABLE OF CONTENTS.....	III
LIST OF TABLES.....	V
LIST OF FIGURES.....	VI
LIST OF MAPS.....	VI
ACRONYMS AND ABBREVIATIONS.....	VII
INTRODUCTION.....	1
STUDY OBJECTIVES.....	2
STUDY AREA	2
METHODS	2
COMMUNITY ENGAGEMENT	2
<i>Public Meetings.....</i>	<i>5</i>
<i>Nuiqsut Caribou Panel Meeting</i>	<i>5</i>
STUDY DESIGN AND FIELD PREPARATION	6
<i>Active Harvester Interviews</i>	<i>6</i>
<i>Household Caribou Harvest Surveys</i>	<i>8</i>
<i>Elder’s Caribou Workshop.....</i>	<i>9</i>
HARVESTER SELECTION PROCESS	9
INTERVIEW PROCESS	10
FIELDWORK SUMMARY	11
POST-FIELD DATA PROCESSING	12
<i>Editing Notes and Overlays.....</i>	<i>12</i>
<i>Data Entry.....</i>	<i>13</i>
<i>Digitizing.....</i>	<i>14</i>
<i>Analytic File Preparation.....</i>	<i>14</i>
<i>GIS File Preparation</i>	<i>14</i>
CARIBOU USE AREAS.....	14
LOCATION OF CARIBOU USE AREAS.....	14
CHARACTERISTICS OF CARIBOU USE AREAS.....	20
HARVEST SITES.....	27
LOCATION OF HARVEST SITES.....	27
CHARACTERISTICS OF HARVEST SITES.....	27
OBSERVATIONS OF CHANGES IN HARVEST PATTERNS.....	33

CHANGES IN HARVEST AMOUNT	33
CHANGES IN TRIP FREQUENCY	36
CHANGES IN TRIP DURATION	37
CHANGES IN USE AREA.....	39
CHANGES IN HUNTING MONTHS	40
HARVESTED ENOUGH CARIBOU	40
GENERAL OBSERVATIONS OF CHANGES IN CARIBOU	41
OBSERVATIONS OF HARVESTED CARIBOU HEALTH AND CONDITION IN 2008	44
IMPACTS ON HARVESTING ACTIVITIES.....	48
IMPACTS OF HELICOPTER TRAFFIC.....	48
IMPACTS OF MAN-MADE STRUCTURES	53
IMPACTS OF AIRPLANE TRAFFIC.....	56
IMPACTS OF REGULATIONS.....	59
IMPACTS OF OIL COMPANY PERSONNEL.....	60
IMPACTS OF OTHER TRAFFIC.....	61
EXISTING MITIGATION OF IMPACTS.....	63
CHANGES THROUGH TIME.....	65
TRADITIONAL USES OF CARIBOU.....	65
TRADITIONAL HUNTING AREAS AND METHODS	66
CHANGES IN CARIBOU OVER TIME	66
<i>Migration</i>	67
<i>Quality</i>	69
HARVESTER ADDITIONAL OBSERVATIONS	70
FUTURE OIL AND GAS DEVELOPMENT	71
NEED FOR ADEQUATE MITIGATION.....	71
CPAI CARIBOU MONITORING STUDY	72
IMPACTS ON CARIBOU	72
IMPLICATIONS OF HUNTER OBSERVATIONS FOR ADDITIONAL MONITORING COMPONENTS.....	73
TESHEKPUK AND CENTRAL ARCTIC HERD TRENDS (CONTRIBUTED BY ABR)	74
SUMMARY	76
REFERENCES.....	79
APPENDIX A: NUIQSUT CARIBOU MONITORING INFORMED CONSENT	A-1
APPENDIX B: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE HARVESTER INTERVIEW.....	B-1
APPENDIX C: 2008 NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY	C-1

LIST OF TABLES

TABLE 1: FIELDWORK SUMMARY	11
TABLE 2: PLACE OF MOTHER’S RESIDENCE AT BIRTH	11
TABLE 3: DECADE BORN	12
TABLE 4: YEARS OF RESIDENCE IN NUIQSUT	12
TABLE 5: RESPONDENT GENDER	12
TABLE 6: PERCENTAGE OF CARIBOU USE AREAS IN WHICH RESPONDENTS REPORTED SUCCESSFUL HARVESTS, NUIQSUT, 2008	23
TABLE 7: CARIBOU HUNTING NUMBER OF TRIPS, NUIQSUT, 2008	24
TABLE 8: CARIBOU HUNTING TRIP DURATION, NUIQSUT, 2008	25
TABLE 9: CARIBOU HARVESTS BY MONTH, NUIQSUT, 2008	27
TABLE 10: PERCENTAGE OF HARVESTERS REPORTING CHANGES IN 2008 HARVEST ACTIVITIES COMPARED TO RECENT YEARS	33
TABLE 11: PERCENTAGE OF RESPONDENTS NOT HARVESTING ENOUGH CARIBOU IN 2008	33
TABLE 12: REASONS FOR CHANGE IN HARVEST AMOUNT BY TYPE OF CHANGE, NUIQSUT, 2008	35
TABLE 13: REASONS FOR CHANGE IN TRIP FREQUENCY BY TYPE OF CHANGE, NUIQSUT, 2008	36
TABLE 14: REASONS FOR CHANGE IN TRIP DURATION BY TYPE OF CHANGE, NUIQSUT, 2008	38
TABLE 15: REASONS FOR CHANGE IN USE AREA BY TYPE OF CHANGE, NUIQSUT, 2008	39
TABLE 16: REASONS FOR CHANGE IN MONTHS OF HARVEST BY TYPE OF CHANGE, NUIQSUT, 2008	40
TABLE 17: REASONS FOR NOT HARVESTING ENOUGH CARIBOU, NUIQSUT, 2008.....	41
TABLE 18: TYPE OF RESOURCE CHANGE OBSERVED, NUIQSUT, 2008.....	42
TABLE 19: OBSERVATION OF RESOURCE CHANGE BY CHANGE TYPE, NUIQSUT, 2008.....	42
TABLE 20: REASONS GIVE FOR MIGRATION CHANGE OR DIVERSION, NUIQSUT, 2008.....	43
TABLE 21: REASONS GIVEN FOR OBSERVATIONS OF CARIBOU IN SMALLER GROUPS, NUIQSUT, 2008	43
TABLE 22: REASONS GIVEN FOR OBSERVATIONS OF CARIBOU MOVING TO DIFFERENT AREAS, NUIQSUT, 2008	44
TABLE 23: OBSERVATIONS OF ABNORMALITIES IN HARVESTED CARIBOU, NUIQSUT, 2008	44
TABLE 24: DID RESPONDENT USE ABNORMAL CARIBOU? NUIQSUT, 2008	48
TABLE 25: HARVESTER REPORTED IMPACTS ON CARIBOU HUNTING, NUIQSUT, 2008	49
TABLE 26: SOURCES OF HELICOPTER IMPACTS, NUIQSUT, 2008.....	51
TABLE 27: SOURCES OF MAN-MADE STRUCTURE IMPACTS, NUIQSUT, 2008	53
TABLE 28: SOURCES OF AIRPLANE IMPACTS, NUIQSUT, 2008.....	58
TABLE 29: SOURCES OF OTHER TRAFFIC IMPACTS, NUIQSUT, 2008	61
TABLE 30: HARVESTER PERCEPTIONS OF WHAT IS LESSENING IMPACTS, NUIQSUT, 2008.....	63
TABLE 31: HARVESTER PERCEPTIONS OF WHO IS LESSENING IMPACTS, NUIQSUT, 2008	63
TABLE 32: ISSUES RAISED IN YEAR ONE REPORT HAVING IMPLICATIONS FOR YEAR TWO MONITORING PROGRAM	73

LIST OF FIGURES

FIGURE 1: NUIQSUT CARIBOU HARVEST ACTIVITY BY TRAVEL METHOD AND MONTH, 2008.....	21
FIGURE 2: IMPACTS ON CARIBOU HARVEST ACTIVITIES BY TYPE AND MONTH, NUIQSUT, 2008.....	49

LIST OF MAPS

MAP 1: NUIQSUT OVERVIEW AND PLACENAMES	3
MAP 2: NUIQSUT OVERVIEW AND PLACENAMES: COLVILLE RIVER DELTA	4
MAP 3: SPAGHETTI EXAMPLE: CARIBOU USE AREAS 2008.....	15
MAP 4: DISSOLVED POLYGON EXAMPLE: CARIBOU USE AREAS 2008.....	16
MAP 5: CARIBOU SUBSISTENCE USE AREAS 2008	17
MAP 6: METHOD OF TRANSPORTATION TO CARIBOU USE AREAS, 2008.....	22
MAP 7: DURATION OF TRIPS TO CARIBOU USE AREAS, 2008	26
MAP 8: CARIBOU HARVEST LOCATIONS, 2008	28
MAP 9: CARIBOU USE AREAS AND HARVEST LOCATIONS: JANUARY, FEBRUARY, AND MARCH, 2008	29
MAP 10: CARIBOU USE AREAS AND HARVEST LOCATIONS: APRIL, MAY, AND JUNE, 2008.....	30
MAP 11: CARIBOU USE AREAS AND HARVEST LOCATIONS: JULY, AUGUST, AND SEPTEMBER, 2008.....	31
MAP 12: CARIBOU USE AREAS AND HARVEST LOCATIONS: OCTOBER, NOVEMBER, AND DECEMBER 2008.....	32
MAP 13: NUMBER OF CARIBOU HARVESTED BY HARVEST LOCATION, 2008	34
MAP 14: LOCATIONS OF ABNORMAL CARIBOU, 2008,.....	45
MAP 15: HELICOPTER TRAFFIC IMPACTS, 2008	50
MAP 16: AIRPLANE TRAFFIC IMPACTS, 2008	57
MAP 17: OTHER TRAFFIC IMPACTS, 2008	62
MAP 18: ASDP CARIBOU STUDY YEAR	75

ACRONYMS AND ABBREVIATIONS

ABR	ABR Inc.—Environmental Research & Services
BLM	Bureau of Land Management
CPAI	ConocoPhillips Alaska, Inc.
GIS	Geographic Information System
KSOPI	Kuukpik Subsistence Oversight Panel, Inc.
NSB	North Slope Borough
SPSS	Statistical Package for the Social Sciences
SRB&A	Stephen R. Braund & Associates
USGS	U.S. Geological Survey

INTRODUCTION

In their CD4 permit from the North Slope Borough (NSB), ConocoPhillips Alaska, Inc. (CPAI) is required to conduct a study to monitor the impacts of CD4 and other Alpine satellite developments on Nuiqsut subsistence hunting and harvesting activities. In part, the NSB permit reads:

CPAI shall hire a third party to conduct a subsistence study to better understand and act upon the impacts of the CD4 development and other CPAI satellite developments within a 30-mile radius of CD4. The third party contractor shall be selected with the concurrence of the North Slope Borough. The purpose of the study will be to evaluate the short and long term impacts of CD4 and other CPAI satellite developments on the people of Nuiqsut. The scope of the study shall include but is not limited to (a) harvest success by area and species, (b) changes in harvest levels by area and species composition over time, (c) changes in use of subsistence areas and identification of the causes for any changes. The study design shall be forwarded to the North Slope Borough Department of Wildlife Management for review and approval. The contractor will collaborate with the on-going North Slope Borough subsistence harvest documentation study to avoid duplication of efforts, and especially to avoid “burnout” of interviewees. A draft annual report shall be submitted to the North Slope Borough, City of Nuiqsut, Native Village of Nuiqsut, and Kuukpik Corporation for review and comments. The final report shall address any comments made by these parties. The study shall commence no later than November 1 of the winter CPAI begins construction and will continue annually for 10 years. At the end of 5 years, CPAI and the North Slope Borough will discuss the results of the study and determine if the study methods should be adjusted. At the end of 10 years, the third party contractor shall summarize the results and CPAI and the North Slope Borough shall then review the summary and synthesize the results from the study. Based on the study results, CPAI and NSB shall evaluate the need for additional subsistence impact studies. It is intended that the study design will address the possible impacts of CD4 development as well as the additional anticipated CPAI satellite developments proposed for construction prior to 2010 within the 30-mile radius of the CD4 development.

As part of addressing this requirement, CPAI contracted Stephen R. Braund & Associates (SRB&A) to conduct a caribou subsistence monitoring project in Nuiqsut. The Nuiqsut Caribou Monitoring Project is an ongoing, multi-year project meant to measure impacts on caribou hunting related to CD4 and other Alpine satellite developments. The intent of the project is to assemble data on impacts on caribou harvesting that lead to a common understanding of these impacts by the community of Nuiqsut, industry, and government oversight agencies. Several types of data are relevant to a common understanding of caribou harvesting impacts: (1) hunter observations; (2) caribou distribution, abundance, herd size, habitat quality; (3) industry mitigation activities; and (4) historical subsistence use. This first annual report is based primarily on hunter observations. An additional section of the report briefly describes population and distribution trends for the Teshekpuk and Central Arctic herds. An important function of the report is to identify additional data monitoring components most relevant to developing a common understanding of these impacts.

To monitor impacts on caribou hunting in year one of the monitoring program, SRB&A, with the assistance of a Nuiqsut panel of caribou experts, designed a study to gather relevant information from hunters regarding their experiences with impacts, in addition to hunting and harvest locations, characteristics of harvesting activities (e.g., duration, months, and frequency of hunting trips), and hunter observations of caribou change. This report contains the results of the first year of hunter information derived from face-to-face interviews conducted in Nuiqsut between March 10, 2009 and April 4, 2009. The reporting period for this information is 2008.

STUDY OBJECTIVES

The primary objective of this project is to monitor impacts on Nuiqsut caribou hunting related to CD4 and other Alpine satellite developments and, in doing so, to facilitate and maintain communication between the study team, Nuiqsut residents and organizations, the NSB, and CPAI. The Nuiqsut Caribou Monitoring Project is designed to monitor and understand the causes of the following potential problems that have been reported by North Slope hunters including those from another study entitled *Impacts and Benefits of Oil and Gas Development to Barrow, Nuiqsut, Wainwright, and Atkasuk Harvesters* (SRB&A 2009):

1. Fewer caribou nearby Nuiqsut
2. Fewer caribou within a day's snow machine ride of Nuiqsut
3. Fewer caribou within reach of community hunters
4. More than the usual number of skinny caribou
5. More than the usual number of caribou with signs of parasites or disease
6. More caribou behaving as if they are disturbed
7. Physical obstacles making it harder to reach hunting areas
8. Regulations closing hunting areas
9. Disturbance of hunters by security or other industry personnel

STUDY AREA

The NSB permit to CPAI for development of CD4 stipulates that the subsistence study should consider impacts of the CD4 development as well as other CPAI satellite developments located within a 30-mile radius of CD4. Impacts related to these developments may occur outside the immediate vicinity of the individual developments. Therefore, for the purposes of this project, the study area includes all areas used for caribou hunting by the community of Nuiqsut. Map 1 and Map 2 show placenames in the study area.

METHODS

SRB&A initiated a program to gather yearly information from local Nuiqsut residents about caribou hunting and harvest activities, observations about harvested caribou, changes in caribou, and impacts on caribou hunting. These data will be used to monitor impacts on caribou hunting related to CD4 and other Alpine satellite developments over time. This section of the report describes the methods used to design and implement the study.

Community Engagement

One of the goals of this project is to promote and facilitate community involvement in the monitoring program. The first step in initiating community involvement is to gain support for the project from the community. The second step is to seek local involvement in the development of the study design, monitor project progress, and review project results. To gain community support for the project, the study team held two public meetings in Nuiqsut. In addition, the study team met with the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI). Once the community and KSOPI voiced support for the project, the study team worked with KSOPI to identify a panel of caribou experts who would help the study team in designing the monitoring plan, assist with and comment on monitoring progress, resolve monitoring problems, and review report findings. The following are summaries of the public meetings (including meetings with KSOPI) and the meeting with the Nuiqsut caribou panel.

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

Kuparuk

CD 3
CD 2
CD 1
CD 4
CD 5
CD 6

CD 7

Nuiqsut

Ocean Pt.

Fish Creek
Creek

Colville River

Kuparuk River

Judy

Sentinel Hill

Kikia Arorak River
Kogosukruk River

Itkillik River

White Hills

Colville River

Anakturuk River
Chandler River

Umiat

70°30'0"N

70°30'0"N

70°0'0"N

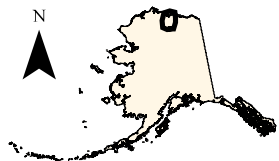
70°0'0"N

69°30'0"N

69°30'0"N

69°0'0"N

69°0'0"N



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Map 1 - Nuiqsut Overview and Placenames

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

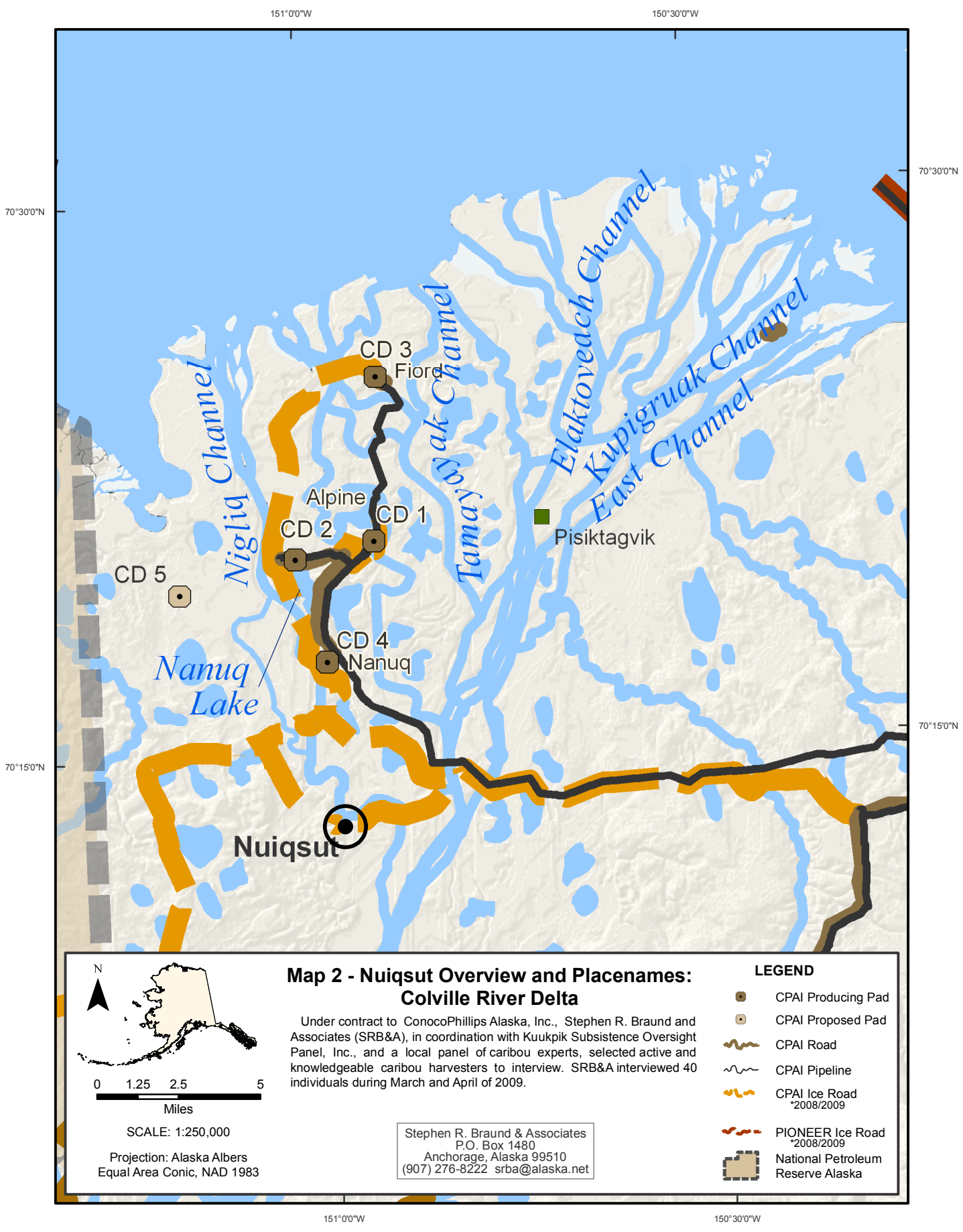
- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Pipeline
- CPAI Road
- CPAI Ice Road *2008/2009
- CPAI Rolligon Trail

Other Infrastructure

- ENI Ice Road *2008/2009
- PIONEER Ice Road *2008/2009
- National Petroleum Reserve Alaska

152°00'W

150°00'W



151°00'W

150°30'W

70°30'N

70°30'N

70°15'N

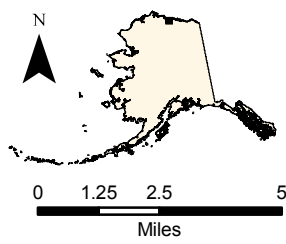
70°15'N

151°00'W

150°30'W

**Map 2 - Nuiqsut Overview and Placenames:
Colville River Delta**

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.



SCALE: 1:250,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Road
- CPAI Pipeline
- CPAI Ice Road *2008/2009
- PIONEER Ice Road *2008/2009
- National Petroleum Reserve Alaska

Public Meetings

SRB&A traveled to Nuiqsut twice to present the caribou monitoring program and seek community approval. The first trip to the community occurred on November 4, 2008. During this trip, the study team met with members of KSOPI, and the KSOPI board members unanimously supported the project. On the evening of November 4, SRB&A held a public meeting in Nuiqsut. At this meeting, community members noted that the study should have started years ago, when construction of CD4 first began. They also expressed concern that not enough community members (approximately 15 persons) were present, it would be better if SRB&A had scheduled the meeting other than on election night, and that SRB&A had not posted the meeting on the City of Nuiqsut calendar. The public meeting concluded with the decision for SRB&A to return and present the project at a second public meeting.

SRB&A held a second public meeting on February 17, 2009. Major topics of discussion at the meeting included the design of the monitoring program and study team interactions with local residents and organizations. The meeting ended with the meeting residents (17 persons) supporting the project and suggesting residents for inclusion on the caribou panel. The community indicated that the study team should coordinate through KSOPI but also keep other councils and organizations (such as the City of Nuiqsut and the North Slope Borough Department of Wildlife) informed. On the following day (February 18, 2009), the study team again met with KSOPI board members to discuss the study plan and to begin formation of a Nuiqsut panel of caribou experts. KSOPI agreed to select 10 Nuiqsut residents to serve on the Nuiqsut caribou panel. KSOPI chose panel members based on the following criteria:

- Experienced and knowledgeable about the resource (i.e., caribou) being studied
- Active harvester of the resource (either current or past)
- Willingness to participate with the panel members and with outside scientists to meet the goals of the project
- Able to attend periodic workshops and meetings
- Represent a range of age groups, including elders, middle-aged hunters, and younger hunters
- Represent a range of active hunting/harvesting families in the community (especially avoid appointing members of the same household)

KSOPI subsequently provided SRB&A with the list of 10 caribou panel members, and arranged for a meeting with the panel at the beginning of SRB&A's first field trip in March 2009.

Nuiqsut Caribou Panel Meeting

The study team met with the Nuiqsut caribou panel on March 10, 2009 to review the Year 1 field protocol and monitoring plan. The panel had a number of suggestions regarding the monitoring plan, including the following:

- The study team should interview between 30 and 40 active harvesters.
- The study should incorporate the knowledge of local elders regarding long-term changes in caribou.
- In order to allow for the monitoring of overall caribou harvests and uses over time, the monitoring plan should include a yearly household caribou harvest survey.

In response to the comments made by the caribou panel, SRB&A updated the monitoring plan to include (in addition to the active harvester interviews) an Elder's workshop on caribou and a household harvest survey. The caribou panel reviewed and approved the active harvester field protocol and provided an initial list of active caribou harvesters to interview.

Study Design and Field Preparation

The field effort for the Nuiqsut caribou monitoring program is comprised of three separate components:

- Annual interviews with active caribou harvesters in Nuiqsut
- Annual household caribou harvest survey
- An elder's workshop to gather data about long-term observations and changes in caribou

The second and third components were added to the monitoring design in response to suggestions from the Nuiqsut caribou panel. In addition to the field effort, the study team plans to incorporate several other components to the study design in the future, which will provide additional context for measuring impacts. We have noted in the report where year one study results of hunter observations prompted industry review comments that can be best addressed by adding monitoring components in future project years. These components include the following:

- Collaboration with ABR, Inc. – Environmental Research and Services (ABR) to incorporate a review of caribou distribution, abundance, herd size, habitat quality (see section on Teshekpuk and Central Arctic Herd Trends)
- Incorporation of data from studies investigating relationships between industry activity and caribou, including industry mitigation activities
- Incorporation of historical subsistence use data for comparison

In addition to developing field protocols for the active harvester interviews, household surveys, and elder's workshop (see descriptions below), the study team also developed an informed consent that guaranteed the confidentiality of harvester information, anonymity of persons interviewed, and the reporting of aggregated data only (see Appendix A). SRB&A reviewed previous subsistence map data to determine the extent of Nuiqsut caribou use areas. This information was used to compile U.S. Geological Survey (USGS) maps for use in the field.

Active Harvester Interviews

SRB&A designed an active harvester protocol to use during annual interviews with Nuiqsut caribou hunters (see Appendix B). The protocol was designed to gather observation data that, among other things, would help measure the following potential impacts of oil and gas development on caribou:

1. Fewer caribou nearby Nuiqsut
2. Fewer caribou within a day's snow machine ride of Nuiqsut
3. Fewer caribou within reach of community hunters
4. More than the usual number of skinny caribou
5. More than the usual number of caribou with signs of parasites or disease
6. More caribou behaving as if they are disturbed
7. Physical obstacles making it harder to reach hunting areas
8. Regulations closing hunting areas
9. Disturbance of hunters by security or other industry personnel

The protocol consisted of four sections: 1) Caribou Hunting Activities; 2) Assessment of Harvested Caribou; 3) Impacts on Caribou Hunting; and 4) General Assessment of Caribou. The protocol was designed to gather hunting areas and harvest locations in addition to hunting activity characteristics, assessments of abnormalities in harvested caribou, observations of personal experiences with impacts on

caribou hunting, and general observations about non-harvested caribou. Gathering these data yearly will allow for multi-year comparison and monitoring of subsistence use data, resource observations, and impact experiences over time.

The first section (Caribou Hunting Activities) included mapping of 2008 hunting areas and harvest locations. For each hunting area, the study team gathered the following variables:

- Months of use
- Transportation method
- Number of trips
- Duration of trip(s) (including typical duration and longest duration)
- Harvest success (in terms of whether the hunter did or did not harvest caribou in that hunting area in 2008)

In addition, for each harvest location, the study team gathered the following variables:

- Number of caribou harvested
- Month of harvest

The first section of the interview also gathered data about changes related to the above variables (hunting area, number of trips, duration of trips, months, and number of caribou harvested).

The second section of the interview (Assessment of Harvested Caribou), gathered data about the following abnormalities in the respondent's harvested caribou:

- Abnormal health (e.g., disease/infection/color of meat)
- Abnormal quality (e.g., taste, smell)
- Abnormal size (e.g., fat content or overall size)
- Abnormal quantity of parasites
- Other abnormalities

Each observation of abnormal caribou was tied to a harvest location on the map. Respondents also indicated whether or not they used the abnormal caribou.

The third section of the interview (Impacts on Caribou Hunting) included volunteered and cued questions regarding impacts on caribou hunting in 2008. The section began with an open-ended question regarding impacts on caribou hunting, followed by cued questions about the following types of impacts:

- Helicopter traffic
- Plane traffic
- Other traffic
- Oil company personnel
- Man-made structures (e.g., pipelines)
- Regulations
- Other

For each impact observation, respondents provided the months the impact occurred (if applicable), a description of the impact, and suggestions for how the impact could have been lessened. In addition, this

section of the interview gathered data regarding existing mitigation, including who implemented the mitigation, and how the mitigation helped lessen impacts. Respondents also provided the location of the impact, if applicable. When asked to identify the location of an impact, respondents sometimes pointed to the source of the impact rather than the location where the actual impact occurred. Thus, some maps show impacts occurring in places where Nuiqsut residents do not hunt caribou.

The final section of the interview (General Assessment of Caribou) documented respondents' observations about caribou abundance, health/quality, distribution, and migration in 2008.

Although the purpose of the active harvest interviews is to gather yearly data for comparison over time, it became clear during the first year of interviews that using 2008 as the baseline study year was difficult to implement as respondents generally thought of changes associated with development events extending beyond 2008. Using only 2008 would not allow for the full documentation of changes that had occurred since construction of CD4 and other Alpine satellite developments. For example, residents' harvest activities may not have been different in 2008 compared to 2007, but they may have changed beginning with the construction of CD4. Thus, for the 2008 study year, the study team chose to collect data for 2008 as it relates to recent years, rather than only comparing 2008 activities to the previous year (2007). Future interviews will be more focused on gathering comparative data as it relates to the previous study year (e.g., interviews occurring in 2010 will focus on 2009 only and in order to document any changes that may have occurred since 2008).

Hunter observations are valuable as first hand reports of experiences on the land. These hunter experiences also inform hunter opinions about relationships between industry activities and caribou harvests. Each hunter is not in a position to observe all industry activities, as they use multiple hunting areas. Hunter observations are also based on what they see and hear: an airplane or a helicopter for example. Whether or not a particular airplane is part of a CPAI activity may not be obvious. The intent of this Year One Report is to document hunter observations. Some of these observations prompted questions or comments from CPAI reviewers. These instances provide the opportunity to identify relevant additional monitoring components to include in year two of the monitoring program. Together, the monitoring components can contribute to a common understanding of caribou harvest impacts. Such a common understanding is a necessary foundation for an effective mitigation program. Text box insets note instances where industry reviewers commented on an observation and identify additional monitoring data relevant to building a common understanding of caribou harvest impacts. These suggestions are consolidated in the report section, "Implications of Hunter Observations for Additional Monitoring Components".

Household Caribou Harvest Surveys

The study team added the harvest survey component to the monitoring plan as a result of panel members' concerns that the original study design would not adequately capture overall uses and harvests of caribou by the community of Nuiqsut. In CPAI's CD4 permit, the NSB stipulates that the contractor should collaborate with the NSB subsistence harvest documentation study (which is ongoing in North Slope communities) to avoid duplication of efforts. SRB&A contacted the NSB Department of Wildlife to discuss the intent to incorporate yearly caribou harvest surveys into the study design, and the NSB agreed to conduct a household caribou harvest survey, which would be implemented by the NSB Subsistence Specialist in Nuiqsut. The study team designed the harvest survey instrument (see Appendix C), which was sent to the NSB for approval, and then met with the NSB subsistence specialist in Nuiqsut to provide and review the survey forms.

The goal of the 2008 Nuiqsut Household Caribou Harvest Survey was to gather the following data for each Nuiqsut household:

- Use caribou

- Attempt to harvest caribou
- Harvest caribou
- Number of caribou harvested
- Months caribou harvested
- Give caribou
- Receive caribou

In addition, each household was asked whether any development activity made their caribou hunting more difficult, and if so, to describe what happened. The NSB Subsistence Specialist agreed to contact each household, complete the survey, copy the completed surveys, and mail the originals to the SRB&A office for data entry and analysis.

The current NSB household list provided to SRB&A includes 130 Nuiqsut households. This included households that were not occupied at the time of the 2008 surveys or were occupied by temporary residents or contractors. The NSB subsistence specialist attempted to contact 110 Nuiqsut households and completed 47 household surveys. In some cases household heads were not home, were out hunting, or were out of town and were therefore unavailable for an interview. Other households declined to participate in the survey.

The goal of the household survey was to conduct a census of Nuiqsut households. In general, the study team aims for a target response rate of 80 percent to ensure a representative sample that can be used to extrapolate harvest amounts to the entire community population. Because the 2008 household survey effort resulted in a response rate of less than 50 percent, the study team does not consider the sample representative. Thus, the study team chose not to present the 2008 harvest data in this report, but will reassess the representativeness of the data after harvest surveys for the 2009 data period are complete. The study team will also work with the Nuiqsut caribou panel and the NSB to determine how best to survey a representative sample of Nuiqsut households for the 2009 data period.

Elder's Caribou Workshop

Similar to the caribou harvest survey, the study team added an elder's caribou workshop as another component of the study design in response to suggestions from the Nuiqsut caribou panel. SRB&A designed a protocol for the elder's workshop, which included questions about their experiences with caribou in the Nuiqsut area before Nuiqsut was resettled in 1973; their experiences and observations when they returned to Nuiqsut in the 1970s; and their experiences and observations over the years since they returned to Nuiqsut. Although SRB&A was unsuccessful scheduling the workshop during the 2009 field season, individual interviews were conducted with several elders. The results of these interviews are discussed in this report under "Changes Through Time." The study team plans to schedule the elder's caribou workshop during the 2010 fieldwork season, and include the results in the report for the 2009 caribou hunting season.

Harvester Selection Process

In order to collect accurate data for the 2008 caribou hunting season, it was necessary to interview currently active caribou harvesters. The study team identified active caribou harvesters using a "snowballing" method of informant selection (Johnson 1990). The Nuiqsut caribou panel provided an initial list of active caribou harvesters in Nuiqsut. The study team began by interviewing residents on this list. At the conclusion of each interview, researchers asked each respondent to provide the names of other active caribou harvesters in the community. The study team created a list of active harvesters based on the names provided by interview respondents, and tallied the number of nominations for each active harvester. The study team attempted contact with all active harvesters on the list (including those on the

initial list provided by the panel), but considered individuals with a higher number of nominations to be especially qualified candidates for an interview.

In some cases, residents who were not on the study team's list of potential respondents requested an interview. After confirming that the individual had hunted caribou in 2008, fieldworkers recorded these individuals' names and contact information and agreed to contact them to schedule an interview if time allowed. If the fieldworkers had an opening and had exhausted efforts to schedule interviews with individuals on the list of active harvesters, they often conducted these interviews at that time. In some cases, these individuals were later nominated by another respondent. Fieldworkers found that these "walk-in" respondents were often active hunters and harvesters who provided informative and thorough interviews.

Interview Process

This section describes the interview process for the active harvester interviews. The contents of the active harvester interview are described above under "Study Design." Researchers generally conducted interviews at the KSOPI office, although some interviews were conducted at the residence of the respondent or at the camp where researchers were staying. KSOPI employees assisted the researchers in contacting residents and scheduling interviews. Before the interview began, study team members asked respondents to read and sign the informed consent form.

Two study team members were present for each active harvester interview. One team member conducted the interview and recorded geographic information on an acetate sheet positioned over a 1:250,000 USGS map. The interviewer put registration marks on the clear acetate corresponding to locations on the USGS base maps so that it could later be registered on identical USGS base maps for digitizing. The interviewer recorded geographic data on the acetate, including hunting areas, harvest locations, and impact locations, using color-coded permanent markers and using a different color for each type of data. The second team member took detailed notes of the responses of the respondents and probes by the interviewer using a laptop computer.

Interviewers recorded each mapped feature as a polygon, line, or point. Caribou hunting areas were recorded as polygons, and harvest locations were recorded as points. Impact locations were recorded either as a polygon, line, or point, depending on the type of impact. Impact location points and lines were later buffered and converted to polygons so that they could be shown with other impact locations as overlapping polygons (see below, under "GIS File Preparation"). SRB&A assigned numbers to each feature as the interview proceeded (e.g., "Polygon 1") and recorded this number next to the feature on the map and in the notes about that feature. This provided a link between the notes and the map and was later used to create distinct feature codes in the Geographic Information System (GIS) and Access databases. In addition to recording data on the acetate and in the laptop, the interviewer also recorded data next to the relevant questions on the field protocol used to guide the interview. The protocol for each interview was later referenced while entering data to ensure the accuracy of the notes.

In four instances, study team members conducted interviews with two or three respondents at a time, generally hunting partners or family members who traveled to many of the same areas for subsistence purposes. Interviewers used the same overlay for each respondent and used initials to denote respondents' use of an area. If more than one person used the same feature, SRB&A entered and digitized the feature once for each participant. Study team members were careful to distinguish between each respondent's information on the maps and in the notes.

Interviews with elders followed the same general process as described above, but covered a broader range of topics, including traditional caribou hunting areas and uses, impacts on caribou related to oil and gas development in general, and long-term changes in caribou migration, abundance, distribution, and health/quality. Geographic data were recorded on the acetate as appropriate.

Active harvester interviews generally lasted between 30 minutes and one hour, depending on the respondent's age, experience, activity level, and interview participation. The number of participants in each interview also affected the length of the interview. At the conclusion of the interview, each participant received a \$50 honorarium for their participation and time and signed a receipt. Some respondents chose to decline the honorarium.

Fieldwork Summary

The study team traveled to Nuiqsut two times to conduct interviews in March and April 2009. As shown in Table 1, SRB&A researchers interviewed 40 Nuiqsut residents. Four of these respondents were elders, and one of these elders was also an active harvester who provided 2008 hunting areas and harvest locations. SRB&A interviewed 67 percent of individuals with more than one nomination as an active caribou harvester. The remaining respondents had one nomination. Of the 56 nominated individuals who were available for interviews (i.e., they were in town), SRB&A interviewed 40 harvesters, or 74 percent of nominated residents.

Table 1: Fieldwork Summary

	# of Occupied Households (2003)¹	Population (2003)¹	# of Persons Identified for Interviews	# of Persons Available for Interviews	# of Respondents Interviewed	% of Respondents with More than One Nomination Interviewed	Number of Interview Workshops	Number of Interview Trips to Community
Nuiqsut	114	416	67	56	40	67%	35	2

Notes: ¹Source: Shepro, Maas, et al., 2003 as cited in URS Corporation, 2005.

Stephen R. Braund & Associates, 2010.

The following tables (Table 2 through Table 5) only show data for the 37 active harvester respondents. In some tables, percentages may add up to less or more than 100 percent (e.g., 99 percent or 101 percent). This is because the percentages are rounded to the nearest whole number, which occasionally results in percentages that do not total 100 percent. Birthplace, birth date, and years of residence were gathered for only 35 of the 37 active harvesters. As shown in Table 2, 89 percent of the Nuiqsut harvesters interviewed were born on the North Slope. They were born between the 1940s and the 1990s, with almost a third born in the 1960s. Eighty percent of the harvesters have resided in Nuiqsut for 20 or more years. All but one harvester is male.

Table 2: Place of Mother's Residence at Birth

	Percentage of Harvesters
Nuiqsut	29%
Other North Slope Community	60%
Elsewhere in Alaska	9%
Outside Alaska	3%
Total	100%
Number of Harvesters	35

Stephen R. Braund & Associates, 2010.

Table 3: Decade Born

Decade	Percentage of Harvesters
1940s	6%
1950s	17%
1960s	31%
1970s	20%
1980s	20%
1990s	6%
Total	100%
Number of Harvesters	35

Stephen R. Braund & Associates, 2010.

Table 4: Years of Residence in Nuiqsut

	Percentage of Harvesters
5 years or less	6%
6-10 years	3%
11-19 years	11%
20 plus years	80%
Total	100%
Number of Harvesters	35

Stephen R. Braund & Associates, 2010.

Table 5: Respondent Gender

	Percentage of Harvesters
Female	3%
Male	97%
Total	100%
Number of Harvesters	37

Stephen R. Braund & Associates, 2010.

Post-field Data Processing

Editing Notes and Overlays

After completing fieldwork in Nuiqsut, study team members edited the acetate overlays and notes for each interview. Researchers checked the overlays to ensure that they were readable and that all features had been numbered correctly without duplications and that the feature numbers were consistent with the information in the notes. For example, if a map contained 42 polygons, 10 lines, and 5 points, SRB&A ensured that none of these had accidentally been repeated in the field (e.g., two “Polygon 8”s). Study team members then wrote the total number of features on the corner of the overlay to assist digitizers. Researchers proofread interview notes for typing errors, legibility and accuracy.

Data Entry

After editing the notes and overlays, researchers entered all of the data from the interview, including the features on each overlay, into an Access database created by the study team. Each geographic feature received a unique feature code, which matched the feature code in the GIS database (see below under “GIS File Preparation”). Each feature code included the community code, respondent ID, interview date, shape type (e.g., polygon, line, or point), and shape number. Data for each section of the interview were entered as records in separate tables. The Access Database included the following data tables:

- Respondent Table – This table contains each individual’s Respondent ID, interview date, birth residence, birth date, gender, and years of residence
- Harvest Area Table – This table contains one record per hunting area collected in Section A of the field protocol (“Caribou Hunting Activities”), in addition to variables (months, transportation method, number of trips, and duration of trips) for each of those features. Each record also includes the unique feature code assigned to that feature.
- Harvest Location Table – This table contains one record per harvest location collected in Section A of the field protocol (“Caribou Hunting Activities”), in addition to the number harvested and month of harvest for each of those features. Each record also includes the unique feature code assigned to that feature.
- Harvest Activity Assessment Table – This table contains one record per respondent and includes their responses regarding changes to their hunting activities (e.g., hunting area, trip frequency, trip duration, hunting months, and harvest amount) as collected in Section A of the field protocol. The study team coded each response so that the data could later be queried.
- Harvested Caribou Assessment Table – This table contains one record per type of abnormality reported by respondents, as collected in Section B of the field protocol (“Assessment of Harvested Caribou”). Associated feature codes are included for each record. The study team coded each response so that the data could later be queried.
- Hunting Impact Table – This table contains one record per impact observation, as collected in Section C of the field protocol (“Impacts on Caribou Hunting”), in addition to the month of impact, associated feature codes, descriptions of the impact, and descriptions of suggested mitigation to lessen the impacts.
- General Mitigation Table – This table contains one record per respondent who reported that mitigation helped lessen impacts on hunting in 2008 and includes a description of who and what lessened impacts. These data were collected in Section C of the field protocol (“Impacts on Caribou Hunting”).
- Observed Resource Assessment Table – This table contains one record per change observation as collected in Section D of the field protocol (“General Assessment of Caribou”). The study team coded each response so that the data could later be queried.
- Additional Observations – This table contains residents’ responses to the final section of the field protocol “Additional Observations,” in which residents were asked, “Do you have any additional comments or concerns regarding your subsistence activities in 2008?”

The resulting database contains nine data sets. The number of records in each data set is given in parentheses:

1. Harvester characteristics (n=37)
2. Hunting area characteristics (n=138)
3. Harvest location site characteristics (n=182)
4. Observations of changes in harvest activity patterns (n=35)
5. General observations of changes in caribou (n=92)
6. Observations of harvested caribou health and condition (n=45)

7. Impacts on harvest activities (n=105)
8. Mitigation of impacts (n=27)
9. Harvester additional observations (n=29)

After completion of data entry, SRB&A performed a Quality Control check of all data previously entered. This consisted of a detailed review of maps, notes, and database records and resulted in all data entry being checked for accuracy.

Digitizing

To facilitate digitizing, SRB&A first had all the acetate overlays scanned. This step permitted multiple staff to complete the digitizing process by editing scanned images. All digitizing was done using ArcGIS ArcEdit software. Digitized features included polygons associated with subsistence use areas and impact areas; lines associated impacts and other data; and points associated with harvest locations and impact locations. Altogether, SRB&A digitized 136 use areas and 181 harvest locations. Some features are not displayed on the maps in this report because they were reported for a previous study year (prior to 2008). SRB&A checked all digitized records against acetate maps for accuracy and conducted a Quality Control check of each digitized record. Each GIS record was assigned a unique Feature Code.

Analytic File Preparation

The Access Database resulting from entry of field data consists of eight related tables, which are described above (“Data Entry”): (1) Respondent; (2) Harvest Area; (3) Harvest Location; (4) Harvest Activity Assessment; (5) Harvested Caribou Assessment; (6) Hunting Impact; (7) General Mitigation; (8) Observed Resource Assessment. SRB&A used Stat Transfer to convert Access tables for analysis with the Statistical Package for the Social Sciences (SPSS). SRB&A converted harvester quotes from Access to Word files and also used Access forms to query quotes.

GIS File Preparation

The relevant tables from the Access database were linked to the GIS database so that GIS staff could develop maps querying specific feature information. The SRB&A GIS mapping system consists of three possible methods of presenting mapped information. The first method is represented by Map 3 and is referred to as a “spaghetti map.” The spaghetti map as shown is made up of vectors (e.g., a point, line or polygon) and represents overlaying all of the individual respondent outlines of 2008 caribou hunting areas. Typically, this representation is not used in map production as it presents individual data (e.g., individual polygons). The second method uses a single polygon to depict the extent of subsistence use areas for all respondents, as seen in Map 4. Researchers often use this method to represent subsistence use areas on maps. While this single polygon approach clearly shows the extent of the use area, it does not differentiate between areas that are used by one person from those that are used by multiple persons. In the third method, SRB&A converts polygons (use areas) to a grid with each pixel being assigned a value of one. Then, the number of overlapping pixels are summed and assigned a color, with the darkest color representing the highest density (or number) of overlapping pixels. This method is the primary one SRB&A used to depict use areas and other variables in this report and can be seen below, under “Location of Caribou Use Areas.”

CARIBOU USE AREAS

Nuiqsut respondents reported 136 caribou use areas for the 2008 study year. Descriptions of the locations and characteristics of their caribou hunting activities are described below.

Location of Caribou Use Areas

Nuiqsut 2008 caribou use areas, as reported by 36 Nuiqsut respondents, are depicted on Map 5. The map shows residents traveling along local rivers and in the ocean along the coast, in addition to traveling

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kosuvik Pt.

Atigaru Pt.

Oliktok Pt.

70°30'0"N

70°30'0"N

Nuiqsut

70°0'0"N

70°0'0"N

Sentinel Hill

69°30'0"N

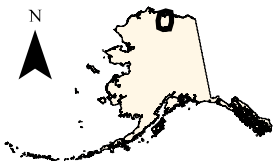
69°30'0"N

White Hills

Umiat

69°0'0"N

69°0'0"N



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983


Map 3 - Spaghetti Example: Caribou Use Areas 2008


Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND

 136 caribou areas used by 36 respondents

 National Petroleum Reserve Alaska

152°00'W

150°00'W

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Oliktok Pt.

Atigaru Pt.

70°30'N

70°30'N

Fish Creek

Nuiqsut

Ocean Pt.

Colville River

70°00'N

70°00'N

Sentinel Hill

Judy

Kikia Arorak River

Kogosuyuk River

Itkillik River

Kuparuk River

69°30'N

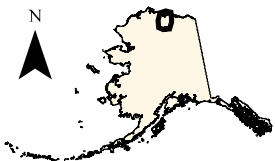
69°30'N

White Hills

Colville River

Umiat

Anaktuvuk River



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Map 4 - Dissolved Polygon Example: Caribou Use Areas 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND



136 caribou areas used by 36 respondents



National Petroleum Reserve Alaska

69°00'N

69°00'N

152°00'W

150°00'W

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Loaru Bay

Atigaru Pt.

Oliktok Pt.

70°30'N

70°30'N

Nuiqsut

Ocean Pt.

70°0'N

70°0'N

Sentinel Hill

69°30'N

69°30'N

Judy Creek

Fish Creek

Kikia Arorak River

Kogosukruk River

Colville River

Chandler River

Anaktuvuk River

Itkillik River

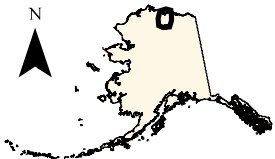
Kuparuk River

White Hills

Umiat

69°0'N

69°0'N



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

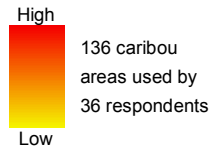
Map 5 - Caribou Subsistence Use Areas 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND



National Petroleum Reserve Alaska

152°00'W

150°00'W

overland, in search of caribou. Residents traveled south as far as Umiat, west to Cape Halkett, and east beyond Oliktok Point. Hunters traveled overland both west and east of the Colville River, in an area around Fish and Judy creeks, Itkillik River, and Kikiakrorak and Kogosukruk rivers. The highest numbers of overlapping caribou use areas occur along the Colville River on Nigliq Channel, a portion of the East Channel, and south beyond Sentinel Hill, where local residents own cabins and frequently camp. Other areas with relatively high numbers of overlapping polygons include Fish Creek, Itkillik River, and in an overland area west of the community toward Fish and Judy creeks.

During the summer and fall months of 2008, caribou hunting generally occurred by boat along local river systems and on the coast. Residents generally either traveled north from the community along Nigliq Channel, or they traveled south toward Ocean Point and Sentinel Hill. A number of residents own cabins on the Nigliq Channel, where they or their family harvest fish and hunt caribou when they migrate through the area. Several individuals described hunting caribou while staying at or traveling to and from their camp. Two hunters described,

My grandma's actually got a camp out that way [Nigliq Channel]; I went that way a lot, 10 times at least. I was working [last year]. Caribou and fish, June, July, and August. I spend a few days here at the cabins, usually overnight. (SRB&A Nuiqsut Interview March 2009)

My mom has a cabin [on Nigliq Channel] and I go check on her and see if she needs help gathering wood or smoking fish. I say three or four times out of a year I take some trips that way. (SRB&A Nuiqsut Interview March 2009)

Similarly, there are cabins and camps along Fish Creek, near the mouth of Itkillik River, and at Sentinel Hill on Colville River. Nuiqsut respondents reported traveling to these locations in 2008 and hunting caribou.

Nuiqsut hunters reported having different preferences for where they hunt caribou every year. A number of hunters indicated that they wait for the caribou to cross Nigliq Channel in the early summer to hunt them, although the caribou migration, according to several individuals, was later than usual in 2008. As one individual said, "This [Nigliq Channel] is the area that we usually hunt, but their routes have been changed, and they usually come from CD1, right around there" (SRB&A Nuiqsut Interview March 2009). Another individual described hunting along Nigliq Channel as follows:

I just travel this area, going down toward Nigliq Channel, not all the way to the mouth. I went all the way to the mouth in July, like in the first or second week of July. Caribou migrated from the northeast heading southwest I look for some caribou. Look around see if there's any caribou on this side or this side or inland or outside. They're hard to find. They're always all over the place [spread out]. Sometimes I just barely spot them.... East and west [channels], about a mile. Sometimes three miles going in. Mostly I go in and back out toward Nigliq channel. (SRB&A Nuiqsut Interview March 2009)

Residents also reported hunting caribou along Fish Creek in 2008. Respondents generally indicated that they hunt in the ocean and along Fish Creek once the ice opens up in June or July. One hunter described traveling to Fish Creek when he is unsuccessful closer to Nuiqsut:

Sometimes when I don't spot any I go along the bay and go to Fish Creek. That is my main concentration. Like a 40 minute boat ride [from village]. Go to Fish Creek, which is this little creek right here. I might have gone past [Resident's] cabin. I checked a fish hole and looked for caribou too.... For caribou it is in June or July. July preferably. I did look last year. (SRB&A Nuiqsut Interview March 2009)

One individual described difficulty harvesting caribou along Fish Creek in 2008:

Also into the Fish Creek. We go as far as where the fork is, there are three forks in there and the middle fork takes you to where the lake is; that's as far as we go. June, July, August. We mostly go out weather permitting, and a lot of what we've done, we haven't seen them [caribou] since break up. Our caribou didn't come in until July 20 from the west side. That was when we were able to harvest our caribou. There was too much plane traffic on that west side. But the majority of people are able to go and travel [farther] The caribou that we see at Fish Creek are so far away from the channels, and it's not that easy to harvest caribou and wait for the caribou. And sometimes we have to travel farther west. But a lot of us who go there, we have to wait and a lot of the caribou are diverted by the aircraft. They [aircraft] are counting fish, and some caribou that have collars on them. (SRB&A Nuiqsut Interview March 2009)

Also during the summer, several individuals described traveling along the coast both west and east of the Colville River delta, particularly hunting near Atigaru Point and Oliktok Point, where the caribou congregate during the hot summer months to escape the heat and insects. Two individuals described,

And we go out all the way along the coast line to Atigaru Point, right inside and then back out (Kogru River), and all the way to Cape Halkett. During July season. That's the same time we go bearded seal hunting. July to Cape Halkett (one time to Cape Halkett). We could see some caribou all along the coast line. Takes all day, all day trip, come back late in night. That's our main hunting area. (SRB&A Nuiqsut Interview March 2009)

When caribou are not too fat on this side, we go to the east side and check them out. I love the fat. My family gets tired of me eating it, I eat the fat on the caribou all the time. Just past Oliktok, by Beechey Point. Let's see, July. July is when it's too hot up here and they stick around at the ocean. (SRB&A Nuiqsut Interview March 2009)

Nuiqsut hunters also traveled south of the community along the Colville and Itkillik rivers, especially during August and September, when residents are also searching for moose along the Colville. Although residents reported traveling as far upriver as Umiat, hunters more commonly reported hunting south to Sentinel Hill and, to a lesser extent, Chandler and Anaktuvuk rivers. Residents provided the following descriptions of hunting south of the community by boat:

I usually go down as far as I can go. This river is changing a lot. I went as far as [Sentinel Hill]. We usually coast instead of zip on by everything. I made a couple trips and the second trip I mostly concentrated on Arctic char and dollies. It was an overnight trip with my boys. One night we stayed there. (SRB&A Nuiqsut Interview March 2009)

We've been going this way, at the mouth of Itkillik Channel, my mother has a native allotment up there. Inside of Itkillik Channel. You can go seven miles up in there, seven miles – that's the furthest up. We've seen a lot of caribou way inside the Itkillik River. During the summer there was an abundance of caribou in there. They come across. (SRB&A Nuiqsut Interview March 2009)

In addition to traveling by boat during the summer, a number of Nuiqsut respondents reported hunting caribou during the fall and winter of 2008, generally traveling west of the Colville River toward Judy Creek and Ocean Point. As one individual described the areas east of the Colville have too much activity and he prefers to hunt on the west side, saying, “There is too much activity over there on the east side, they were doing seismic, so I was kind of disturbed over there” (SRB&A Nuiqsut Interview March 2009). Another respondent expressed similar concerns regarding overland hunting east of the Colville River, saying,

Before I would go east of here but there is so much activity going on that I don't hunt that way anymore. Occasionally if I miss one I don't want a stray [bullet] going that way. We are allowed but most people don't hunt up there." (SRB&A Nuiqsut Interview March 2009)

As depicted on Map 5, the majority of overland hunting occurs west of the community, particularly between Ocean Point and Fish and Judy creeks. Several individuals described their late fall and winter hunting in these areas as follows:

In 2008, I go out, in wintertime I go southwest. I'll go about five, 10, 20 miles a day from here going southwest. Towards Judy Creek River, all the way to Judy Creek River, I travel along in wintertime by snowmachine heading this way. And travel along toward the Ocean Point. I travel this way going inland and head back to Nuiqsut. Like in October and November. (SRB&A Nuiqsut Interview March 2009)

January and February, I got three caribou within a five to 10 mile radius of here, south and west, southwest. I saw caribou all the way, the furthest I went was Ocean Point, there's a big hill out there somewhere. I followed this valley all the way back up. I saw a whole bunch of caribou out there last year. They were on the ice road. I used my snowmachine, and I saw a whole bunch. (SRB&A Nuiqsut Interview March 2009)

While Nuiqsut hunters have traditionally used snowmachines over the past 30 years to hunt their caribou during the late fall and winter months, several respondents reported they now are able to use trucks for hunting in the winter. With development and expansion of the ice road network in and around Nuiqsut over the past several years, residents are now able to use their trucks to hunt caribou in the winter. Two individuals provided the following comments regarding their caribou hunting along the ice roads.

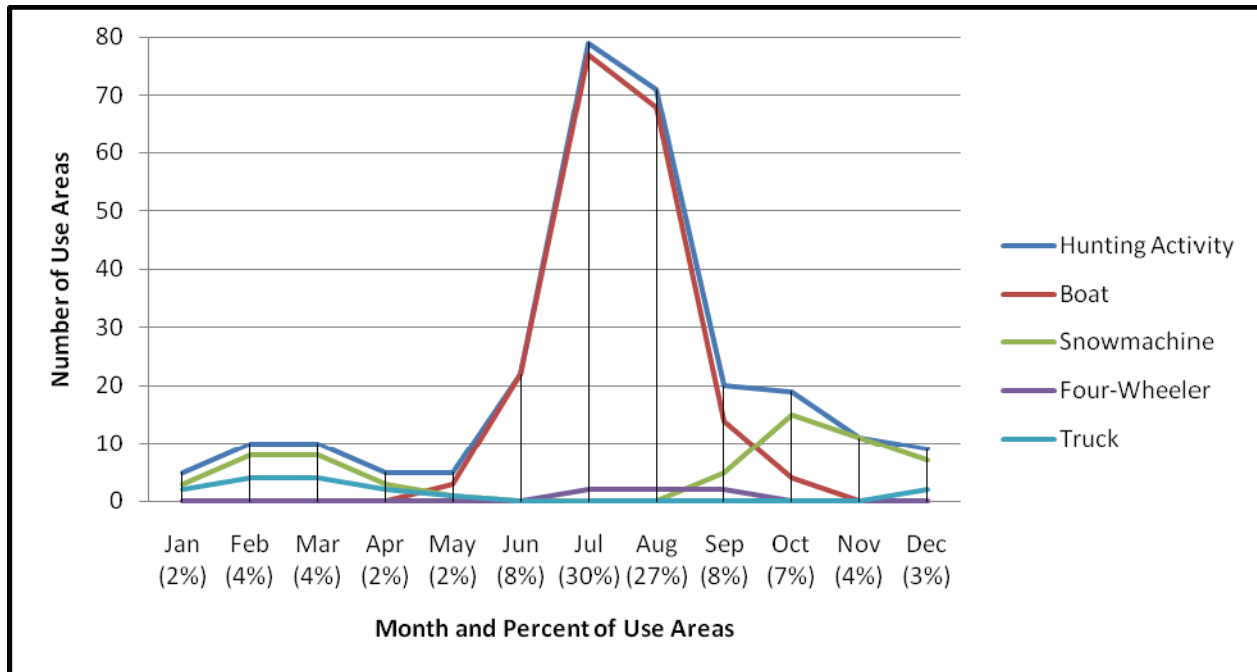
Winter caribou, let's see. I got, on the ice road, I did get caribou. Right around here [west of Nuiqsut]. Just one. I did get one by the freshwater lake; that was in March. It was by the road there. I didn't go on snowmachine, just the truck. Throughout the ice road season, [20 times or more]. Day trips, December to April. (SRB&A Nuiqsut Interview March 2009)

I did most of it in ice road season in January of last year. On the NPRA road, that would be on the dump side. When we came out this way it went out towards close by Fish Creek. That is part of the NPRA road and the other went out almost in the same pattern. One up by lake and the other was right around the corner from there. And this one here was in February. And this was February but that one is real close to the dump road. I got two over there in January. (SRB&A Nuiqsut Interview March 2009)

Characteristics of Caribou Use Areas

Active caribou harvesters characterized their 2008 caribou use areas for the following variables: success, number of trips, duration of trips, travel method, and harvest month. Residents reported year round caribou harvest activity, although the majority of use areas (57 percent) were accessed during July and August (Figure 1). Residents used boats along the Colville and Itkillik rivers and Fish and Judy creeks during these two months as well as during June and September (Figure 1).

Figure 1: Nuiqsut Caribou Harvest Activity by Travel Method and Month, 2008



Stephen R. Braund & Associates, 2010.

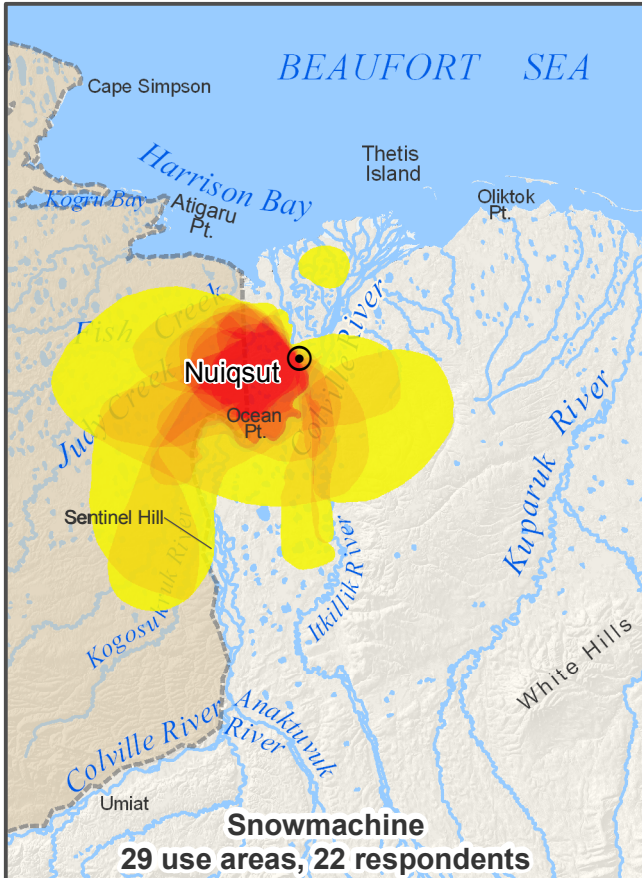
Map 6 depicts Nuiqsut respondents' boat use areas occurring along local waterways; in 2008 the highest amount of boat activity during the caribou hunting season occurred along the Colville River from Sentinel Hill north to the Colville River delta and Nigliq Channel. A moderately high number of overlaps also occur near the mouths of Fish Creek and Ikillik River and south of Sentinel Hill. Residents also accessed a few use areas close to the community by four-wheeler during the summer months (Map 6). Respondents described their 2008 caribou activity during the peak summer months, saying,

I just travel this area, going down toward Nigliq Channel. Not all the way to the mouth. I went all the way to the mouth in July. Like in the first or second week of July. Caribou migrated from the northeast heading southwest like caribou herds. One whole month, of July and August. I rest for three, four, five days and go back out with my brothers.... In summertime we don't just stay home. We travel a lot in summertime, in July and August, travel every week, every two to three days. I look for some caribou. Look around, see if there's any caribou on this side or this side or inland or outside. They're hard to find. They're always all over the place. (SRB&A Nuiqsut Interview March 2009)

June, July, August. We mostly go out weather permitting, and a lot of what we've done, we haven't seen them since break up. Our caribou didn't come in until July 20 from the west side. That was when we were able to harvest our caribou. There was too much plane traffic on that west side. But the majority of people are able to go and travel. (SRB&A Nuiqsut Interview March 2009)

July. Sometimes I don't like to go inland in July because there's lots of mosquitoes inland. I travel inland in August, when there's hardly any mosquitoes. One whole month. Every day. (SRB&A Nuiqsut Interview March 2009)

From the late fall through winter of 2008, residents transitioned from hunting caribou on the rivers and creeks by boat to pursuing caribou overland by snowmachine (Map 6). Beginning in late September and



Map 6
Method of Transportation to Caribou Use Areas, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND

- High
- Overlapping Polygons
- Low
- National Petroleum Reserve Alaska

N

0 5 10 20
Miles

SCALE: 1:1,700,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983

early October and continuing until April or May, snowmachine was the preferred method of travel, with truck also used from December through May (Figure 1). In the fall, residents preferred to harvest their caribou in late September and early October before the rutting season begins. The highest number of overlapping snowmachine use areas for the 2008 hunting season are located in an overland area directly to the west of the community (Map 6). Describing their September and October snowmachining harvest activity, two individuals remarked,

Snowmachine, I always just go out here. Just in this area if there was caribou. If we don't see any then we have to go up in this area. Sometimes I go early September, October, before mating season. They have a different flavor if you catch them that time [during the rut]. (SRB&A Nuiqsut Interview March 2009)

I went again in late September just west of here before the rut season. Just four or five miles west of here. I went to that big lake. September, when they are nice and fat before the rut season. I got four of them that time. Just past that lake, out in this area here [to the west of the village]. I got four, we all got four each [12 total]. We just went straight and there were a couple other guys that went four of us. Snowmachine. Not very much snow but it is hard enough where you won't get stuck. I tried in October but I didn't get any luck. Last time I got them was in September. (SRB&A Nuiqsut Interview March 2009)

Harvesters reported successful harvests in 78 percent of the 138 harvest areas used in 2008 (Table 6). One hunter learned from his grandmother about a certain creek where caribou are commonly available and reported successful harvests in that area, saying,

My first couple were right here, and going through here this little creek here. My grandma knows that there is always caribou in there so we went in through there and we got one. I don't usually go up there, just the one time I went up there to go hunting and check with my grandma. (SRB&A Nuiqsut Interview March 2009)

Table 6: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests, Nuiqsut, 2008

Harvested Caribou in Use Area	Percentage of Use Areas
Yes	78%
No	22%
Total	100%
Number of Use Areas:	138
Notes: Tables showing percentage of use areas are based on the number of use areas for which Nuiqsut respondents provided a response. Thus, the number of use areas may vary between tables.	

Stephen R. Braund & Associates, 2010.

Respondents were unable to harvest caribou from the remaining 22 percent of use areas in 2008. Respondents reported various reasons for why certain use areas were not successful in 2008, including traveling to the area only one time, or mistiming the caribou's migratory movements. Other factors affecting residents' overall harvest success in 2008 are discussed below, under "Observations of Changes

in Harvest Patterns.” Describing their reasons for the lack of hunting success at certain caribou use areas, Nuiqsut caribou hunters provided the following responses:

Also I went out here too, sometimes I would go in this Tamayayak River too, before Alpine. Last year maybe I go to this island. Right here, that’s that Porcupine Herd, sometimes they come through this way, but I didn’t meet up with them last year. I didn’t see them. August and September. That was just maybe three times, day trip. (SRB&A Nuiqsut Interview March 2009)

That was in June, just the one time, just to go check it out. That was just a day. I looked around in there and didn’t see anything. Usually my uncle goes in there every year and gets a moose. (SRB&A Nuiqsut Interview March 2009)

Residents traveled two or more times to 81 percent of use areas and six or more times to 35 percent of use areas (Table 7). Harvesters explained that multiple trips were often necessary in order to harvest the caribou they needed or to help other families harvest their caribou.

Table 7: Caribou Hunting Number of Trips, Nuiqsut, 2008

Number of Trips	Percentage of Use Areas
More than 20 Trips	8%
6-20 Trips	27%
4-5	21%
2-3	25%
1	18%
Total	100%
Number of Use Areas:	132

Stephen R. Braund & Associates, 2010.

When asked about the number of trips they took to caribou use areas in 2008, two individuals provided the following responses:

I don’t count how many times I go out. It wasn’t that many times, maybe about 12 times or so, it would have been more if we were able to get to the camp. The creek dried out so much, we said instead of damaging our props we just stayed close. Just day trips to a couple of weekends, maybe five nights is the longest I stayed. (SRB&A Nuiqsut Interview April 2009)

All the way down to here. All the way from Nuiqsut. We got to go down there, river’s starting to change [shallow in the delta]. August, that’s when I look. They are fatter. So many times. I’d say about maybe like 10 to 15. And we’re going out with other families to help them. Day trips. They’re all day trips. (SRB&A Nuiqsut Interview March 2009)

One individual reported that he only went twice for caribou in 2008 because he preferred moose, saying, “I think it was twice. Once during the big herd passing through and the other time looking for caribou. We don’t do much caribou hunting; we eat moose mainly” (SRB&A Nuiqsut Interview March 2009). Several harvesters added that mechanical problems with their boats and snowmachines limited the number of trips to caribou use areas in 2008.

The majority of residents' trips during their 2008 caribou hunting activity were day trips (Table 8). Map 7 depicts residents' same day use areas and use areas in which they stayed one or more nights. As would be expected, the highest number of Nuiqsut caribou harvesters' day trips are located closer to the community along the Colville from the Nigliq Channel and upper delta area south to Ocean Point as well as the overland areas directly west of the community, which were used primarily during the winter months. When residents stayed for one or more nights while hunting caribou, they reported the majority of those trips to be south of the community along the Colville River.

As shown in Table 8, 87 percent of typical trips in 2008 were completed on the same day and 13 percent of typical trips were one night or longer. For each use area, respondents also reported the duration of their longest caribou hunting trip in 2008. At 70 percent of caribou use areas, respondents' longest trips were same day trips. In 2008, the longest trips to 24 percent of use areas lasted two nights or longer. Describing the duration and frequency of their caribou hunting trips, two respondents said,

I'd say most of the summer, up and down boating, camping, we'd go out for two or three days. Not always, but a few times. Mainly daytrips. Four days [would be the longest]. (SRB&A Nuiqsut Interview March 2009)

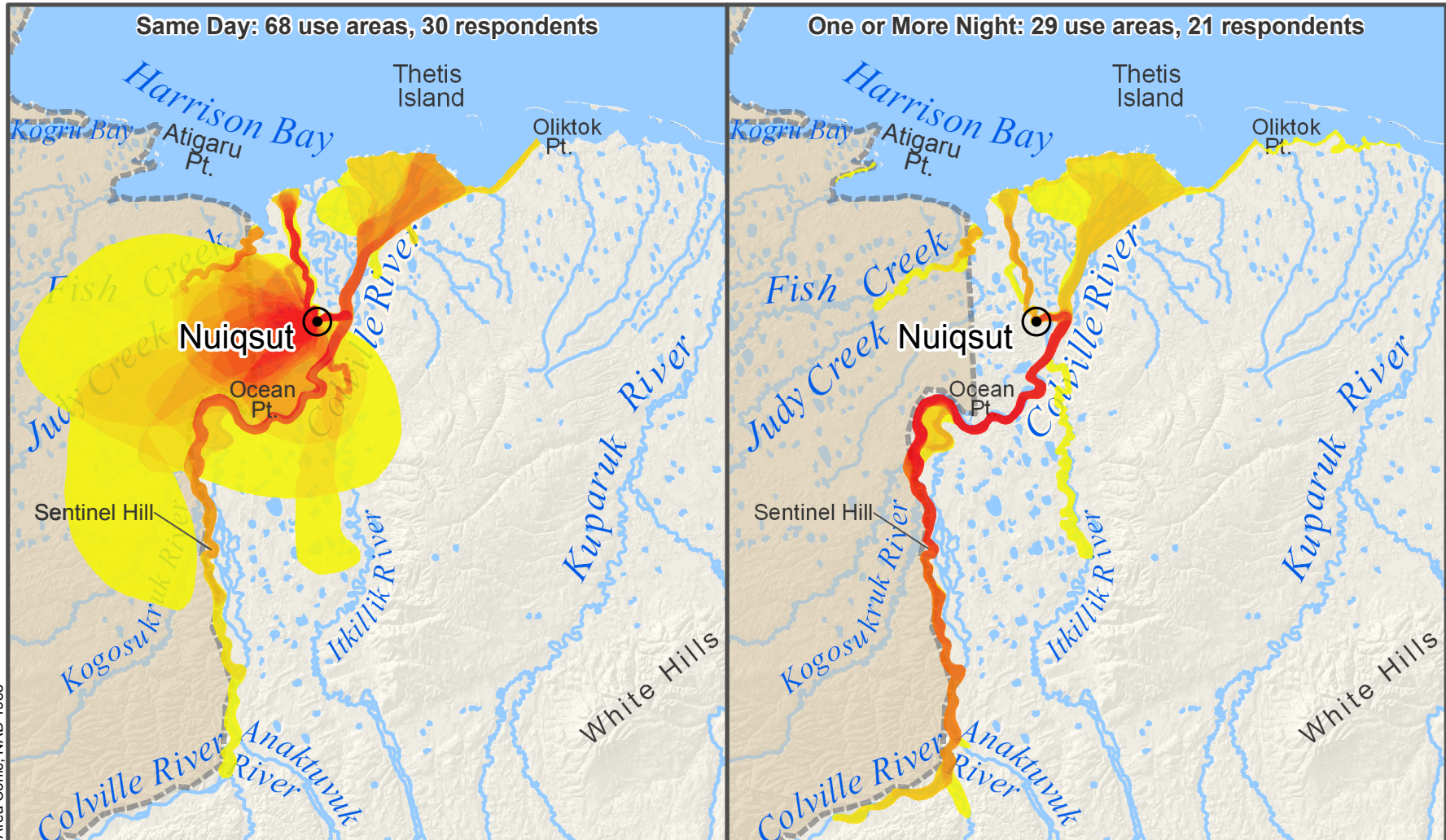
Sometimes, when we had money for gas we go out every other week. We camp, about three, four, five days, a day. Sometimes we travel light, sometimes we spend a night, sometimes five days, a week. Just a day, a night going toward Ocean Point. And sometime past Ocean Point to Sentinel Hill. Just for a day. When I'm going inland for a long trip, about a week. (SRB&A Nuiqsut Interview March 2009)

One individual added that technological improvements have allowed him to shorten his caribou hunting trips from overnight to day trips, explaining, "Just a daytrip. Years back, you'd have to spend the night, because you had two stroke [outboard motors]. Now you got four strokes" (SRB&A Nuiqsut Interview March 2009).

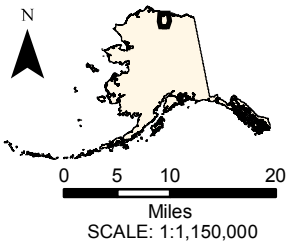
Table 8: Caribou Hunting Trip Duration, Nuiqsut, 2008

Duration of Trip	Percentage of Use Areas	
	Typical Trips	Longest Trips
More than 2 weeks	0%	1%
1-2 Weeks	1%	3%
2-6 Nights	7%	20%
1 Night	5%	6%
Same Day	87%	70%
Total	100%	100%
Number of Use Areas:	135	97

Stephen R. Braund & Associates, 2010.



Projection: Alaska Albers Equal Area Conic, NAD 1983

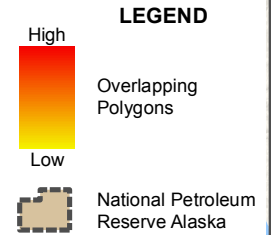


Map 7 - Duration of Trip to Caribou Use Areas, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net



HARVEST SITES

In addition to providing the location of their 2008 caribou use areas, respondents identified the location of their harvest sites within each use area. They also reported the number of caribou harvested and the harvest month.

Location of Harvest Sites

Map 8 shows the location of Nuiqsut respondents' 2008 caribou harvest sites. Overall, respondents reported harvest sites over a broad area from as far south as near Umiat, north to Oliktok Point, west toward Atigaru Point and Judy Creek and east towards the Kuparuk River. The majority of their reported harvests occurred along the Colville River, particularly near Ocean Point and along the Nigliq Channel. Fish Creek and the overland area west of the community also show a high number of harvest sites. Other than the area around the mouth of the Ikillik River, very few harvests occurred east of the Colville River in 2008.

Characteristics of Harvest Sites

Harvesters interviewed reported 189 harvest locations, accounting for 397 harvested caribou by 36 harvesters in 2008 (Table 9, Map 8). Map 9 through Map 12 depict 2008 caribou harvest locations and use areas by months. These maps show caribou harvests increasing in number and distance from the community starting in June and peaking in August. Harvests began decreasing in September and occurred increasingly close to the community through March and April. The months of July and August accounted for 272 (69 percent) of the caribou harvested. In those two months, 23 and 30 of the 36 harvesters, respectively, reported harvesting caribou. As Map 11 shows, the majority of the harvests in July and August occurred along the Colville River and directly west of the community. During all other months, no more than 12 harvesters reported harvests, and no more than 32 harvests were reported. Only one caribou harvest was reported in May, the lowest harvest amount for any month. The high number of caribou harvests in July and August correspond with the increase in hunting activity depicted above in Figure 1.

Table 9: Caribou Harvests by Month, Nuiqsut, 2008

Harvest Month	Number of Harvesters	Number of Harvest Locations	Number Harvested	Percent of Harvest	Map Number
January	3	3	4	1%	Map 9
February	4	6	8	2%	Map 9
March	4	4	6	2%	Map 9
April	3	3	7	2%	Map 10
May	1	1	1	0%	Map 10
June	12	16	32	8%	Map 10
July	30	62	130	33%	Map 11
August	23	62	142	36%	Map 11
September	6	10	30	8%	Map 11
October	9	10	17	4%	Map 12
November	3	7	12	3%	Map 12
December	4	5	8	2%	Map 12
Total	36	189	397	100%	

Stephen R. Braund & Associates, 2010.

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

70°30'N

70°30'N

Fish Creek

Nuiqsut

Ocean Pt.

70°00'N

70°00'N

Judy

Sentinel Hill

Kikia Arorak River

Kogosukruk River

Itkillik River

Kuparuk River

69°30'N

69°30'N

Colville River

Umiat

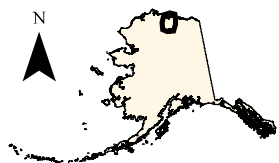
Chandler River

Anaktuvuk River

White Hills

69°00'N

69°00'N



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Map 8 - Caribou Harvest Locations 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND

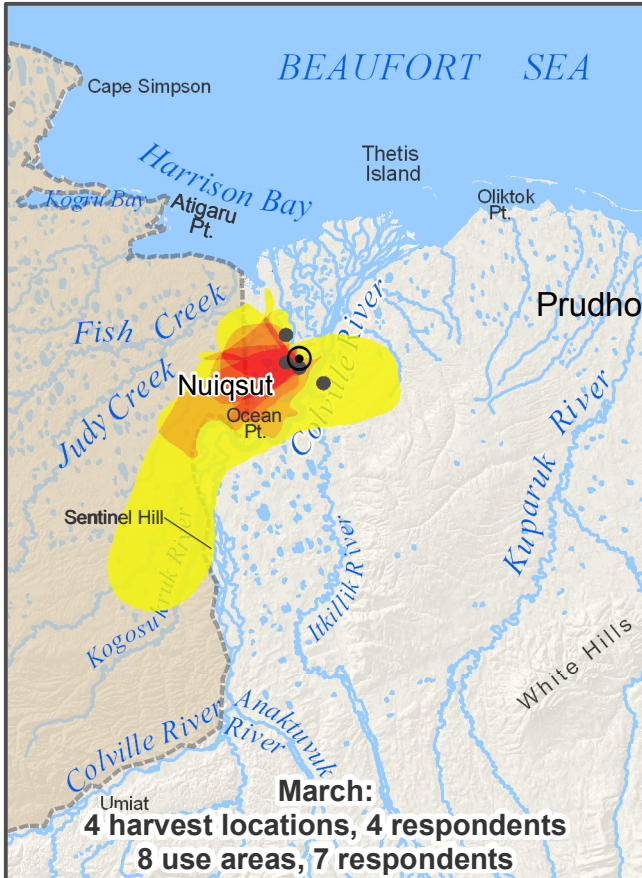
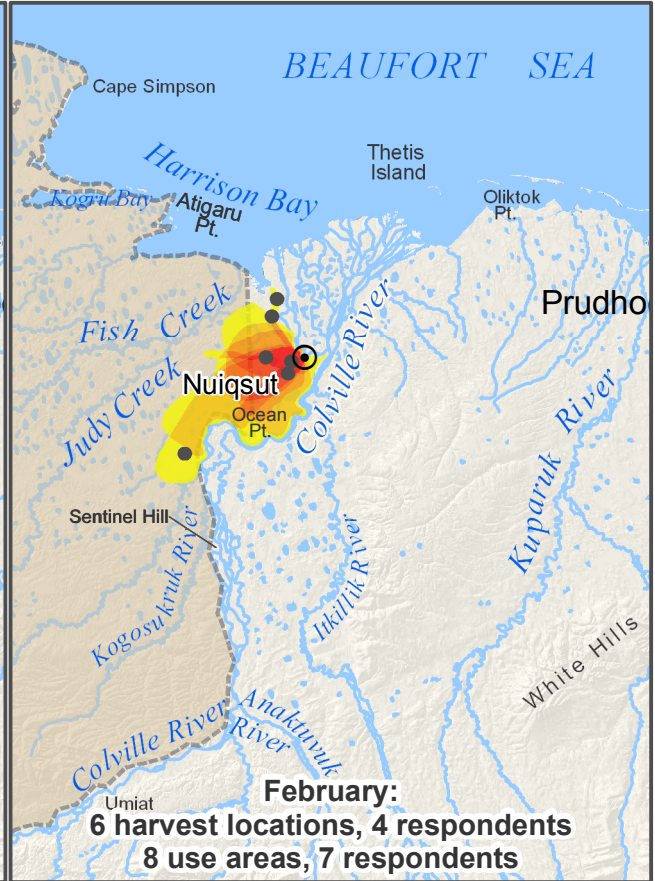
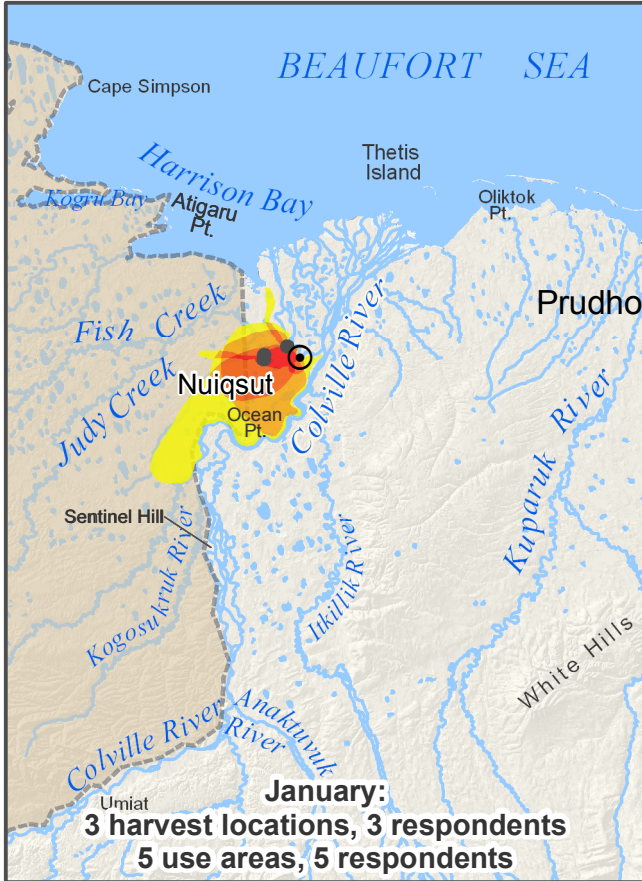
● 181 caribou
harvest locations
36 respondents



National Petroleum
Reserve Alaska

152°00'W

150°00'W





Map 9
Caribou Use Areas and Harvest Locations
January, February and March, 2008

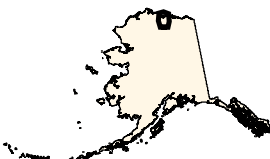
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

LEGEND

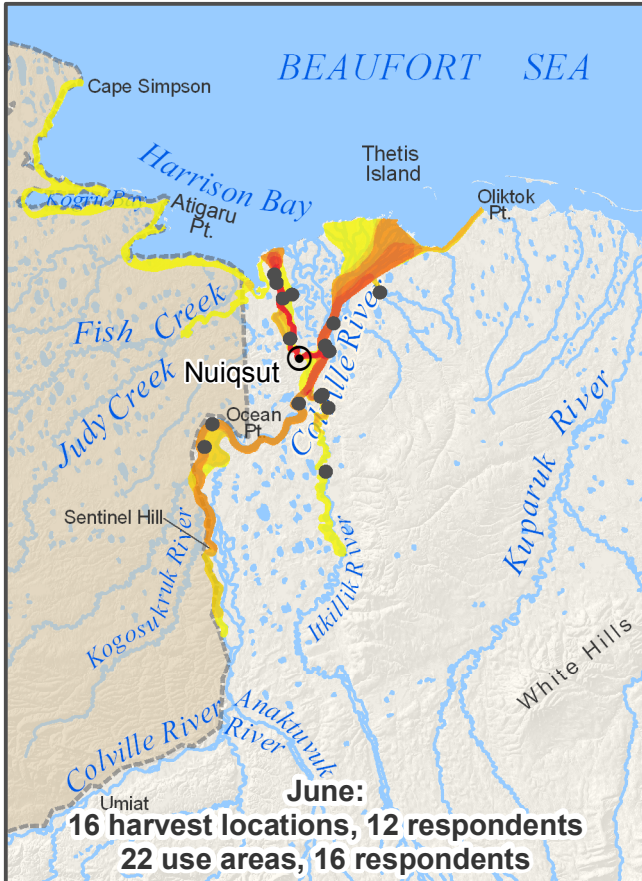
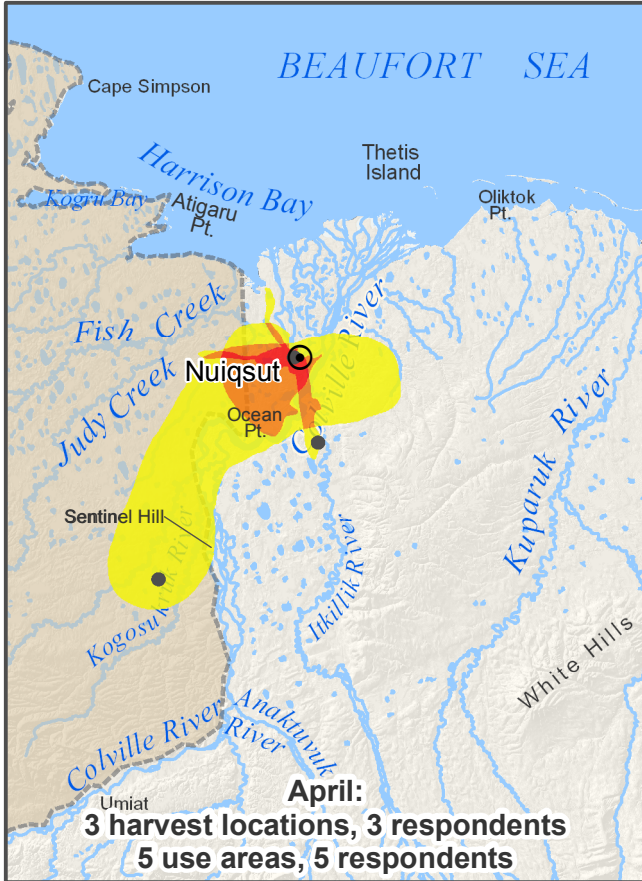
- Harvest Locations
- High
 Overlapping Polygons
- Low
-  National Petroleum Reserve Alaska



N

0 5 10 20
 Miles

SCALE: 1:1,700,000
 Projection: Alaska Albers
 Equal Area Conic, NAD 1983



Map 10
Caribou Use Areas and Harvest Locations
April, May and June, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

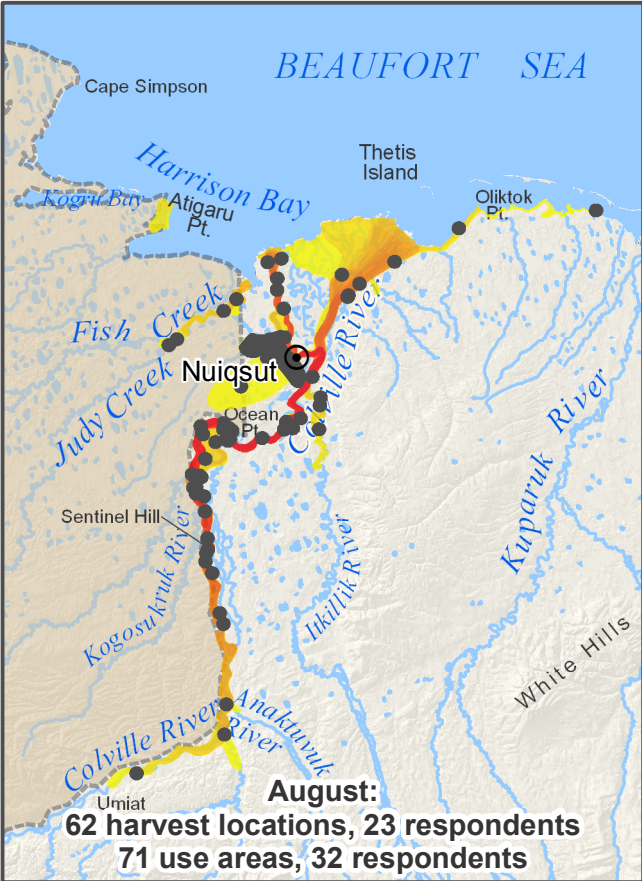
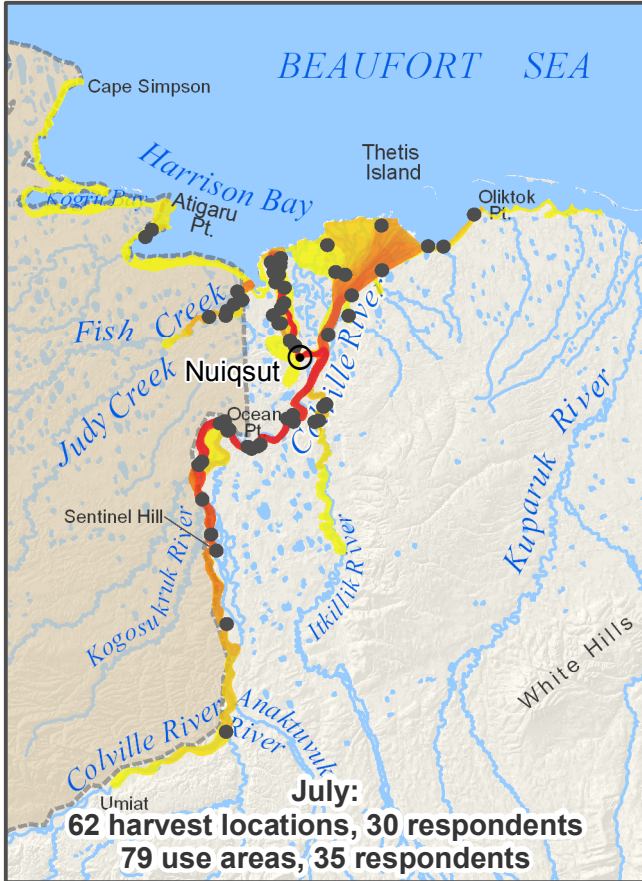
LEGEND

- Harvest Locations
- High
 Overlapping Polygons
- Low
- National Petroleum Reserve Alaska

N

0 5 10 20
 Miles

SCALE: 1:1,700,000
 Projection: Alaska Albers
 Equal Area Conic, NAD 1983



Map 11
Caribou Use Areas and Harvest Locations
July, August and September, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

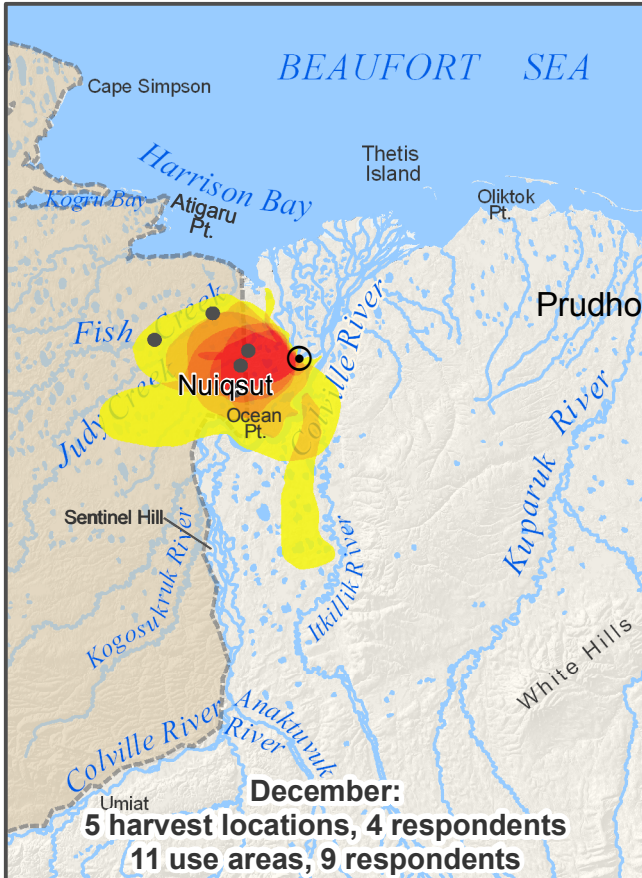
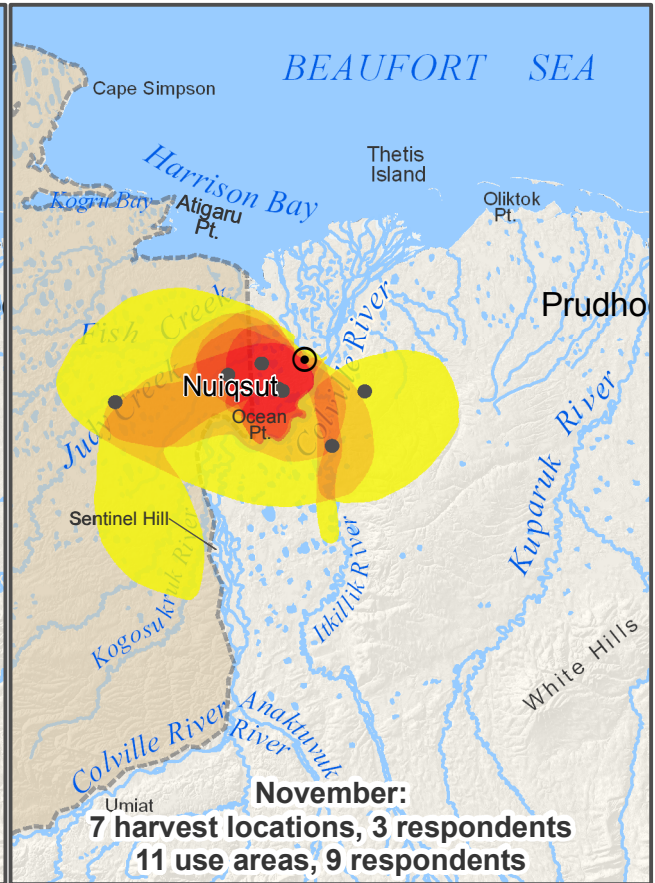
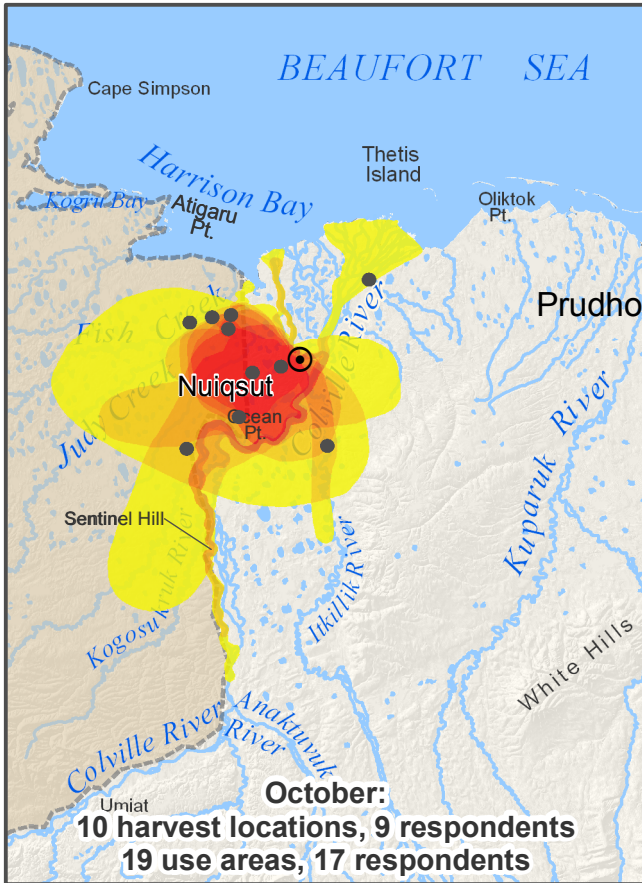
LEGEND

- Harvest Locations
- High
 Overlapping Polygons
 Low
- National Petroleum Reserve Alaska

N

0 5 10 20
 Miles

SCALE: 1:1,700,000
 Projection: Alaska Albers
 Equal Area Conic, NAD 1983



Map 12
Caribou Use Areas and Harvest Locations
October, November and December, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

LEGEND

- Harvest Locations
- High
 Overlapping Polygons
- Low
- National Petroleum Reserve Alaska

N

 0 5 10 20
 Miles
 SCALE: 1:1,700,000
 Projection: Alaska Albers
 Equal Area Conic, NAD 1983

Map 13 depicts the number of caribou respondents reported they harvested in 2008 by harvest location. This map suggests that higher numbers of caribou are more often harvested closer to the community, whereas harvests that occur farther from the community are generally limited to one or two caribou. Most harvests of five or more caribou occurred close to Nuiqsut or north of Nuiqsut in the Colville River delta.

OBSERVATIONS OF CHANGES IN HARVEST PATTERNS

Nuiqsut harvesters reported observations of change in their caribou harvest activities for 2008, including changes in harvest amount, trip frequency, trip duration, use area, and harvest month. Seventy-seven percent of harvesters reported a change in harvest amount between 2008 and recent years (Table 10). Fifty-one percent reported a change in trip frequency, and 40 percent reported a change in trip duration. Additional changes noted by harvesters include a change in caribou use area (31 percent) and change in hunting months (20 percent). Forty-nine percent of harvesters reported that they did not harvest enough caribou to meet their needs in 2008 (Table 11).

Table 10: Percentage of Harvesters Reporting Changes in 2008 Harvest Activities Compared to Recent Years

Type of Change	Percentage of Harvesters
Harvest Amount	77%
Number of Trips	51%
Trip Duration	40%
Use Area	31%
Hunting Months	20%
Number of Harvesters:	35

Stephen R. Braund & Associates, 2010.

Table 11: Percentage of Respondents Reporting Not Harvesting Enough Caribou in 2008

	Percentage of Harvesters
Reported Did Not Harvest Enough	49%

Stephen R. Braund & Associates, 2010.

Changes in Harvest Amount

Seventy-seven percent of harvesters reported a change in harvest amount (Table 12). Table 12 shows the reasons Nuiqsut respondents provided for changes in caribou harvest amounts in 2008 by type of change. Twenty-three of the 27 harvesters observing a change in harvest amount reported a decrease in harvest compared to recent years. Eight of the reasons for a decrease in harvest concerned a change in resource availability (i.e., the number of caribou found in hunting areas). In four cases, respondents attributed the decrease in harvest to helicopter traffic disturbance, and in three cases residents indicated that their decreased harvests involved some form of air traffic.

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

70°30'N

70°30'N

Alpine

CD 2 * * * CD 1

Nuiqsut

Ocean Pt.

70°00'N

70°00'N

Sentinel Hill

Judy Creek

Fish Creek

Kuparuk River

Kikiarorak River

Kogosuk River

Itkillik River

White Hills

69°30'N

69°30'N

Colville River

Umiat

Anaktuvuk River

LEGEND



15 caribou harvested
1 respondent



5, 6, or 7
caribou harvested
10 respondents



3 or 4
caribou harvested
15 respondents



2 caribou harvested
28 respondents



1 caribou harvested
31 respondents



National Petroleum
Reserve Alaska

69°00'N



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Map 13 - Number of Caribou Harvested by Harvest Location, 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

69°00'N

152°00'W

150°00'W

Table 12: Reasons for Change in Harvest Amount by Type of Change, Nuiqsut, 2008

	Harvest Less	Harvest More	Total
Resource Availability	8		8
Change in subsistence dependents	3	1	4
Helicopter Traffic Disturbance	4		4
Migration changed or diverted	3		3
Airplane Traffic Disturbance	2		2
Development	2		2
Lack of transportation/equipment	2		2
More difficult	2		2
Need less	2		2
Personal Reasons		2	2
Air Traffic	1		1
Change in subsistence providers	1		1
Closer to Village		1	1
Employment/Lack of time	1		1
Pipeline	1		1
Resource in Smaller Groups	1		1
Take more trips		1	1
Travel farther to harvest resource	1		1
Total Observations	34	5	39
Number of Harvesters	23	4	27

Stephen R. Braund & Associates, 2010.

Residents provided the following descriptions regarding their concern over the impact of air traffic on caribou harvests:

Because of the pipeline and the choppers and aircrafts that were flying around. When we were way down by the Chandler area and there was air traffic going on over here at Umiat and that red and white plane of Alpine kept following the river and scaring the caribou like he is doing it on purpose. We have bright clothes on and he knew we were there and he made a couple passes and made the caribou run further inland. That was wrong. Red and white plane. We had the caribou in our sight and plane comes and it took off and turned back around and did the same thing and same path and that [made us angry]. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that CPAI does not have activities in the Chandler area.

Implication for future Monitoring Program: document CPAI activities on maps over time.

It will be about 12 to 15 that we average in that area. It was less than that. Too much air traffic. That is the main problem, is that during summer there is too much air traffic. The caribou is unable to come near this area. Conoco has an interest in this area too [Fish Creek]. (SRB&A Nuiqsut Interview March 2009)

It is hard to say, you see helicopters flying around, you have things going out there that are not usually there, human activity. It is hard to say, with the Meltwater road. With the last couple years the caribou haven't been coming like they used to. I usually catch 20, 30 caribou for my mom and other people. [I have been harvesting] way less than usual. (SRB&A Nuiqsut Interview April 2009)

Changes in Trip Frequency

Fifty-one percent of harvesters reported a change in trip frequency in 2008 compared to recent years (Table 10). Harvesters reported both an increase and a decrease in the number of hunting trips they took in 2008 compared to previous years (Table 13). Lack of transportation or other equipment and a lack of time for caribou hunting in 2008 accounted for seven of the 10 reasons given for taking fewer trips.

Table 13: Reasons for Change in Trip Frequency by Type of Change, Nuiqsut, 2008

	Take Fewer Trips	Take More Trips	Total
Lack of transportation/equipment	4		4
Resource Availability		4	4
Employment/Lack of time	3		3
Development		2	2
Migration changed or diverted		2	2
Personal Reasons	2		2
Less Snow	1		1
Mitigation Funds		1	1
Pipeline		1	1
Sharing More		1	1
Traffic Disturbance		1	1
Total Observations	10	12	22
Number of Harvesters	9	8	17

Stephen R. Braund & Associates, 2010.

Describing the lack of transportation and lack of time for caribou hunting, two harvesters stated,

[I went] less, because I got hooked up with a job. I didn't have as much time, they hooked me up with the five-plex project in May. And weekends would be a good time for me to go. (SRB&A Nuiqsut Interview March 2009)

I couldn't make it much because shortly after [the hunting season started] my outboard went out. I ordered another outboard, but it didn't come in 'til the late fall. Outboard ran out on me and I couldn't do much hunting. This year I hope I do more, 'cause I got a new outboard. (SRB&A Nuiqsut Interview March 2009)

A change in resource availability, development, and a change in or diversion of migration accounted for eight of the 12 reasons given for an increase in the number of trips. Several residents provided the following explanations for an increase in the number of hunting trips they took in 2008:

I would say I would go more often last year. Just trying to get some caribou. Ever since that development going on for the last 10 years, you hardly see caribou around our village. Before Alpine the Porcupine [Herd] would come and the Western Arctic Herd would come toward our village at the same time. Only reason I can think of is because of the pipeline they make from Alpine. They want to come, [but] they're blocked. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers contrasted the above statement with Map 13, which shows the greatest number of caribou were harvested near the village.

Implication for future monitoring program: Each interviewed harvester's comments are treated as valid in that they are verbatim quotes. One measure of success of the monitoring program is that there is a consensus within each stakeholder group about a given impact. One measure of consensus - or lack of consensus - is the prevalence of quotes citing an impact. Include in the 2010 scope of work a review with Nuiqsut harvesters of data relevant to caribou harvest and caribou locations.

Well, it seemed to be going a little bit more than my normal, because you got to go a little further out to try and find caribou. Not like they used to be, because of displacement. (SRB&A Nuiqsut Interview March 2009)

I probably had so much [more] money this year; this grant that you can buy motor gas with, we request from them. And when you have so much gas, it makes you want to go out more. Normally I like to go out on Monday, because everyone else is at work. It's nice and quiet, the caribou come back to the river. I go out on the weekdays. (SRB&A Nuiqsut Interview March 2009)

Changes in Trip Duration

Forty percent of harvesters reported a change in trip duration in 2008 (Table 10). Eleven of 13 harvesters reported longer trips compared with previous years (Table 14). Nine of the 11 observations attributed the change to a caribou migration change or diversion, or, more generally, to a change in resource availability. An additional four observations attributed the change to longer trip durations to airplane or helicopter traffic disturbance.

Table 14: Reasons for Change in Trip duration by Type of Change, Nuiqsut, 2008

	Take Longer Trips	Take Shorter Trips	Total
Migration changed or diverted	5		5
Resource Availability	4		4
Airplane Traffic Disturbance	2		2
Helicopter Traffic Disturbance	2		2
Development	1		1
Employment/Lack of time		1	1
More difficult	1		1
Personal Reasons		1	1
Travel farther to harvest resource	1		1
Total Observations	16	2	18
Number of Harvesters:	11	2	13

Stephen R. Braund & Associates, 2010.

Residents generally indicated that because the caribou are less available in their usual hunting areas, hunters have to spend more time waiting or looking for caribou. One harvester offered this explanation for taking longer trips:

The caribou that we see at Fish Creek are so far away from the channels, and it's not that easy to harvest caribou and wait for the caribou. And sometimes we have to travel farther west. But a lot of us who go there, we have to wait and a lot of the caribou are diverted by the aircraft. They [aircraft] are counting fish and some caribous that have collars on them. (SRB&A Nuiqsut Interview March 2009)

Asked why the caribou are diverted, this individual explained,

Too much air traffic. And the majority of it is from Alpine, CD 2, 3, 4. CD 1 is only about a mile, Alpine is southeast from our cabin, about a mile. CD 4, 1, 2. They fly a lot, they do fly a lot. They call and people say there are caribou down river, and then by the time I get down there, there will be choppers and planes flying, they will divert them, they sure do. (SRB&A Nuiqsut Interview March 2009)

Two other harvesters reported:

It's longer [until the caribou arrive], we have to wait for the caribou to cross the river. Sometimes they don't even cross the river. Yeah, ever since Alpine started, we are having to wait for caribou to cross the river. It seems like they're sticking over by the pad, that one. They mainly stay around this area, don't move nowadays. (SRB&A Nuiqsut Interview March 2009)

Because there's none out here; [there are] usually some across river. Those pipelines, you don't see them out here no more. They seem to migrate further south and east, seems they're going out. [Trips are] longer than usual, I usually stay out a couple of days. because there's none. You could hardly see any caribou, got to go out further and further just to see one or two. I usually go out in the spring time, maybe July. Sometimes [go in October]. (SRB&A Nuiqsut Interview March 2009)

Changes in Use Area

Thirty-one percent of harvesters reported a change in use areas in 2008 compared to recent years (Table 10). Five of the 11 harvesters observing a change in use area described having to travel farther to hunt caribou (Table 15). Reasons given for this more distant travel included a change or diversion in caribou and disturbance by airplane or helicopter traffic, pipelines, and ice roads.

Table 15: Reasons for Change in Use Area by Type of Change, Nuiqsut, 2008

	Travel farther to harvest resource	Smaller hunting area	Use area changed	Total
Migration changed or diverted	3		1	4
Lack of transportation/equipment		2		2
Personal Reasons		1		1
Employment/Lack of time		1		1
Less Snow		1		1
Traffic Disturbance	1			1
Helicopter Traffic Disturbance	1			1
Airplane Traffic Disturbance			1	1
Development			1	1
Pipeline	1			1
Ice roads	1			1
Resource Availability			1	1
Farther from riversides/farther inland	1			1
Total Observations	8	5	4	17
Number of Harvesters	5	4	2	11

Stephen R. Braund & Associates, 2010.

Harvesters explained the reasons why they traveled further as follows:

Yeah, it's different, there's ice roads and Rolligons and choppers. Sometimes they'll scare them away. I always go different places every year, try a new place, go farther and farther. (SRB&A Nuiqsut Interview March 2009)

They're [caribou] a little far, a lot farther than usual. Don't get much Porcupine Herd, ever since they built that Meltwater pipeline. Even after they built that Alpine. They go through Alpine, but after they built Meltwater they go toward the oceanside or further south. (SRB&A Nuiqsut Interview March 2009)

These caribou been so far out, so I started using four-wheeler [to hunt]. All these caribou start being away from the river. Last year, every time there's caribou, [they are] away from the Colville River, about five to six miles. Some are close to the river sometimes....We got a cabin down here and caribou are way, way out here instead of close to the river. There's too much traffic. Airborne [traffic] is one of the problems we had. That really affects our hunting. (SRB&A Nuiqsut Interview March 2009)

Changes in Hunting Months

Twenty percent of harvesters reported a change in hunting months in 2008 compared to recent years (Table 10). Harvesters reported seven observations of changes in hunting months (Table 16). In three cases, respondents attributed the change to a later migration and/or arrival of caribou in their hunting areas. Harvesters explained the later arrival of caribou as follows:

No, it's usually June, July, and August, but last summer it's different. The reason it was different is the caribou are coming in late on their usual migration model. No, this was the only time that the caribou were harvested by the community. The caribou didn't come in until late. The only ones that the community got came in from the west. None of the ones that is from the east ever did come in. They have to cross right where our camp is at, and they never did cross. But some of the caribou from this side [west] did come across and they came in from the west; they are the same herd those ones, but they were coming from the west. 2007, 2006, this was the first [time] that they never did come across from the east side. We were told so many times that the caribou are coming, and we sat and waited and never a thing. That was strange for them not to go across Colville. (SRB&A Nuiqsut Interview March 2009)

Yeah, it's different now, the migration. I know that years back it used to be end of June, July. Now I think it's later than July and the herds are smaller. There's smaller herds down there. I think because of the pipeline over here. They say it's not affecting [the caribou], but it is. They're coming later and later. If you get an aerial thing [picture], you can pretty much see the footprints of the caribou, coming east-west like [local elder] was saying. Since they made the other pipeline going from the river crossing, it has changed, too. (SRB&A Nuiqsut Interview March 2009)

Table 16: Reasons for Change in Months of Harvest by Type of Change, Nuiqsut, 2008

	Later hunting season	Change in timing of hunt	Total
Later Migration/Arrival	3		3
Employment/Lack of time		2	2
Lack of transportation/equipment	1	1	2
Total Observations	4	3	7
Number of Harvesters	4	3	7

Stephen R. Braund & Associates, 2010.

Harvested Enough Caribou

Fifty-one percent of harvesters reported that they were able to harvest enough caribou in 2008; the remaining 49 percent indicated that they did not harvest enough caribou in 2008 to meet their household needs (Table 10). Twelve of the 23 reasons respondents gave for not harvesting enough caribou concerned resource availability in general, or a change in migration (Table 17). Residents provided the following general explanations for why they did not harvest enough caribou, saying,

September, just before freezeup, we were looking for caribou and they were hard to come by. Then we were out of caribou and had to wait until October to go out with snowmachine.... Usually when we run out and someone got a lot, we go ask them. A lot of people share like that around here. (SRB&A Nuiqsut Interview March 2009)

No, it's usually June, July, and August, but last summer it's different. The reason it was different is the caribou are coming in late on their usual migration model. (SRB&A Nuiqsut Interview March 2009)

No, those January and February caribous I got, those were the caribous for other families, because they were in more need than I was. That's how I was raised; I just like to keep the people happy. So I didn't get enough for myself. (SRB&A Nuiqsut Interview March 2009)

Table 17: Reasons for Not Harvesting Enough Caribou, Nuiqsut, 2008

	Not Harvest Enough
Resource Availability	7
Migration changed or diverted	5
Change in subsistence dependents	3
Lack of transportation/equipment	2
Helicopter Traffic Disturbance	2
Development	2
Airplane Traffic Disturbance	1
Air Traffic	1
Total Observations	23
Number of Harvesters	18

Stephen R. Braund & Associates, 2010.

Six of the 23 reasons given for not harvest enough caribou in 2008 concerned development or air traffic, and two respondents provided the following explanations for why these activities reduced their harvests:

Before they developed Alpine, around our area here would be a whole bunch of caribou on the west side, to this point. You hardly see them anymore, too much activity going on around Alpine area, making it hard for us. Both [herds impacted]. (SRB&A Nuiqsut Interview March 2009)

Definitely not, my household consists of my mom's house and other relatives, even my boys didn't see enough. Hopefully this season will be better. It is hard to say, you see helicopters flying around, you have things going out there that are not usually there, human activity. It is hard to say, with the Meltwater road. With the last couple years the caribou haven't been coming like they used to, I usually catch 20, 30 caribou for my mom and other people. [I harvested] way less than usual. (SRB&A Nuiqsut Interview April 2009)

GENERAL OBSERVATIONS OF CHANGES IN CARIBOU

Study team members asked respondents to describe any general observations about changes in caribou in 2008. Ninety-two percent of harvesters reported one or more caribou resource changes (Table 18). Seventy-eight percent reported a change in caribou migration; 67 percent reported a change in caribou distribution; 44 percent reported a change in Health/Quality; and six percent reported a change in caribou abundance. Twenty-nine of the 37 observations of caribou migration changes in 2008 concerned a change in or diversion of migration (Table 19).

Table 18: Type of Resource Change Observed, Nuiqsut, 2008

	Percent of Harvesters	Percent of Observations
Migration	78%	43%
Distribution	67%	37%
Health/Quality	44%	18%
Abundance	6%	2%
Total Percentage:	92%	100%
Total Number:	36	87

Stephen R. Braund & Associates, 2010.

Table 19: Observation of Resource Change by Change Type, Nuiqsut, 2008

Change Type	Number of Observations
Migration	
Migration changed or diverted	29
Later Migration/Arrival	8
Distribution	
Resource in Smaller Groups	10
Move to Different Areas	10
Farther from riversides/farther inland	4
Resource concentrating around oil and gas facilities	4
Closer to Village	2
Habituated to development	1
Caribou calving in different areas	1
Health/Quality	
Decrease in Resource Size	6
Disease/Infection	4
Skittish Behavior in Species	3
Habituated to development	2
Less Fat	1
Abundance	
Decrease in Species Number	1
Increase in Species Number	1
Total Observations	87
Number of Harvesters:	36

Stephen R. Braund & Associates, 2010.

Observed changes in distribution primarily concerned observations of caribou in smaller groups (10 observations) and caribou moving to different areas (10 observations). Respondents' observations of changes in the health and quality of caribou primarily focused on a decrease in resource size and incidences of disease/infection. While many individuals noted a local change in caribou abundance due to changes in distribution or migration, only two respondents reported a noticeable change in the overall population of caribou. Changes with 10 or more observations are discussed in further detail below.

Asked why caribou migrations were changed or diverted, 20 of 45 observations attributed the change to pipelines, 11 observations attributed the change to air traffic disturbances, and an additional eight to development in general (Table 20). More discussion of these impacts is contained in the section of this report entitled "Impacts on Harvesting Activities."

Table 20: Reasons Give for Migration Change or Diversion, Nuiqsut, 2008

Cause	Number of Observations
Pipelines	20
Air traffic disturbance	11
Development	8
Other	3
Do not know	3
Total Observations	45

Stephen R. Braund & Associates, 2010.

In eight cases, harvesters who observed caribou in smaller groups attributed the change to some form of traffic disturbance (Table 21). Other reasons given for caribou being in smaller groups included predators, a migration change or diversion, or development in general. More discussion of these impacts is contained in the section of this report entitled "Impacts on Harvesting Activities."

Table 21: Reasons Given for Observations of Caribou in Smaller Groups, Nuiqsut, 2008

Cause	Number of Observations
Traffic Disturbance	8
Predators	2
Migration change or diversion	2
Development	2
Other	2
Do not know	1
Total Observations	17

Stephen R. Braund & Associates, 2010.

The 13 reasons given for caribou moving to different areas included development (3 observations), traffic disturbance (2 observations), ice roads (2 observations), and predators (2 observations) (Table 22). More discussion of these impacts is contained in the section entitled "Impacts on Harvesting Activities."

Table 22: Reasons Given for Observations of Caribou Moving to Different Areas, Nuiqsut, 2008

Cause	Number of Observations
Development	3
Traffic disturbance	2
Ice roads	2
Predators	2
Other	3
Do not know	1
Total Observations	13

Stephen R. Braund & Associates, 2010.

OBSERVATIONS OF HARVESTED CARIBOU HEALTH AND CONDITION IN 2008

Sixty-six percent of respondents reported one or more abnormalities in the condition of caribou they harvested in 2008 (Table 23). Respondents also identified the harvest location where each caribou abnormality was observed (Map 14). The majority of residents' observations of caribou abnormalities occurred on the Colville River from the mouth of the Colville River delta to just beyond Ocean Point. However, observations were also reported east of Nuiqsut to Oliktok Point, and west of the community to Fish Creek. The observations of abnormalities generally occurred in all the areas where hunters harvested caribou. Forty-nine percent of harvesters and 49 percent of the observations concerned abnormalities in the health of caribou. The second most commonly reported abnormality was in regards to the size of caribou (31 percent of harvesters). Other abnormalities included parasites (23 percent of harvesters), and quality (nine percent of harvesters).

Table 23: Observations of Abnormalities in Harvested Caribou, Nuiqsut, 2008

	Number of Harvesters Observing Abnormality	Percent of Harvesters	Percent of Observations
Health	17	49%	49%
Size	11	31%	24%
Parasites	8	23%	18%
Quality	3	9%	7%
Other	1	3%	2%
One or More Abnormalities	23	66%	100%
Total		35	45

Stephen R. Braund & Associates, 2010.

The most common observations regarding abnormalities in caribou health concerned discolored or slimy meat and pus around the joints and lungs. Harvesters most commonly described discolored meat as having a green or yellow color. Harvesters had the following observations regarding abnormalities in caribou health in 2008:

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

70°30'N

70°30'N

Fish Creek

Nuqsut

Colville River

Kuparuk River

70°00'N

70°00'N

Judy Creek

Sentinel Hill

Itkillik River

White Hills

69°30'N

69°30'N

Kikiaroruk River

Kogosukruk River

Anaktuvuk River

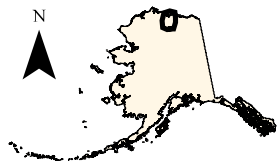
69°00'N

69°00'N

Colville River

Umiat

Chandler River



0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Map 14 - Locations of Abnormal Caribou 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

LEGEND

- 51 abnormal caribou harvest locations
- 22 respondents

National Petroleum Reserve Alaska

152°00'W

150°00'W

Well, the last caribou I caught at the end of the month was kind of weak; I don't know what was wrong with it. When I took the skin off it was like green meat. I brought it back and my mom said it must have been because of the fat. No [I didn't use it]; I gave it to the dogs. I don't know [why]. We were after it and I shot it and it went down. It was kind of skinny, took the hide off and that's when we saw the green and yellow stuff, around the legs [haunches]. It was a big caribou, but didn't have any fat. (SRB&A Nuiqsut Interview March 2009)

The one, that first caribou we got, it didn't look too good, so we just took the head off. There was some pus. The lungs were greenish and there was some pus coming out. Nice full fat caribou, too, and we noticed, too, that, after we cut it and I was going to take the tongue off, you could see minerals in the jaw, like gold or something. [The pus was] right on the lungs. Even the joints, it had some deformed joints with pus coming out. No idea [why]. Must be sick, the only think I can think of would be sick, from something. (SRB&A Nuiqsut Interview March 2009)

One, yeah, one caribou. It was around this area here. It was just green meat and lot of real slimy. No [I left it]. No fat on it, too, nothing. I know that they're different from year to year, or seasons, [it] depends on what they eat. (SRB&A Nuiqsut Interview March 2009)

When asked for the cause of the abnormalities, several respondents explained they had observed the abnormality but that they did not know the cause. As one individual said, "Probably what they're eating, where they're eating it, I guess. I don't know. Your guess is as good as mine" (SRB&A Nuiqsut Interview March 2009). Others attributed the abnormalities to oil and gas development and provided the following comments:

Going home we got this one and it was sick. In June, July. Green liquid in their joints and their meat's kind of greenish sometimes. Like one would get smaller and go to the other side and the other testicle would be two to three times bigger than normal. Mhmm [left sick ones]. Probably oil companies. I always think they've been affected by what they call that smog and whatnot, going down on the ground. It's happening more and more nowadays [not when he was young]. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers questioned whether oil company activities are the cause of sick caribou.

Implication for future monitoring Program: In the future, the monitoring program could include a work session involving hunters, caribou biologists and CPAI staff on how multiple types of observations could be used to examine the potential relationships between development and abnormalities.

Oil and gas. I think that that onshore development definitely has some issues with the resources. They use our lakes for water to build ice roads, and there are just a lot of little things that can add up to make the caribou have sicknesses. I've helped with little spills and I know they have that. It's the same thing with our humans. I can guarantee that at least 10 of my elders passed away from cancer, we had some from heart attacks, but at least 10 from cancer. I think it might be the air pollution, it might contain small particles, but it adds up. That one with the tumor, I cut off the head and took the horns, but I left the

rest for the animals to eat, cut the gut open so it wouldn't explode. (SRB&A Nuiqsut Interview March 2009)

In addition to abnormalities in caribou health, respondents noted abnormalities in caribou size. These respondents generally described the caribou as being either skinny or smaller in size in 2008. Harvesters made the following observations of abnormalities in the size of harvested caribou and attributed the causes to industry and weather conditions, explaining:

Well, actually, the only way I would describe it is less fat. They were good eating, though hardly any fat in them. I don't know [why]. Maybe it could be from the pollution from the oil industry, or they could be lacking food in that area. It's not that normal. (SRB&A Nuiqsut Interview March 2009)

Yeah, [the caribou are] smaller and thinner [less fat]. I don't know [why]. Seems like they're eating less, because all these oil companies are spreading all around us where they're [caribou] migrating. (SRB&A Nuiqsut Interview March 2009)

It changed, it got warm and then it got cold all of a sudden. It changed, it [fat] got thinner [when it was cold], and then later when I went [the fat] was thick again [because of] warm weather. (SRB&A Nuiqsut Interview March 2009)

No, all the caribous that we harvested were healthy, just that some of them did not have enough fat on them. None of the caribou that we got were that fat. They were just skinny. It was most of them. It's hard to say [why]. It's something that has to do with, probably, when it turns winter it accumulated so much snow.... And we've heard that in the past their vegetation is beginning to become contaminated. (SRB&A Nuiqsut Interview March 2009)

Nearly a quarter of respondents also noted abnormal amounts of parasites (both fewer and more parasites) in their harvested caribou (Table 23). Residents generally attributed these occurrences to natural causes. Harvesters observing changes in parasites noted:

Well, actually, the one I got over here by Alpine, that one bull I got had a lot of those flies in them. Well, you know them honeybees look for something to hibernate in winter time. We have a bunch of those in winter time. They go in the caribous and hibernate over the winter. They're always hoping to go along the coast. That's the only time the caribou get those bugs in them. I heard that them flies are really good eating. (SRB&A Nuiqsut Interview March 2009)

A couple of them did, they had, like pus or something. Parasites. With my brother, in that area. It was just one [of the 5 up there]. We just left it. Didn't use it. No, we still don't know[what caused it]. Everyone always talks about that too, the little yellow balls. We still don't know. (SRB&A Nuiqsut Interview March 2009)

Three harvesters observed changes in the quality of the caribou they harvested in 2008. All three noted the meat had an abnormal smell or taste. As one individual observed:

Some caribou, the meat tastes like sour, real sour, not like caribou meat. I don't like that taste of it. That's in August. July and August. Last year. Just one [by] Fish Creek. Sour, you know, just sour. Probably the sick caribou. (SRB&A Nuiqsut Interview March 2009)

Respondents were asked if they used any of the abnormal caribou they had harvested in 2008 (Table 24). As the table shows, in most instances (19 of 22) residents did not use the caribou if the abnormality was related to the health of the caribou (e.g., discolored meat or pus). On the other hand, harvesters utilized 16 of 22 of the caribou that were abnormal in regards to size, parasites, or quality.

Table 24: Did Respondent Use Abnormal Caribou? Nuiqsut, 2008

	Health	Other	Parasites	Quality	Size	Total
No	19	1	2	1	3	26
Yes	3	0	6	2	8	19
Total	22	1	8	3	11	45

Stephen R. Braund & Associates, 2010.

IMPACTS ON HARVESTING ACTIVITIES

Eighty-six percent of respondents reported some type of impact on their hunting activities in 2008 (Table 25). Seventy-one percent of respondents reported one or more impacts from helicopter traffic and sixty-nine percent reported one or more impacts from man-made structures. Fifty-four percent of impact observations concerned these two types of impacts (helicopter traffic and man-made structures). A total of 54 percent of harvesters reported impacts from plane traffic, accounting for 25 percent of the total impact observations. Other impacts reported included other traffic (10 percent of observations), regulations (six percent of observations), and oil company personnel (two percent of observations).

Table 25 distinguishes between volunteered impacts (i.e., impacts identified without specific cues: “Did you experience any impacts on caribou hunting in 2008?”) and cued impacts (i.e., impacts reported with specific cues: “Did you experience any impacts from helicopter traffic in 2008?”). Of all volunteered concerns, helicopter traffic, at 34 percent, was the most frequently cited impact. Man-made structures accounted for the highest percentage (31 percent) of cued observations.

Respondents identified the months in which the impact to their caribou hunting occurred in 2008. In some cases, respondents indicated that the impact was present at all times and did not identify a specific month. As Figure 2 shows, the monthly pattern of impact does not vary by type. Almost a third (32 percent) of the impact observations were in July. The months of June, July, and August cumulatively account for 70 percent of all impact observations. As described above, July and August are the most active months for Nuiqsut caribou hunters and thus it is understandable that a majority of impacts would be observed during these months. In addition, the summer months are the most active for air traffic, particularly helicopters, which accounted for 52 percent of impact observations (Table 25).

Impacts of Helicopter Traffic

Seventy-one percent of respondents observed impacts from helicopter traffic (Table 25). These respondents also identified the locations of helicopter impacts, which are depicted on Map 15. This map shows the highest number of overlapping helicopter impact polygons occurring north of the community of Nuiqsut in an area around Nigliq Channel. However, impacts related to helicopter traffic reportedly occurred in an area surrounding the entire Colville River delta, and at various locations along the Colville River to Umiat.

CPAI reviewers noted that CPAI helicopters arrive on the slope in mid- May and usually depart by mid-Sept (in 2008 last flight was Sept 19) - no CPAI helicopters are present after that.

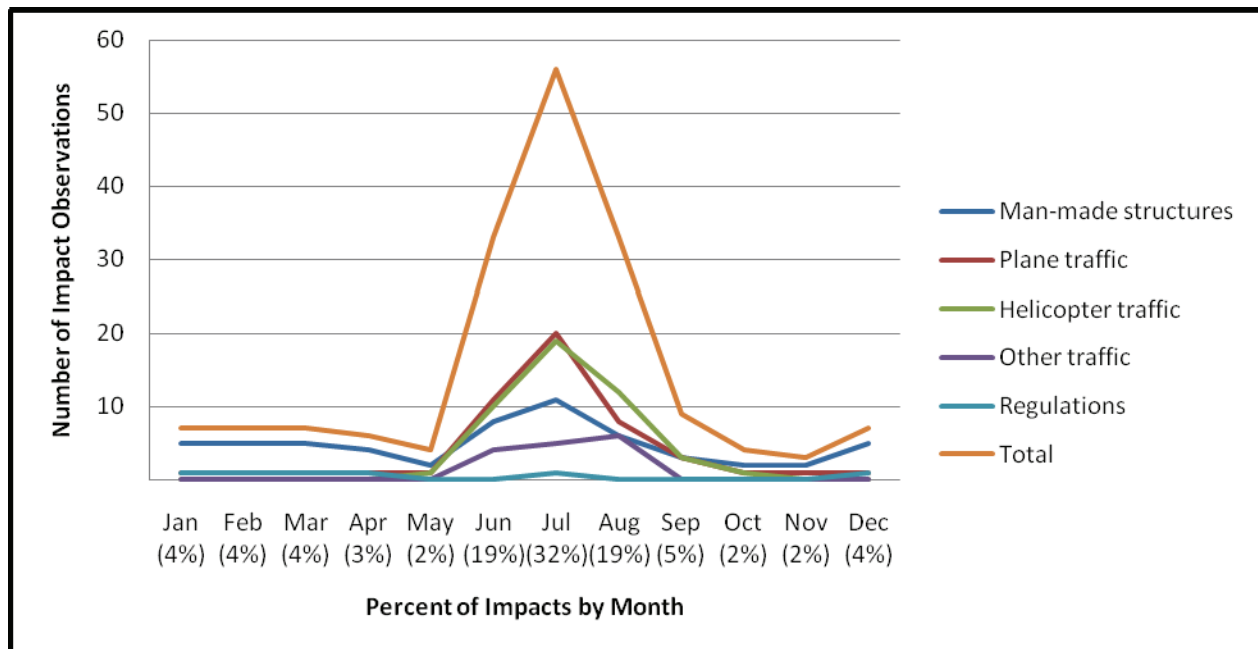
Implication for future monitoring program: identify timing of CPAI activities that are seasonal and that have been associated with impact observations.

Table 25: Harvester Reported Impacts on Caribou Hunting, Nuiqsut, 2008

Impact	Percentage of Harvesters	Percentage of Volunteered Observations	Percentage of Cued Observations	Percentage of Total Observations
Helicopter traffic	71%	34%	20%	27%
Man-made structures	69%	22%	31%	27%
Plane traffic	54%	26%	24%	25%
Other traffic	29%	6%	13%	10%
Regulations	17%	2%	9%	6%
Oil company personnel	6%	0%	4%	2%
Other	14%	10%	0%	5%
Total	86%	100%	100%	100%
Number:	35	50	55	105

Stephen R. Braund & Associates, 2010.

Figure 2: Impacts on Caribou Harvest Activities by Type and Month, Nuiqsut, 2008



152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Harrison Bay

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

Kuparuk

CD 3

CD 2

CD 1

CD 5

CD 4

CD 6

CD 7

Nuiqsut

Ocean Pt.

Sentinel Hill

Judy Creek

Fish Creek

Creek

Colville River

Kuparuk River

Kikiarorak River

Kogosukruk River

Itkillik River

Anaktuvuk River

Chandler River

Umiat

70°30'0"N

70°30'0"N

70°0'0"N

70°0'0"N


69°30'0"N

69°30'0"N

69°0'0"N

69°0'0"N

LEGEND

High

 Low

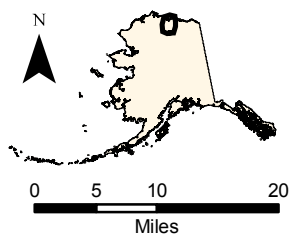
34 helicopter traffic impacts
 22 respondents

ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Pipeline
- CPAI Road
- CPAI Ice Road *2008/2009
- CPAI Rolligon Trail

Other Infrastructure

- ENI Ice Road *2008/2009
- PIONEER Ice Road *2008/2009
- National Petroleum Reserve Alaska



Map 15 - Helicopter Traffic Impacts 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

152°00'W

150°00'W

Table 26 shows respondents' descriptors of the helicopters that affected them; in some cases, residents provided multiple descriptors (e.g., "blue and white helicopters owned by Alpine" was counted under "Blue and White" and "Alpine").

Table 26: Sources of Helicopter Impacts, Nuiqsut, 2008

Impact Source Descriptor	Number of Times Mentioned
Blue and White Helicopters	15
Alpine Helicopters	9
Air Logistics Helicopters	2
Helicopters Used for Wildlife and Other Studies	2
Conoco Phillips Helicopters	2
Black Helicopters	1
Red Helicopters	1
BLM Helicopters	1
Other Agencies Helicopters	1
Helicopters - Unknown Owner	1
Total Mentions	35
Number of Harvesters	26

Stephen R. Braund & Associates, 2010.

Respondents described the helicopters impacting their caribou hunting as "Alpine" helicopters and "Blue and White" helicopters. In addition, many respondents stated that the helicopters used by Alpine are blue and white. Nuiqsut harvesters provided the following description of impacts to their caribou hunting related to these helicopters:

When we were trying to look for caribou a helicopter came flying like 200 feet right above us. In the little creek here. On the north side, somewhere in that area. It was Alpine's I guess. The two tone blue and white. Air logistics. (SRB&A Nuiqsut Interview March 2009)

I know it has been reported that when they hunt in this area the choppers fly low enough to scare the caribou away. We were waiting for the caribou by my grandma's cabin, and the choppers flew by and scared them away. From this creek back and forth. That's not the first time either. I think it's when they check on the ice roads. Like July. June and July. Dark blue and white [helicopter]. There's been a lot of complaints about that chopper. Somewhere in that area me and my uncle were trying to catch those caribou. They fly all the way up to here back and forth through the summer. (SRB&A Nuiqsut Interview March 2009)

There are choppers flying all along here [along the central part of Colville River]. All the way around here. There are lots of helicopters flying. They're usually blue and white. They're the same helicopters as these. June, July, August [is the worst time]. August, September (further down Colville)." (SRB&A Nuiqsut Interview March 2009)

Several respondents mentioned that in addition to Alpine helicopters, other helicopters and air traffic from wildlife studies, BLM, and other agencies and organizations cumulatively worsen the impacts on their caribou hunting. Two respondents described the effects from cumulative air traffic as follows:

Of course [there are impacts], because there's so much studies going on, lots of aerial traffic. Especially traffic from Alpine to Kuparuk. It's both: a combination of chopper, because there's so much studies going on, the wildlife studies counting, and flights in and out of Alpine....The helicopters are being hired by Conoco Phillips. I know BLM hires the other outfit that does it. It's not just these Conoco Phillips [helicopters]; there are other agencies out there doing studies. Planes take off and land from Alpine, you can't miss that. You have daily flights, there's Shared Services flights, and a supply plane, the DC6 that lands there. I think they need to restructure their transportation corridor. (SRB&A Nuiqsut Interview March 2009)

Oh yeah, oh yeah [helicopters], and those small planes. There's a bunch last year that was going all around my grandma's camp, and this whole area here. Small Cessna plane, helicopters. It's getting worse too, every year. Every year since Alpine started. It's always those Alpine helicopters and planes. I believe that it's the ones that go out and scan the caribou or something. When I caught my caribou up there, there was a plane that was hanging around, I don't know why. I believe it was because they were taking a bear out there that was hanging around the Alpine. July through August. Scares the caribou. (SRB&A Nuiqsut Interview March 2009)

In regards to mitigation, residents offered several approaches to lessen impacts from helicopter traffic. The majority of these suggestions focused on fewer helicopter overflights, changing flight paths or the timing of helicopter activities, and communicating more closely with local hunters. Regarding fewer helicopter flights, harvesters offered the following suggestions:

They got to at least either stop for a while or give them a weekly flight instead of flying every day. I would say try not to fly too much during summer time. A daily or weekly schedule. I'm not against oil companies. But during winter time they can go out there, because there's less caribou. During winter time I wouldn't mind. They're from Alpine, that's for sure [helicopters]. (SRB&A Nuiqsut Interview March 2009)

Slow their traffic during the summer caribou migration. June and July, when they [caribou] migrate westward. Before Alpine came up, that herd that passes through every summer in the past. It is not passing through like it used to. Some years we don't see that herd and some we do, and it would be up to 10,000 caribou. Alpine diverted the caribou route or something. (SRB&A Nuiqsut Interview March 2009)

Others suggested changing the path of the helicopters' flights, saying,

Of course, because they've got this straight path transportation corridor. They need to change the pattern of the transportation corridor. They come right where the caribou migrate, the Central Herd that migrates through. There's Kuparuk somewhere here, they fly over, Alpine, right in the path of the migrating caribou. (SRB&A Nuiqsut Interview March 2009)

No choppers or planes around this area, because when the west herd comes around they come through this way. The west herd comes straight through. They used to be close by around Nuiqsut at all times, but air traffic divert them this way [south]. When I'm out

here, I see them, I go further out and look around. Just airborne in summertime. (SRB&A Nuiqsut Interview March 2009)

If they could fly around a little higher. It sounds like a gun when it comes around the bend. Comes out of nowhere. (SRB&A Nuiqsut Interview March 2009)

Two harvesters also added that the communication between the oil companies and the local hunters could be improved to lessen the impacts of helicopter traffic. One individual observed,

Stay away from the hunters. I mean, when they see us, they should go. If they had VHF to communicate with us, we could tell them they're getting too close and scaring the caribou. I know they got radios to communicate. And us, with the boats, always have VHF. This could help. Search and Rescue does it, communicates with VHF all the time. I don't see why the oil companies don't do that. 'Hey you're getting too close, scaring the caribou.' (SRB&A Nuiqsut Interview March 2009)

Impacts of Man-made Structures

Sixty-nine percent of harvesters reported impacts of man-made structures (Table 25). Twenty-two of the 26 impacts of man-made structures were attributed to pipelines (Table 27). Examples of the locations of pipelines causing impacts include the pipeline between Nuiqsut area and Deadhorse, the pipeline crossing the main channel of the Colville River, and the pipeline from Alpine to Kuparuk and CD3 to Alpine.

Table 27: Sources of Man-Made Structure Impacts, Nuiqsut, 2008

Impact Source Descriptor	Number of Observations
Pipeline	22
Ice roads, bridges	2
Infrastructure	2
Seismic lines	1
Total Observations	27
Number of Harvesters	24

Stephen R .Braund & Associates, 2009.

Respondents generally stated that the physical presence of the pipeline (especially the height of older pipelines) and/or the glare from the pipeline has caused the caribou to change their migratory route and thus impact Nuiqsut harvesters' hunting activities. Nuiqsut hunters stated that the caribou used to regularly come through the Nuiqsut area, but now that the pipelines are in place, the caribou are being diverted from their normal migratory paths, especially caribou coming from the east toward Nuiqsut. Harvester explanations of how pipelines impact caribou hunting activities included the following:

You know, what I think about it, since they built that pipeline up, the Porcupine Herd doesn't want to come this way. I think that pipeline is diverting them. Because the Porcupine Herd that's coming in from the east usually travels along the shores. I think they come in from the shore and stay in this area around Beechey Point, because there's no way to go further westward. (SRB&A Nuiqsut Interview March 2009)

If I'm able to hunt within 1,000 feet of the pipeline, then it isn't an issue. But a lot of areas between here and Deadhorse, the pipeline is just too low. The snow builds up and

they aren't going to put their head down to go under. I saw a caribou blocked just the other day, by Deadhorse. One side of the pipeline is all bare, and the other side is all open land. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that Deadhorse is not in the study area.

Implications for future monitoring Program: Harvester observations are likely cumulative, spanning multiple developments. Yet mitigation programs are designed on a development-specific basis. Include in the future monitoring program hunter interview protocol a means of highlighting observations that occurred in the CPAI study area and observations directly related to CPAI activities.

Mostly the caribou used to come from the west, back in the old days before that Alpine there was nothing around, we had caribou coming this way and that way. They mostly came right [through], the whole section of this from the eastern [direction]. Back in the old days, before that activity. Alpine, it started happening since they build that pipeline. Some [caribou] go further north coming in. Especially when they build that pipeline, they really divert that caribou that used to come straight across before Alpine was here. The pipeline's just right over here. All that pipeline goes there and the Western Herd, before the pipeline, they used to go straight there. They really divert that caribou. All those caribou used to come from the eastern herd and go right through. (SRB&A Nuiqsut Interview March 2009)

There used to be a lot more caribou, but it's getting to be a lot less going to that area. Because they're getting diverted in Meltwater. The pipelines from Meltwater to Kugaruk are so low and they can't cross the pipeline. (SRB&A Nuiqsut Interview March 2009)

Noting how the reflections off the pipelines divert the caribou, two harvesters said,

That's where most of the Porcupine Herd usually comes, around here, due to that pad; that pipeline that goes from Alpine to Prudhoe has pretty much changed the route of the caribou migration. The only big herd that usually came around is the Teshekpuk Herd; they came around. None of the Porcupine Herd that usually comes around, they never really came around, [because of] that big pipeline and the pads that connect to Alpine. And that other pipeline that goes all the way to Kugaruk. And from the north pad, CD3, down to Alpine. And then it goes to Kugaruk. It's shiny and makes the caribou not want to go through. Those caribou are scared of the pipeline. Some stick around. Some go towards it and go back. (SRB&A Nuiqsut Interview March 2009)

Well, the pipeline is a problem. When you look at it, it is reflective. All that pipeline that comes to Alpine and goes to Kugaruk, it shines and it looks like ice out there. The caribou look at that and they are re-routed. If you come here in the summer time, and look, it looks like a glaring ice pack out there. And we told Conoco Phillips that the caribous that are coming from the east side and the west side, they need to do something about the pipeline. It goes all the way from Colville all the way to Kugaruk and where are the caribous? Some of them do migrate all the way through there. And once they see that pipeline, the caribous think that they are close to the ocean [that's why they re-route]. But on this side [west side] you don't have that yet. (SRB&A Nuiqsut Interview March 2009)

Nuiqsut respondents also explained that the pipelines not only divert the caribou but also disrupt where local residents can hunt. They explained that even though the caribou may be near the pipeline, local residents are not allowed to hunt them or do not want to take the risk of shooting near the pipelines and other oil company infrastructure:

And a lot of caribou this year was towards the Alpine side so I couldn't shoot or anything because the drill rigs and the pipeline there were very few on this side....I just don't shoot towards the pipeline. I'm not taking that kind of risk. (SRB&A Nuiqsut Interview March 2009)

The pipeline. They say we can't hunt near the pipeline; most of the caribou are near the pipeline. We can't hunt with a certain miles of the pipeline. I think it's around here. We went through but they say if we catch caribou in there and get caught they'd give us a fine. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that hunters can hunt near pipelines as long as they follow agreed-upon safety procedures. Reviewers also noted that CPAI does not fine Nuiqsut hunters; the only action they take is to report an incident to the NSB police.

Implication for future monitoring program: Several quotes, including this one, document that harvesters have differing understandings of hunting policies. Include in the future monitoring program documentation of past and current policies and safety procedures, highlighting those used by CPAI. Also include a work session with hunters and security staff to develop a consensus description of the situation and possible mitigation and/or monitoring actions.

Harvesters also observed impacts of other man-made structures, such as ice roads and drilling pads, on caribou, saying,

They're too far out, too far from the rivers. Gotta be lucky [to get them] when they're migrating, but they never came through last year. Now they're over toward Atqasuk. There's none over there. People gone to Umiat and back around. Like I said they were at the dump for months. Traffic, when they start putting in all those ice roads, constantly going back and forth. The roads and stuff scare them off, the congestion and we have to go further to get caribou. Three years ago people were going 75 miles just to get caribou and that's ridiculous. Just the oil companies, the ice roads. I heard that's what's been keeping them away from town. Go back and forth on the ice roads, it's putting a hamper on it. Once the ice road gets built there's equipment and congestion, seems like they go further [the caribou]. (SRB&A Nuiqsut Interview March 2009)

The wolves, the traffic, the Meltwater road, that [the caribou migration] is going further south than usual. That goes 10 miles out. A lot of people think that road causes the caribou to cut further south around Sentinel Hill to get west to east and east to west. (SRB&A Nuiqsut Interview April 2009)

Seems like they're sticking over by the pad, that one. They mainly stay around this area, don't move nowadays. I know that they spend a lot of time over by Alpine. They don't move once they get by over there. I guess just like at Prudhoe Bay. You even see herds go under the building, to cool off. Because it's cool, there's a draft going under that building. I used to work in Prudhoe Bay for how many years, a technician, for their

annual tests to see if there's anything leaching from their pads. (SRB&A Nuiqsut Interview March 2009)

Nuiqsut respondents provided several suggestions for the best ways to mitigate the impacts from man-made structures on caribou. Nearly all these suggestions involved making the pipelines non-reflective, and/or raising the pipeline height. Harvesters provided the following responses when asked about mitigation suggestions for pipelines:

We've been telling Conoco Phillips time and time again that they need to have a darker casing, because this sun is reflecting [on the pipeline]. (SRB&A Nuiqsut Interview March 2009) That pipeline should be colored like a green [color]; when the sun comes up it's shining, especially this time of year. (SRB&A Nuiqsut Interview March 2009)

They need more passes to go through that pipeline, and less traffic. (SRB&A Nuiqsut Interview March 2009)

They need to take them to where they won't cause any diversion, and they say that it will cost them so much dollars to try to do that [put pipelines underground or re-route them]. I am surprised that when they built that pipeline the community didn't address those issues, knowing that is should be a different color, the pipeline color. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that new lines to CD 3 & 4 have a dull coating and future lines will as well.

Implication for future monitoring program: Why is the statement still being made if the problem has been addressed? Is the harvester unaware of the new pipes? Is he/she talking about different pipes? Answers to these questions can help improve the observation base used by Nuiqsut, industry, and oversight agencies. This quote helps us identify a problem, which may not be the color of the pipes but rather residents' lack of knowledge about mitigation implemented by CPAI. Include in the future monitoring program a work session of Nuiqsut and CPAI staff on the status of this concern and identify improvements that can be monitored.

Make it five feet high. It is maybe five feet now. Make it taller. (SRB&A Nuiqsut Interview March 2009)

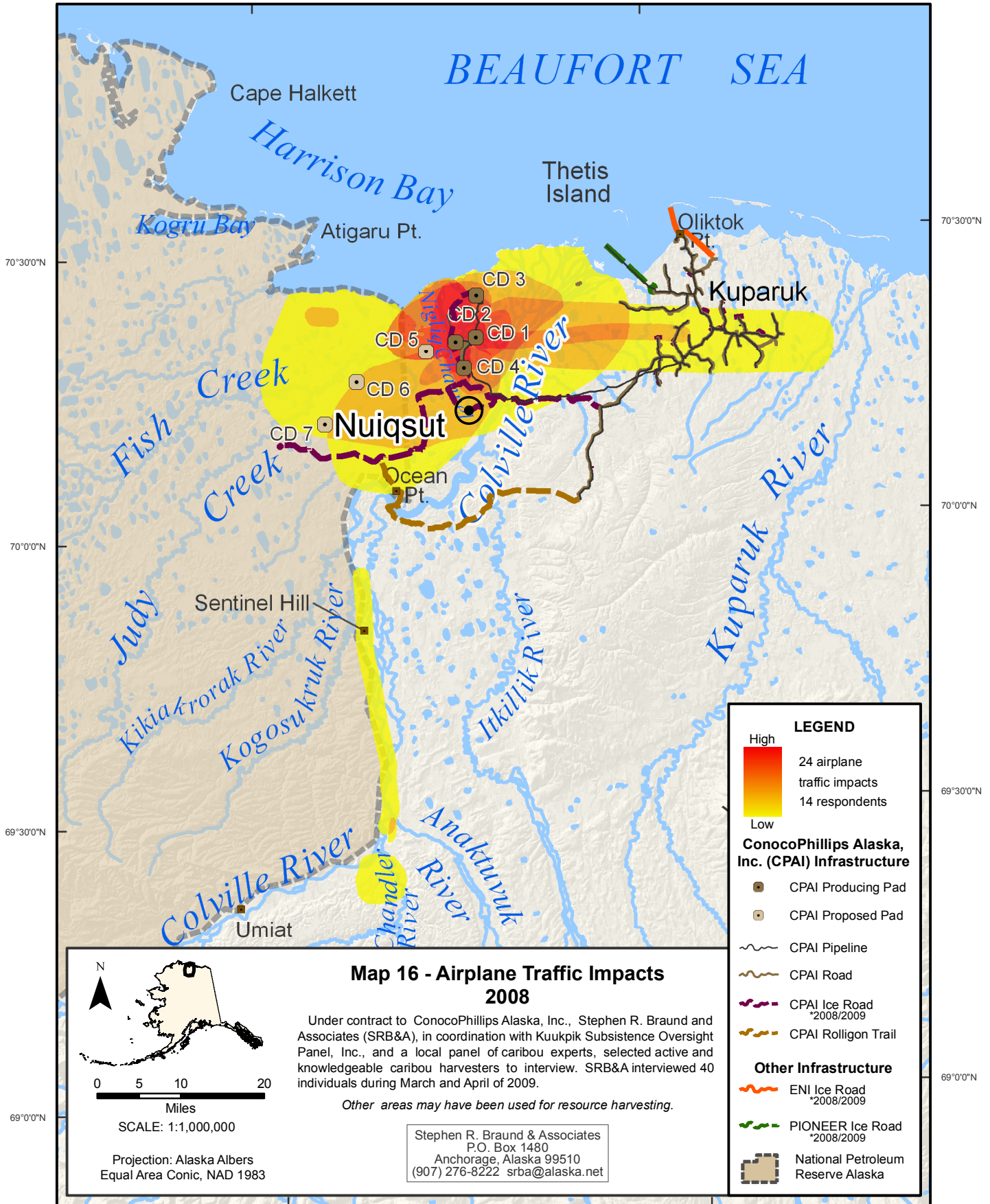
Impacts of Airplane Traffic

Nineteen harvesters (54 percent) reported impacts of airplanes to their caribou hunting (Table 25). The reported locations of airplane traffic are depicted on Map 16. Respondents described airplane impacts occurring north of the community in an area surrounding the Colville River delta, as well as along the Colville River as far as Chandler River. In 2008, the highest numbers of overlapping airplane impact areas respondents reported occurred north of Nuiqsut along Nigliq Channel and CD1, CD2, and CD4. Sources of impacts included airplanes described as "Red and White, Alpine," various Cessna models, and a variety of other descriptors (Table 28). As with helicopter impacts, respondents commonly provided multiple descriptors of airplanes. Thus, one observation may be counted under more than one descriptor. Nuiqsut respondents identified Alpine airplanes (8 observations), Cessna airplanes (7 observations), and Twin Otter airplanes (4 observations) as the three most common descriptors. No other descriptor of airplane impacts was reported more than two times.

152°00'W

150°00'W

BEAUFORT SEA



152°00'W

150°00'W

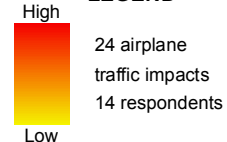
Map 16 - Airplane Traffic Impacts 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

LEGEND



ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Pipeline
- CPAI Road
- CPAI Ice Road *2008/2009
- CPAI Rolligon Trail

Other Infrastructure

- ENI Ice Road *2008/2009
- PIONEER Ice Road *2008/2009
- National Petroleum Reserve Alaska

SCALE: 1:1,000,000

Projection: Alaska Albers
 Equal Area Conic, NAD 1983

Table 28: Sources of Airplane Impacts, Nuiqsut, 2008

Impact Source Descriptor	Number of Times Mentioned
Alpine Airplane	8
Cessna	7
Twin Otter	4
Red and White Airplane	2
Sport Hunting Airplane	2
White Airplane	2
Shared Services Airplane	2
Supercub	2
Frontier Airplane	2
DC3	1
DC6	1
Blue and White Airplane	1
Blue and Gray Airplane	1
Red Beechcraft	1
Fish and Wildlife Airplane	1
Kuparuk Airplane	1
Total Mentions	38
Number of Harvesters	19

Stephen R. Braund & Associates, 2010.

Harvesters made the following observations concerning the planes variously described as “Red and White,” “Alpine Twin Otter,” and “Alpine Twin Otter, red and white:”

When we were way down by the Chandler area and there was air traffic going on over here at Umiat and that red and white plane of Alpine kept following the river and scaring the caribou like he is doing it on purpose. We have bright clothes on and he knew we were there and he made a couple passes and made the caribou run further inland. That was wrong. Red and white plane. We had the caribou in our sight and plane comes and it took off and turned back around and did the same thing and same path and that pissed us off. Right between those two rivers. Just following the river. We had the caribou in our sight waiting for a good shot and we heard the plane and they just took off. That was in July. Red and white, Alpine. Four boats waiting for them caribou. (SRB&A Nuiqsut Interview March 2009)

They are running amok, here, there. [The caribou] used to come all at once, 5,000, 10,000 caribou, the Porcupine Herd. When they come around from Kuparuk and Prudhoe Bay they're all scattered. They arrive in intervals. Helicopters and airplanes. We call Alpine and they say it's not them, then why are they landing at their place? (SRB&A Nuiqsut Interview March 2009)

One harvester described impacts from Frontier planes:

Maybe just once last year, there was a couple of planes flying very low. Near the delta. I would think [the planes would scare caribou], but we didn't see any caribou. This area here [Alpine area]. Those were Frontier 1900s, two of them. That was in July. (SRB&A Nuiqsut Interview March 2009)

Another harvester described experiencing impacts from several different types of planes:

Our caribous didn't come in until July 20 from the west side. That was when we were able to harvest our caribou. There was too much plane traffic on that west side. The caribou that we see at Fish Creek are so far away from the channels, and it's not that easy to harvest caribou and wait for the caribou. And sometimes we have to travel farther west. But a lot of us who go there, we have to wait and a lot of the caribou are diverted by the aircraft. They [aircraft] are counting fish, and some caribou that have collars on them. For the whole duration of June and July, because June is when they start flying west or east....And it was Cessna 287 and Cessna 185 and it was a Beechcraft that was red and I think that might belong to the Fish and Wildlife. And some of those planes are contracted with private studies in the Fish Creek area. (SRB&A Nuiqsut Interview March 2009)

Respondents suggested that the impacts from the airplane traffic could be mitigated by limiting the number of flights each day and avoiding flying over rivers and creeks that have a high concentration of hunters and caribou. According to the local hunters, following these suggestions would lessen the impact of airplanes diverting and scaring caribou from areas where residents have traditionally hunted them. Three harvesters explained,

We've been telling them, but they do the same thing, they keep telling us it's not them, and they don't listen to us. They scare the animals away, the moose, the caribou, away from our area of hunting. Every day, planes from Kuparuk, every day. Well, they should have a stipulation that they have only a certain number of flights each time. There is a stipulation they only fly four times, but they don't do that. [There is an] increase in development on the west side, they're going to have to have more airplanes. (SRB&A Nuiqsut Interview March 2009)

Probably slow their traffic during the summer caribou migration. June and July when they migrate westward. Before Alpine came up. That herd that passes through every summer in the past. It is not passing through like it used to. Some years we don't see that herd and some we do and it would be up to 10,000 caribou. Alpine diverted the caribou route or something. (SRB&A Nuiqsut Interview March 2009)

Don't follow the river. Because that is what they are doing. That is where the hunters are. That plane I wish and the chopper I wish they would reroute instead of following the river from Umiat. (SRB&A Nuiqsut Interview March 2009)

Impacts of Regulations

Seventeen percent of harvesters reported impacts of regulations (Table 25). All six reported impacts related to hunting regulations around pipelines. Harvester observations suggest that there is conflicting information about regulations and inconsistent enforcement:

We were waiting for caribou by Nanuk that one time and they walked by there, and one guy says you can't be around here, you're in a restricted area, you have to move on. By CD4. Last year. During the summer, [the caribou] are just hanging around, right around

CD4. They said 'You can't stay here and hunt around here.' Somewhere in July. Whether they like it or not, if the caribou are by the pipeline, you're going to get the caribou. You have no choice but to try to get them when they're right by the edge. (SRB&A Nuiqsut Interview March 2009)

I am allowed to hunt within 1,000 feet. BP might have a different thing about it, they used to say that I could hunt between here and there, but if they don't let us through with a firearm, sometimes if we do bring a rifle we have to be escorted through the whole way. Purcell Security does that to L pad. Deadhorse security. On the gravel roads. It's for their safety, but it's for our food too. (SRB&A Nuiqsut Interview March 2009)

They're saying we're not supposed to hunt five miles from the pipelines. But we never know when we're gonna get them again. Over here we shot towards the pipeline, lucky we didn't shoot the pipe. (SRB&A Nuiqsut Interview March 2009)

I totally avoided the area [does not hunt near pipelines]. I believe they're there year-round [caribou]. They're hanging around the pipelines. You know, when they do their pattern [migrations] they get around [the pipelines]. (SRB&A Nuiqsut Interview March 2009)

In regards to mitigation for pipeline regulations, one individual added,

They should keep their word. They told us we would be able to keep our hunting area, and when we try to hunt in that area, people say 'You can't do that, can't do that.' (SRB&A Nuiqsut Interview March 2009)

Impacts of Oil Company Personnel

Two harvesters reported impacts related to oil company personnel (Table 25) and offered these observations:

Yes, [ice road activity] affects me. It makes me nervous at the same time. I don't like to shoot my rifle towards this. There's an ice road southwest toward CD5; that makes me nervous. I know there's traffic out there. I don't like to shoot my rifle toward southwest and even if I try to shoot that caribou, pointing my rifle toward southwest there's traffic, caribous, tracks, rolligons, you name it, it's out there. That scares me, makes me nervous. I always thinking about shooting my rifle northeast because there's less traffic. More traffic going southwest. On facing southwest there's more traffic. That make me nervous, super. There's people out there just traveling. They're walking sometimes, doing seismic. October, November, December. Rolligon, cat train. I look with my binoculars and see people walking. (SRB&A Nuiqsut Interview March 2009)

Summertime you'd see surveyors out there. Yeah, it does affect us, you know.... Ever since Alpine was developed. Mainly on the Nigliq Channel. All along this coast [north of village]. The only time they'd go south of the village is May. They're trying to keep track of how the ice is gonna break up. That's what they've been studying since they really want that bridge. I don't mind ice roads because it helps us sometimes, take your truck and drive, look for caribou. (SRB&A Nuiqsut Interview March 2009)

The above respondent provided the following mitigation suggestion in regards to surveyors:

If they're gonna be sending surveyors they shouldn't be wearing these bright orange colors, caribou are sensitive to red, scaring them away. (SRB&A Nuiqsut Interview March 2009)

Impacts of Other Traffic

Ten respondents (29 percent) reported impacts of traffic other than helicopters or planes. Seven of 10 observations concerned airboats (Table 29). The locations of impacts related to other traffic are depicted on Map 17. The majority of impacts reportedly occurred north of Nuiqsut in the drainages around CD2, CD3, and CD4. Most respondents reported that the noise from the airboats scared the caribou. The other three observations included jetboats, rolligons, and water trucks.

Table 29: Sources of Other Traffic Impacts, Nuiqsut, 2008

Impact Source Descriptor	Number of Observations
Airboats	7
Jet boats	1
Rolligons	1
Water Truck	1
Total Observations	10
Number of Harvesters	10

Stephen R. Braund & Associates, 2010.

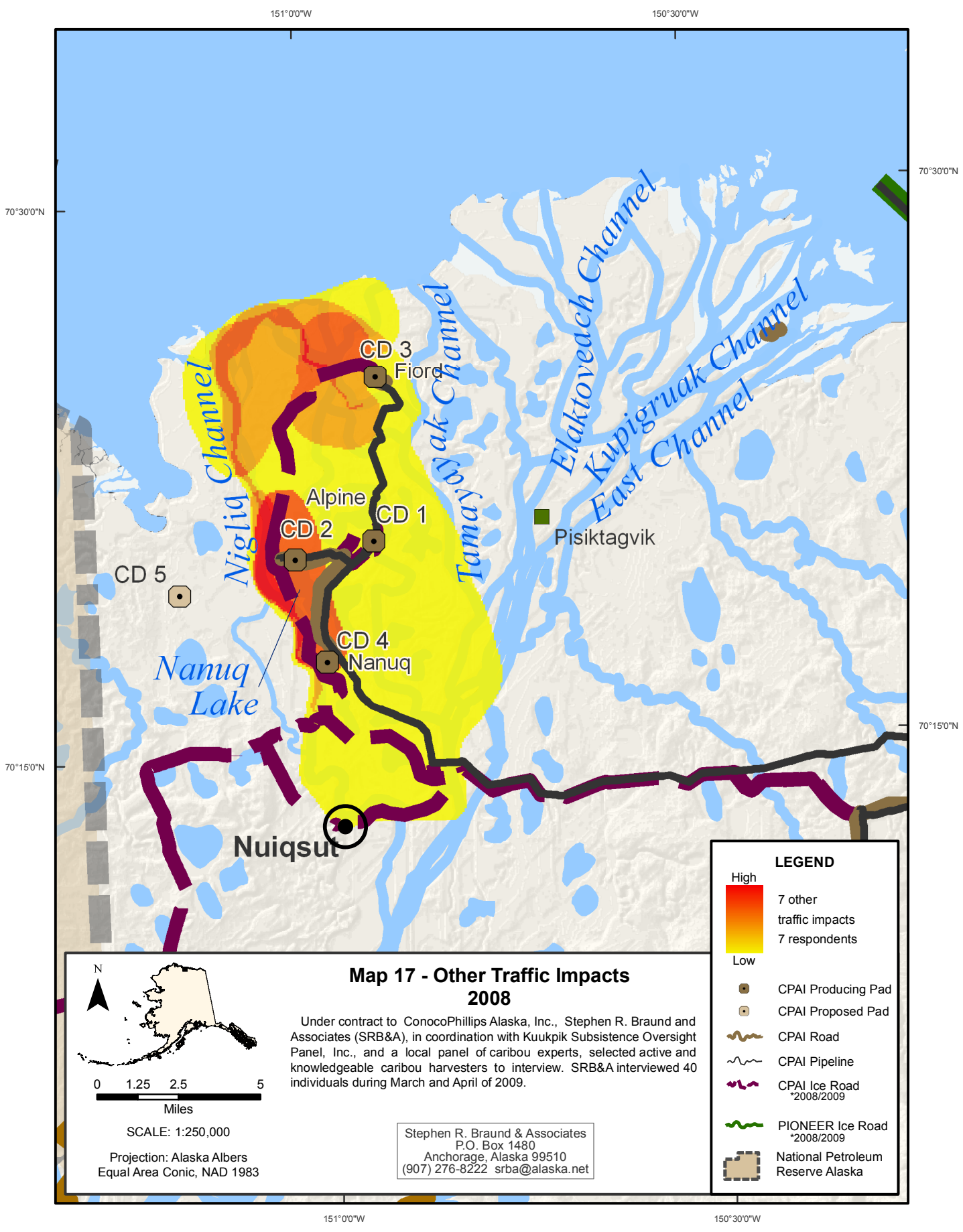
Concerning the impacts of airboats on their caribou hunting activities, harvesters observed:

Those airboats, that's a real big problem. You can hear them from miles away. There's four-stroke jet boats they can use now that can go through shallow water. Nigliq Channel, airboats. I know it was during the summer, from June to August, somewhere around there. (SRB&A Nuiqsut Interview March 2009)

They have those airboats that do that training. We do have a lot of airboats down there. They have access to a boat ramp at CD 4, and then you have those zodiac boats that come around from CD3 and they come around and go in this channel. I've seen how many that come around and go in. It has to be in this area. They come out from these two [channels]. And you know that the community is not informed about when they are going to have an exercise about those airboats. If we would know, that would inform our hunting. And now they have a bigger one [airboat] that is bigger than the two-seater. They are louder than the planes [airboats]. You could hear them before you could see them. That is a concern to the area. That would be during the duration of the summer. Sometimes it could go later, like mid August. (SRB&A Nuiqsut Interview March 2009)

Asked what could be done to lessen the impacts from the airboats on their caribou hunting, the two harvesters responded,

They need to limit their exercises and they need to communicate with the community. It is hard for the community to stop them unless they make phone calls to the state and local agencies. We come back and we make phone calls. That's the only way to stop them. (SRB&A Nuiqsut Interview March 2009)



Map 17 - Other Traffic Impacts 2008

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

Stephen R. Braund & Associates
 P.O. Box 1480
 Anchorage, Alaska 99510
 (907) 276-8222 srba@alaska.net

LEGEND

<p>High</p> <p>Low</p>	<p>7 other traffic impacts</p> <p>7 respondents</p>
	CPAI Producing Pad
	CPAI Proposed Pad
	CPAI Road
	CPAI Pipeline
	CPAI Ice Road *2008/2009
	PIONEER Ice Road *2008/2009
	National Petroleum Reserve Alaska

N

0 1.25 2.5 5
Miles

SCALE: 1:250,000

Projection: Alaska Albers
 Equal Area Conic, NAD 1983

Get rid of those air boats and get those four-strokers with jets. Conoco [owns the boats]. Just like the one over here. They're silver, they're just flat bottom boats. (SRB&A Nuiqsut Interview March 2009)

EXISTING MITIGATION OF IMPACTS

Respondents provided comments regarding the success of existing mitigation programs in place to limit impacts on caribou hunting. Harvester perceptions of the institutions that are currently mitigating impacts on subsistence are varied. Respondents provided 30 observations regarding existing programs that help lessen impacts. Of these 30 observations, 24 identified fuel vouchers as helping to lessen impacts (Table 30). Residents attributed these programs to the City of Nuiqsut and/or Conoco Phillips or Pioneer, in 21 of the 32 observations (Table 31).

Table 30: Harvester Perceptions of What is Lessening Impacts, Nuiqsut, 2008

What Lessened Impacts	Number of Observations
Fuel Vouchers	24
Cash	2
Communication of problems with Corporation	1
Impact fund	1
Local hiring practices	1
Search and Rescue	1
Total Observations	30

Stephen R. Braund & Associates, 2010.

Table 31: Harvester Perceptions of Who is Lessening Impacts, Nuiqsut, 2008

Who Lessened Impacts	Number of Observations
City of Nuiqsut	10
Conoco Phillips	7
Pioneer	4
Kuukpik Corporation	3
Citgo	1
Alpine	1
ENI	1
Native Village of Nuiqsut	1
Local Individuals	1
North Slope Borough	1
Oil Companies	1
Fuel Vouchers	1
Total Observations	32

Stephen R. Braund & Associates, 2010.

Harvesters commented positively on the past fuel voucher program, in its ability to mitigate impacts, although some added that more help is needed to fund their fuel costs incurred for having to travel further due to caribou displacement. Respondents provided the following descriptions of the fuel voucher program:

Well, the impact funds started helping us with the fuel, we're getting fuel vouchers. I'm not sure, Conoco I think. Only help we got out of them. More vouchers will certainly help these outrageous gas prices. (SRB&A Nuiqsut Interview March 2009)

Impact mitigation funds from Pioneer and Conoco Phillips. That helps because if the helicopters scare our caribou further from here, like to Fish Creek, then that helps to go out there. We can get fuel vouchers from that impact fund, and once or twice a year they will give out a small check to the household, but you have to be an active subsistence household, not just any household; like the elders aren't active, but they have people hunt for them. (SRB&A Nuiqsut Interview March 2009)

[The fuel vouchers] was only supposed to be the people who weren't working who could get fuel, but some got them even though they were working and had jobs. That worked out pretty well. Twenty gallon limit. Three to four times a month. You could pick it up and then the next week or the next two weeks you could pick it up. We haven't got that this year [2009]. (SRB&A Nuiqsut Interview March 2009)

As indicated in the above quote and in quotes below, some individuals stated that the fuel vouchers were not currently available and that the program had been shut down. Others' comments suggest that the fuel voucher program is ongoing. Several respondents indicated that the existing mitigation is not adequate or is being misused and needs to be improved:

They need to beef up their mitigation, because we have a, when you have a village of almost 500 and there's 104 households and they compete to get the fuel vouchers, it's not enough to cover your subsistence activities for the whole year. That's part of the Conoco mitigation measures, and the city administers that program. Like the mitigation fund they initiated is nickels and dimes. (SRB&A Nuiqsut Interview March 2009)

Using the vouchers isn't enough. If you're gonna divert our caribou, that 10 gallons of gas ain't gonna get us there. We're gonna go further out, got to spend more money on gas. Mitigation hasn't done nothing, since they're gonna divert our caribou further south. That's from the oil company mitigation, from the city [City of Nuiqsut]. Some of these mitigations are being misused. Given to non-hunters around here. They want to gas up their vehicle, not go out there [hunting]. Go to City and write where you're going and what game you're going for. Some of the non-hunters mistreat it. Last year they shut it down cause there was misuse. (SRB&A Nuiqsut Interview March 2009)

One harvester commented about misuse in the program as follows:

Well, like what my brother told you guys, it's being misused. They haven't given out any fuel vouchers out since 2005 or 2006 [stopped because of misuse]. (SRB&A Nuiqsut Interview March 2009)

In addition to the mitigation programs identified by Nuiqsut respondents, CPAI has implemented various other mitigation programs to help lessen impacts on subsistence for local residents. These include a yearly mitigation fund (discussed above); hiring local Subsistence Representatives (SRs) to monitor exploration ice road and drilling activities and recommend ways to avoid impacts to subsistence; providing free natural gas from Alpine to the community of Nuiqsut; and the

implementation of local hire initiatives including a program entitled Career Quest, an intern program, and local hire incentives for contractors.

A number of CPAI's mitigation actions were implemented in response to local residents' concerns or knowledge about the local environment. For example, CPAI responded to residents' concerns about the shiny coating on pipelines affecting caribou movement by installing pipelines with dull coatings. In response to residents' concerns during permitting of the Meltwater Project, CPAI now installs pipelines at a minimum of seven feet above the tundra. Other actions taken by CPAI in response to local traditional knowledge include installation of rounded, rather than square, gravel pads at CD4, and fencing around the CD4 pad to deter caribou from lingering around the pad during the summer migration months.

CHANGES THROUGH TIME

Although the purpose of the Nuiqsut Caribou Monitoring Project is to monitor changes in and impacts on caribou subsistence hunting activities related to the Alpine satellite development, it is helpful to view current trends in the context of historic and long-term trends. To address this, the Nuiqsut caribou panel suggested that the study team conduct an Elders' Workshop about caribou. Although the current community of Nuiqsut was formed in 1973, many elders living today were born in or lived in the Nuiqsut region (including Nigliq Channel, Oliktok Point, and Foggy Island) prior to the 1970s resettlement, and thus have long-term knowledge of the environment, climate, land, and animals in the area, including traditional knowledge passed on to them by their elders.

Although the study team did not successfully schedule the Elders' Workshop during the 2009 study year, researchers did conduct individual interviews with several Nuiqsut elders. The topics of these interviews included past hunting and harvesting methods, caribou migration patterns over time, and impacts of oil and gas development on caribou over time. This section presents the information gathered from the elders during these interviews. Additional information from Nuiqsut elders will be included in future reports as it is gathered. A translator was present for the majority of the interviews, and therefore some quotes appear in the third person.

Traditional Uses of Caribou

One elder provided a detailed description of the various uses and preparations of caribou for food, clothing, shelter, and art. She noted that caribou was, and is, a primary subsistence resource for Nuiqsut people, saying, "Everything was caribou. That was their main thing, the caribou was their clothing...caribou, seal, bearded seal, and polar bear skin, caribou blanket" (SRB&A Nuiqsut Interview March 2009). She went on to describe, in further detail, the many traditional uses of caribou:

We use them for the tent outside, to make it warm. And we use them for mattress. Clothing, the legs, mukluks, and make a mitten. Take their skin and put it water, to make skin masks. They take all the skin off. You could use it for when you make mukluks. [Tendons] for the string for the mukluks. The caribou is used everything for parka, for winter, make Eskimo coveralls.... We are ready to get the fur for the parka after August 15. Those we get in August, they are fat, we make ice cream. Agutuq. We always eat everything...bone, we cut up for the stew, we don't throw them [away]. When a caribou is no good, we checking on its liver. We like those bugs [found in caribou], we eat them when they are moving, when we were small. Then we boil them. When they getting big, it's good. You could boil them and eat them. We eat anything, even stomach. We eat that. We use that [stomach] for the vegetables. They ate that thing first, in the winter time they cover the caribou and cut it up and the stomach they save it and eat all of them [stored vegetation in the caribou stomach to eat during the winter]. That was long time ago when

there were no stores. We don't throw anything [away], bone we cut up and the dogs will eat the bone. Even the feet, we cut them right here and put them in summertime in the pond. Keep them there for a while and after they age they eat them. They put it in a pond for two months and then we eat the feet. (SRB&A Nuiqsut Interview March 2009)

Traditional Hunting Areas and Methods

Several elders described hunting caribou while growing up in the region near the current site of Nuiqsut on Nigliq Channel. They also discussed their hunting activities since Nuiqsut was resettled in 1973. Respondents most commonly described hunting caribou along the Nigliq Channel and indicated that caribou regularly and predictably migrated through the Colville River delta during the summer months. Describing past caribou hunting, one elder said, "Everywhere is caribou; they're not bothered" (SRB&A Nuiqsut Interview March 2009). However, she went on to describe recent changes to their traditional hunting area along Nigliq Channel:

Right now it is hard to get caribou here. They going to up there, the mountains. [Translator] When they first come [to Nuiqsut], they were all over this area, they roam over there by the village. Nowadays they hardly in this area because of the pipelines. Hardly catch any caribou in this area. The pipeline has diverted the caribou. (SRB&A Nuiqsut Interview March 2009)

Another elder observed,

Just in here, hunt mostly in that area [Nigliq Channel] before. Up and down there. Yeah, they have to go farther [now], only place to go. They'd be all around here briefly, but when [the caribou] moved, [the hunters] had to change, because they had to go Fish Creek and along this area to hunt now, on the west side, along the coastline or up in the Fish Creek area. (SRB&A Nuiqsut Interview March 2009)

That's where we used to go [hunting], from Nigliq. Used to have tuttus hang around there, where Alpine is. We used to hunt tuttu where the Alpine is. (SRB&A Nuiqsut Interview March 2009)

The timing of the caribou hunt, as described by elders, was similar to the present day. One elder recalled that they usually harvested one caribou in June, but preferred to harvest the majority of their caribou in August, when they were fat:

We don't hunt caribou until.... We gotta get one in June. We gotta wait until August, they are skinny [before August]. Before they come in July, take one caribou. In August, we go hunting for winter. Sometimes we get five caribou, cut them, put them away.... Those days they didn't have no fridge, nothing. Had to take it to the ground level, permafrost and store them down there in ice cellars. We hunt in August and September only. But there's October, we don't hunt those. They try to get as much as they can before rutting season. (SRB&A Nuiqsut Interview March 2009)

Changes in Caribou over Time

Elders discussed changes that they have observed in caribou over time. In particular, they described changes in caribou migration, quality, and abundance. Many of these changes were reported to have occurred as a result of oil and gas development.

Migration

Several elders identified and described the locations of past and present caribou migration routes. Although they stressed that the routes they identified were not exact and that the caribou migration varies from year to year, the elders noted some general patterns in the movement of caribou. According to their descriptions, the Teshekpuk Herd migrates along the coast west of Nuiqsut during the summer and fall months, arriving west of the community and then heading south along the Colville River toward the Brooks Range. The Central caribou herd arrives from the east around the same time. In September and October, some caribou from the west (Teshekpuk Herd) and east (Central and Porcupine herds) mingle in an area west of the community toward Fish Creek and Ocean Point before heading south for the winter. Some caribou remain in the area all winter long. The elders believe that the Central Herd migration has changed due to interference from pipelines, and they pointed out several areas on the Colville River delta, including a place called *Pisiktaġvik*, where they used to cross. The elder respondents commented that the shine from the pipelines deflects caribou, and suggested that the oil companies should dull or paint the surface of the pipelines to mitigate this impact. As one individual described, “The pipeline is so shiny that they come to it and start to cross it, the glare in that pipeline took the caribou away from migration” (SRB&A Nuiqsut Interview March 2009).

The elders provided the following descriptions of caribou migrations and impacts on caribou migrations:

He knows that Teshekpuk has never changed much, they still go on the migration of their past. Central Herd is same general area, but changed slightly, because low water happened and some pipeline in Meltwater. Can't come across it, and that's why it's up, caribou can't cross to the other side. They go around the pipeline. Some of them [pipelines] are real low. Make sure they are seven feet [tall]. The older ones are those ones deflecting the caribou [new pipes are better, taller]. (SRB&A Nuiqsut Interview March 2009)

I never seen a real lot of caribou. Back then we used to have a lot. There'd be a lot more caribou in this area than compared to the west, Teshekpuk Herd. When they'd migrate there'd be more. In the 50s there's lots of caribou used to cross right down there, in the summer time. Never do that anymore, hardly. They start CD3 and Alpine, but that Tamayyak River used to have lots and lots of caribou but hardly any more. CD3, the people told Alpine, there's hardly any here. There used to be a lot of caribou that migrate right here, they don't do that anymore [by the coast]. (SRB&A Nuiqsut Interview March 2009)

When the caribou from the Central come through here they go this way, but after they start build pipeline they stopped going to this area. Pisiktaġvik, this whole sandbar, this whole island. But now with pipelines they don't come there no more. There used to be a lot of caribou on the west side, following the coast lines. Went right along here by Nanuk, CD4, used to go through there all the time but not now. It changed their migration. We were in Fish Creek, making fish and tuttu try to take for winter and then they start coming in August from Teshekpuk. Going to... Heading up north from there. To the mountains. Pretty soon they gonna come, maybe next month. May, June, they start heading back up. The start heading from the mountains. They start coming in May, June, July. They used to cross there. (SRB&A Nuiqsut Interview March 2009)

Teshekpuk go up this way. This side of the Colville. The Central Herd go back [along Itkillik River]. And start migrating up to the mountains from this area. September, October. In the spring time they [Central Herd] always go down [toward Nuiqsut]. (SRB&A Nuiqsut Interview March 2009)

Yeah, they still come through here on this area [west]. This side of the channel. And they cross straight down to the ocean. Porcupine Herd and Teshekpuk Herd come together in this area and mingle, then go their separate ways. (SRB&A Nuiqsut Interview March 2009)

As indicated above, these respondents also mentioned that the Porcupine Herd used to travel to the area from the east, but observed that their migration routes have changed in recent years due to diversion from pipelines:

The Porcupine Herd that comes from Canada through here, when the pipeline, when it went all the way to the Meltwater, when they build that pipeline to Alpine, they stopped seeing them. Oliktok, to Meltwater. (SRB&A Nuiqsut Interview March 2009)

One elder expressed concern that the pipelines east of the community have affected caribou calving areas, indicating that some caribou no longer travel to the Teshekpuk area to calve, as they traditionally have. He went on to describe the effects of pipelines on caribou migration from the east and access to insect relief areas on the coast:

There's a lot of changes. There's too much pipeline on that other side [east]. They're starting to have their young on that side. Usually had them down toward Teshekpuk. Yeah, over here on this side, cause of this pipeline they couldn't go. I seen quite a few in that area.... They been impacted by the oil companies, yes, true.... No caribou from the east. You gotta keep telling them there's no caribou from the east in Nuiqsut anymore. When me and my buddies used to catch them, the ones from the east and west joined together and come up. They meet and start going up. By Nechelik, right close and they start going up. Yeah, quire a few [come from west]. In the mosquito harassment area here [on the coast east of Colville], they got closed out by the pipeline. They should put an easement, about a half mile, to let them cross. I seen some turned back, about 100, back by that pipeline from Meltwater. They stay by Prudhoe nowadays. That Meltwater pipeline. When they first put this pipeline, the shine from that, they seen it and started running around back. (SRB&A Nuiqsut Interview March 2009)

This elder also commented that the pipelines cause the caribou to stop and scatter, rather than continuing on their migratory route and remaining as one herd. He described,

Once they get corralled by the pipeline they just stay there. They go some place, I don't know where. They don't bunch, they scattered all over. That's what they need, an easement along the coast. Sometimes they come through [to the west]. But that pipeline, I see quite a few turn. Maybe they go around it nowadays or not. And the flash from that pipeline, that galvanized thing, will turn them back, too. Put a dull finish on it. (SRB&A Nuiqsut Interview March 2009)

In addition to impacts from pipelines, the elder respondents described experiencing or observing impacts related to traffic, such as helicopter, plane, and boat traffic. They indicated that the noise from traffic causes the caribou to act skittish or “spooked.”

Plenty [of traffic]. Especially those boats with loud noise. Go through my allotment every summer. Really loud, you can hear them from a distance. Airplane, helicopter fly everyday. Even small planes, sometimes. Summer, in summer, mostly always fly. They always go through towards Fish Creek, land by my allotment, helicopters down there. Every summer, in July, June. I never see much in August, I always go up river moose hunting. They got three of them [airboats]. They can go through the shallow water. Lots of noise. Some of them get spooky. That noise is no good for an animal. Yeah, when some

of the caribou get spooked, they run off. When they get spooked they just start running away. (SRB&A Nuiqsut Interview March 2009)

We stay in Fish Creek for the month, preparing food for winter. Little plane was back and forth. We try to go get that tuttu, we can't, there's a plane right there. (SRB&A Nuiqsut Interview March 2009)

I heard they are always counting the caribou through helicopters. One time before Alpine had happened, they did a lot of caribou stuff by "Piniqtuk" and they noticed they used chopper and planes to scoot them away from the area where they planned to build Alpine. Then they say helicopters don't interfere with the migration. I think they always be together when they start coming in, the main herd that stay together. Then one lone caribou [makes it near Nuiqsut]. We always wait long time for caribou. Then July we're hungry because we got one in June, waiting for August. How we gonna get the meat from the store, it's expensive? \$16 a steak. (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that CPAI does not try to herd or move caribou.

Implication for future monitoring program: Include in the future scope of work a description of CPAI wildlife management policies. Include a work session to understand how harvesters may perceive actions to be herding caribou.

In addition to the route of the migration, the elders noted that the timing of the caribou migration into the area has also changed somewhat, with two saying,

Porcupine Herd that comes to Kuparuk, they changed from there and some of these in Central and Teshekpuk are slightly changed in timing, July most of them are on the coastline. There were times in July that all the caribou were on the coastline until August-September. (SRB&A Nuiqsut Interview March 2009)

They start to come in late, they used to come in early, now they start to come in late. Right now, there's nothing there and Teshekpuk stay around there most of the time. We can't get any caribou around here, there's the pipeline and Kuparuk [even if the caribou were there]. This is the caribou area. Nowadays they gonna get the caribou [south]. (SRB&A Nuiqsut Interview March 2009)

Quality

The elders provided comments on the quality of the caribou, and noted some changes or patterns in the amount of fat on the caribou and in the taste of the caribou. The elders have observed that the caribou are fat or skinny often depending on where they are located. Caribou from the Porcupine Herd, for example, are skinny after traveling such long distances. The amount of fat on the caribou also depends on the timing of the year. Two elders described,

The ones from Porcupine Herd travel a long distance. They travel constantly, compared to the ones that stay around here. They get more fatter here, compared to that Porcupine Herd that has to travel further. (SRB&A Nuiqsut Interview March 2009)

The Teshekpuk Herd that went over there would always be skinnier. But the ones from up river where there's less snow would be fatter [not as much digging]. There's caribou feeding in the high plains, Ocean Point area. (SRB&A Nuiqsut Interview March 2009)

One elder observed that the caribou have been getting fat later in the summer, saying, “In the old days, they got fat in July. They are late to get fat these days.” He indicated that the fat is approximately two inches thick in July, whereas it used to be approximately four inches thick.

The elders also observed differences and changes in the taste of caribou. Several commented that caribou harvested west of the community, near Atqasuk and Wainwright, taste better than the caribou harvested near Nuiqsut. One of these elders indicated that this started occurring within the last 10 years. These elders believe that contamination related to development affects the taste of the caribou. The following are descriptions of changes and variations in the taste of caribou:

Yeah, some of them, I don't even feel like eating sometimes when I get one like that. Tastes different, even if it's fat. I don't know why it tastes different, can't figure out why they taste like that. Because good caribou taste real good to eat. It's been how many years now, five, six years? They'll be fat, but taste different. They could notice it and can't even eat it. Once you get it from this west side the caribou are good and more tastier. Even from the right they taste good. Some of them taste good around here. The ones close to the bank and stuff eat some of the stuff that's been polluted and they are different from one caught on the west side. When I have some caribou from Wainwright they taste good. Around here, that area, right around here. A couple years ago the two he had, one from here and one around there, taste different, could hardly eat them. (SRB&A Nuiqsut Interview March 2009)

The one coming from the west is real tasty but the ones staying around here change. The ones that be staying around here is [not good]. There's no pipeline, no anything [in Atqasuk]. There's nothing around, so the caribou are really tasty and heathy. (SRB&A Nuiqsut Interview March 2009)

One elder commented that the incidence of sick caribou has increased since Alpine development began, saying,

When they get caribou that are sick they leave it alone. Give it to eagle. They used to get some sick caribou, but they mostly showed up after Alpine. Some of them got sore right there, inside the joints, can't move. Some of them caribou, in the bone marrow they have yellow pus, are sick. (SRB&A Nuiqsut Interview March 2009)

In addition, concerns remain about contamination from Umiat, a former military site. One elder commented that many of the changes in caribou can be traced back to that contamination. She observed

One drum diesel, five gallon motor gas, they were floating down the river. Some changes in the 40s and 50s, there were lots [of changes] from the Navy explorations. Some of the buoys were left behind before they clean up that area. The caribou changed, and everything changed with the caribou. Notice that, I trace changes back to that. That's what I know happened. From Umiat. I think it was 15 years ago [drums floating down the river]. They been cleaning up slowly, but they're still out there. (SRB&A Nuiqsut Interview March 2009)

HARVESTER ADDITIONAL OBSERVATIONS

At the end of each interview, researchers gave respondents the opportunity to discuss any additional concerns related to subsistence. In many cases, respondents further discussed concerns about impacts on caribou related to oil and gas development. In addition, residents discussed concerns about the future expansion of oil and gas development in the Nuiqsut area, other impacts related to oil and gas

development, other subsistence resources, the need for adequate mitigation, and the effectiveness of the Nuiqsut Caribou Monitoring Project. Residents' comments are provided below under the above topics.

Future Oil and Gas Development

The only biggest concerns we're gonna have is CD5 – what's going to happen? How are the caribou going to be affected and how are the locals going to have access, and how can we make some changes so that we can work together for us to be able to harvest caribou? (SRB&A Nuiqsut Interview March 2009)

And then we have oil companies that are exploring south of us. Anadarko is in Anaktuvuk and Chandler [rivers]. When they start doing that exploration, what is going to happen to all those caribou? The more pipelines that they build, the more they are going to change their routes. (SRB&A Nuiqsut Interview March 2009)

What about the caribou that never come through Colville last summer? Why didn't they come? Too many pipelines to cross. You have more pipelines being built. We didn't have to see that in the past. We could call to Oliktok and there would be an abundance of caribou. But today we don't see that. How is the future of our children and our grandchildren going to survive? With the BLM [Bureau of Land Management] leasing all their land to the oil companies. And now it's going to happen in the west, like Wainwright and Point Lay, how are they going to be affected once those come through? (SRB&A Nuiqsut Interview March 2009)

And now that the oil rig is down here at Ocean Point I am pretty sure they are going to change their routes. Probably going to be permanent. They talk about putting two wells right there. Right where I got my moose. I was disappointed when I heard they were going there. I said 'you are going where?' (SRB&A Nuiqsut Interview March 2009)

CPAI reviewers noted that CPAI does not have any rigs in the Ocean Point area.

Implication for future monitoring program: Include in the harvester observation interview maps showing the location of CPAI infrastructure and activities.

I didn't say rolligons, but all the camps showing up more [to the] west are a problem. Because at some point I'll come over here with a snowmachine, but not last year. There's more and more pads starting to be built on this side. Probably the bridge, that Nigliq crossing. That's about it for me. (SRB&A Nuiqsut Interview March 2009)

Need for Adequate Mitigation

My concern would be seasonally, we mostly have seasonal [activity], they just do it in the summer, how come they don't do it in winter, not just on land but oceanside? Planes, choppers, stuff like that. Why don't they study during the winter, too? (SRB&A Nuiqsut Interview March 2009)

Well, the wildlife, I think it's just the timing of the studies, the month of the studies has an impact. In the summer. Even the wildfowl notice, starting in May that's when they're really active doing their studies and that's a prime time when our local folks are trying to

harvest their meat and they're being interfered by their summer activities. That's what it is. Just the changing of the pattern of their studies. (SRB&A Nuiqsut Interview March 2009)

And how can we lessen the air traffics to make it so the caribou can travel their original route. And how can we make it so the caribous in the east side can come back? What are the aircrafts doing without us knowing? We haven't seen the massive herd coming out way because they don't tell us what goes on, and the only thing we see is what goes on in our area. How can we work together with this Alpine and how can we allow them to do their exercise [without hurting caribou] what can we do to minimize that? (SRB&A Nuiqsut Interview March 2009)

When Stephen [Braund] came in saying that he's going to do the caribou study, not Conoco Phillips, and now he's going to tell what we did with the community and the elder's concerns. And if they have concerns, how can we let the oil companies understand that we need to have access to this area and we can't travel? (SRB&A Nuiqsut Interview March 2009)

But this is my area of interest. And Conoco Phillips is in the process of building a bridge, and Kuukpik is supporting that and the community is opposed. And Conoco Phillips did the 40 miles radius study of the wildlife, and within that how much have they studied? (SRB&A Nuiqsut Interview March 2009)

CPAI Caribou Monitoring Study

I think that what Stephen [Braund] does is need to come up during the summer. Observe. If he has enough staff. Once after the spring break up they will be flying, right through the duration. We would like for Stephen Braund to see himself. To help us observe. I got a friend who is a marine biologist and I come and observe the caribou. And how is Stephen Braund going to make this work to satisfy the community and the oil company? There are hundreds of different stories about this area. You might hear the same story 100 times, but someone will tell you what they observe. I have been always in this area since 1973, my lifetime, and I travel and now I teach my son and my nephews. When you kill a caribou there is no wanton waste, some like to shoot for target practice. But I teach that if you get that caribou then you go and butcher it. The only ones that are wanton waste are the sick. Sometimes we call wildlife in Barrow to see if they are edible and sometimes they are not. You need to come during the summer and see which way the caribou are heading. Are they heading their original route or are they heading a different way? I'll be out there boating a lot in the summer time. (SRB&A Nuiqsut Interview March 2009)

Impacts on Caribou

Every day and every year, I've interpreted for so many oil companies. They have spoken all the time so much because of these lease sales. The community depends on the caribou. Just like in Anaktuvuk right now, they are hurting for caribou. After fall, after winter, the caribou never did come through. Instead of coming east [Teshukpuk Herd] they are going west, near Atqasuk. I've been out, we drive out. All the way to Chandler with my son and we don't see any caribou. We see a lot of dead caribou. They are sick because there is so much wolves in that area. And then there was a wolverine that got one. And I was surprised to see that a wolverine kill a caribou. I think the wolves are hunting the moose now, too. But this [Nigliq] channel is our biggest concern. So we are fighting the

companies and the corporations. I observe all the hunters, what they get, how were their caribous. I ask them what they're like. They say that some are skinny, some are not that good. (SRB&A Nuiqsut Interview March 2009)

I would like to find out which way the Porcupine Herd goes. As for the Western Herd it really hasn't changed and they come from west of here and if they start activity west of here.... And you can see the lights west of here. Like Grandview, Pioneer, and Midway. That only goes on in the winter time and it is pretty quiet in the summertime. Oh, it has been about since before Alpine [the last time we saw the Porcupine Herd]. I remember in the 80s we go just to the Colville. On the main Colville a lot of guys go to the Colville River and wait for the Porcupine Herd to cross. And there would always be one herd that would break the trail and we always told to leave them alone and let them go through and get the ones that follow. (SRB&A Nuiqsut Interview March 2009)

IMPLICATIONS OF HUNTER OBSERVATIONS FOR ADDITIONAL MONITORING COMPONENTS

An important function of the report is to identify additional data monitoring components most relevant to developing a common understanding of these impacts. We noted in the report where year one study results prompted industry review comments that can be best addressed by adding monitoring components in future years. This section of the report consolidates recommendations for future monitoring components (Table 32).

Table 32: Issues Raised in Year One Report Having Implications for Year Two Monitoring Program

Monitoring Challenge	Suggested Monitoring Action
Differentiating Alpine impacts from other development impacts	Show CPAI activities and infrastructure over time on maps used in hunter interviews.
Conflicting data on caribou impacts	SRB&A will provide caribou location data and harvest data to hunters. SRB&A will also set up a work session between ADF&G, NSB, or ABR, Inc. biologists and local hunters to discuss differing observations of impacts on caribou.
Differing beliefs on relationship of development activities and abnormalities in caribou	As noted above, SRB&A will set up a work session between ADF&G, NSB, or ABR, Inc. biologists and local hunters to discuss differing observations of impacts on caribou.
Differentiating CPAI-related aircraft impacts from other aircraft impacts	SRB&A will show CPAI activities and infrastructure over time on maps used in hunter interviews. CPAI will provide observable aircraft characteristics to SRB&A and will implement a plan with KSOPI to disseminate aircraft related information (e.g., the timing and location of aircraft activities) to the community.
Differentiating hunter impact observations associated with CPAI from other impact observations	SRB&A will include in the hunter interview protocol a means of highlighting observations that occurred in the CPAI study area and observations directly related to CPAI activities.

Monitoring Challenge	Suggested Monitoring Action
Differing beliefs about CPAI hunting policies and actions	CPAI will provide documentation of past and current policies and safety procedures, highlighting those used by CPAI, to SRB&A. CPAI will implement a work session with hunters and security staff to come up with a consensus description of the situation and possible mitigation and/or monitoring actions
Differing observations of pipes without dull coating	CPAI will implement a work session discussing the mitigation measures that CPAI has implemented as a result of Nuiqsut concerns.
Differing understanding of mitigation actions	As discussed above, CPAI will implement a work session discussing the mitigation measures that CPAI has implemented as a result of Nuiqsut concerns.
Differing beliefs about CPAI-related aircraft treatment of caribou	CPAI will implement a work session to understand how harvesters may perceive actions to be herding caribou. Provide a method of harvester - CPAI exchange of information.

Stephen R. Braund & Associates, 2010.

TESHEKPUK AND CENTRAL ARCTIC HERD TRENDS (CONTRIBUTED BY ABR)

The Alpine Satellite Development Plan (ASDP) study area (Map 18), which is centered on the Colville River delta (within a 30-mile radius around the CD-4 pad), is used at various times of the year by two neighboring herds of caribou (*Rangifer tarandus*)—the Teshekpuk Herd (TH) and the Central Arctic Herd (CAH). Based on extensive radio-tracking by the Alaska Department of Fish and Game (ADFG) and others since the late 1970s and early 1980s, the TH generally ranges to the west and the CAH to the east of the Colville River delta, but caribou from both herds use the delta occasionally, primarily in summer (Lawhead et al. 2009). In addition to radio-tracking studies using VHF, satellite, and GPS collars, these herds have been the focus of many aerial transect surveys in the last 25 years. The other two herds that inhabit Alaska north of the Brooks Range — the Western Arctic Herd (WAH) and Porcupine Herd (PH) — have not been recorded in the ASDP study area. The WAH normally ranges well to the southwest, migrating to and from western Alaska south of the Brooks Range, and the PH spends the year far to the east, migrating to and from the Yukon in Canada.

The TH generally remains on the coastal plain year-round. The area of most concentrated calving is located consistently around Teshekpuk Lake and the primary area used for relief from insect harassment in midsummer is the swath of land between Teshekpuk Lake and the Beaufort Sea coast (Prichard and Murphy 2004, Carroll et al. 2005, Person et al. 2007). Most TH caribou winter on the coastal plain, although the specific areas used vary widely from year to year and some TH caribou occasionally (most notably in 1990–1991 and 2008–2009) overwinter south of the Brooks Range with the Western Arctic Herd (WAH) (Philo et al. 1993, Prichard and Murphy 2004, Carroll et al. 2005, Carroll 2007, Person et al. 2007). In recent years, a substantial portion of the TH also has wintered in areas outside the previous range of the herd, from far east in the Arctic National Wildlife Refuge (ANWR) in 2003–2004 (Carroll et al. 2004, Carroll 2007) to southeast in the winter range of the CAH since 2004–2005 (Carroll 2007; Lenart 2007; Lawhead et al. 2007, 2008).

152°00'W

150°00'W

BEAUFORT SEA

Cape Halkett

Thetis Island

Kogru Bay

Atigaru Pt.

Oliktok Pt.

70°30'0"N

70°30'0"N

CD 3

CD 2

CD 1

CD 5

CD 4

CD 6

CD 7

Nuiqsut

Kuparuk

70°0'0"N

70°0'0"N

Sentinel Hill

Caribou Study Area - 30 Mile Diameter From CD 4

69°30'0"N

69°30'0"N

Judy Creek

Fish Creek

Harrison Bay

Kogru Bay

Colville River

Kuparuk River

White Hills

Itkillik River

Anaktuvuk River

Chandler River

Colville River

Kogosukruk River

Kikiarorak River

Judy Creek

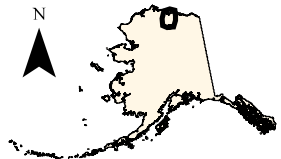
Umiat

69°30'0"N

69°30'0"N

69°0'0"N

69°0'0"N



Map 18 - Alpine Satellite Development Plan ABR, Inc. Caribou Study Area

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 40 individuals during March and April of 2009.

0 5 10 20
Miles

SCALE: 1:1,000,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Pipeline
- CPAI Road
- CPAI Ice Road *2008/2009
- CPAI Rolligon Trail

Other Infrastructure

- ENI Ice Road *2008/2009
- PIONEER Ice Road *2008/2009
- National Petroleum Reserve Alaska

152°00'W

150°00'W

Caribou movements often are unpredictable, except for broad seasonal patterns, and it is not uncommon for herds that are increasing in size to shift their range use into marginal areas as they grow larger (Hemming 1971). The TH increased substantially in size since the late 1970s and early 1980s, when it was estimated at 3,000–4,000 animals in (Carroll 2007). Subsequent censuses produced estimates of 11,822 caribou in 1984; 13,406 in 1985; 16,649 in 1989; and 27,686 in 1993 (Carroll 2007). The TH experienced a dip in numbers in the early/mid-1990s similar to that seen in the neighboring CAH, but increased steadily from 25,076 animals since 1995, reaching at least 28,627 animals in 1999, 45,166 animals in July 2002 (Carroll 2007), and 64,106 caribou on the most recent photocensus in July 2008 (L. Parrett, ADFG, pers. comm.), the greatest size yet recorded for the TH.

The CAH is the primary herd using the oilfield region on the central coastal plain. From the early 1970s to 2002, the CAH grew at an overall rate of 7% per year. The herd grew rapidly from about 5,000 animals in the mid-1970s to the early 1990s, reaching a count of 23,444 caribou in July 1992 before declining 23% to 18,093 caribou in July 1995 (Lenart 2009). The herd has increased since then, reaching 19,730 animals in July 1997, 27,128 animals in July 2000, and 31,857 animals in July 2002 (Lenart 2009). The most recent photocensus was conducted in July 2008 by ADFG, producing an estimate of 66,772 caribou, the greatest size yet recorded for this herd (Lenart 2009) and representing a 13% average annual rate of increase since 2002. Concentrated calving activity by the CAH tends to occur in two areas of the coastal plain, one located south and southwest of the Kuparuk oilfield and the other east of the Sagavanirktok River (Wolfe 2000, Arthur and Del Vecchio 2007, Lawhead and Prichard 2009). The CAH typically moves to the Beaufort Sea coast during periods of mosquito harassment (White et al. 1975, Dau 1986, Lawhead 1988). In recent years the majority of the CAH has wintered south of the Brooks Range, generally east of the Trans-Alaska Pipeline (Arthur and Del Vecchio 2007, Lenart 2009) and summer movements since about 2003 have extended much farther east than in the previous two decades, with some CAH animals traveling far east on the coastal plain of the Arctic National Wildlife Refuge (Lawhead et al. 2009, Lenart 2009).

SUMMARY

The Year One Caribou Monitoring Program focused on hunter observations. The final Year One report also includes a summary of Teshekpuk and Central Arctic caribou herd trends contributed by ABR. The Teshekpuk Lake herd has grown from about 25,000 in the mid-1990s to over 60,000 in the early 2000s. Possibly related to this increase, a substantial portion of the Teshekpuk Lake herd has wintered outside its normal range. The Central Arctic herd has increased from about 5,000 in the 1970s to over 66,000 in the early 2000s. In recent years the majority of the Central Arctic Herd has wintered south of the Brooks Range, generally east of the Trans-Alaska and summer movements since about 2003 have extended much farther east than in the previous two decades, with some CAH animals traveling far east on the coastal plain of the Arctic National Wildlife Refuge.

Year one data collection for the Nuiqsut Caribou Monitoring Project has resulted in the documentation of residents' 2008 caribou hunting activities, harvester observations of change or abnormalities in observed and harvested caribou, and observations about impacts on caribou hunting activities. A majority of Nuiqsut harvesters indicated that one or more harvest activity variables in 2008 were different from recent years, a majority reported harvesting caribou with abnormalities in 2008, a majority reported changes in observed caribou in 2008, and a majority reported experiencing impacts on their caribou hunting related, in their view, to oil and gas development.

Although Nuiqsut respondents attributed changes in caribou hunting to various causes, the most prevalent causes cited by Nuiqsut harvesters were related to oil and gas development. In particular, local hunters noted that oil and gas infrastructure such as pipelines and disturbances from traffic such as airplanes, helicopters, and air boats, have affected the availability of caribou near Nuiqsut by changing caribou migration routes, making them more skittish and farther from riversides, and causing the herd to split up into smaller groups. As a result, local hunters reported having to take more hunting trips, staying out

longer, or traveling to different areas to harvest caribou. Just under 50 percent of Nuiqsut hunters reported that they did not harvest enough caribou in 2008.

Respondents offered various ideas for the mitigation of impacts on caribou hunting activities and believed that fuel vouchers, although not adequate to some harvesters, have already helped mitigate some of the impacts. Continuing the collection of yearly data on Nuiqsut caribou harvesting activities and observations will further allow for the measurement of changes in the locations and methods of residents' hunting and harvesting activities, in addition to the location and frequency of observations of caribou abnormalities and hunting impacts. Ongoing monitoring will provide a better understanding of the magnitude and nature of impacts related to CD4 and other Alpine Satellite Developments and will allow for the identification of potential mitigation to lessen impacts on Nuiqsut caribou hunters.

A review of the Year One Draft Monitoring Report by CPAI identified differing views held by hunters and CPAI staff on a number of impacts and mitigation activities. The revised report identifies actions that can be taken in future monitoring program activities.

REFERENCES

Arthur, S. M., and P. A. Del Vecchio

- 2007 Effects of oil field development on calf production and survival in the Central Arctic Herd. Interim research technical report, June 2001–March 2006. Federal Aid in Wildlife Restoration Project 3.46, Alaska Department of Fish and Game, Juneau. 40 pp.

Carroll, G.

- 2007 Game Management Unit 26A: Teshekpuk Herd. Pages 262–283 in P. Harper, editor. Caribou management report of survey and inventory activities, 1 July 2004–30 June 2006. Federal Aid in Wildlife Restoration Project 3.0, Alaska Department of Fish and Game, Juneau.

Carroll, G. M., L. S. Parrett, J. C. George, and D. A. Yokel

- 2005 Calving distribution of the Teshekpuk caribou herd, 1994–2003. *Rangifer*, Special Issue 16: 27–35.

Carroll, G. M., A. K. Prichard, R. S. Suydam, L. S. Parrett, and D. A. Yokel

- 2004 Unexpected movements of the Teshekpuk Caribou Herd. Presentation at the 10th North American Caribou Workshop, 4–6 May 2004, Girdwood, AK. [abstract]

Dau, J. R.

- 1986 Distribution and behavior of barren-ground caribou in relation to weather and parasitic insects. M.S. thesis, University of Alaska, Fairbanks. 149 pp.

Hemming, J.

- 1971 The distribution and movement patterns of caribou in Alaska. Wildlife Technical Bulletin No. 1, Alaska Department of Fish and Game, Juneau. 60 pp.

Johnson, J.

- 1990 *Selecting Ethnographic Informants*. Sage Publications, Inc. Newbury, California.

Lawhead, B. E.

- 1988 Distribution and movements of Central Arctic Herd caribou during the calving and insect seasons. Pages 8–13 in R. Cameron and J. Davis, editors. *Reproduction and calf survival: Proceedings of the Third North American Caribou Workshop*. Wildlife Technical Bulletin No. 8, Alaska Department of Fish and Game, Juneau.

Lawhead, B. E., and A. K. Prichard

- 2009 Mammal surveys in the Greater Kuparuk Area, northern Alaska, 2008. Report for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks. 38 pp.

Lawhead, B. E., A. K. Prichard, and M. J. Macander

- 2007 Caribou monitoring study for the Alpine Satellite Development Program, 2006. Second annual report for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks. 75 pp.

Lawhead, B. E., A. K. Prichard, and M. J. Macander

- 2008 Caribou monitoring study for the Alpine Satellite Development Program, 2007. Third annual report for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks. 89 pp.

Lawhead, B. E., A. K. Prichard, and M. J. Macander

- 2009 Caribou monitoring study for the Alpine Satellite Development Program, 2008. Fourth annual report for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks. 91 pp.

Lenart, E. A.

- 2007 GMU 26B and 26C: Central Arctic Herd. Pages 284–308 in P. Harper, editor. Caribou management report of survey and inventory activities, 1 July 2004–30 June 2006. Federal Aid in Wildlife Restoration Project 3.0, Alaska Department of Fish and Game, Juneau.

Lenart, E. A.

- 2009 (in press) GMU 26B and 26C: Central Arctic Herd. Pages XXX–XXX in P. Harper, editor. Caribou management report of survey and inventory activities, 1 July 2006–30 June 2008. Federal Aid in Wildlife Restoration Project 3.0, Alaska Department of Fish and Game, Juneau.

Person, B. T., A. K. Prichard, G. M. Carroll, D. A. Yokel, R. S. Suydam, and J. C. George

- 2007 Distribution and movements of the Teshekpuk Caribou Herd, 1990–2005: prior to oil and gas development. *Arctic* 60: 238–250.

Philo, L. M., G. M. Carroll, and D. A. Yokel

- 1993 Movements of caribou in the Teshekpuk Lake Herd as determined by satellite tracking, 1990–1993. Unpublished report, North Slope Borough Department of Wildlife Management, Barrow; Alaska Department of Fish and Game, Barrow; and U.S. Department of Interior, Bureau of Land Management, Fairbanks. 60 pp.

Prichard, A. K., and S. M. Murphy

- 2004 Analysis and mapping of satellite telemetry data for the Teshekpuk Caribou Herd, 1990–2002. Final report for North Slope.

Shepro, C.E., D.C. Maas, et al.

- 2003 North Slope Borough 2003 Economic Profile and Census Report. Barrow, Alaska, North Slope Borough, Department of Planning and Community Services. IX.

URS Corporation

- 2005 North Slope Borough Comprehensive Plan. Prepared for the North Slope Borough. Adopted by the North Slope Borough Assembly. Ordinance 75-6-48. October 11, 2005.

APPENDIX A: NUIQSUT CARIBOU MONITORING INFORMED CONSENT

Stephen R. Braund & Associates

P.O. Box 1480, Anchorage, Alaska 99510

907-276-8222 (Phone); 907-276-6117 (Fax)

srba@alaska.net

Nuiqsut Caribou Subsistence Monitoring Project

March-April 2009

Informed Consent Form

Description of the Study

Stephen R. Braund & Associates (SRB&A) has been contracted by ConocoPhillips Alaska, Inc. (CPAI) to conduct a caribou subsistence monitoring project in Nuiqsut. In their CD4 permit from the North Slope Borough (NSB), CPAI is required to conduct a subsistence study to monitor the impacts CD4 and other Alpine satellite developments may have on Nuiqsut subsistence hunting and harvesting. The purpose of the research is to evaluate the short and long term effects of CD4 and other CPAI satellite developments on the people of Nuiqsut. It is important that this analysis relies on current and accurate subsistence information from Nuiqsut caribou hunters. This project is designed to gather relevant subsistence use information as well as residents' observations and perceptions of changes to subsistence over time.

While in your community, we would like to interview knowledgeable subsistence harvesters about their caribou subsistence use during 2008. We would also like to gain information about changes in caribou use, abundance, health/quality, distribution, and migration and to document and analyze the experiences and thoughts of Nuiqsut residents about changes in subsistence harvest and use patterns as well as impacts to caribou hunting in 2008.

Risks and Benefits of Being in the Study

This study is intended to provide current and accurate information in order to monitor the impacts of CD4 and other Alpine satellite developments on Nuiqsut caribou subsistence use. As such, any relevant information that helps avoid, minimize or mitigate environmental impacts is likely to benefit those who live in the area potentially affected by oil and gas development or use resources from the area. With any project of this kind, there is no guarantee how the information will be used in the future.

Anonymity

Your name will not be used in our study without your permission. Some people wish to be acknowledged for participating in this kind of study. Others prefer that their names are not mentioned in publications and reports. The decision is entirely up to you. Please circle the appropriate answer below, above the signature line.

Confidentiality

Individual harvester information will remain confidential and will not be included in either the maps or report.

Voluntary Nature of the Study

Your decision to take part in the study is voluntary. You are free to choose not to take part in the study or to stop taking part at any time without any penalty to you.

Honoraria

SRB&A will pay honoraria to each participant who completes the entire interview.

Contacts and Questions

If you have questions, please contact Stephen Braund during the interview or workshop, or afterwards at 907-276-8222.

Statement of Consent

I understand the procedures described above. My questions have been answered to my satisfaction, and I agree to participate in this study.

My name **MAY** / **MAY NOT** be used in the project report (please circle one).

Signature & Date

Printed Name

**APPENDIX B: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE
HARVESTER INTERVIEW**

NUIQSUT CARIBOU MONITORING PROTOCOL

Date _____
 Respondent Name _____
 Respondent Birth date _____
 Birthplace _____
 Years in Community _____

SECTION A: CARIBOU HUNTING ACTIVITIES, 2008

1. Did you go caribou hunting in 2008? YES _____ NO _____ (IF NO, SKIP TO SECTION D)
2. Where did you hunt for caribou in 2008? (Draw caribou hunting areas on map)

FOR EACH CARIBOU HUNTING POLYGON, RECORD THE FOLLOWING INFORMATION ON THE MAP [CHECK BOX WHEN COMPLETE]:

	Months	Transportation Method(s)	Number of Trips	Duration of Trip(s) [Longest and typical]	Did you harvest caribou here? (Y/N)	Where? (Mark harvest locations)	How many caribou?	Harvest months (by harvest location)
POLY 1								
POLY 2								
POLY 3								
POLY 4								
POLY 5								

3. Was your hunting area different in 2008 from previous years? YES _____ NO _____
- 3a. [IF YES], HOW? _____

- 3b. [IF YES], WHY? _____

4. Was the number of hunting trips in 2008 typical of recent years? LESS _____ SAME _____ MORE _____
- 4a. [IF LESS OR MORE], WHY? _____

5. Was the duration of trips in 2008 typical of recent years? LESS _____ SAME _____ MORE _____
- 5a. [IF LESS OR MORE], WHY? _____

6. Were the months you hunted for and harvested caribou in 2008 typical of recent years? YES _____ NO _____
- 6a. [IF NO], HOW? _____

- 6B. [IF NO] WHY? _____

7. Was the number of caribou harvested in 2008 typical of recent years? LESS _____ SAME _____ MORE _____
- 7a. [IF LESS OR MORE], WHY? _____

8. Did your household harvest enough caribou in 2008 to meet your needs? YES _____ NO _____
- 8a. [IF NO], WHY? _____

SECTION B: ASSESSMENT OF HARVESTED CARIBOU, 2008

1. Thinking about the caribou you shot or harvested in 2008, did you notice any of the following?
(If none, Skip to Section C)

- _____ Abnormal health (e.g., disease/infection/color of meat)
- _____ Abnormal quality (e.g., taste, smell)
- _____ Abnormal size (e.g., fat content or overall size)
- _____ Abnormal quantity of parasites (flies)
- _____ Other abnormalities

2. For each type of abnormality, complete the following (Use additional sheets if necessary):

Type of Observation: _____ **Health** _____ **Quality** _____ **Size** _____ **Parasites** _____ **Other** _____

Please describe the abnormality: _____

Please describe why you think the abnormality occurred: _____

Approximately how many caribou were abnormal? _____

Where were these caribou harvested? [Record Harvest Location Points]: _____

Did you use these caribou? YES _____ NO _____

SECTION C: IMPACTS ON CARIBOU HUNTING, 2008

1. Please describe any impacts on your caribou hunting activities in 2008. These impacts could be related to development (such as oil and gas development), climate, competition, etc. [**RECORD LOCATIONS OF IMPACTS**]

2. Is there any way these impacts could have been lessened? YES _____ NO _____ [IF YES, DESCRIBE]: _____

3. Did you experience any of the following additional impacts on your caribou hunting activities in 2008?

	✓ if YES	Mark Location on Map (✓ if done)	Month(s)	Please describe [*For helicopter and plane traffic, collect data about color of aircraft and aircraft number, if possible]	Suggestions for Mitigation?
Helicopter traffic*					
Plane traffic*					
Other traffic					
Oil company personnel					
Man-made structures (e.g., pipelines) blocking access					
Regulations					
Other					

4. Were there any existing programs or mitigation in 2008 that helped lessen impacts on hunting? YES _____ NO _____
 [IF YES], Who? _____

[IF YES], Please Describe: _____

SECTION D: GENERAL ASSESSMENT OF CARIBOU, 2008

1. Thinking about the caribou you observed in 2008, please indicate if you noticed changes in any of the following:

	[✓ if Noticed Change]	[IF YES], Please Describe How	[IF YES], Please Describe Why
USE [e.g., methods of hunting, butchering, or preparing caribou]			
ABUNDANCE			
HEALTH/QUALITY			
DISTRIBUTION [Were they in the usual locations?]			
MIGRATION [Route/Timing]			

SECTION E: ADDITIONAL OBSERVATIONS

1. Do you have any additional comments or concerns regarding your subsistence activities in 2008?

APPENDIX C: 2008 NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY

2008 NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY

In its permit to ConocoPhillips for development of CD4, the North Slope Borough required that ConocoPhillips implement a subsistence monitoring program to measure the impacts of CD4 and other Alpine Satellite developments on Nuiqsut subsistence hunting and harvesting. Stephen R. Braund & Associates has been contracted to monitor Nuiqsut caribou harvests to fulfill this requirement. SRB&A is working with KSOPI, the NSB, and a panel of Nuiqsut caribou experts to implement the monitoring program. Part of this program is to record yearly harvests and uses of caribou by the community of Nuiqsut so that these harvests and uses can be compared over time. The NSB is assisting SRB&A with this effort. Your individual information will remain anonymous.

HH ID: _____ Person Responding to Survey (check one): _____ Head of HH _____ Other Adult HH member
 Interviewer: _____ Date: _____

Between January and December 2008....

1. Did you or anyone in your household use caribou (e.g., harvested, received, or utilized in the home)? _____ YES _____ NO
2. Did you or anyone in your household attempt to harvest caribou? _____ YES _____ NO (If NO, Skip to Q6)
3. Did you or anyone in your household successfully harvest caribou? _____ YES _____ NO (If NO, Skip to Q6)
4. How many caribou did your household harvest in 2008? _____
5. During which months did you harvest these caribou? (Try to record the number of harvests by month):

January	_____	July	_____
February	_____	August	_____
March	_____	September	_____
April	_____	October	_____
May	_____	November	_____
June	_____	December	_____
		Unknown	_____

6. Did you or anyone in your household give caribou to other households? _____ YES _____ NO
7. Did you or anyone in your household receive caribou from other households? _____ YES _____ NO
8. Did any development activity during the last year make your household's caribou hunting more difficult? _____ YES _____ NO

8a. (If YES) Please describe what happened: _____

[Continue notes on back of page if necessary]