Nuiqsut Caribou Subsistence Monitoring Project: Results of Year 6 Hunter Interviews and Household Harvest Surveys

Prepared for

ConocoPhillips Alaska, Inc.

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Stephen R. Braund & Associates

P.O. Box 1480

Anchorage, Alaska 99510

(907) 276-8222

(907) 276-6117 (fax)

srba@alaska.net

EXECUTIVE SUMMARY

This Year 6 report presents the first six years 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 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 and changes over time. The intent of the project is to assemble data on impacts on caribou subsistence uses in order to work toward 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) and caribou harvests over time. This sixth annual report is based primarily on hunter observations and a comprehensive household caribou harvest survey.

In November of 2013, SRB&A interviewed 60 residents (57 active harvesters and three knowledgeable residents who had not hunted during the previous year) regarding their caribou hunting activities over the previous 12 months (November 2012 to October 2013). SRB&A also completed a total of 84 household harvest surveys (84.8 percent of households) in the community of Nuiqsut to document community caribou harvests for the 2013 calendar year. Data from the Year 6 active harvester interviews complement similar data on hunting activities collected for Year 1 (2008), Year 2 (2009), Year 3 (2010), Year 4 (2011), and Year 5 (2012). In addition, the Year 6 household harvest survey data complement harvest data collected by the study team for Year 3 (2010), Year 4 (2011), and Year 5 (2012) in addition to data collected by the NSB and ADF&G in previous years.

Active harvester interview participants identified 196 caribou subsistence use areas and 143 caribou harvest locations for the Year 6 study year, the majority of which were located along the Colville River (including Nigliq Channel and the East Channel) and west of the community toward Fish Creek. The extent of riverine travel was relatively similar during all study years, although in Year 6 use areas extended beyond Umiat at a greater distance than in previous years. In contrast to previous years, active harvesters during Year 6 interviews reported a smaller use area to the west of the community toward Fish Creek. Year 6 also shows a smaller overland area compared to some other previous study years. Actual harvests of caribou were concentrated along the Nigliq Channel, the East Channel, near the mouth of Itkillik River, and in the area to the west between the village of Nuiqsut and Fish Creek. Fewer harvest locations were reported in Year 6 compared to previous years, and therefore there were fewer areas of high harvest density. Overall, harvest locations during the summer months occurred in similar locations for all five years of the study, with the majority of harvests occurring close to the community and harvests occurring with less frequency with increased distance from the community.

While certain hunting characteristics (e.g., trip frequency, duration, and travel method) have remained similar over the six study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. Boats were the most common method of transportation used over all study years, followed by snowmachine or four-wheeler. Respondents more commonly reported using four-wheelers during the last two study years (Years 5 and 6). Following an ongoing trend, respondents took only same day trips to a majority (74 percent) of use areas. The frequency of hunting trips to use areas has remained relatively stable overall study years, although Nuiqsut harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 6 compared to Years 1 and 2. A number of factors affect harvest timing and success, including weather and ice conditions, the

timing of caribou migration into traditional hunting areas, and outside factors such as industrial or other activities that potentially affect caribou behavior. In Year 6, caribou hunting activities peaked in the month of July. Harvest success in terms of the percentage of successful hunting areas declined between Years 1 and 4 (from 78 percent to 55 percent), rose slightly in Year 5 (to 64 percent), and declined again in Year 6, at 54 percent of use areas with successful harvests.

Caribou harvest amounts have remained relatively stable over time. In Year 6, the community of Nuiqsut harvested an estimated 68,534 pounds of caribou, providing an average of 692 pounds per household, or 166 pounds per capita. Estimated harvests in Year 6 were higher than the average of previous study years, with only two study years (1985 and 1993) showing higher estimated household harvests. Household uses of caribou were similar to previous years, with 95 percent of households using caribou, and 79 percent of households attempting harvests of caribou. Rates of sharing were also comparable to previous years, with 75 percent households receiving caribou from other households and 62 percent giving caribou. The gap between the percentage of households attempting to harvest caribou and those households successfully harvesting caribou was highest in 2013 for all available study years; 16 percent of Nuiqsut households reported trying to harvest caribou and being unsuccessful in their attempts. The next poorest success rate among Nuiqsut households was reported in 2011 (Year 4) at 14 percent of households unsuccessful.

In Year 6, respondents reported the highest percentage of caribou harvests (27 percent) occurring in the Nigliq Channel area. The percentage of harvests coming from the Nigliq Channel consistently decreased in each of the first five study years with a substantial increase in Year 6 that nearly doubled the previous harvest amount from the Nigliq Channel area in Year 5 (15 percent). The East Channel of the Colville River also saw continued high harvest amounts in Year 6, while harvests west of Nuiqsut (20 percent) declined to harvest levels seen in Year 1 and 2 (18 and 17 percent respectively) compared to the high of 40 percent in Year 4. At four percent, Ocean Point harvest levels were lower than in previous years. The percentage of successful hunting areas was the lowest in Year 6 compared to all previous years.

The percentages of active harvester respondents reporting changes in hunting area, hunting months, trip frequency, trip duration, and harvest amounts are somewhat similar over all study years. A slightly higher percentage of respondents reported a change in their hunting area compared to the previous years. Year 6 shows a similar percentage of respondents who reported a change in their harvest amount compared to the previous year, at 63 percent of respondents compared to between 54 percent and 85 percent in all previous study years. Year 6 results show an increase in the percentage of respondents (54 percent) reporting that they did not harvest enough caribou. Over all six study years, Personal Factors have been the most frequently cited types of causes for harvesting less caribou (77 observations), followed by causes related to Resource Distribution or Migration (68 observations) and Development Activities (29 observations).

The percent of harvesters observing caribou with abnormalities declined over the first four study years from 64 percent in Year 1 to 29 percent in Year 4. However, this increased in Year 5 to the highest percentage of respondents (45 percent) since Year 1 (64 percent), and decreased in Year 6 to 25 percent of respondents observing an abnormality. The number of caribou with one or more reported abnormalities was also lower in Year 6 than in previous years. The two principle types of abnormalities observed in Year 6 were “size” and “health.” “Disease/Infection” was the most common abnormality observation, followed by “Decrease in Resource Size”.

Fifty-six percent of harvesters in Year 6 reported one or more Alpine-related impacts on caribou hunting, an increase from Year 5 (48 percent) and Year 4 (31 percent) but lower than the first three study years. An increase in reported impacts was also evident during the Year 6 household harvest surveys, with 35 percent of households reporting impacts related to Alpine. Similar to previous study years, the most commonly reported impact in Year 6 was helicopter traffic, with 49 percent of harvesters reporting helicopter traffic impacts during the Year 6 study period. Impacts associated with man-made structures (e.g., pipelines, roads, other infrastructure) were higher in Year 6 than in recent study years, at 21 percent of respondents. Twelve percent of respondents reported impacts associated with airplane traffic. Nuiqsut harvesters have

increasingly reported impacts from other (non-Alpine) sources as exploration, development, and research activities have increased within the region. The majority of these impacts were related to helicopter and plane traffic.

Respondents were asked a new question in Year 6 regarding whether there were any areas where they used to hunt that they no longer use or avoid. Sixty-one percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previous used. Twenty-three percent of active harvester respondents specifically reported avoiding the Alpine/Alpine Satellites areas. Development activities, contamination concerns, development infrastructure, and safety concerns were the primary reasons cited for avoiding the Alpine/Alpine Satellites areas.

ACKNOWLEDGEMENTS

Stephen R. Braund & Associates (SRB&A) would like to thank the community of Nuiqsut for their cooperation and assistance in completing the first six years 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 a Nuiqsut panel of caribou experts (Nuiqsut Caribou Panel), providing space to conduct interviews, and assisting with contacting local residents. We would also like to thank the Nuiqsut Caribou Panel for assisting with the development of the monitoring plan, identifying active caribou harvesters to interview, and making suggestions to improve the program; and the North Slope Borough Department of Wildlife Management for supporting the project. We would also like to thank ConocoPhillips Alaska, Inc. (CPAI) for providing funding and logistical support. Finally, SRB&A would like to thank the 60 Nuiqsut caribou hunters and elders who provided us with the information for Year 6 of this study, and the 84 Nuiqsut households who participated in the Year 6 household harvest surveys.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

ACRONYMS AND ABBREVIATIONS

ABR	ABR Inc.—Environmental Research & Services
ASDP	Alpine Satellite Development Plan
CAH	Central Arctic Herd
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
TH	Teshekpuk Herd
USGS	U.S. Geological Survey
WAH	Western Arctic Herd

INTRODUCTION

As a result of the 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. 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.

In response to 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 caribou harvesting activities and 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 sixth annual report is based primarily on hunter observations and household surveys. An important function of the report is to identify additional data monitoring components most relevant to developing a common understanding of these impacts.

This report contains the results of the first six years of hunter information derived from face-to-face interviews conducted in Nuiqsut between March and April 2009 for Year 1; April and May 2010 for Year 2; November 2010 and May 2011 for Year 3; November 2011 and May 2012 for Year 4, November 2012 and February 2013 for Year 5, and November 2013 and February 2014 for Year 6.

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.

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. 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. Maps 1, 2, and 3 show place names and oil and gas infrastructure in the study area.

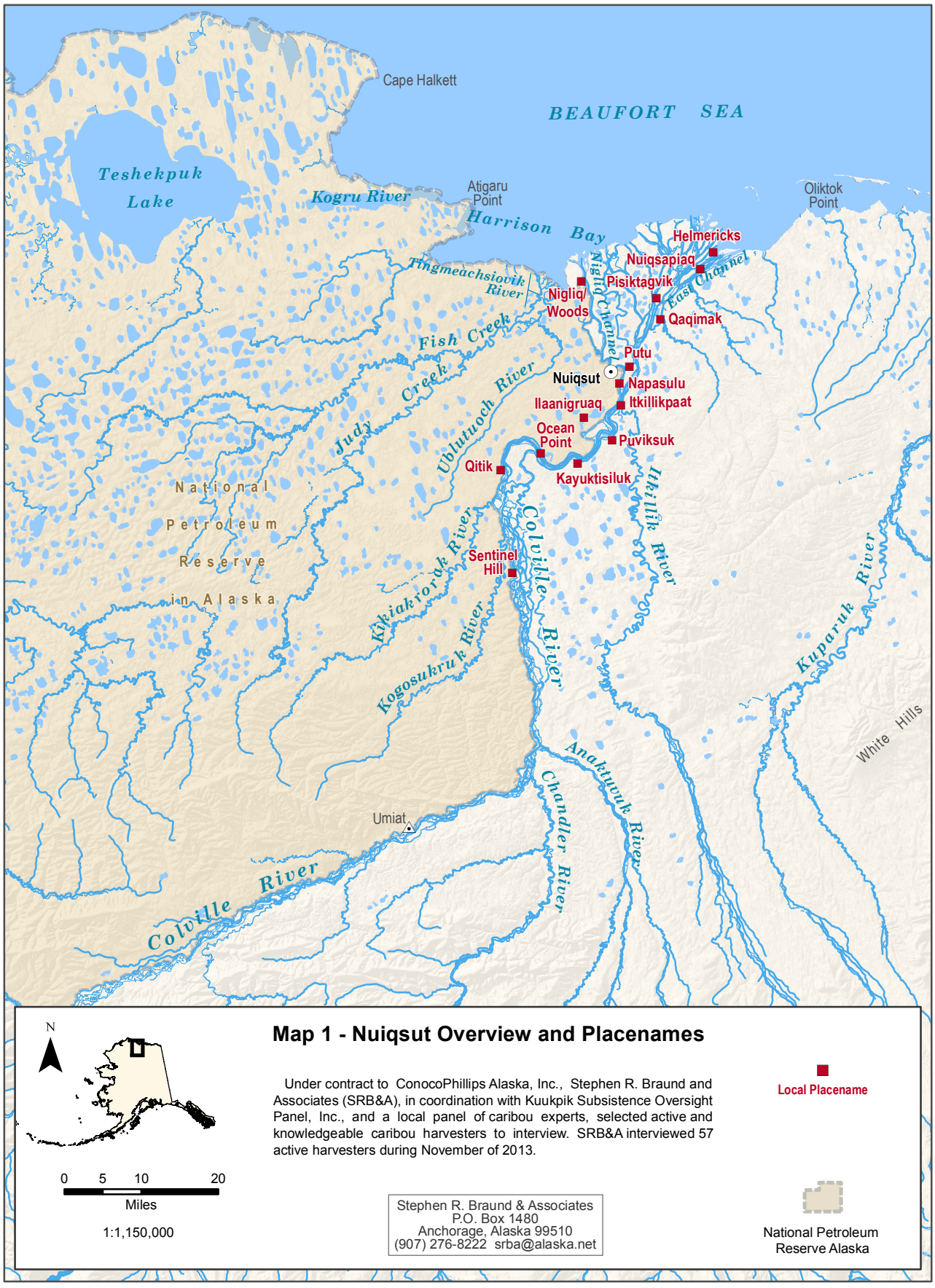
METHODS

In 2009 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 are gathered on a yearly basis in order 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 during Year 6 to design and implement the study. Year 6 active harvester interviews gathered information for harvesting activity between November 2012 and October 2013 and household harvest surveys gathered information for the 2013 calendar year (January to December 2013). Interviews, surveys, and meetings (including the NSB meeting in Barrow) for Year 6 took place between November 2013 and March 2014. Thus, the methods describe 2013 and 2014 monitoring program activities, while the results and discussion describe the Year 6 study period caribou harvest amounts, hunting activities, and impacts (spanning from November 2012 to December 2013).

Community Engagement

One of the goals of this project is to promote and facilitate community involvement in the monitoring program. The primary method of facilitating ongoing community involvement for the Year 6 monitoring program was through contact with the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI) and the previously formed Nuiqsut Caribou Panel. SRB&A traveled to Nuiqsut on July 9, 2013 to review the progress and status of the caribou monitoring project. The July 9 meeting was attended by nine panel members and three additional community residents who were invited to attend the meeting by the panel. The following is a summary of meeting topics:

- Panel members discussed the various sources of impacts on their caribou hunting activities at the time, including CPAI activities related to the Alpine Satellites developments, in addition to other (non-CPAI) developers conducting exploration activities, government research activities, and recreational activities. As one panel member observed, “There are a whole bunch of things going on at once, so it’s hard to say what the causes are” (Nuiqsut Caribou Panel Meeting July 2013).
- Panel members noted increased air traffic to the west of the community toward Fish Creek in addition to a decreased availability of caribou in Year 6, which they attributed to various sources of helicopter and airplane traffic in the region.
- When discussing the decreasing use of Fish Creek in recent years, several panel members suggested that shallower waters and changing channels may be contributing to residents no longer hunting there, while another resident suggested that increased air traffic west of the community could be a reason for reduced harvests.
- Panel members discussed the need to document how all activities on the North Slope (not just CPAI/Alpine Satellites activities) cumulatively affect caribou harvesting activities.
- Regarding communication with industry, panel members noted that KSOPI is the only contact local residents have with development companies and observed that the effectiveness of communication between industry, KSOPI, and the community, varies from year to year.
- Panel members discussed the impacts of roads on caribou, including the Meltwater Road (Kuparuk Drill Site 2P Road) and Dalton Highway.



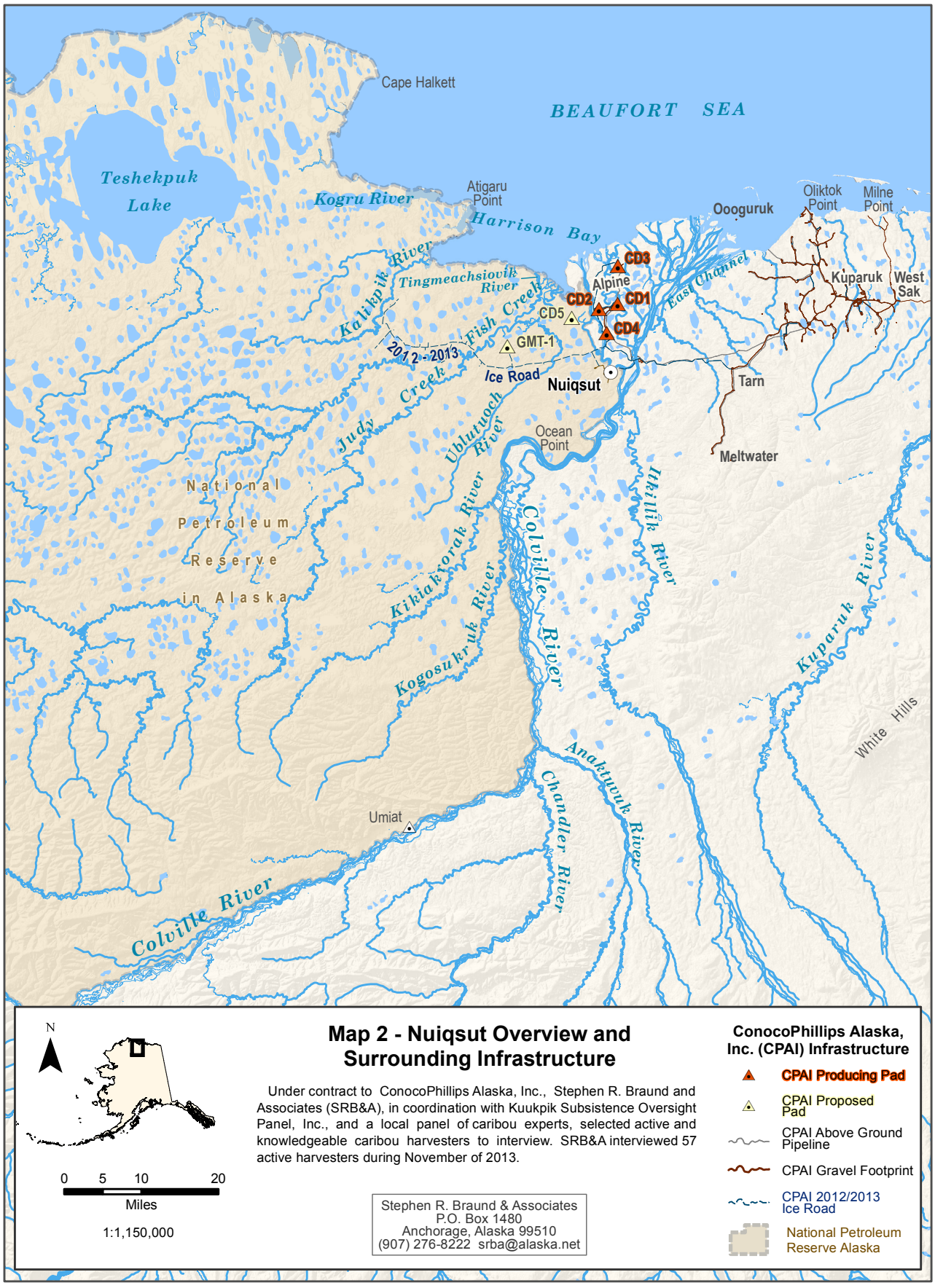
Map 1 - Nuiqsut Overview and Placenames

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 57 active harvesters during November of 2013.

Local Placename

National Petroleum Reserve Alaska

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



Map 2 - Nuiqsut Overview and Surrounding Infrastructure

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 57 active harvesters during November of 2013.

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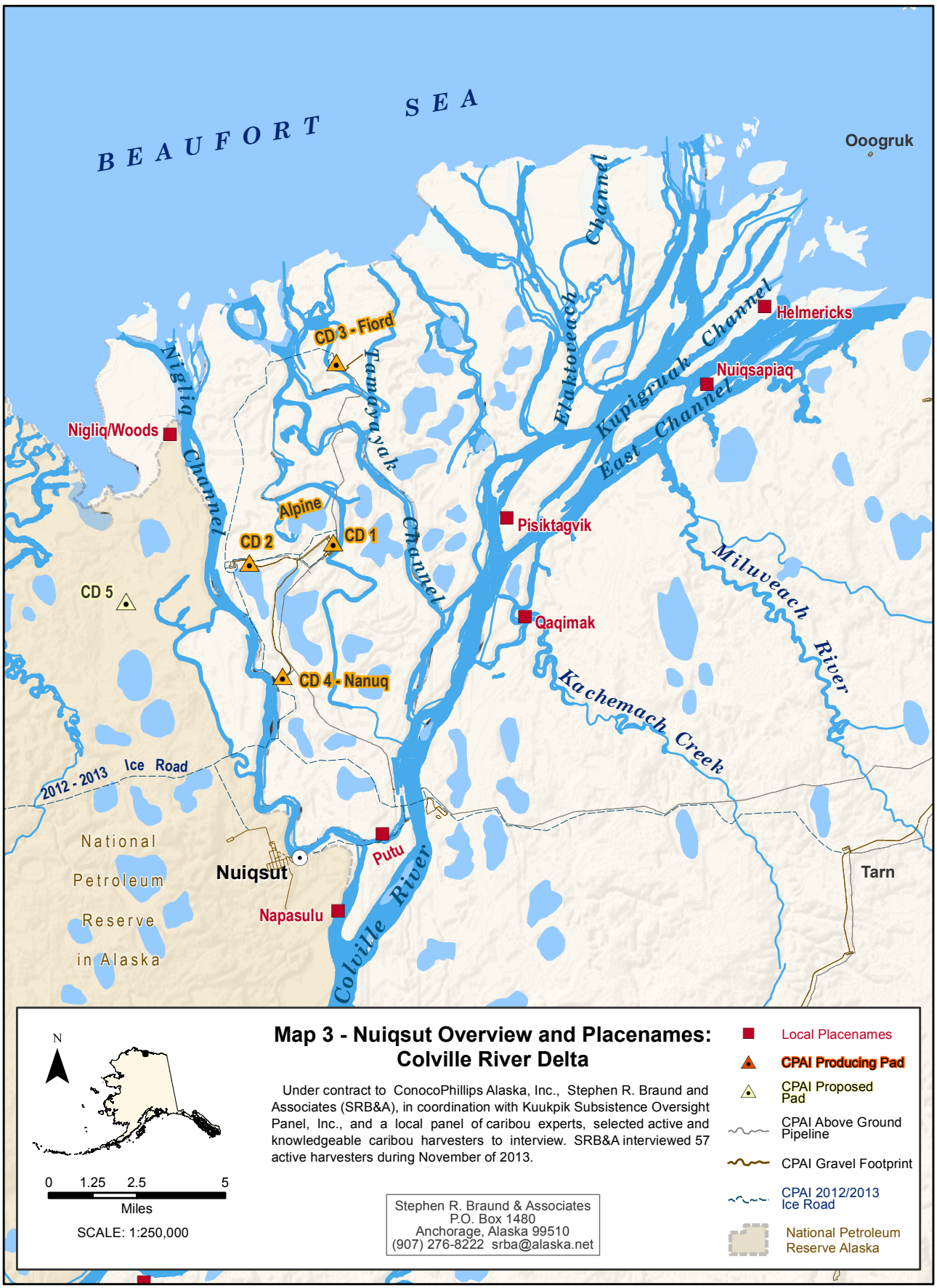
ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Above Ground Pipeline
- CPAI Gravel Footprint
- CPAI 2012/2013 Ice Road
- National Petroleum Reserve Alaska


BEAUFORT SEA
Oogruk
Helmericks
Nuiqsapiaq
Kupigruak Channel
East Channel
Elaktoveach Channel
Nigliq Channel
Tamayayak Channel
CD 3 - Fiord
Nigliq/Woods
Alpine
CD 2
CD 1
CD 5
Pisiktagvik
Qaqimak
Miluveach River
Kachemach Creek
CD 4 - Nanuq
2012 - 2013 Ice Road
National Petroleum Reserve in Alaska
Nuiqsut
Putu
Napasulu
Colville River
Tarn
N
0 1.25 2.5 5
Miles
SCALE: 1:250,000
Map 3 - Nuiqsut Overview and Placenames: Colville River Delta
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 57 active harvesters during November of 2013.
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CPAI Gravel Footprint
CPAI 2012/2013 Ice Road
National Petroleum Reserve Alaska

- The panel provided nominations for new or alternate panel members, with an emphasis on including elders in addition to younger hunters

SRB&A held a second meeting with the Nuiqsut Caribou Panel on November 14, 2013 to discuss the previous hunting season and review monitoring progress. Four panel members attended the November 14, 2013 meeting.

Study Design and Field Preparation

At the outset in Year 1 (beginning in 2009), the field effort for the Nuiqsut caribou monitoring program was comprised of annual interviews with a sample of active caribou harvesters in Nuiqsut. Annual household caribou harvest surveys to document yearly caribou harvest amounts were added to the monitoring design in response to suggestions from the Nuiqsut caribou panel during Year 1. These surveys were not completed in Year 2 (see discussion below), but were completed during Year 3, Year 4, Year 5, and Year 6 data collection.

In addition to the field effort, the study team incorporated several other components to the study design, which will provide additional context for measuring impacts. The components include the following:

- Implement work session between hunters and biologists (from Alaska Department of Fish and Game [ADF&G], NSB, or ABR Inc.—Environmental Research & Services) to discuss observations about impacts on caribou. (see Year 5 report)
- Incorporation of additional sources of Nuiqsut caribou harvest and use area data to aid in the comparison of harvests and hunting patterns over time. (see Year 5 report)
- Incorporation of traditional knowledge about caribou from additional sources (provided in Appendix A)

The study team addressed both of these components during Year 5. The study did not add any study components during Year 6.

Field protocols and maps for the active harvester interviews and household surveys had been developed during previous study years. The study team updated the active harvester and household survey protocols for Year 6 fieldwork (Appendices A and B). The study team used an informed consent form that guaranteed the confidentiality of respondent information, anonymity of persons interviewed, and the reporting of aggregated data only (see Appendix C).

Active Harvester Interviews

SRB&A used the active harvester protocol during annual interviews with Nuiqsut caribou hunters (see Appendix A). The protocol consisted of four sections: 1) Caribou Hunting Activities; 2) Assessment of Harvested Caribou; 3) Impacts on Caribou Hunting; and 4) Additional Observations about Caribou. The protocol was designed to gather hunting areas and harvest locations in addition to hunting activity characteristics, assessments of abnormalities in harvested caribou, and observations of personal experiences with impacts on caribou hunting, in addition to general observations about the behavior, distribution, or migration of caribou during the study year. Gathering these data yearly allows for multi-year comparison and monitoring of subsistence use data, resource observations, and impact experiences over time. For Years 1 and 2, the active harvester interviews collected data on the previous calendar year (i.e., January through December). However, because Year 3, Year 4, Year 5 and Year 6 data collection occurred during the month of November at the request of the Nuiqsut caribou panel, the study team shifted the study period for the active harvester interviews from a calendar year to the previous 12 months (November through October).

The first section of the active harvester interviews (Caribou Hunting Activities) included mapping of Year 6 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 Year 6)
- Location of harvested caribou

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

- Number of caribou harvested by sex
- Month of harvest
- Herd size of harvested caribou[1]

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, number of caribou harvested, and whether or not an adequate amount of caribou was harvested for the hunters' household). In Year 6, the study team added a question related to avoidance of any areas previously used for caribou hunting, to better understand the extent to which hunters avoid or stop using traditional use areas, and the reasons why they do so.

The second section of the interview (Assessment of Harvested Caribou), gathered data about the following abnormalities in the respondent's harvested caribou in Year 6:

- 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

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 and reported the number of abnormal caribou by type of abnormality.

The third section of the interview (Impacts on Caribou Hunting) included questions regarding impacts on caribou hunting in Year 6 related to CD4 or other Alpine Satellite developments. If respondents indicated that they had experienced impacts in Year 6, then researchers asked them specifically about the following potential impacts:

- Helicopter traffic
- Plane traffic
- Other traffic
- Oil company personnel

[1] Although not on the original protocol, a Nuiqsut Caribou Panel member requested that this question be added to the active harvester interview during the November 12, 2012 panel meeting. The study team subsequently added herd size as a new variable to the Year 5 active harvester interviews.

- Structures blocking hunter access
- Regulations
- Seismic lines or activity
- Other

The study team also documented non-Alpine related impacts when volunteered by respondents, but these were not systematically documented. Finally, the study team asked each respondent if they had observed anything else unusual about the behavior, distribution, or migration of caribou during the study year, and recorded their responses.

Household Caribou Harvest Surveys

The study team added the harvest survey component to the monitoring plan during Year 2 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. The study team was successful implementing the harvest survey in Year 3 and in all subsequent years (Years 4 through 6) (see SRB&A 2010a, SRB&A 2011 for a description of the previous efforts to complete the household surveys).

The Year 6 household caribou harvest surveys addressed the 2013 calendar year (January 2013 through December 2013) and consisted of eight questions regarding caribou harvests during the Year 6 study period. Questions in the survey included:

- Did you or anyone in your household use caribou (e.g., harvested, received, or utilized in the home)?
- Did you or anyone in your household try to harvest caribou?
- Did you or anyone in your household successfully harvest caribou?
- How many caribou did your household harvest (only harvested or shot by residents in your household; do not count other households' harvests) in 2013?
- Were any of the caribou harvested by your household sick or injured? Did you use the sick caribou?
- Did you or anyone in your household give caribou to other households?
- Did you or anyone in your household receive caribou from other households?
- Did any Alpine-related activities in 2013 make your household's caribou hunting more difficult?

The study team made several changes to the household harvest survey after Year 3. First, because residents had difficulty reporting the number of caribou harvested by month, the study team elected to remove this question from the survey. Second, the study team added a question about the number of residents living in the household during the study year; this allowed the study team to produce a per capita harvest estimate. Finally, the study team added a question asking residents whether any of the caribou they harvested were sick or injured and, if so, whether they had used those caribou.

The study team conducted Household Caribou Harvest surveys between January and February 2014. Surveys were conducted by phone and in person in the community. SRB&A staff coordinated with KSOPI and traveled to Nuiqsut from February 10 to February 13, 2014 to conduct additional surveys in the community in order to reach a minimum 80 percent response rate.

Respondent Selection Process

Active Harvester Interviews

In order to collect accurate data for the Year 6 caribou hunting season, it was necessary to interview currently active caribou harvesters. All hunters interviewed in Year 1, Year 2, Year 3, Year 4 and Year 5 seasons were included in the Year 6 sample. The study team attempted contact with all Year 1 through Year 5 respondents with the goal of achieving consistency between study years. As anticipated, not all Year 1

through Year 5 respondents were available to participate in Year 6 interviews (e.g., absent from the community for the entire field period, medical issues, or had moved to another community) and therefore in order to maintain a similarly sized sample of Nuiqsut caribou harvesters, the study conducted interviews with additional harvesters who had been identified by others as active (but who had not previously participated in the study), or on a walk-in basis.

Walk-in interviews were selectively conducted only after confirming that the individual had hunted caribou during the Year 6 hunting season; 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. Fieldworkers found that these "walk-in" respondents were generally active hunters and harvesters who provided informative and thorough interviews.

Household Caribou Harvest Surveys

SRB&A obtained an updated household list created by the City of Nuiqsut in September 2013, which reported 114 occupied residences within the city limits. The household list provided by the city included schoolteacher housing, TNHA (Tagiugmiullu Nunamiullu Housing Authority) and NSB housing which were not included for the sake of this survey. For the purposes of the Nuiqsut household caribou harvest survey, the study team identified "eligible households" as those that were occupied at the time of the survey, had been occupied during the study year (2013), and were occupied year-round, thereby excluding seasonal workers and teachers who left the community during the summer months. The study team worked with KSOPI to review and finalize the household list. Of the 114 residences provided by the City of Nuiqsut, 11 of the residences were either unoccupied or out of town for an extended period of time, one was occupied by seasonal workers, and three of the households had been combined with other existing households (i.e., 121a and 121b became 121) making 99 total households eligible for the survey. The final household list (99 households) that was developed by SRB&A and the local liaison using the City of Nuiqsut 2013 household list included all households that were permanently occupied during the 2013 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented.

Interview Process

Active Harvester Interviews

This section describes the interview process for the active harvester interviews. The contents of the active harvester interview are described above under "Study Design and Field Preparation." Researchers generally conducted interviews at the KSOPI office, although some interviews were conducted at the Kuukpik Hotel, 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 U.S. Geological Survey (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 using a laptop computer of the responses of the respondents and probes by the interviewer.

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. In most cases, impact locations were recorded as points in order to pinpoint the location where the respondent experienced the impact. 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 interviewers 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 eight instances, study team members conducted interviews with two 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.

Active harvester interviews generally lasted less than 30 minutes and up to 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.

Household Caribou Harvest Surveys

The contents of the household harvest surveys are described above under "Study Design and Field Preparation." Household surveys were conducted by a single interviewer either in person or over the phone. The interviewer explained the purpose of the interview and asked to speak either to a head of household or to an adult who was able to answer questions about the household's caribou harvesting activities during the study year. Surveys generally took less than 10 minutes.

Fieldwork Summary

Active Harvester Interviews

The study team traveled to Nuiqsut one time to conduct Year 6 active harvester interviews in November 2013. As shown in Table 1, SRB&A researchers interviewed 60 Nuiqsut residents (57 active harvesters and three Nuiqsut residents who had not hunted during the previous year but who provided traditional knowledge). Over the six study years, SRB&A developed a list of 107 active caribou harvesters in Nuiqsut (Table 1), who include all residents interviewed and/or identified as active harvesters during Years 1 through 6. The list of active harvesters has evolved over time and changes from year to year. A number of younger hunters have been added to the harvester list in recent years as they have become more active and proficient hunters. Likewise, some older hunters have indicated that they no longer do the majority of hunting for their household and have recommended that the study team interview their children who have taken over these duties. A hunter's level of activity may also vary from year to year based on work or personal commitments, or the hunter's access to a working boat, snowmachine, or four-wheeler. Thus, a hunter may be particularly active in one study year and then less active during the following study year.

Table 1 depicts the number of persons eligible for interviews in Year 6. A person was not eligible for an interview if he or she did not go caribou hunting during Year 6, if they had moved or were out of town for an extended period of time, or if they had an illness that precluded them from participating in an interview. An exception was made for elders who could provide traditional knowledge about long-term changes. As noted above, SRB&A developed a list of 107 active harvesters, 106 of whom were assumed eligible for an interview based on the information available to the study team. This includes individuals who had been nominated as active harvesters in the past but who had never participated in an interview. An additional 15 residents had been mentioned once by KSOPI staff as possibly being active harvesters but had never participated in an interview; thus, the study team has not been able to confirm whether they are active harvesters. They are not included in the count of eligible active harvesters. Of the 110 individuals who had participated in one of the five previous study years (Table 2), 87 were eligible for an interview. Some

individuals had been removed from the active harvester list altogether, either because they were not active caribou hunters, they had moved away from the community, or they were deceased.

The study team attempted to interview respondents from previous study years again in Year 6, with a focus on respondents who have participated in multiple study years or have been highly recommended as active harvesters. SRB&A interviewed 60 individuals, or 57 percent of those eligible for interviews (Table 1). Eighty-five percent of Year 6 respondents had participated in one or more previous years. As shown in Table 2, during each previous study year, between 53 percent and 68 percent of respondents also participated in Year 6.

The Year 6 sample included nine respondents not interviewed in a previous study year. Differences in the makeup of the six samples could potentially account for observed differences in results between the six years. In Year 3, to test for sample-related differences, results for 15 principal variables were compared for the entire sample for each year and the subsample of 18 respondents interviewed in all three study years. The pattern of results for the entire sample was similar in the subsample. This indicates that the results shown for the entire sample in each year are representative and comparable across years despite changes in the sample of respondents from year to year. As the study proceeds, the sample is more likely to include respondents who had participated in a previous study year.

Table 1: Fieldwork Summary, Year 6

# of Permanent Occupied Households (2012) [1]	Population (2012)[2]	# of Persons Identified as Active Caribou Harvesters	# of Persons Eligible for Interviews	# (%) of Eligible Respondents Interviewed	Number of Interview Workshops	Number of Interview Trips to Community
99	414	107	106	60 (57%)	52	1

[1]Based on eligible households identified during the Year 5 household harvest surveys. Does not include schoolteacher housing, or vacant TNHA (Tagiugmiullu Nunamiullu Housing Authority) or NSB housing.

[2]Estimated based on reported household occupants during the Year 5 household harvest surveys. Does not include estimates for schoolteacher housing, NSB housing, or other non-permanent households.

Stephen R. Braund & Associates, 2014.

Table 2: Respondent Summary, Years 1 – 6

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number of Active Harvester Respondents	36	53	57	58	57	57
Number of Respondents also Interviewed in Year 6	19 (53%)	29 (55%)	31 (54%)	34 (58%)	39 (68%)	-

Stephen R. Braund & Associates, 2014.

The following tables (Tables 3 through 6) show descriptive data for the Year 1 through Year 6 respondents. During all six study years, over 80 percent of respondents were born on the North Slope (Table 3). The distribution of decades in which respondents were born remained fairly consistent in Year 6 compared to Year 5 (Table 4). The percentage of respondents born in the 1990s rose over the four study years, ranging from three percent in Year 1 to 20 percent in Year 4; this reflects the emergence of younger hunters born during this time frame who are increasingly considered active harvesters in the community as they gain more experience. The percentage of respondents born in the 1990s was similar during Years 4 through 6. For the first time in Year 5 and again in Year 6, one respondent was born in the twenty-first century. This respondent was an active harvester during the study years and participated in interviews with his father. While the percentage of harvesters born in the 1980s and 1990s increased, the percentage of respondents born in Nuiqsut stayed within the range of the previous four study years. The first study year showed the highest percentage of respondents whose birth residence was not Nuiqsut; this corresponds with a larger

percentage of respondents born before the community was reestablished in the 1970s. The large majority (82 percent in Year 1, 73 percent in Year 2, 77 percent in Year 3, 73 percent in Year 4, 76 percent in Year 5, and 75 percent in Year 6) of respondents have resided in Nuiqsut for 20 or more years (Table 5). The majority of active harvester respondents have been male for all study years, although the study team interviewed a somewhat higher percentage of females in Year 6 (Table 6).

Table 3: Respondents' Residence at Time of Birth[2]

	Percent of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Nuiqsut	26%	40%	32%	44%	41%	44%
Other North Slope Community	62%	48%	52%	44%	46%	48%
Elsewhere in Alaska	9%	8%	13%	9%	9%	8%
Outside Alaska	3%	4%	4%	2%	4%	0%
Total	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	56	54	54	50

Stephen R. Braund & Associates, 2014.

Table 4: Decade Born

	Percent of Respondents					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1940s	6%	10%	0%	2%	4%	4%
1950s	18%	12%	15%	9%	19%	12%
1960s	32%	17%	27%	16%	17%	20%
1970s	21%	17%	16%	18%	11%	8%
1980s	21%	31%	25%	36%	31%	36%
1990s	3%	13%	16%	20%	17%	18%
2000s	0%	0%	0%	0%	2%	2%
Total	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	55	56	53	50

Stephen R. Braund & Associates, 2014.

[2] 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. In addition, during each study year some interviews were conducted with elders who were no longer active harvesters, or who were not active harvesters during the study year. In this report, tables reporting data collected from active harvesters are based on the active harvester totals, rather than the total number of interviews conducted during each study year. The total number of active harvester interviews in Year 6 was 57 of 60 interviews

Table 5: Years of Residence in Nuiqsut

	Percent of Respondents					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
5 years or less	3%	2%	2%	0%	0%	2%
6-10 years	3%	6%	5%	2%	2%	4%
11-19 years	12%	19%	16%	25%	22%	20%
20 plus years	82%	73%	77%	73%	76%	75%
Total	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	56	55	53	51

Stephen R. Braund & Associates, 2014.

Table 6: Respondent Gender

	Percent of Respondents					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Male	97%	92%	96%	95%	93%	87%
Female	3%	8%	4%	5%	7%	13%
Total	100%	100%	100%	100%	100%	100%
Number of Respondents	36	53	57	58	55	52

Stephen R. Braund & Associates, 2014.

Household Caribou Harvest Surveys

As noted above (Respondent Selection Process), households considered eligible for the household caribou harvest surveys were those that were permanently occupied during the 2013 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented. SRB&A acquired an updated list for 2013 of 114 households from the City of Nuiqsut. Out of the 114 residences on the household list for Year 6, 11 households were either unoccupied or the residents were out of town long term during the time of the survey, three households were united or combined with other existing households (i.e. 121a and 121b became simply 121), and one household was occupied by a non-resident. Therefore, the total number of eligible households for the Year 6 household surveys was 99.

The study team aimed to achieve a minimum response rate of 80 percent (79.2 households) in order to provide a representative sample of the community that could be expanded to estimate for the community as a whole. SRB&A completed a total of 84 (84.8 percent) household surveys in the community of Nuiqsut (Table 7). Of the eligible households not surveyed, five declined to participate, and the remaining 10 households were otherwise unavailable.

Table 7: Nuiqsut List of Occupied Households, 2013

Type of Household	Number of Households
Original Household List	114
Unoccupied or empty at time of survey	11
Household removed or combined with other household	3
Non-Resident	1
Total Eligible Households	**99**
Surveyed Households (Percent of Eligible Households)	**84 (84.8%)**

Stephen R. Braund & Associates, 2014.

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" features). 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 abnormal caribou reported by respondents, as collected in Section B of the field protocol ("Assessment of Harvested Caribou"). The study team coded each response so that the data could later be queried based on type of abnormality.
- 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.

The resulting database contains six data sets. The number of records in each data set for the six study years is shown in Table 8. 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.

Table 8: Nuiqsut Datasets

Nuiqsut Dataset Component	Number of Records					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Active harvester respondent characteristics (age, residence duration, place of birth)	36	53	57	58	58	57
Subsistence use areas	137	187	215	194	211	196
Harvest locations	182	152	196	162	195	143
Observations of changes in harvest patterns	36	53	57	58	56	57
Observations of changes in condition of caribou	58	61	66	68	83	51
Impacts on harvest activities	111	109	81	72	102	107
Number of Respondents	36	53	57	58	58	57

Stephen R. Braund & Associates, 2014

For the Harvest Activity Assessment and Harvested Caribou Assessment tables, the study team assigned numeric codes to each observed change or observed abnormality and to respondents' explanations as to why each observed change or abnormality occurred. Coding of these variables allowed the study team to develop tables with frequencies of respondent observations. Appendix D provides codes used in the Access database, with examples of the types of responses each code encompasses. The study team conducted a quality control check of the codes to ensure consistency.

Digitizing

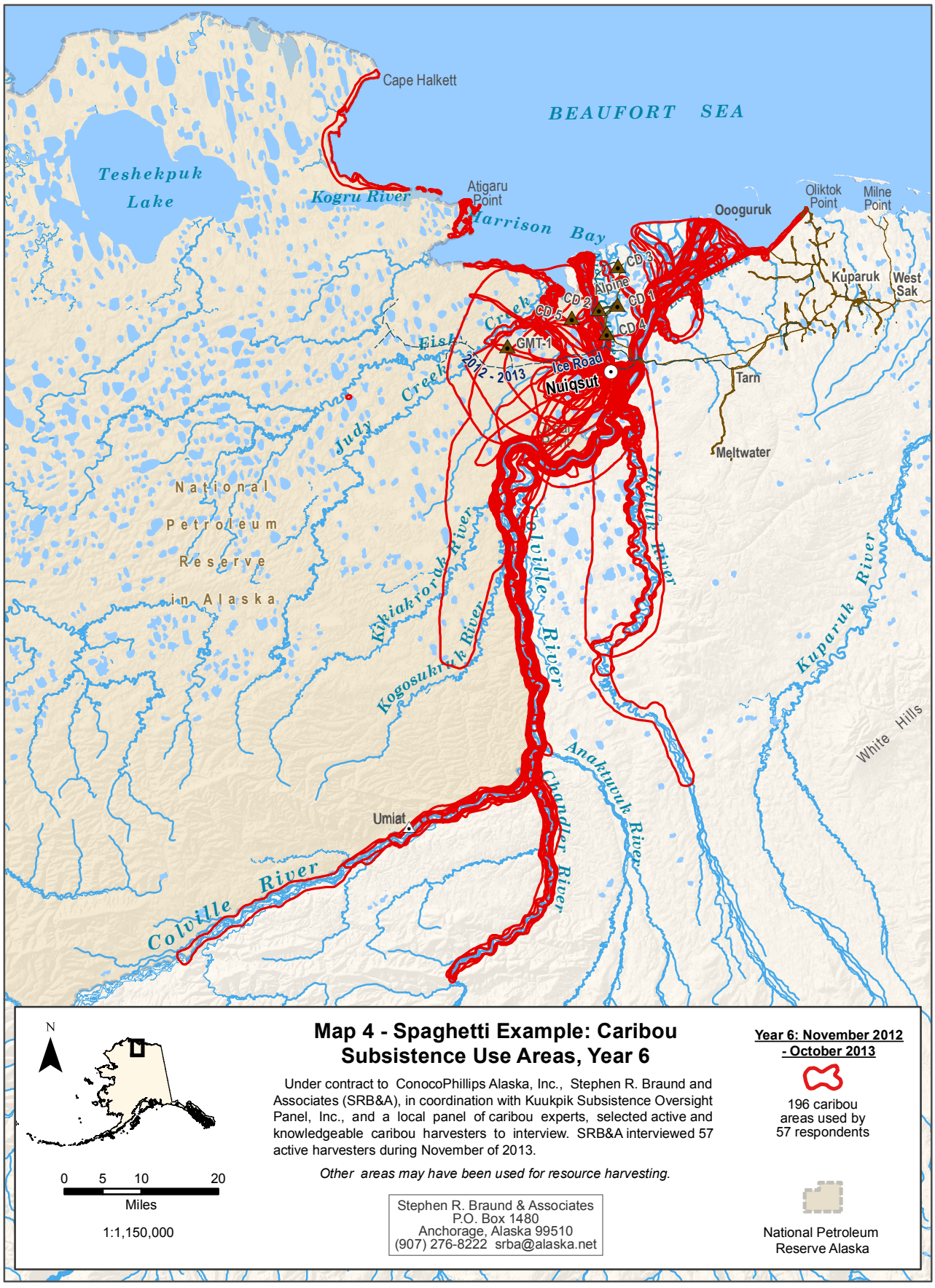
To facilitate digitizing, SRB&A first had all the acetate overlays scanned. This step permitted multiple staff to complete the digitizing process by editing scanned images. All digitizing was done using ArcGIS ArcEdit software. Digitized features included polygons associated with subsistence use areas and impact areas; lines associated impacts and other data; and points associated with harvest locations and impact locations. Altogether, SRB&A digitized 196 Year 6 use areas and 143 Year 6 harvest locations. 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 six related tables, which are described above ("Data Entry"): (1) Respondent; (2) Harvest Area; (3) Harvest Location; (4) Harvest Activity Assessment; (5) Harvested Caribou Assessment and (6) Hunting Impact. SRB&A used Stat Transfer to convert Access tables for analysis with the Statistical Package for the Social Sciences (SPSS). SRB&A created reports within Access to compile quotes for inclusion in this report.

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 4 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 Year 6 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 5. 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 (Map 6), SRB&A converts polygons (use areas) to a grid with each pixel being assigned a value of one.



Map 4 - Spaghetti Example: Caribou Subsistence Use Areas, Year 6

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 57 active harvesters during November of 2013.

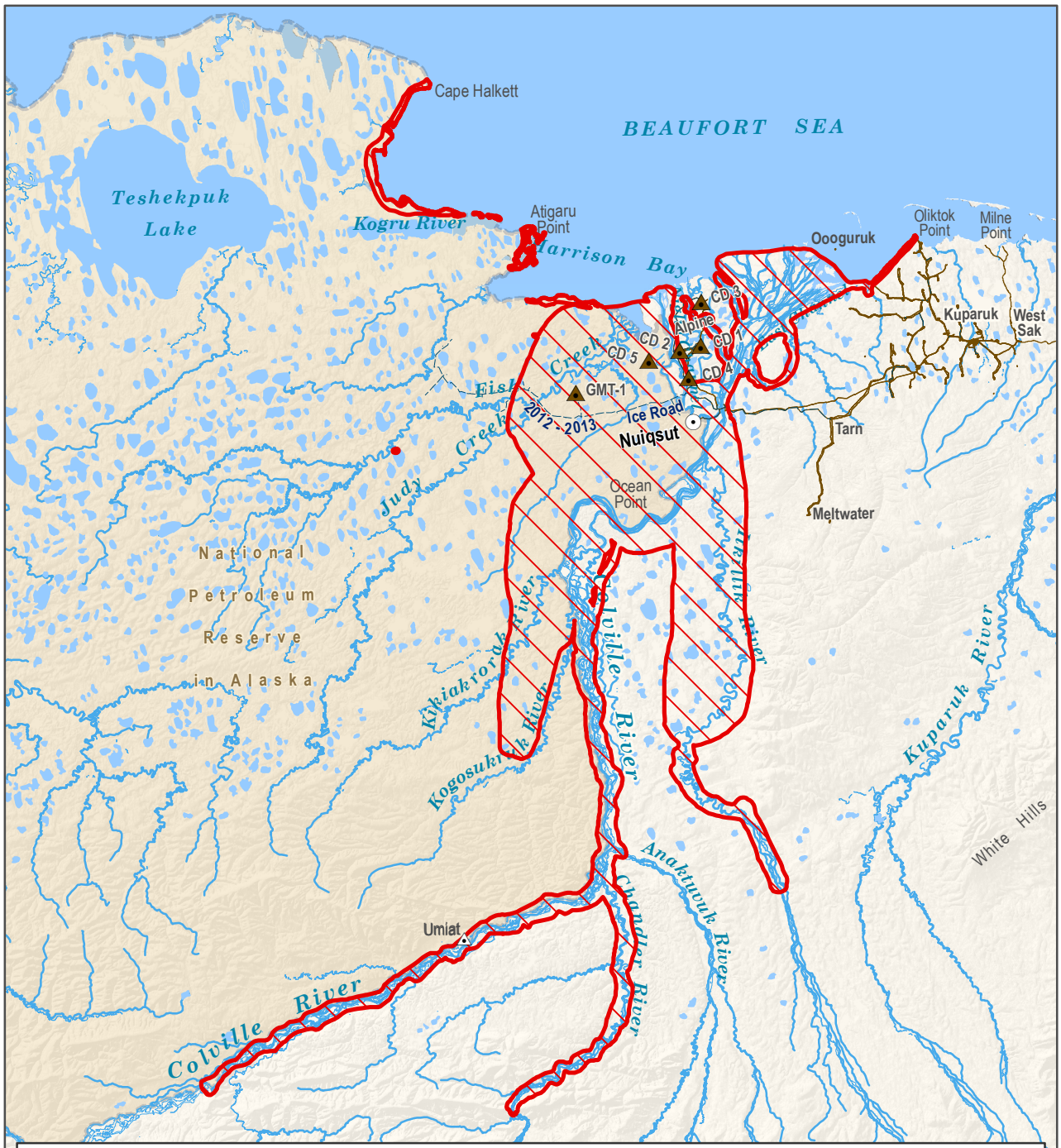
Other areas may have been used for resource harvesting.

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

Year 6: November 2012 - October 2013

196 caribou areas used by 57 respondents

National Petroleum Reserve Alaska



N

0 5 10 20

Miles

1:1,150,000

Map 5 - Dissolved Polygon Example: Caribou Subsistence Use Areas, Year 6

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 57 active harvesters during November of 2013.

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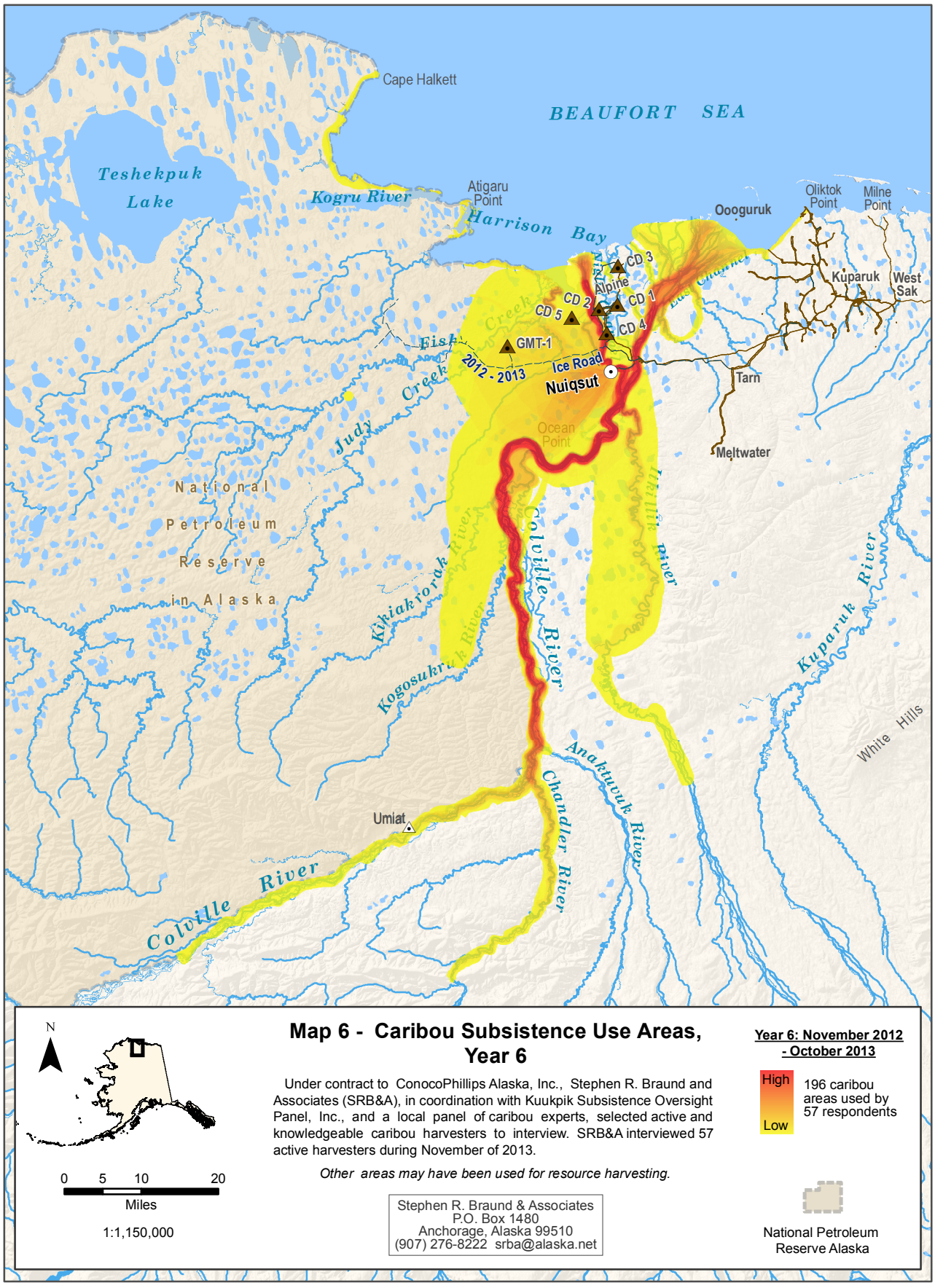
196 caribou areas used by 57 respondents

National Petroleum Reserve Alaska



Map 6 - Caribou Subsistence Use Areas, Year 6

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 57 active harvesters during November of 2013.

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

Year 6: November 2012 - October 2013

High
Low

196 caribou areas used by 57 respondents

National Petroleum Reserve Alaska

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."

Household Harvest Survey Data Analysis

Similar to the data analysis steps for the active harvester interviews, the study team entered the data from each household harvest survey form into an Access database developed by the study team, and used Stat Transfer to convert the Access tables to SPSS for analysis. To create a community harvest estimate based on the results of the household surveys, the study team multiplied the sum of all reported caribou harvests by a weighting factor. The weighting factor was computed by dividing the total number of eligible households for the study year (99) by the number of sampled households (84). The study team operated under the assumption that the 15 households who did not participate in the household survey were not substantially more active or less active (in terms of caribou harvesting) than the community as a whole.

To determine the total pounds of caribou harvested, the study team used a conversion factor of 117 pounds per caribou. The study team chose this conversion factor because it was the one most recently used by ADF&G for the North Slope in Braem et al. (2011). During the NSB review meeting in Barrow on April 16, 2013, several meeting attendees asked about this conversion factor and expressed concern that 117 pounds seemed high. The study team followed up on this comment during the May 1, 2013 caribou panel meeting in Nuiqsut. Panel members believed that the conversion factor may be low rather than high, and noted that Nuiqsut residents use not only the meat of the caribou, but the heart, head, stomach, brains, bones (for marrow and for use in soups), and skin (for clothing and crafts). They suggested that the study team conduct their own analysis to determine the average pounds per caribou used by Nuiqsut residents. For the purposes of the Year 5 and Year 6 report and to facilitate comparison with other recent harvest studies, the study team retained the conversion rate of 117 pounds per caribou.

Data Review

The study team submitted a draft of the Year 6 report to CPAI in October 2014. The study team received comments on the draft report from CPAI in January 2015, revised the report, and submitted a revised draft to CPAI in February 2015. CPAI provided review copies to the NSB and on March 25, 2015, Stephen Braund and Liz Sears of SRB&A traveled to Barrow to present the results of the Year 6 study to the NSB. The study team then sent a summary handout of the draft report to the Nuiqsut Caribou Panel for review. Stephen Braund and Liz Sears of SRB&A traveled to Nuiqsut and held a draft review meeting with the Nuiqsut Caribou Panel on April 28, 2015, where panel members reviewed Year 6 findings. Specific comments made by the Nuiqsut Caribou Panel during that meeting in response to Year 6 data were incorporated into the Year 6 report where applicable.

Presentation of Interview Results

This report summarizes the results of the active harvester interviews using the verbatim (as close as possible by typing their responses during interviews) responses of study participants. The report presents the data as the observations of active harvester respondents. While researchers attempted to obtain the most detailed descriptions of residents' observations, they did not try to verify the factual basis of their reports.

RESULTS

Caribou Subsistence Use Areas and Harvest Sites

Nuiqsut respondents reported 196 caribou subsistence use areas for the Year 6 study period. In addition to providing the location of their Year 6 caribou hunting areas, respondents identified the location of the 143

harvest sites within the use areas. The locations and characteristics of Year 6 caribou use areas and harvest sites are described below.

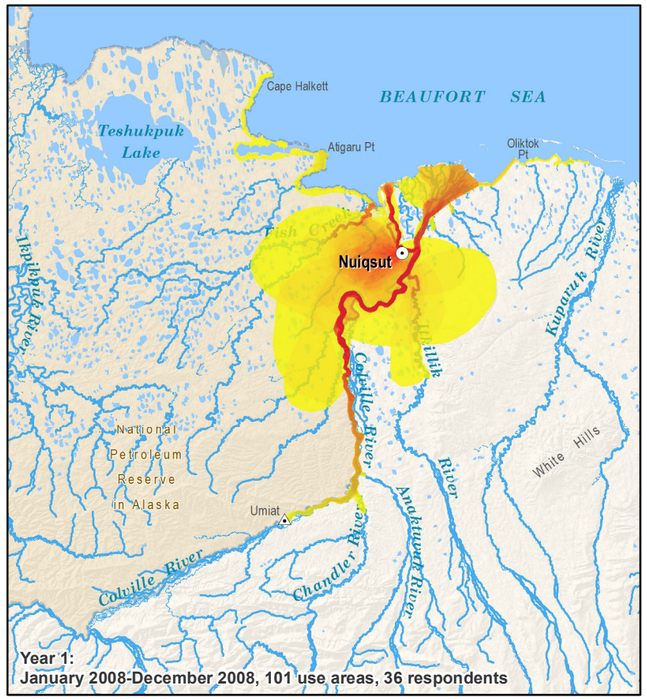
Location of Caribou Use Areas and Harvest Sites

Nuiqsut Year 6 caribou use areas, as reported by 57 Nuiqsut respondents, are depicted on Map 6. Year 1 through Year 6 caribou use areas are depicted side by side on Map 7. During the Year 6 time period (November 2012 through October 2013), caribou study participants reported traveling along local rivers, in the ocean along the coast of the Beaufort Sea both east and west of the Colville Delta, and overland to the west, east, and south of the community, in search of caribou. Residents' riverine travel extended along the Nigliq Channel and the East Channel of the Colville. Respondents also documented subsistence use areas beyond Umiat along the Colville River, along the Itkillik and Chandler rivers, and along Fish Creek. Hunters also traveled along the coast east of the community to Oliktok Point and west of the community to Cape Halkett. Overland travel extended west beyond Fish Creek and to the south of the community surrounding the Itkillik, Kikiakrorak, Kogosukruk rivers. The highest numbers of overlapping caribou use areas in Year 6 occurred along the Nigliq Channel, the lower portion of the East Channel of the Colville River, upriver along the Colville River to its confluence with the Anaktuvuk River, and along the lower portion of the Itkillik River. A moderate number of overlapping use areas also occurred overland in an area west of the community toward Fish Creek and Ocean Point, as well as near the mouth of Fish Creek.

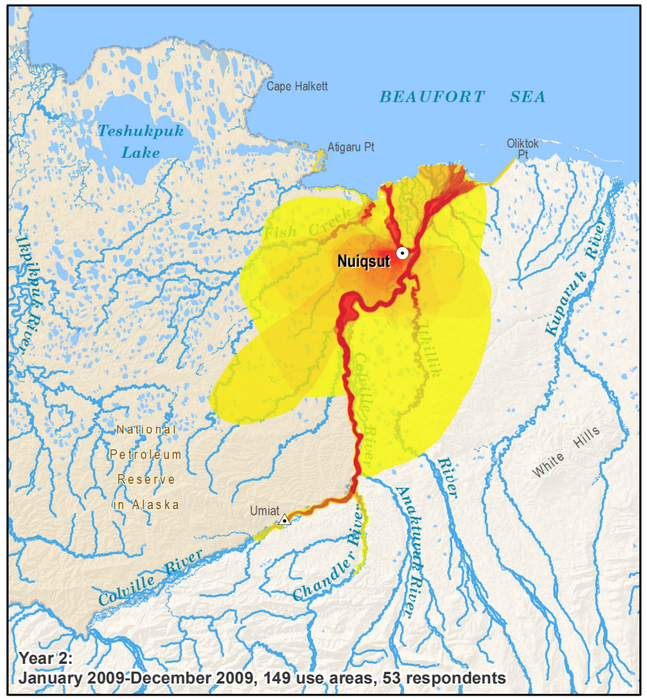
Compared to previous study years, Year 5 and 6 use areas show less overlapping use in areas west of the community toward Fish Creek. A majority of overlapping use areas occur along river corridors and in Year 6 respondents traveled farther upriver past Umiat in search of caribou than in any previous years while also traveling substantial distances along the Chandler River. During Year 6, respondents also reported traveling as far as Cape Halkett on the Beaufort Sea, demonstrating more extensive travel along that stretch of coast in comparison to most previous study years. During the Year 6 draft review meeting with the Nuiqsut Caribou Panel, one panel member expressed the belief that hunters are traveling farther from the community to avoid heavy air traffic during the hunting season. Another panel member discussed the recent decline in the caribou herd and wondered if that may also have been a factor in how far residents traveled. One notable difference between Year 6 and some previous years (such as Year 3), is that overland travel appears to be reduced in comparison to other years. Possible explanations for the apparent reduction in land-based use areas in Year 6 include difficult winter travel conditions, caribou not being present/available during the winter, or because particular hunters who account for much of the overland winter hunting may not have been able to get out as much during Year 6 or did not participate in the study during Year 6.

Maps 8 and 9 depict caribou use areas for all six study years, using two different methods. Map 8 shows overlapping use areas for all 1,138 polygons provided over the six study years combined. The highest numbers of overlapping use areas during all study years occur along the Colville River, including the Nigliq Channel and East Channel, and as far upriver as Umiat; along the lower portion of the Itkillik River; along Fish Creek to where it meets Judy Creek; and in an overland area between the community, Fish Creek, and Ocean Point. Over the course of the six study years, use areas have extended as far as Ikpikpuk River in the west and beyond Kuparuk River in the east to Toolik River. Riverine use areas have extended along the Colville, Itkillik, Chandler, and Anaktuvuk rivers as well as along Fish Creek. Respondents identified coastal subsistence use areas extending from Cape Halkett to beyond Oliktok Point (Map 8). Year 6 (Map 6) differs from the cumulative Year 1 through 6 use areas (Maps 8 and 9) in that during Year 6 use areas do not extend as far east or west overland as they have some other years, nor do they extend as far along the Anaktuvuk River as they have in previous years. Similarities between Map 6 (Year 6 use areas) and Map 8 (representing all years cumulatively) are that the Nigliq and East Channel of the Colville remain highly used, as does the Colville River extending upriver from Nuiqsut. Also, coastal caribou use areas in Year 6 appear similar to the coastal areas shown on Maps 8 and 9.

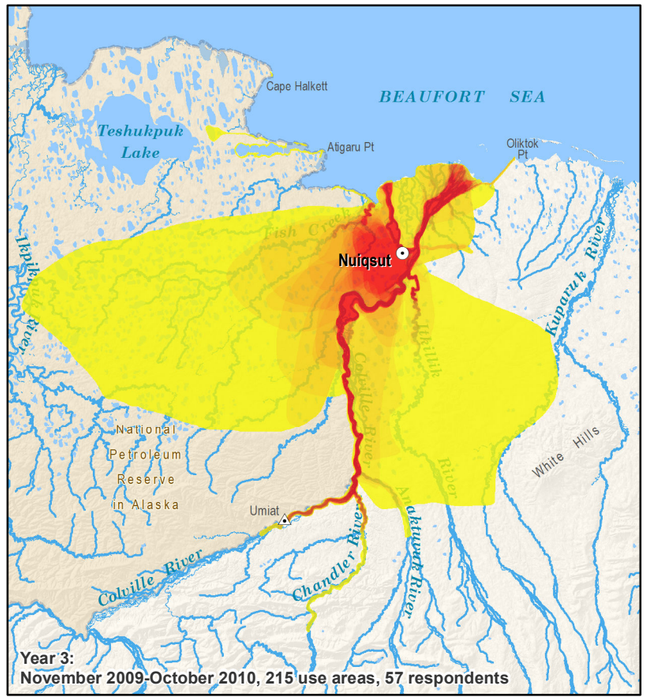
Map 9 depicts overlapping use areas for all six years, but instead of portraying all 1,138 polygons individually, this map includes only one polygon per study year. Areas that were used during all six study



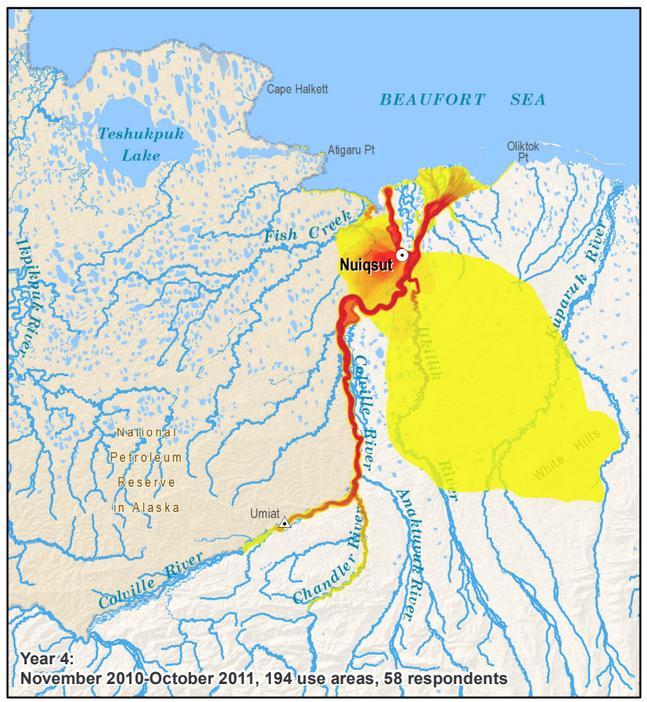
Year 1:
January 2008-December 2008, 101 use areas, 36 respondents



Year 2:
January 2009-December 2009, 149 use areas, 53 respondents

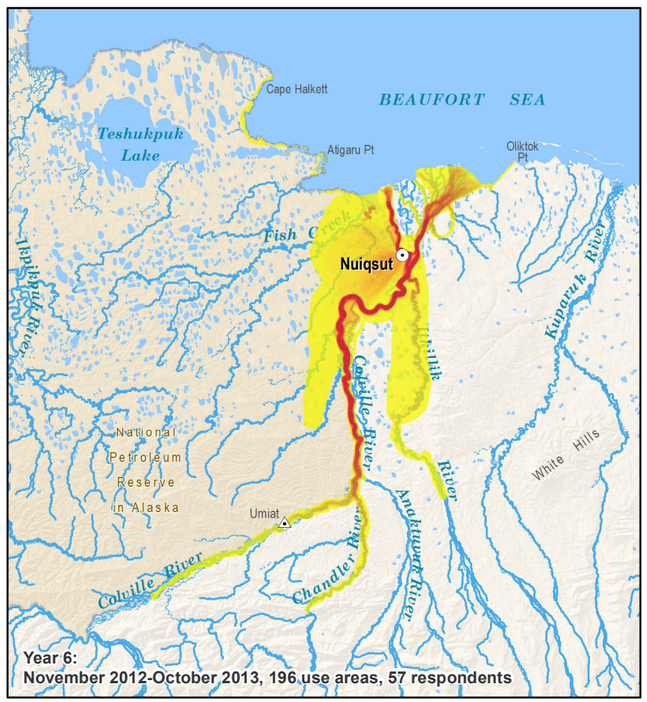


Year 3:
November 2009-October 2010, 215 use areas, 57 respondents



Year 4:
November 2010-October 2011, 194 use areas, 58 respondents

Year 5:
November 2011-October 2012, 211 use areas, 57 respondents



Year 6:
November 2012-October 2013, 196 use areas, 57 respondents

Map 7
Caribou Subsistence Use Areas: Years 1-6 Individually

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 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

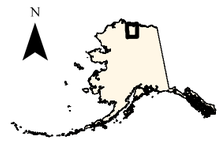
LEGEND

Overlapping Polygons

High

Low

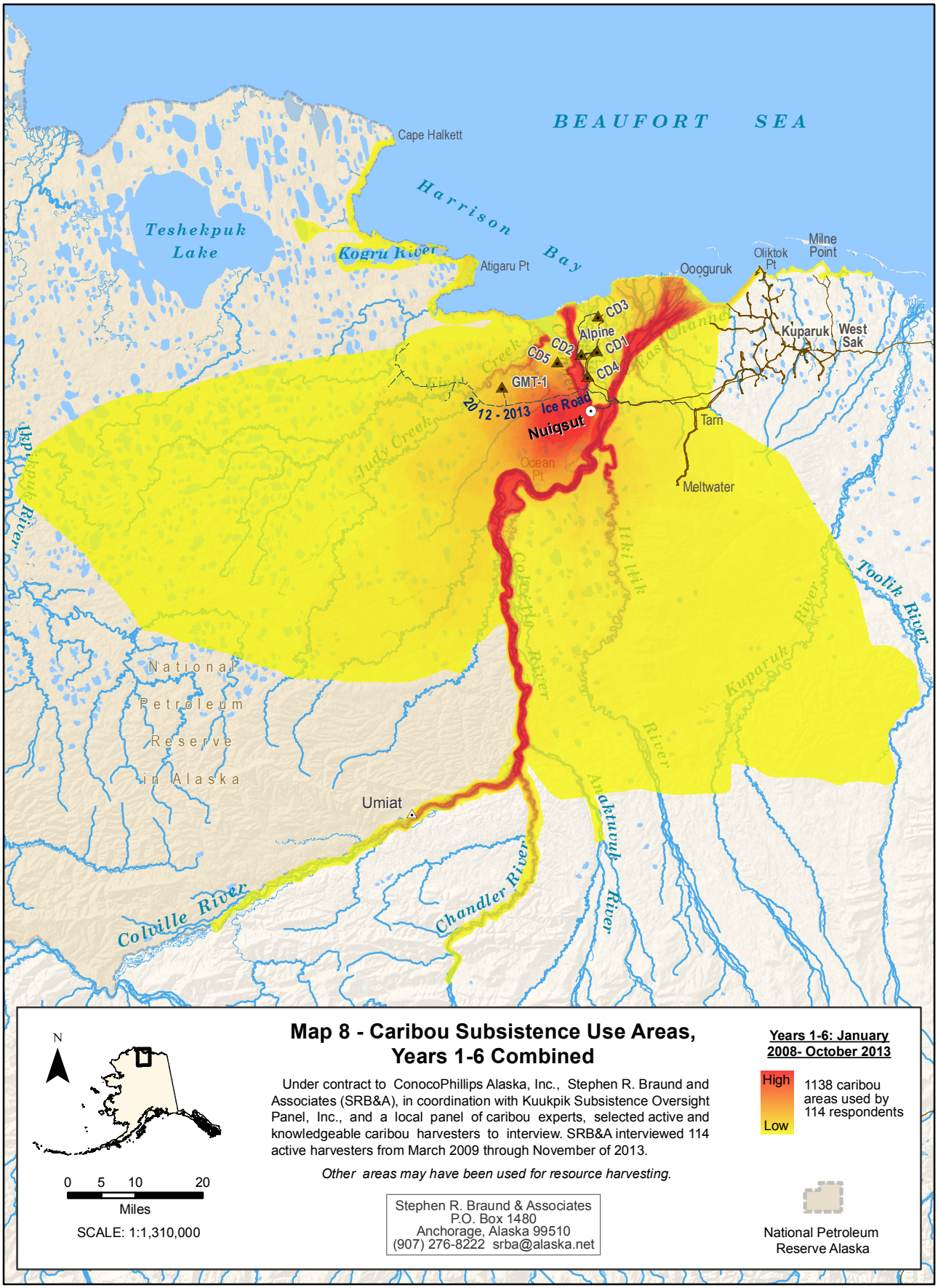
National Petroleum Reserve Alaska



0 10 20 40
Miles

SCALE: 1:1,500,000

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



Map 8 - Caribou Subsistence Use Areas, Years 1-6 Combined

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 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

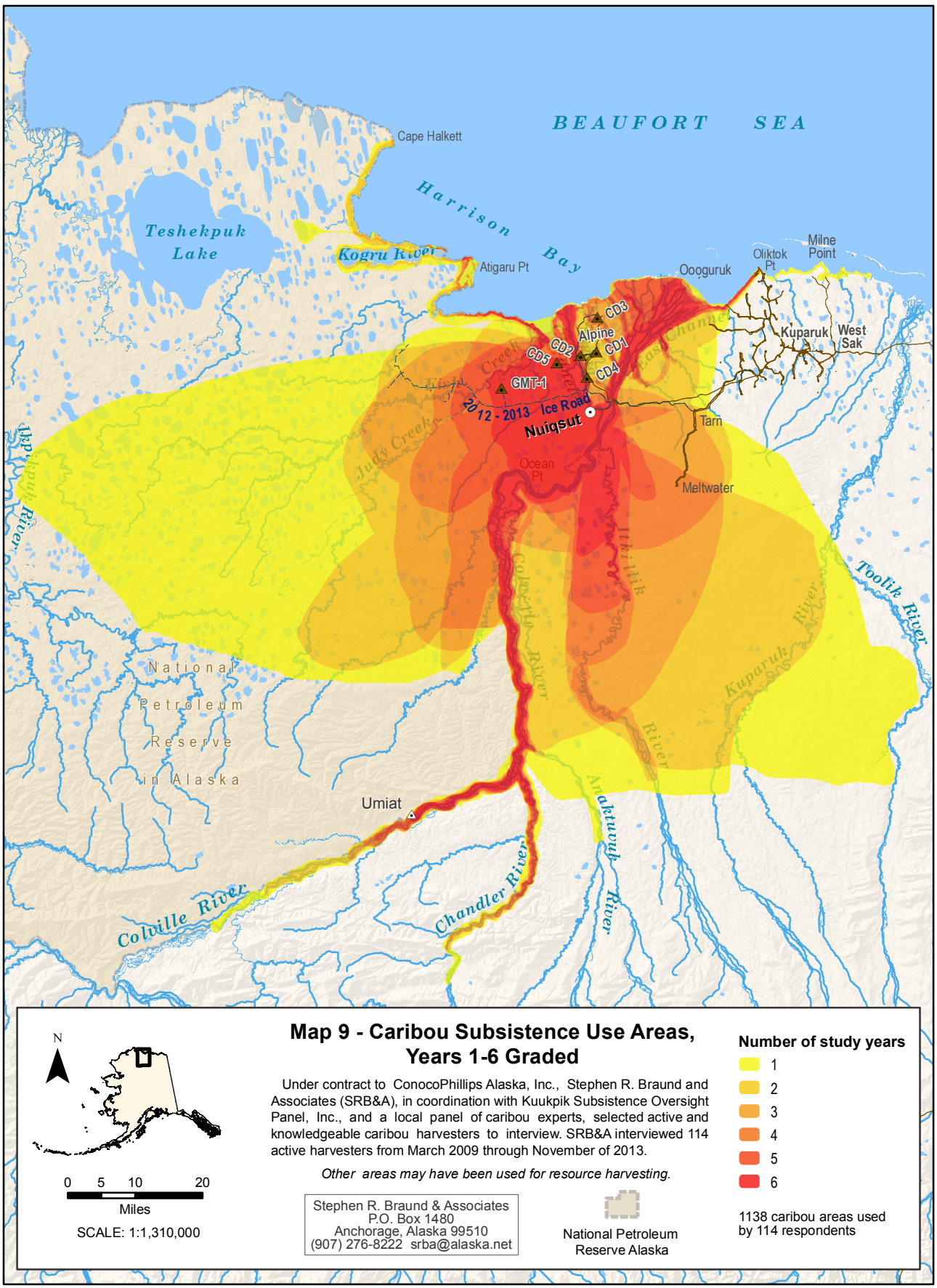
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

Years 1-6: January 2008- October 2013

High
Low

1138 caribou areas used by 114 respondents

National Petroleum Reserve Alaska



Map 9 - Caribou Subsistence Use Areas, Years 1-6 Graded

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 114 active harvesters from March 2009 through November of 2013.

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

National Petroleum Reserve Alaska

Number of study years

- 1
- 2
- 3
- 4
- 5
- 6

1138 caribou areas used by 114 respondents

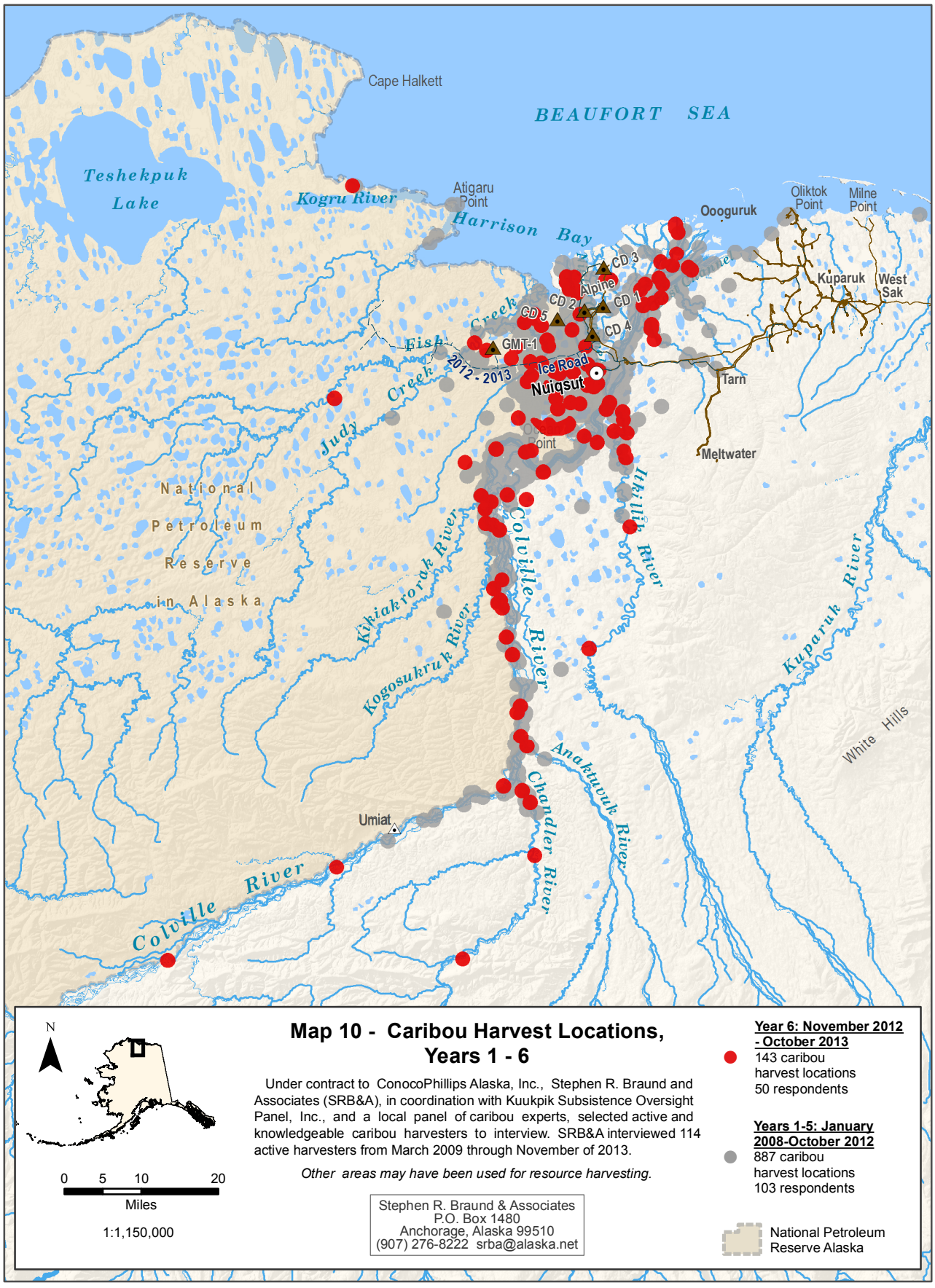
years are portrayed by the darkest red, while areas that were used during only one study year are shown in yellow. Areas used during two, three, four or five study years are shown in varying shades of orange. Areas used during a majority (five or six) of the study years include the Colville River (including the Nigliq Channel, East Channel, and portions of the middle Colville River delta) to Umiat; the Chandler and Itkillik Rivers; Fish Creek; coastal areas to Oliktok Point and Atigaru Point; an overland area west of the community between Nuiqsut, Ocean Point, and Fish Creek; and an overland area to the southeast of the community near the Itkillik River.

Map 10 shows the geographic locations of Nuiqsut caribou harvest sites, as noted by respondents during interviews using a 1:250,000 scale USGS map. Year 6 caribou harvest locations are shown in red, with previous study years' harvest locations shown in grey. In order to maintain a degree of confidentiality and also to account for the fact that respondents are often unable to pinpoint the exact location of a harvest due to the scale and accuracy of the USGS map, SRB&A shows all harvest locations as points buffered at a one-mile radius (or two-mile diameter). Fifty respondents reported harvesting caribou at 143 harvest locations in Year 6. Respondents reported successful harvests in the Colville River Delta; upriver beyond Umiat; along Chandler River, Itkillik River, and Fish Creek; and also on the coast to the west of Atigaru Point. A high concentration of caribou harvests took place along the Nigliq Channel, the East Channel, near the mouth of Itkillik River, and in the area to the west between the village of Nuiqsut and Fish Creek. There are also a number of harvest sites along the Colville River south of Nuiqsut, especially in the area of Sentinel Hill.

Map 11 shows harvest density for all study years combined, with areas of higher harvest concentration shown in red. SRB&A determined harvest density through the use of the "Point Density Tool" located in the "Spatial analyst" toolbox in ArcGIS 10.2.1. The "Point Density Tool" creates an analysis grid, in this case using 100x100 meter cells, to calculate the magnitude per unit area (in this case the number of caribou harvested) from a point feature (harvest locations shown on Map 10) that fall within a one mile radius of each cell. SRB&A chose the one mile radius in order to account for variation in accuracy due to recording harvest locations on a 1:250,000 USGS map (see discussion above). The map accounts for all reported caribou harvests from all six study years. Over the course of the six study years, 109 respondents have noted 1,010 caribou harvest locations, which are shown on Map 11. The highest concentrations of harvest locations occur along the Nigliq Channel to the north, along the East Channel near Pisiktaġviq, within a few miles of Nuiqsut overland to the west, along the Colville to the south, near the mouth of Itkillik River, in the area of Ocean Point, near the mouth of Kikiakrorak River, and near Sentinel Hill.

Map 12 shows the same data for individual study years using the method described above. While the concentration of harvests appears similar from Years 1 through 5, Year 6 shows some distinct differences. In Year 6 there are 135 harvest locations, which is fewer than other years. As a result there are fewer points overlapping and demonstrating areas of higher harvest concentration. For Year 6, the areas that show the most density for caribou harvest are along the Nigliq Channel near Nigliq (or Woods camp), which is similar to Years 1 to 3. Other areas of harvest concentration in Year 6 include the East Channel, at two locations along Itkillik River, and also near Nuiqsut. Harvests upriver show greater intensity during Years 2, 3 and 4, although during Year 6 upriver harvests were farther ranging. Years 3 through 6 show a lower density of harvests along Fish Creek.

Nuiqsut caribou hunting activities occur primarily during the summer months by boat with residents traveling along the Colville River (including Nigliq Channel and the "East" or Kupigruak Channel). The highest numbers of overlapping river use areas occur along the Nigliq Channel to the Nigliq area, and upriver past Sentinel Hill, with moderate overlaps as far as the mouth of the Chandler River and along the upper portion of the East Channel of the Colville River and near the mouth of Fish Creek. Compared to previous study years, Year 6 river hunting activities extended further past Umiat and further up the Itkillik River. There is less river-based hunting along Fish Creek than in Years 1 through 3. The distance harvesters are willing to travel along the Colville River each year depends on a number of things including hunting success, water levels, available transportation, locations of camps or cabins, and coinciding subsistence



Map 10 - Caribou Harvest Locations, Years 1 - 6

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 114 active harvesters from March 2009 through November of 2013.

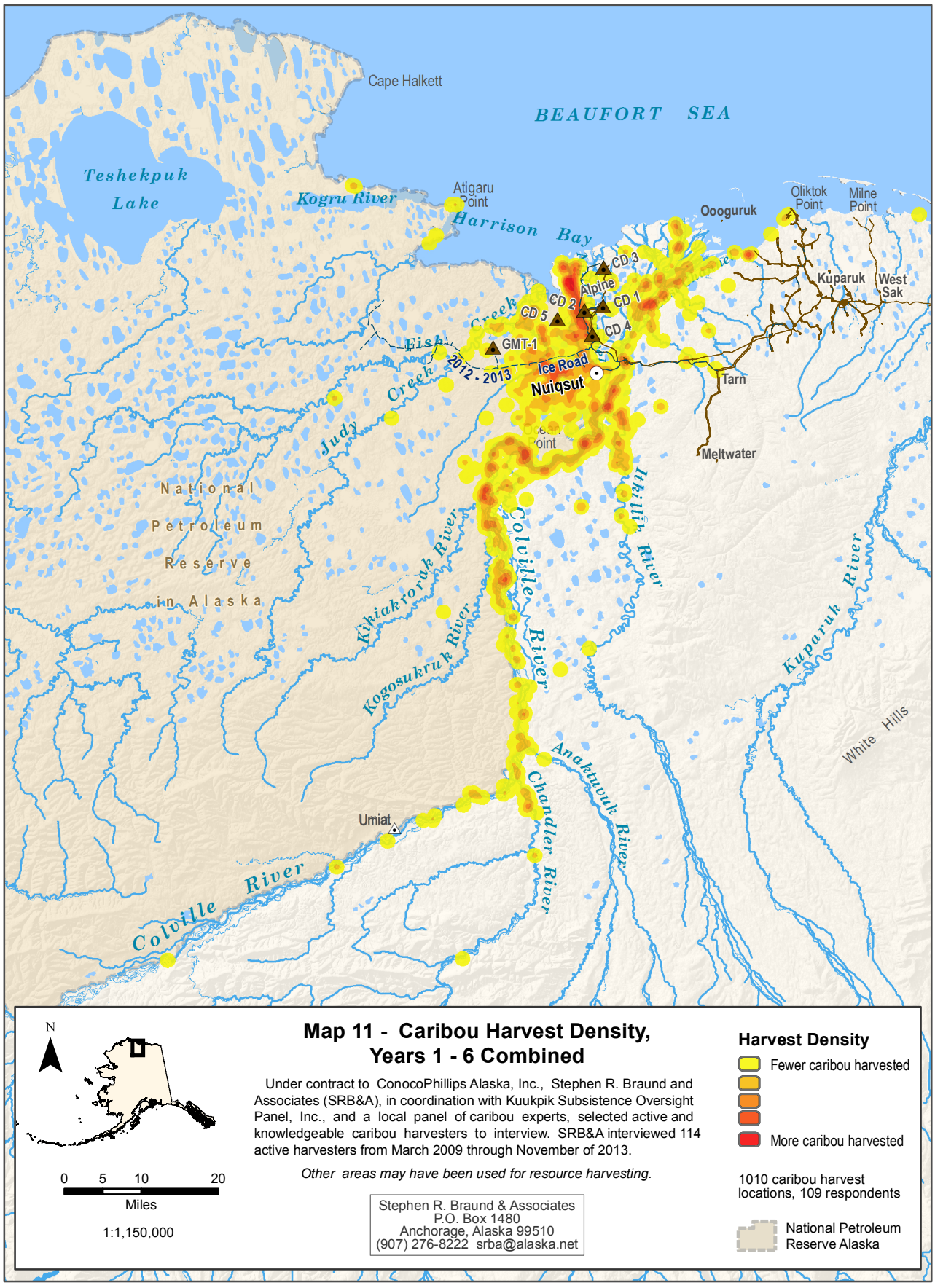
Other areas may have been used for resource harvesting.

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

Year 6: November 2012 - October 2013
143 caribou harvest locations
50 respondents

Years 1-5: January 2008-October 2012
887 caribou harvest locations
103 respondents

National Petroleum Reserve Alaska



Map 11 - Caribou Harvest Density, Years 1 - 6 Combined

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 114 active harvesters from March 2009 through November of 2013.

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

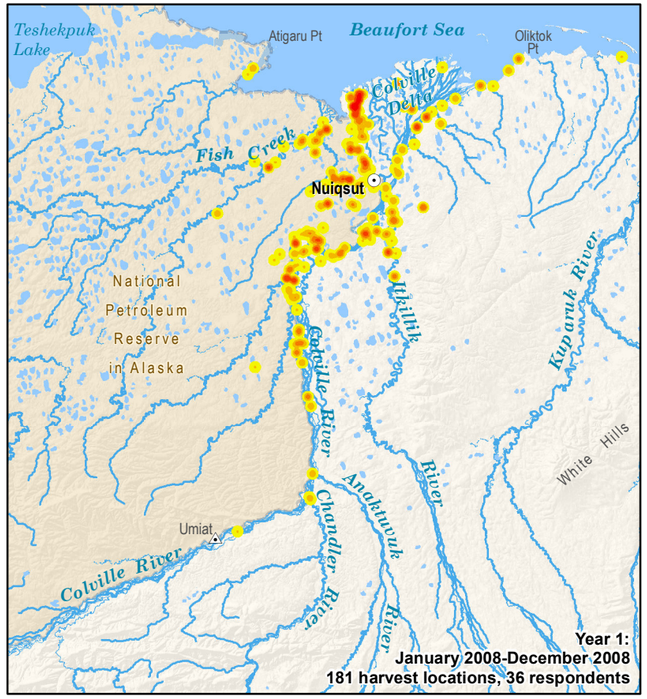
Harvest Density

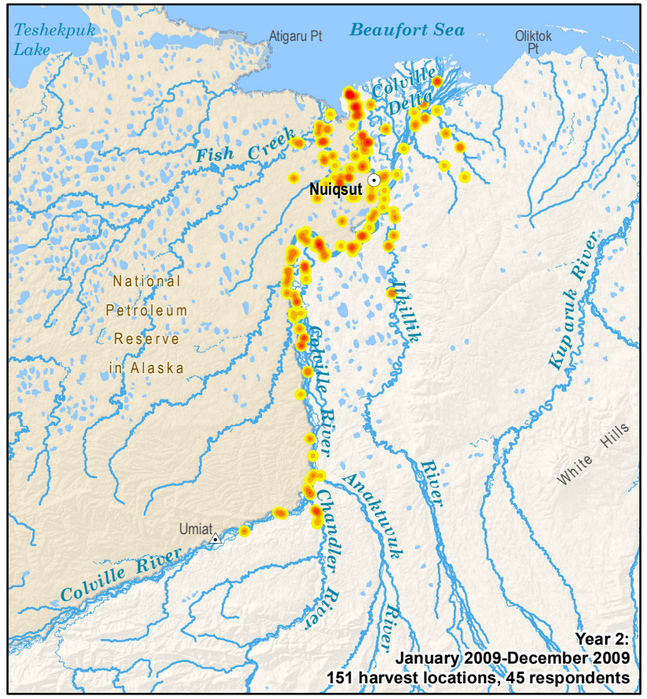
Fewer caribou harvested

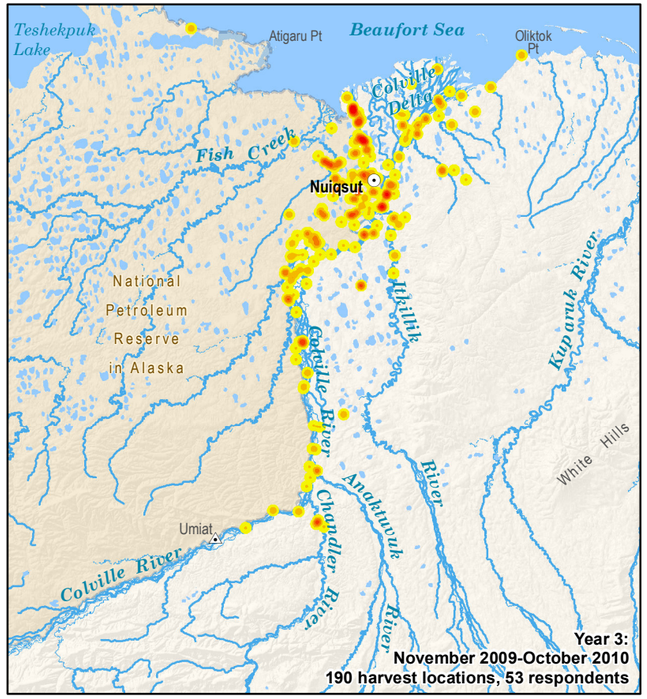
More caribou harvested

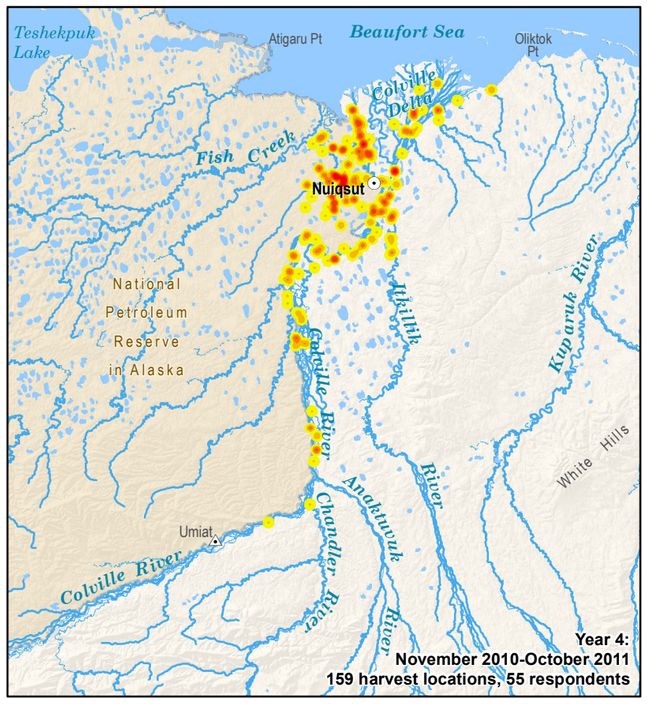
1010 caribou harvest locations, 109 respondents

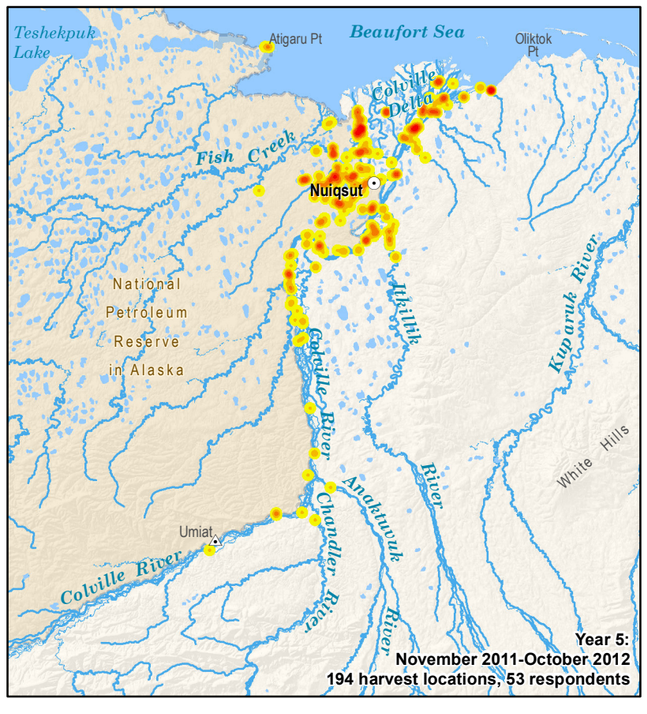
National Petroleum Reserve Alaska

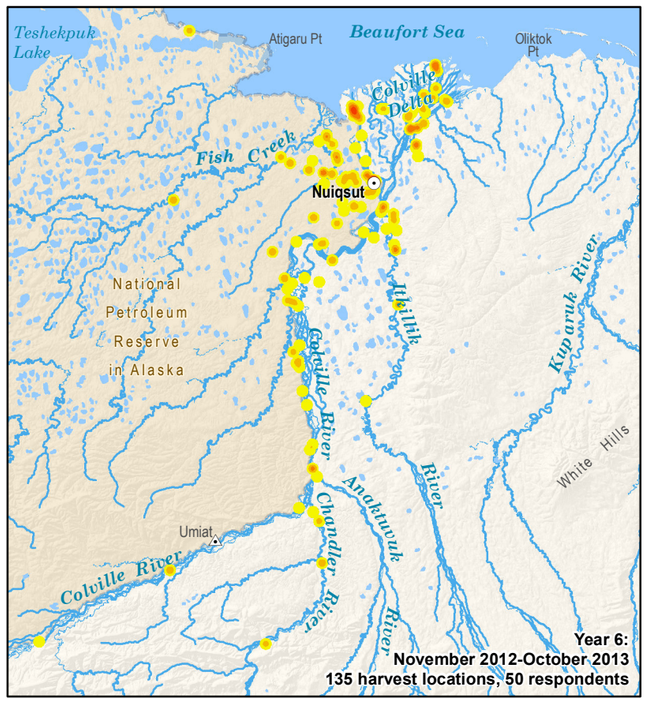












Map 12
Caribou Harvest Density: Years 1-6 Individually

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 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

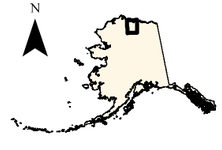
LEGEND

Harvest Density

Fewer caribou harvested

More caribou harvested

National Petroleum Reserve Alaska



0 5 10 20
Miles

SCALE: 1:1,500,000

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

activities such as moose hunting (which generally takes place farther upriver) and seal hunting (which occurs in the ocean). Nuiqsut residents frequently travel along the Nigliq Channel and in coastal areas during the summer months to hunt for caribou while they also travel to check fishing nets or stay at fish camps, and on their way to and from the ocean where they hunt for seals, caribou, and eiders:

> *We got one around the Nanuq area [on the Nigliq Channel], when we were coming back home from the ocean. On this trip we were on our way home from the ocean but we were looking for them the whole way. We didn't want to go home empty handed. The main channel was too shallow and the caribou were crossing the river at that time, that's [where we got that] young buck; that was late June, early July. [We traveled to the ocean] probably about 15 times; out to the ocean and back, we look for caribou too.* (SRB&A Nuiqsut Interview November 2013)

> *There was a caribou, just past Pisiktaġviq, [that we shot] when we were headed back this way; that was a male, my brother shot it. We were coming out [from the east side of Colville Delta and], coming into the ocean. It was in summer time. Most every summer I go to the ocean. We went out this way, this channel [that goes past Pisiktaġviq], and went boating out in the ocean and then went back through this other channel [Nigliq] just that one time. We went to go camp at* Amaulituuq *[Thetis] Island for seal hunting. On Thetis Island, we were out seal hunting and we camped out there, overnight, then we went out looked for seals and came back through Nigliq.* (SRB&A Nuiqsut Interview November 2013)

The camps around the lower (downriver) portion of the Nigliq Channel are a destination and landmark for many Nuiqsut harvesters, and they commonly discuss caribou hunting in the area of the camps. These activities are often combined with fishing:

> *I went up Nigliq Channel, to the cabin [around] here somewhere. I took a boat all the way up and we saw caribou from the boat up by the cabins; both males, that was in July. There were about 12 of them, they were kind of scattered, just up around the channel. I also had a [fishing] net out there near the mouth [of Nigliq Channel], just once. And one time I went downriver and my boat broke down. That was after I got home though. That was in July, for both fish and caribou; it just happened to be one of them lucky days when there were caribou out there.* (SRB&A Nuiqsut Interview November 2013)

> *I went boating, mainly downriver with my* aapa [grandfather]*, downriver in the Nigliq Channel. That is where I spend most of the summer, just at the camp. I usually go in the little side channel, but not this year. [We went] from the beginning of summer until August, so June through August. To be honest we went out there lots, I think about 20 times or something. We got two caribous, right outside my* aapa*'s camp on the river. We caught them right there by the river in front of the camp. We got the two of them together. Two males. Two bulls. When there are a whole bunch of them in the river we circle around them and get the big ones.* (SRB&A Nuiqsut Interview November 2013)

In addition to describing hunting along the Nigliq Channel, Nuiqsut respondents described hunting activities in the Colville Delta, especially along the East Channel in the areas of Pisiktaġvik and Helmericks, although hunters sometimes describe shallow water conditions in this part of the Colville Delta:

> *There was quite a few that came this way too, over here near East Channel. We just seen* tuttus *[caribou] from Johnny's cabin which is right around there. We were hunting over here on the East Channel all summer. I also went up Kupigruak as far as I could go, I never really go all of the way. There was quite a few up there. It was too shallow [to go all the way up]. … They call it Kupigruak Channel on the map but we call it* Nuiqsapiaq *[first Nuiqsut]. That was during July and into August because I waited for the river to settle.* (SRB&A Nuiqsut Interview November 2013)

I also went over here to Helmericks area [off the East Channel] and to Nuiqsapiaq. Nuiqsapiaq *is over here, I think it is up here near the Elaktoveach Channel. I went up here into this little channel to get on this side over here and then went all of the way over. I just got two caribou right around the main channel, right at the "Y". That was in July. There were two to three hundred but that is nothing compared to the 10,000 that there should be. July that was when I got my three caribous over there.* (SRB&A Nuiqsut Interview November 2013)

In addition to hunting along the main channel, Nuiqsut harvesters also sometimes travel into smaller channels in the middle Colville delta, or into drainages such as Miluveach and Kachemach rivers:

Earlier in the summer I went in and out of the Miluveach and Kachemach channels. You can go in and out, like a loop. This map [you have] isn't very detailed. That was just one trip… I only saw one caribou that time, a small one. Too small. We just want to get the big ones. [I traveled] about three times [up the East Channel]. Just a round trip. Late July and early August. After breakup time, early July sometimes [you can get in the side channels]. It is right at breakup you can go [into those smaller channels]. (SRB&A Nuiqsut Interview November 2013)

We took Putu*, all the way down, and all the way to this [main] river. Those Porcupine herds, when they're coming in from the east they're mainly coming from this area. That was early September. We got about four caribou on that Kachemach River. We could see Kachemach Mound. It was on the east side, pretty close to the river. That's a quarter mile [in]. [We got] four caribou during a one day trip… [They were] not too far from the main mouth, maybe a couple miles up. We stayed in the main channel and we scrounged for caribou, but they were too far inland. The closest ones we saw were right on Kachemach area. It's always on the east side [of the channel]…. There were a couple males and two females at the most. And there was one calf, but it ran. We couldn't go after it. My nephew got one. I got one of them. It was like maybe [a group of] eight [caribou], maybe there were nine at the most, but once we start shooting they scrambled. We didn't want to do a lot of work [and chase them]. [Probably we got], like four at the most.* (SRB&A Nuiqsut Interview November 2013)

Several harvesters discussed particular caribou hunting events that took place in the Helmericks and Nuiqsapiaq area of the Colville Delta during the summer of 2013. Below are comments from two different hunters regarding similar occurrences in that area:

I was looking for Lonely Island. That's where that big herd came across. July 14. We actually went this way. We were out bearded seal hunting and it was kind of shallow so we went through [this particular river and when] we came through there that's when we saw a bunch of caribou. They were on this [east] side [of the river] and we waited a couple hours until they swam across. We were out seal hunting [and when we were] coming back to the village that's when we saw the herd. Yeah [we were on the east side]. We tried to get them on this side but they were running on the beach. They actually kept moving back and forth. There were a bunch of boats out there and we caught them in the water. They were on the beach [of Nuiqsapiaq]. We were actually around that island for like eight hours. There were a bunch of boats. It was early in the morning and we had a VHF and told a bunch of people and they came out [to help]. We cut them up and brought them back. (SRB&A Nuiqsut Interview November 2013)

The last three caribous I got were [in an area where we] almost had to start pushing the boats, they were in here…. I had never been in this area with the boat. That is where people were saying caribou were: Nuiqsapiaq. They were saying the caribou were crossing from Helmericks to Nuiqsapiaq. My cousin wanted to go west but I told him there were going to be stragglers, so we went and got the stragglers. Probably 20 in the herd. That was in August

before we went whaling… The longest trip was 28 hours. That is when I started going to the ocean in July. That one time [I just mentioned] I specifically went looking for caribou, but I look [for caribou] during every trip. (SRB&A Nuiqsut Interview November 2013)

In addition to hunting caribou in the Colville Delta, respondents also described going upriver along the Colville by boat looking for caribou during the summer months. Harvesters usually travel upriver with a specific destination or area in mind (e.g. Ocean Point, Sentinel Hill and *Umiraq*) for harvesting caribou and often mentioned their use of the *Napasulu* channel, which is generally a more navigable channel than *Putu:*

Boating, I went only around Ocean Point, just on the main channel [of the Colville River]. Napasulu*. I didn't see any caribou going up that way. [I went] maybe three times in June and July. Not a single caribou.* (SRB&A Nuiqsut Interview November 2013)

We went to Umiraq *once, moose hunting and caribou hunting, but there were no caribou up there this summer.* [Umiraq] *is around here somewhere, this Sentinel Hill, past the creek… it is a pretty big bluff, like an upside down boat, the hill. [Also we went] maybe three times to Ocean Point. Once moose season opened we went all the way up to* Umiraq*, a day trip there and back.* (SRB&A Nuiqsut Interview November 2013)

I went on the Colville for a day [to] Umiraq*, it is one big bluff right on the edge of the river, on the west side of the channel….* Umiraq *is about the halfway point – that's what it means – [halfway] to the Chandler River. [That was in] July and August of last year. I got one caribou at* Umiraq*, on the main Colville River, it was right in the middle of the river. It was a male. That was in August. I have been going back and forth on the Colville. Just [got] one caribou. Later on another caribou came up but nobody got it.* (SRB&A Nuiqsut Interview November 2013)

Several individuals mentioned having escorted a group of school children upriver on the Colville for a hunting and traditional camp. Here are comments from two different respondents discussing some of the places they went to during this trip:

When we take the youth group out we take them out to Umiraq*, and teach them to hunt.* Kayuktisiluk*, should be right here… I caught the caribou on the east side. September time, by boat. I got two caribou right there. [There were] just a few bulls.* [Kayuktisiluk], *it used to be an old Native store right there, like a trading area. That is where it used to be. It was open in the 1912 time [period]. I hardly go there now because it is getting so shallow. I go almost every weekend up to* Umiraq. *On weekends we camp. These are mostly day trips. Showed those kids how to hunt caribou or set up a net.* (SRB&A Nuiqsut Interview November 2013)

We went camping once with the students all weekend. That was pretty amazing. That was by Umiraq*. We got one [caribou] on the top of one of these hills. That was just one, there were like eight of them [caribou] together so we just got one of them.* (SRB&A Nuiqsut Interview November 2013)

A number of hunters travel to the ocean throughout the summer to harvest seals in addition to hunting caribou in coastal areas and along Nigliq Channel or the East Channel when returning from the ocean. Residents also hunt for caribou in the Fish Creek area, either while hunting in coastal and ocean areas or when traveling to cabins or fish camps on Fish Creek. As noted above, respondents have less frequently reported hunting for caribou along Fish Creek in recent years. One respondent noted that the channels have become more difficult to navigate:

I went into Fish Creek to look for caribou but I didn't see any. It has changed, the river has changed a lot; there are sandbars all over. I was there in the middle of July or end of July. I went in there twice, I think. (SRB&A Nuiqsut Interview November 2013)

Despite an apparent decrease in boating activities along Fish Creek, several individuals stressed that the Fish Creek area is still a key subsistence area, particularly for fishing. Many of these activities occur during the late fall and early winter when residents can travel to the area using overland methods such as four-wheelers and snowmachines.

Some Nuiqsut caribou hunters travel substantial distances upriver on the Colville River during the late summer and early fall in search of both caribou and moose. Hunters described traveling into the Chandler River, and occasionally the mouth of the Anaktuvuk River, although these two rivers can only be accessed when water levels are higher.

Hunters who travel farther upriver often use Umiat as a landmark to describe their upriver activities, which often include travel into Chandler River when possible. These upriver hunting trips are often targeting moose, but residents indicate that if they are unsuccessful harvesting moose these trips may "turn into" caribou hunting trips. Two individuals observed,

> *[We got to] just before Umiat. Like from [here], I could see Umiat from that side, so it's got to be around here [where we went]. I tried to go inside Chandler, but it was too shallow, so I just stayed along the main channel. I stayed along the main channel [of the Colville]. [We were looking for] caribou and moose. I tried to go for caribou in September but I didn't get anything.* (SRB&A Nuiqsut Interview November 2013)

> *I also went down this way, we went to Umiat. That was mainly for moose, but we went down there and we saw a caribou [while] we were waiting for moose, and then [we can] turn it into a caribou [hunting] trip if we don't catch a moose. But then we didn't see caribous on the way back [home]. I know we went into Chandler, also. This was the same trip as when we went up to Umiat. We first made it to here by the split and then the second day we went up Chandler and then made our way back out [from Chandler] and went to Umiat the next day. It has been a long time since we went up there… August, [we stayed] four days, we were hoping to catch [a caribou] on the way home.* (SRB&A Nuiqsut Interview November 2013)

A number of Nuiqsut harvesters discussed their use of the Itkillik River for caribou hunting. The Itkillik River is located close to Nuiqsut and hunters often describe hunting close to the mouth of Itkillik River, sometimes in conjunction with hunting trips in other parts of the Colville Delta or upriver on the Colville. Respondents frequently mention the "old airport" along the Itkillik River in their discussions, and most respondents agree that the water levels in the river make it difficult to hunt too far up without a jet unit.

> *I did [hunt for caribou in the Itkillik River]. I went like 15 to 20 miles in. That was a different trip. We would go up the Colville one day, then go home and go up the Itkillik the next day. [We went] maybe four miles past the old airport. It is about there. All those Itkillik trips are in June, July, and August, too. I went maybe five times total. This is the furthest I went, [it got] too shallow after that. [There were] no caribou up [the Colville] River or up Itkillik. Some people got some but when we went they were all gone.* (SRB&A Nuiqsut Interview November 2013)

> *I went to Kachemach Creek and came back out and then went inside Itkillik River, to the old airport. [We went] right after the river broke, [during the] first week or second week of June.* (SRB&A Nuiqsut Interview November 2013)

In addition to traveling and hunting along rivers by boat, residents traveled overland by four-wheeler looking for caribou. A commonly used, popular and easily accessed area to do this type of caribou hunting is west of Nuiqsut, from the village overland extending towards Ublutuoch River, Fish Creek, and Ocean Point. Hunters describe a similar pattern of activities in this area and use various lakes as land marks:

> *I went out how many times on this side, with Hondas. Like 10 miles, 14 miles, just around that Fish Creek line. There's some places we can't even cross though. We go around here,*

as far as four-wheelers can go. There's like a trail, a Honda trail that goes off in to a "Y" once you get about 10 miles out. We [also] go toward Ocean Point [once we hit Ublutuoch River]. There was a couple of caribous laying in the lakes, on one of those [lakes]. That's only with a boat [that we can go all the way to Ocean Point]. With a Honda sometimes we make our own trail – like a shortcut, when it gets dark. (SRB&A Nuiqsut Interview November 2013)

I went a long way out, to Fish Creek. I went straight back, close by the same trail. I went out there [multiple] times. Once in July, twice in August, and four times in September. Two of them were scouting trips. The farthest one [was harvested at the end of the trip], next closest [harvest was] right by this big lake. That was only five miles [from the community]; that was the closest one. (SRB&A Nuiqsut Interview November 2013)

[Leaving] from the airport – there's the dump, there's the airport – [we] go straight through the lakes [toward Ublutuoch River]. I think the farthest one [I got] was [from the] airport, 12 miles, and that was two males. I went this way, and then around through these lakes, and back. I should have gone through the dump. They were all right through here [on the upper part of the use area toward Ublutuoch River]. From the airport, behind the airport, I think [I went] nine times. (SRB&A Nuiqsut Interview November 2013)

When winter arrives and snow cover allows for snowmachine travel, some Nuiqsut hunters will hunt caribou to supplement their summertime harvests. Winter hunters generally travel greater distances overland than they would with four-wheelers. Year 6 winter caribou hunters described traveling in the same area as described above for four-wheelers but also went farther south towards the Kogosukruk River on the west side of the Colville and along the Itkillik River on the east side of the Colville. Several harvesters described these activities as follows:

We went hunting by snowmachine on that old trail, the same old trail out towards Fish Creek. We just go in between [Nuiqsut and Fish Creek], around here somewhere. There is a little cabin [a local resident] has down there. I put [fish] nets on the Y, close to these cabins, just right in between the Y, for one week. Every day I travel back and forth to check the nets and look for caribou. This [area] is pretty high, south of Nuiqsut. [I look] just in this area for caribou. Out here too recently I got a couple of caribou out here, there are quite a few herds scattered around just southwest of town. [The one I got was] on its own. (SRB&A Nuiqsut Interview November 2013)

And over [from Ocean Point I went] right at Kitik *area so that should be [around here], it's not very far from Ocean Point. If you cut straight across you could get there. Yeah we did camp out one time overnight. We went to Ocean Point and then we went this way across the river and dodged the lakes. It was springtime, really warm.* (SRB&A Nuiqsut Interview November 2013)

I passed a few times this way [on snowmachine]. I usually go straight out to the west. I go up to Judy Creek where it starts [confluence of Judy and Fish creeks]. And I come out, and follow it down. I go all the way down to this area for wolves and caribou. Yeah [I go inside of these two lakes]. That's where I go and come back around this way. Yeah [I follow the creek back up but] I stay on this side though. And then I cross straight to Ocean Point and then straight home. (SRB&A Nuiqsut Interview November 2013)

Characteristics of Caribou Use Areas and Harvest Sites

Study participants characterized their Year 6 caribou use areas for the following variables: timing of hunting activities, travel method, success (measured according to whether the respondent successfully harvested caribou in the use area or not), duration of trips, and frequency of trips. Caribou harvest locations were

characterized by month, number of caribou harvested, and the sex of caribou harvested. The following sections describe the characteristics listed above as they pertain to caribou use areas and harvest sites.

Timing

Figure 1 shows that caribou hunting activities over the six study years have occurred during every month of the year with the most use areas reported between July and August. For Year 6, respondents reported traveling to over 50 percent of their caribou use areas during the month of July, followed closely by August, during which they visited over 40 percent of their use areas. Figure 2 shows the percentage of caribou harvested by respondents, by month. Again, during most years July and August have accounted for a majority of the harvest. The only exception was in Year 4, when a substantial portion of the harvest occurred in September. The timing of Nuiqsut respondents' caribou harvests in Year 6 was similar to previous study years, in that they harvested more caribou in July than in any other month, followed closely by August. The timing of caribou harvest is influenced by factors such as the availability of caribou (whether they are in the area) and also environmental factors like weather and travel conditions.

Maps 13 through 16 show Year 6 caribou subsistence use areas and harvest locations by month, and Maps 17 and 18 show the extent of previous study years (Years 1 through 5) as a single polygon, with all harvest locations, by month. According to Year 6 active harvester interviews, during the month of May harvesters reported that they traveled between Nuiqsut and Ocean Point, along the East Channel of the Colville, and also south along the Colville from Ocean Point (Map 13). Respondents only noted one caribou harvest location during the month of May (Map 15). Compared to previous years activities shown on Map 17, Year 6 respondents did not travel as far overland in May as they have during some previous years in which respondents reported having traveled as far as Ikpikpuk River and Umiat. Travel in May is highly dependent on snow and river conditions, with most May travel conducted by snowmachine. A review of weather data for May 2013 indicates that temperatures were regularly above freezing during the latter half of the month, suggesting that snow conditions may not have been conducive to snowmachine travel. In fact, the max temperature in May of 2013 was 43 degrees Fahrenheit (National Climatic Data Center 2015), whereas the average max temperature in May is 26 degrees (Weather Underground 2015).

Map 13 shows that during the months of June through September, Year 6 respondents reported travel along the rivers and coast, with riverine use areas being the most extensive during the month of August. During these months, respondents traveled as far as Cape Halkett on the coast of the Beaufort Sea to the west of the Colville Delta, and as far as Oliktok Point on the coast east of the Colville Delta. In August, respondents traveled 30 to 40 miles past Umiat on the Colville and 20 to 30 miles along the Chandler River.

As shown on Map 13, Year 6 respondents focused more of their June and July hunting activities on the Colville Delta, specifically the Nigliq Channel in June and both the Nigliq and East channels in July. During August and September, Nuiqsut hunters focused their hunting activities more heavily on areas upriver from the community, with a majority of activity occurring between the community and Chandler River. Respondents also reported traveling greater distances up the Itkillik River in August and September. Map 17 shows that respondents' June through September travel patterns were similar in previous study years, with some differences. In contrast to previous study years, Year 6 respondents did not hunt along the Anaktuvuk River. Year 6 respondents also reported traveling farther up the Itkillik River during the summer months than they have during any previous years.

Figure 1: Nuiqsut Percentage of Caribou Use Areas by Month, Years 1-6

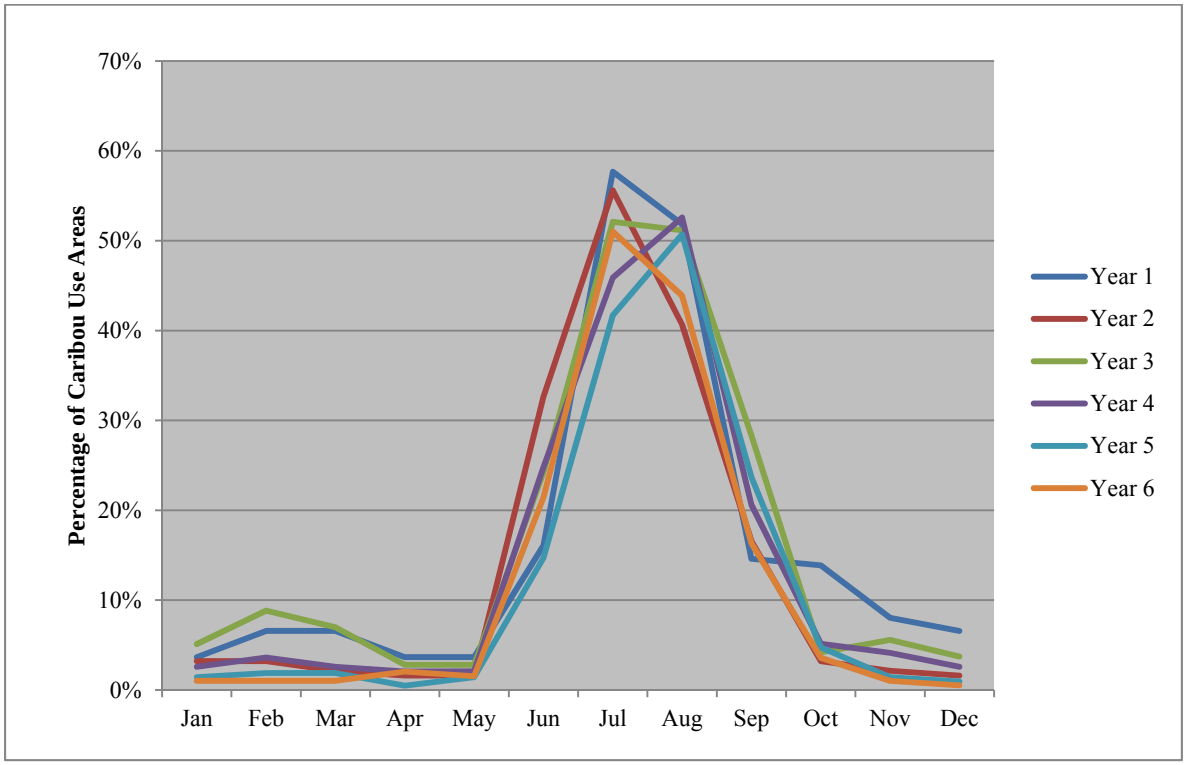
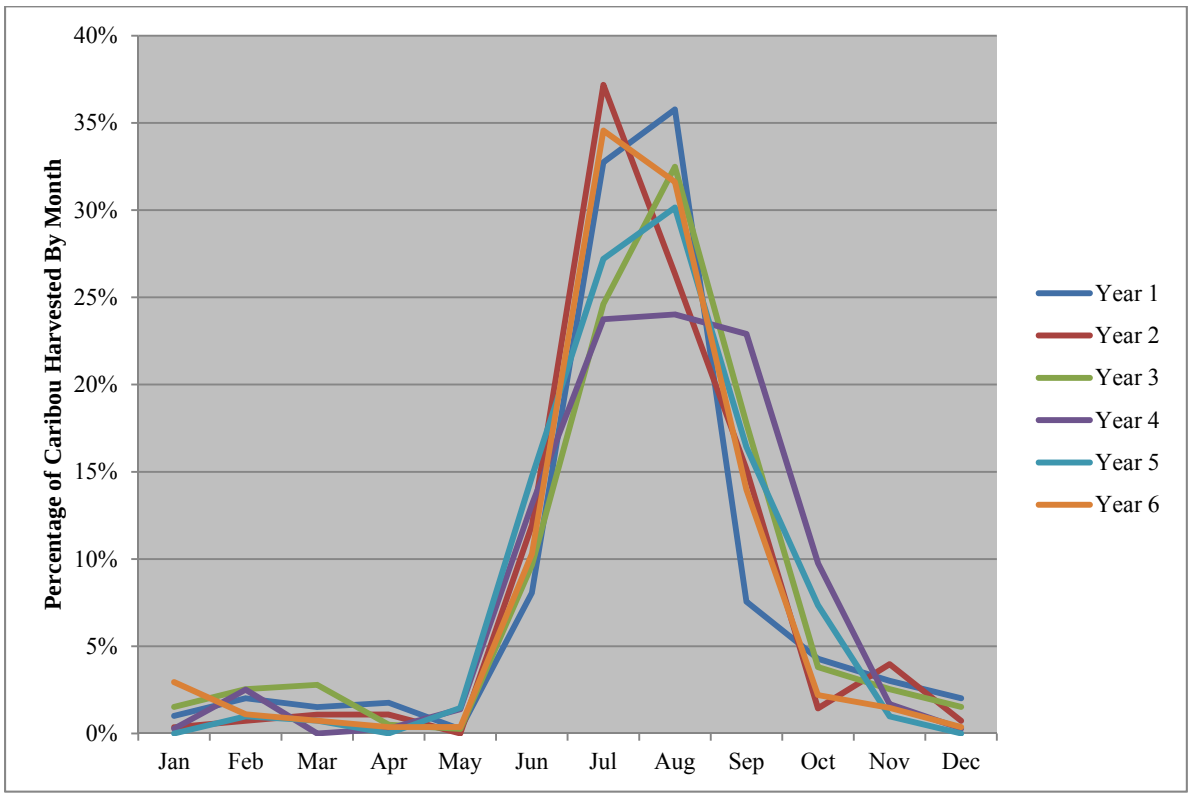


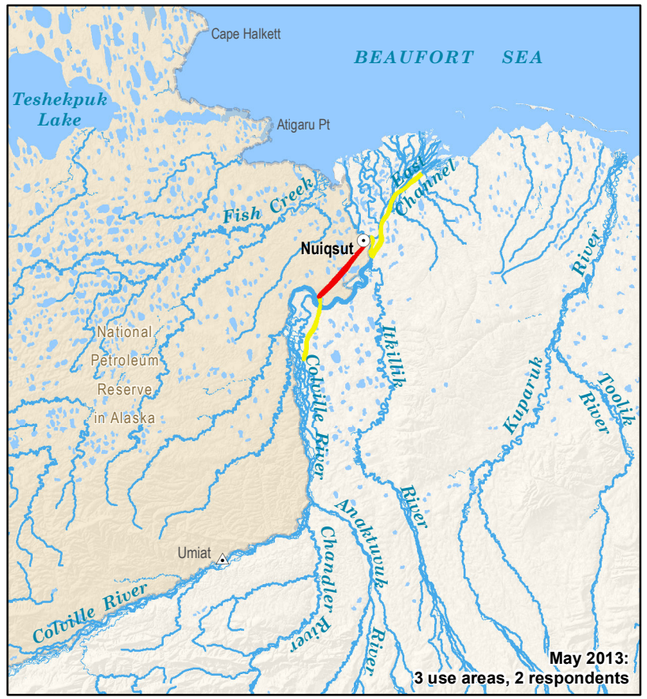
Figure 2: Nuiqsut Percentage of Caribou Harvested by Month, Years 1-6

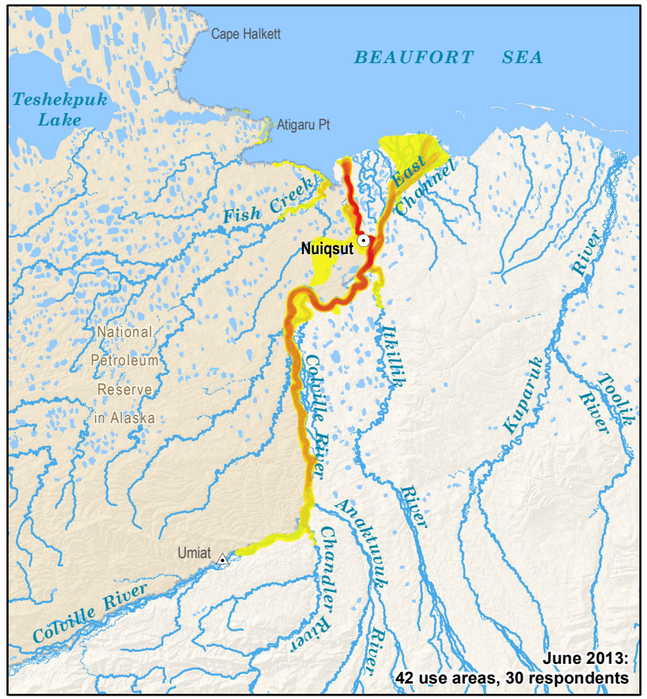


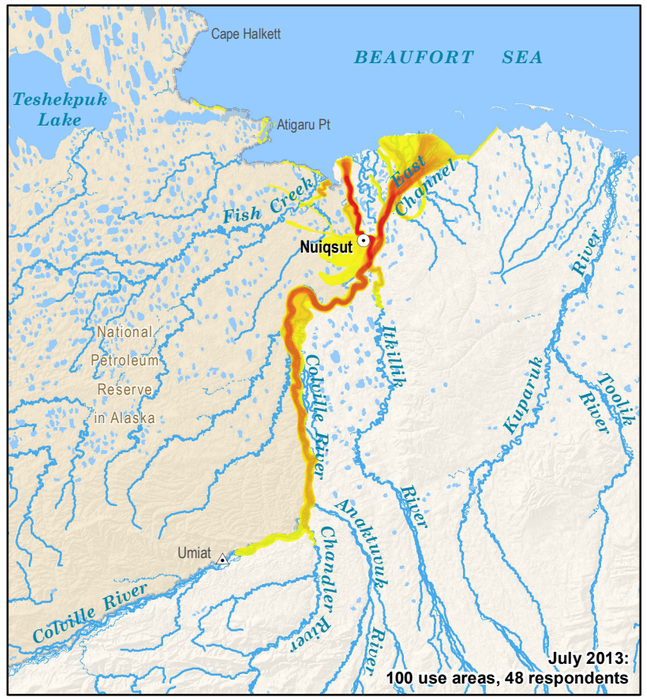
Map 13
Caribou Subsistence Use Areas, May - October, Year 6

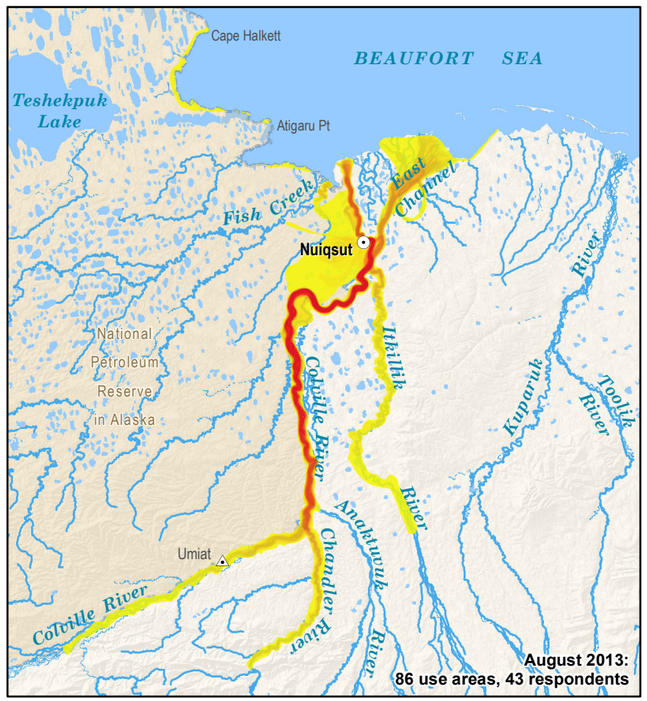
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 57 active harvesters during November of 2013.

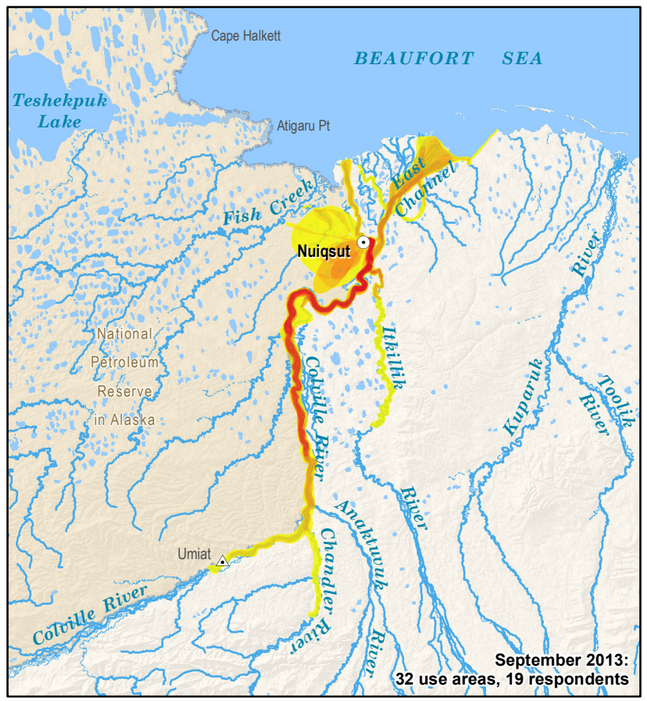
Other areas may have been used for resource harvesting.







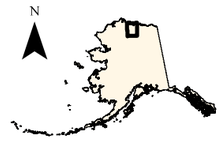




LEGEND

Overlapping Polygons

National Petroleum Reserve Alaska



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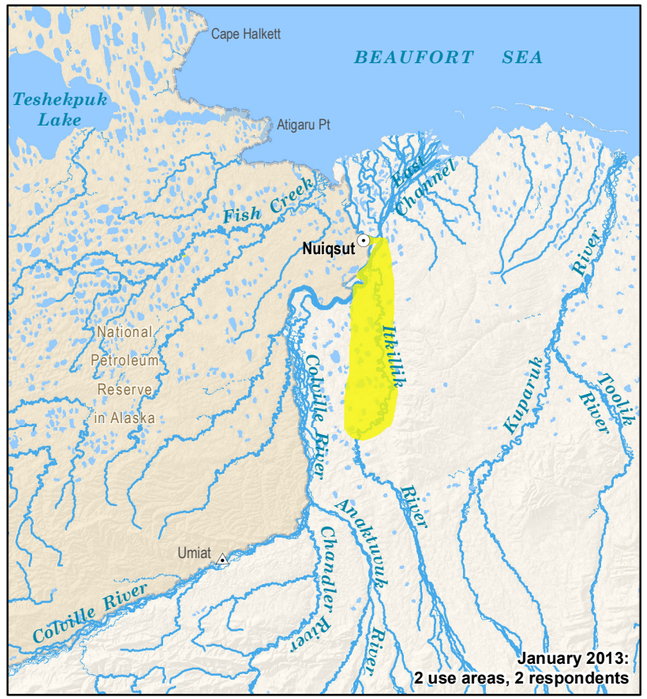
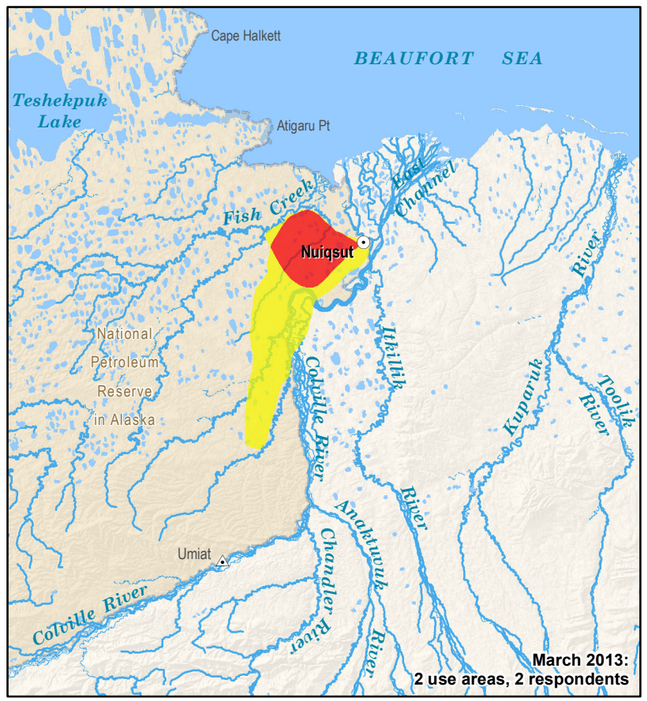
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net





Map 14
Caribou Subsistence Use Areas, November - April, Year 6

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 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

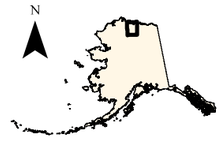
LEGEND

Overlapping Polygons

High

Low

National Petroleum Reserve Alaska



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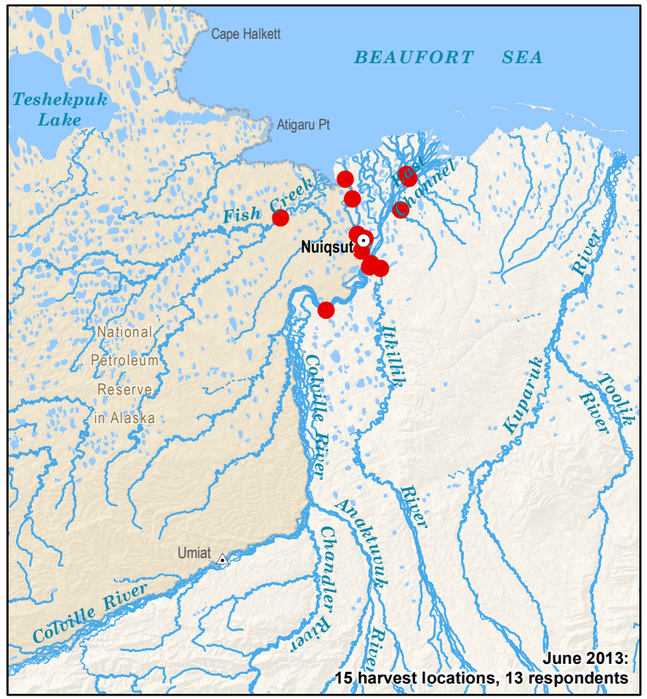
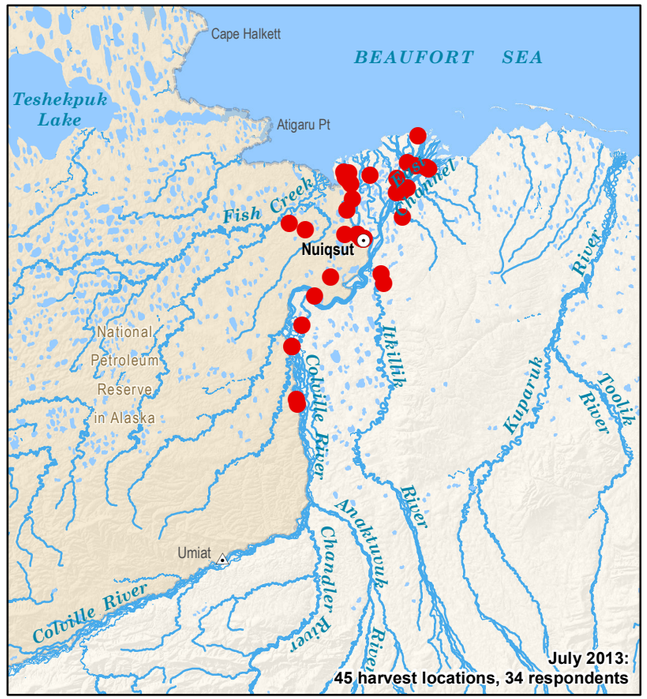
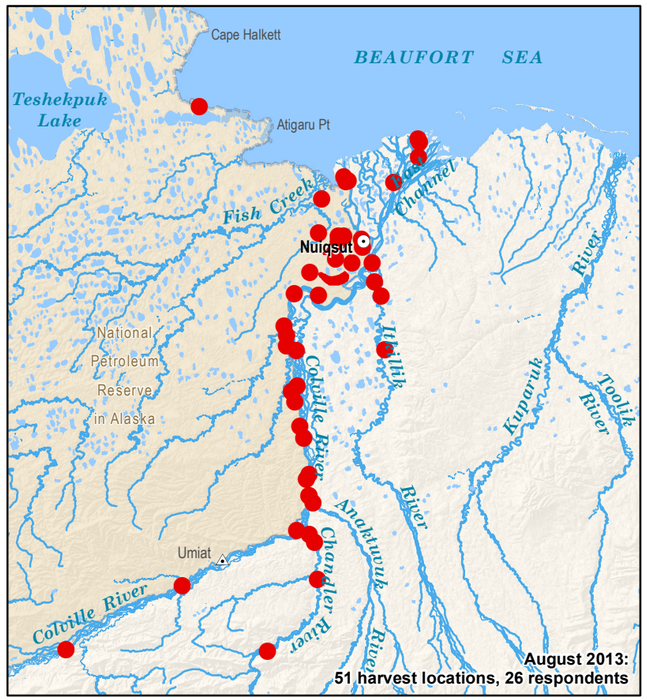
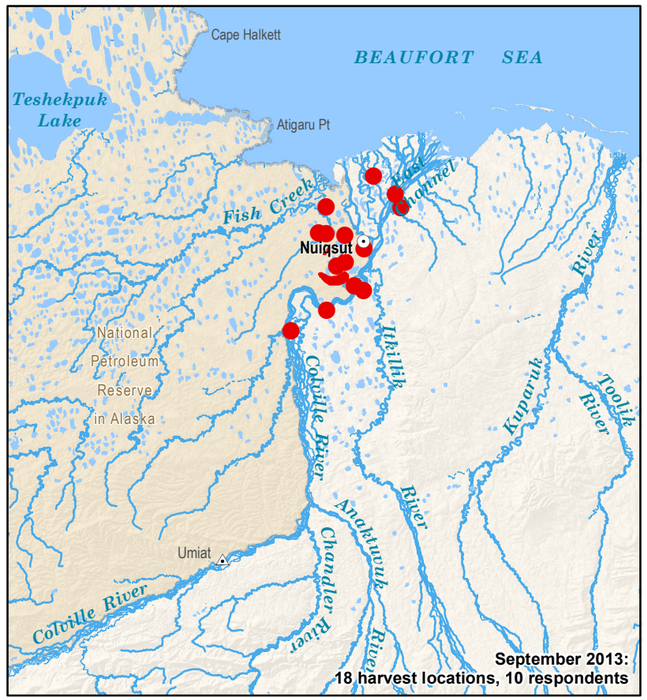
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net









Map 15
Caribou Harvest Locations
May - October, Year 6

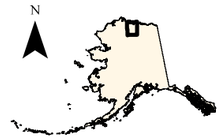
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations

National Petroleum Reserve Alaska



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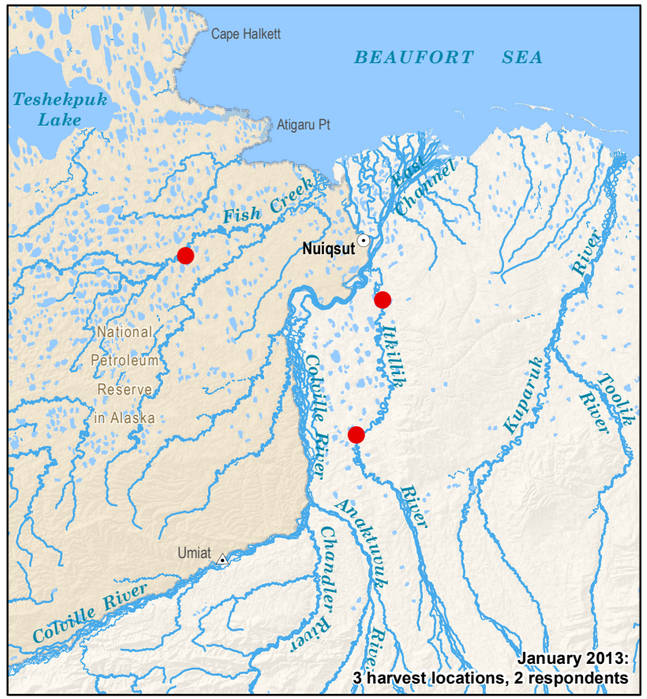


Map 16
Caribou Harvest Locations
November - April, Year 6

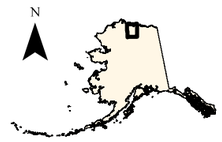
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations

National Petroleum Reserve Alaska



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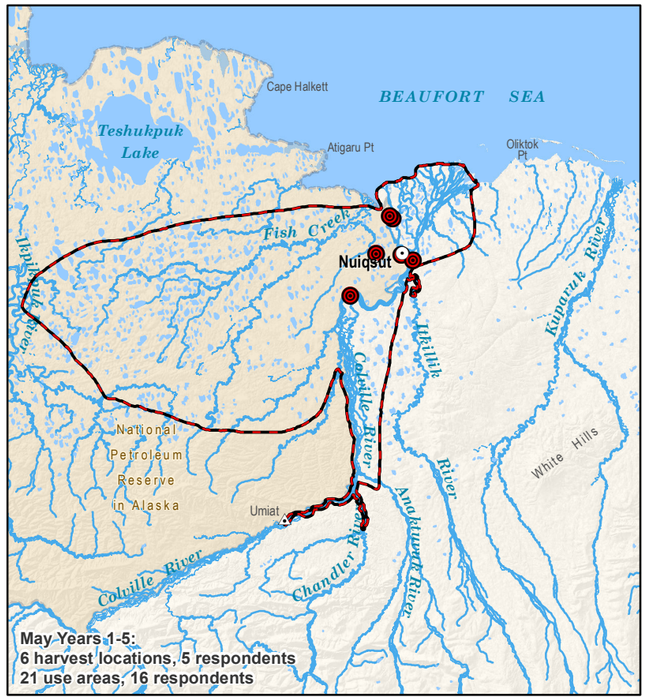
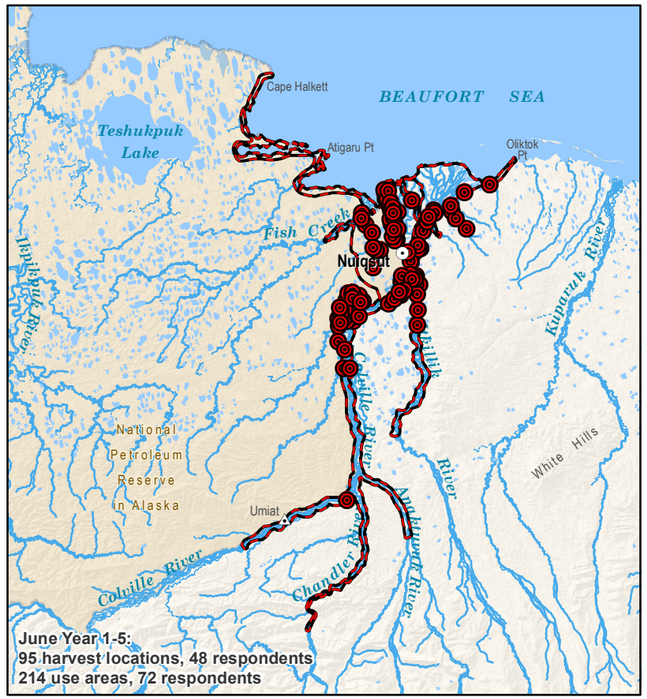
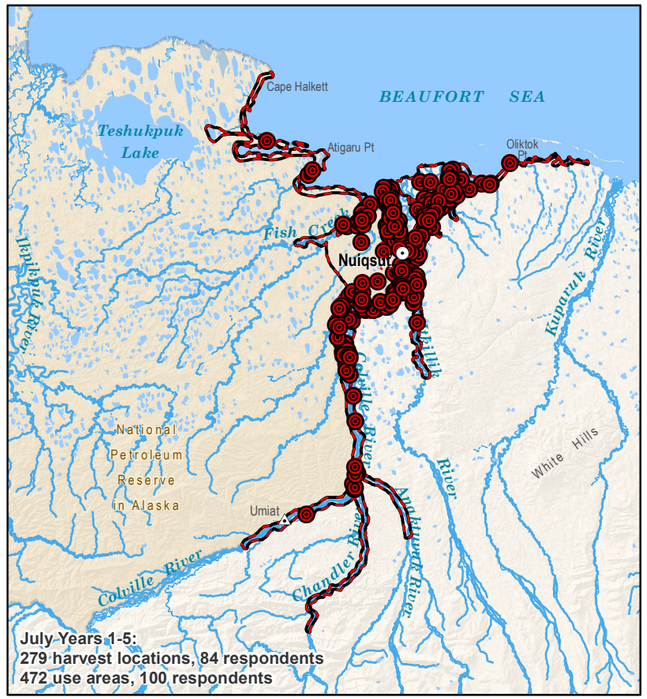
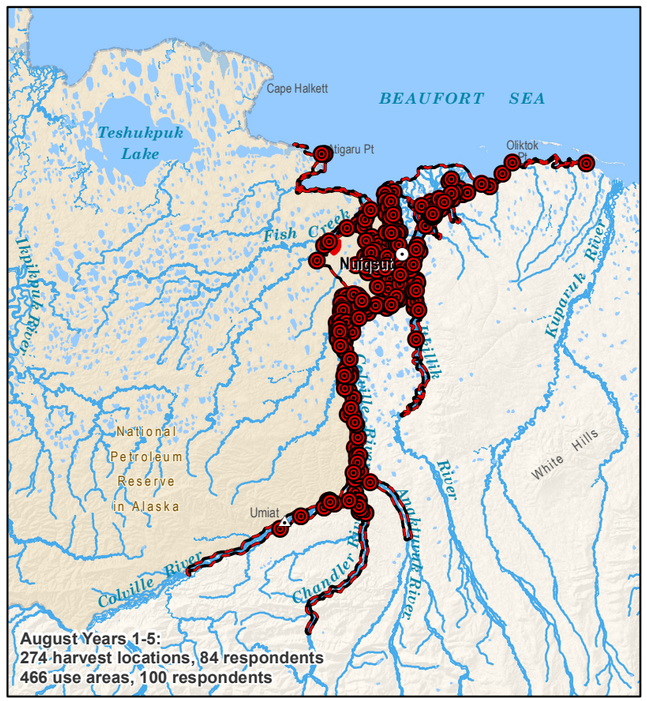
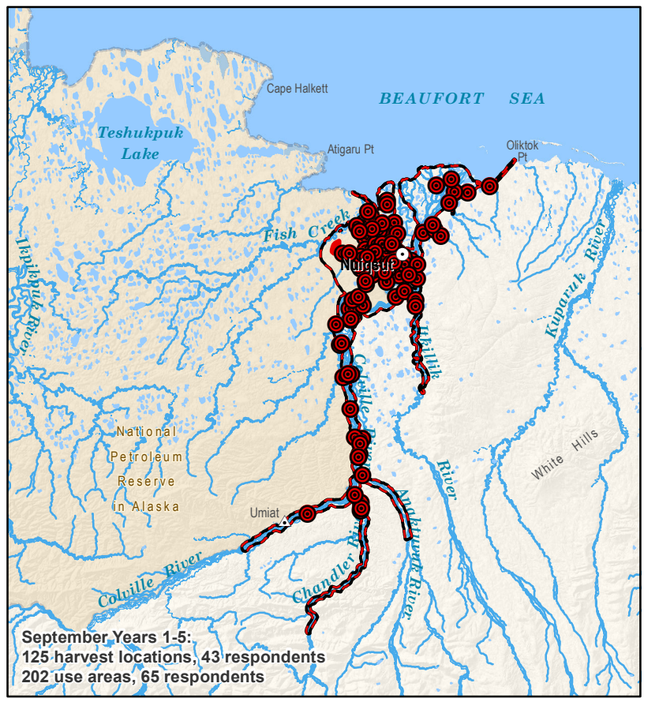
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

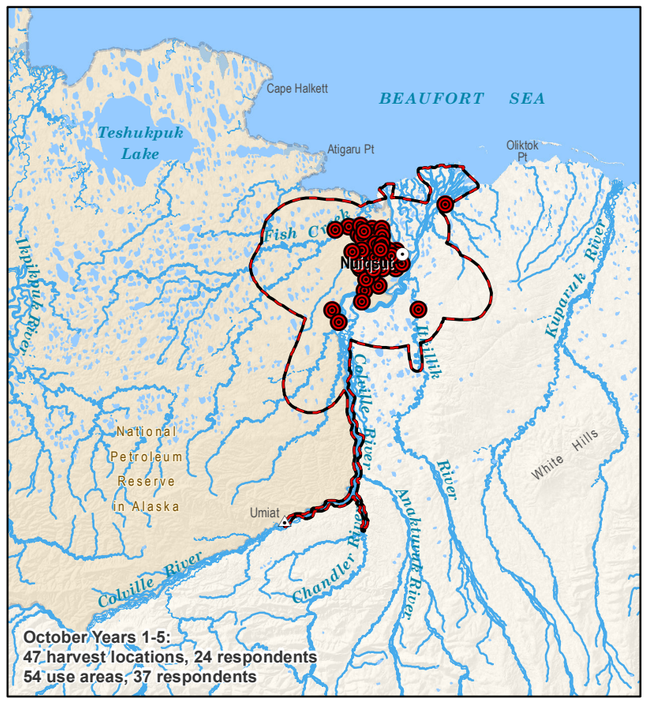












Map 17
Caribou Harvest Locations and Use Areas, May-October, Years 1-5

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 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations

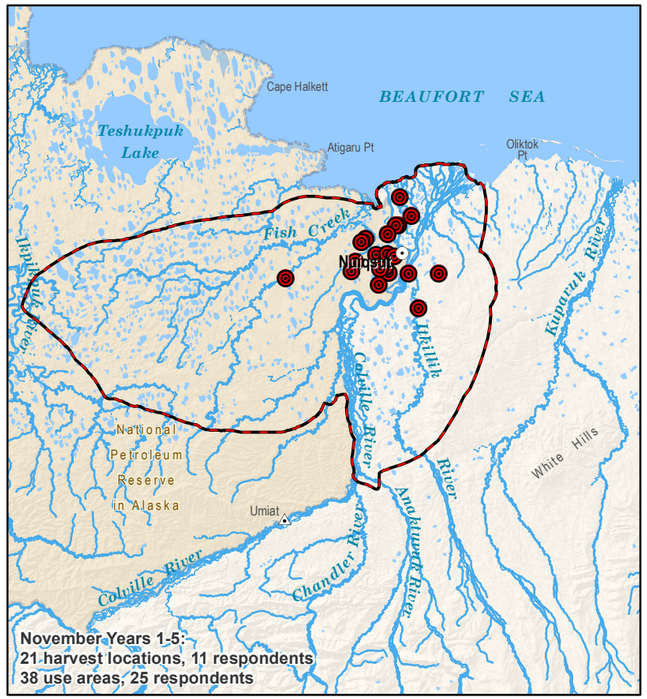
Use Areas

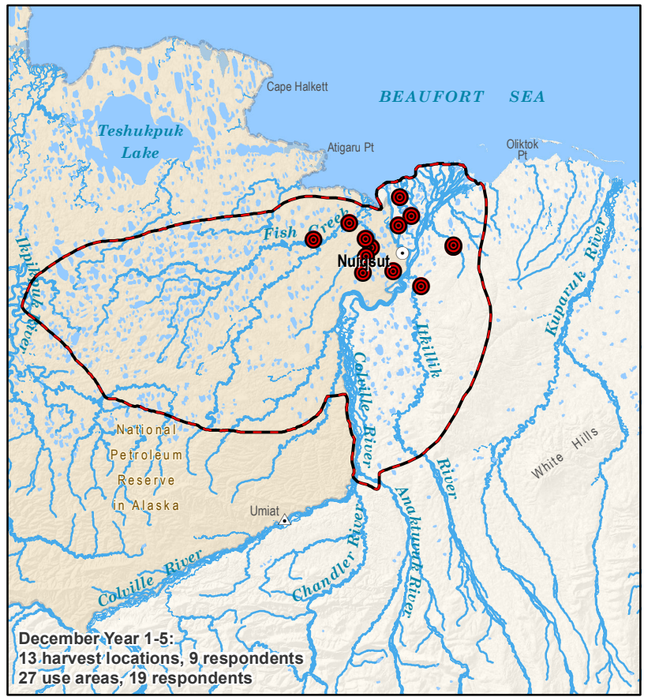
National Petroleum Reserve Alaska

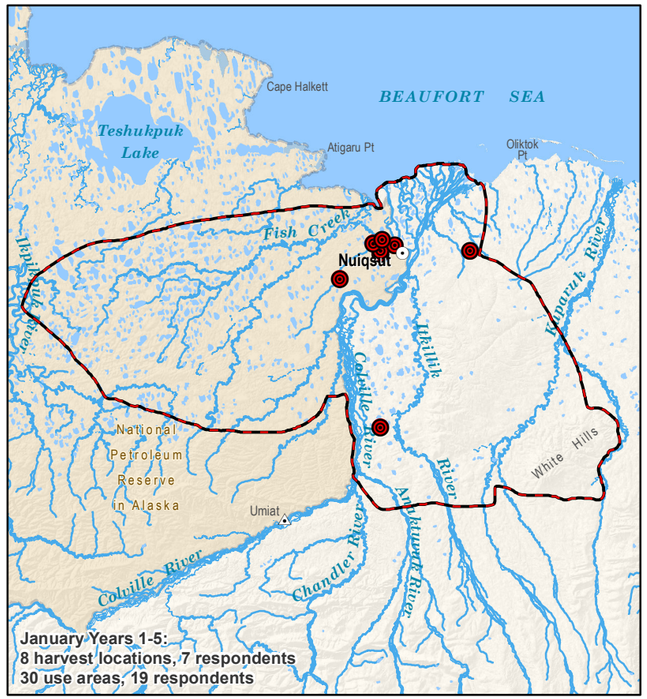
0 10 20 40
Miles

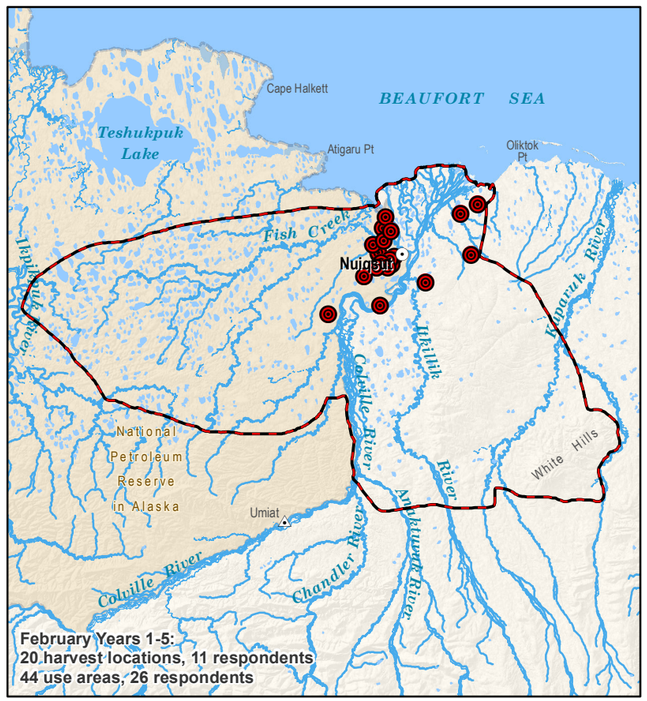
SCALE: 1:1,500,000

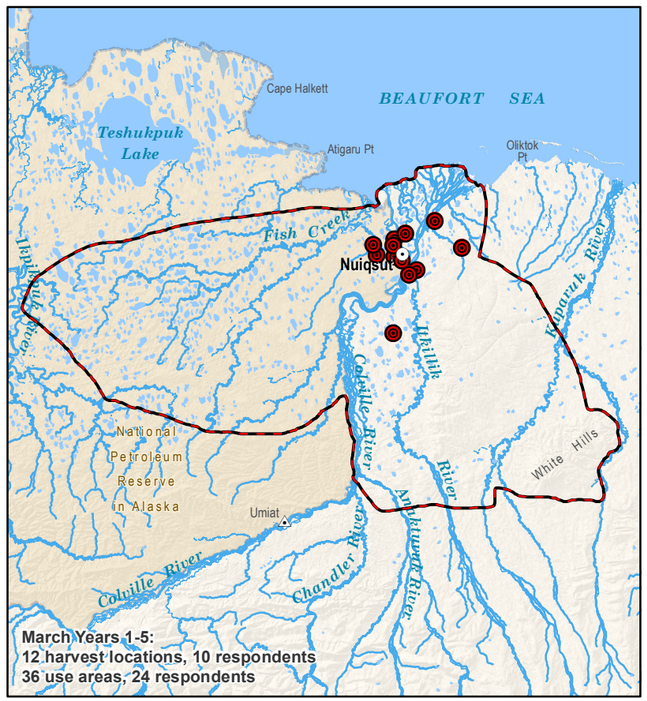
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

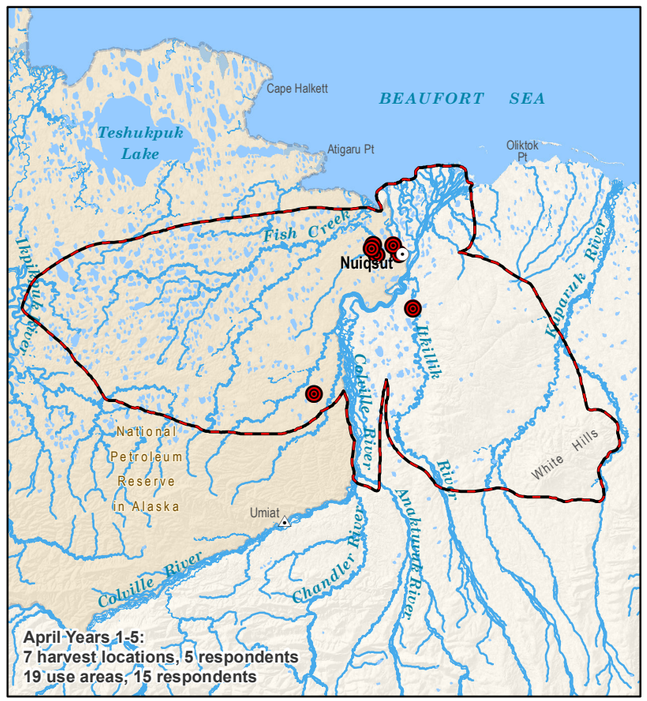












Map 18
Caribou Harvest Locations and Use Areas, November-April, Years 1-5

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 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations

Use Areas

National Petroleum Reserve Alaska

0 10 20 40
Miles

SCALE: 1:1,500,000

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

Overall, harvest locations during the summer months occurred in similar locations for all six years of the study, with the majority of harvests occurring close to the community and harvests occurring with less frequency with increased distance from the community (Map 15, Map 17). This trend may be due to the fact that a higher number of trips are taken within a short distance of Nuiqsut compared to the number of long distance trips taken. Upriver trips are also often combined with moose hunting, and therefore caribou are not the only target species during these trips. During the month of June, Year 6 caribou harvest locations were clustered closer to the village along the Nigliq Channel, near the mouth of Itkillik River and on the East Channel, at Fish Creek and around Ocean Point (Map 15). In July the pattern of harvest locations appears similar, with a greater number of harvest locations as well as an expansion of harvest locations upriver to the Ocean Point and *Kitik* area on the Colville River. During August, harvest sites are located at greater distances from Nuiqsut. Only during August did Nuiqsut hunters harvest caribou south of Sentinel Hill on the Colville and into Chandler River. Harvests took place at the greatest distance from the community during August; this month included harvests as far south as approximately 30 miles past Umiat on the Colville and as far north as Kogru River on the Beaufort Coast (Map 15). During Year 6, respondents harvested caribou farther up the Colville and Chandler rivers than they have in any previous study year (Map 15, Map 17). In Year 6, September harvest locations were similar to those in June and occurred relatively close to the village and to the west toward Fish Creek.

Starting in August and peaking in September and October, harvest activities increase in the overland area west of the community (Map 13 and Map 15). October hunting activities occur almost solely in overland areas (Map 13), as do hunting activities for the rest of the winter months (Map 14). During October, November, and December the few respondents who reported caribou hunting did so in an overland area west of Nuiqsut reaching slightly past Fish Creek and spanning south to Ocean Point and north to the Beaufort coast. In comparison to the previous five study years (Maps 17 and 18), Year 6 respondents did not travel as extensively during October, November, and December as they have some other years.

During the mid-winter and early spring months of January through April, Year 6 respondents hunted in the immediate vicinity of Nuiqsut, in the area west of the Colville River toward Fish Creek and Ocean Point, and in overland areas extending toward the Kogosukruk River and around the Itkillik River approximately 40 miles south of the community (Map 14). Previous study years show harvesters accessing overland areas as far west as the Ikpikpuk River and to the southeast extending beyond the Kuparuk River to the White Hills and the Toolik River (Map 18).

During Year 6, successful winter harvests were made near the community during all months between October and April (Maps 15 and 16). Residents have noted that their primary target during winter snowmachine trips are wolf and wolverine and that caribou are sometimes harvested as needed and available during these trips. Because of the focus on caribou in this study, it is possible that not all harvesters report the full extent of their winter activities due to the fact that they view their winter activities as targeted towards wolf and wolverine rather than caribou.

Travel Method

Continuing the trend of the previous five study years, Year 6 respondents reported that boats were their principal mode of travel for caribou harvesting activities: 77 percent of caribou use areas in Year 6 were accessed by boat, followed by four-wheeler (11 percent), snowmachine (10 percent) and truck (one percent) (Table 9).

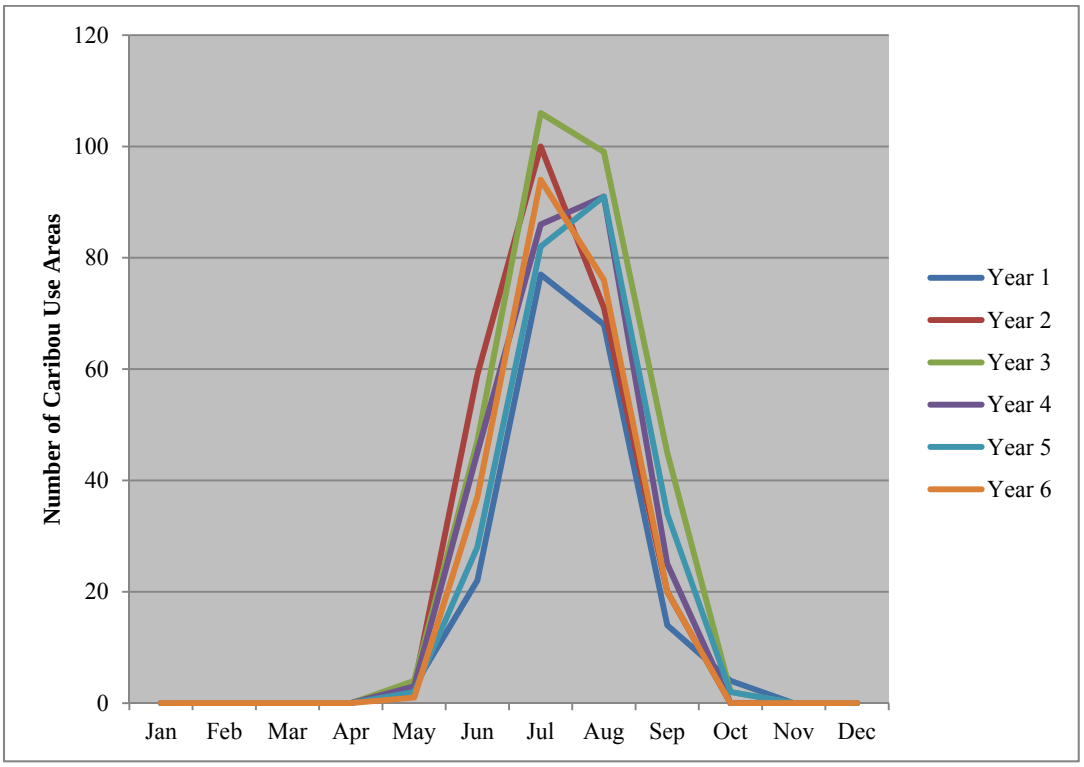
In general, boat travel begins as soon as the ice breaks up in either May or June and continues until September or October when the waterways ice over again. In terms of the number of use areas, the peak month for boat travel for Years 1, 2, and 3 was July, with Years 4 and 5 having a slightly later peak in August, and Year 6 peaking again in July (Figure 3). Annual differences in the peak of boating activities may be explained by the timing of break up in the spring and also the availability or lack of availability of caribou in boat-accessed use areas during each ice-free month.

Table 9: Travel Method to Caribou Use Areas

Travel Method	Percentage of Caribou Use Areas					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Boat	74%	80%	74%	80%	74%	77%
Snowmachine	22%	9%	16%	12%	8%	10%
Four-wheeler	4%	9%	9%	9%	17%	11%
Truck	2%	2%	0%	0%	1%	1%
Total	100%	100%	100%	100%	100%	100%

Stephen R. Braund & Associates, 2014.

Figure 3: Boat Use by Month, Years 1-6



Based on respondent observation in Year 6, the rivers broke up in June. Residents noted that certain areas are more accessible just after breakup but are too shallow during other times of the year. Several individuals observed that boating early in the year allows access to areas that are difficult to access later in the summer, such as some of the smaller channels of the Colville River delta, *Putu*, and Itkillik River:

> *After breakup time, early July sometimes [you can get in the side channels]. It is right at breakup you can go [into those smaller channels]. Same with the Itkillik, you can go in there early July [because the water is high enough].* (SRB&A Nuiqsut Interview November 2013)

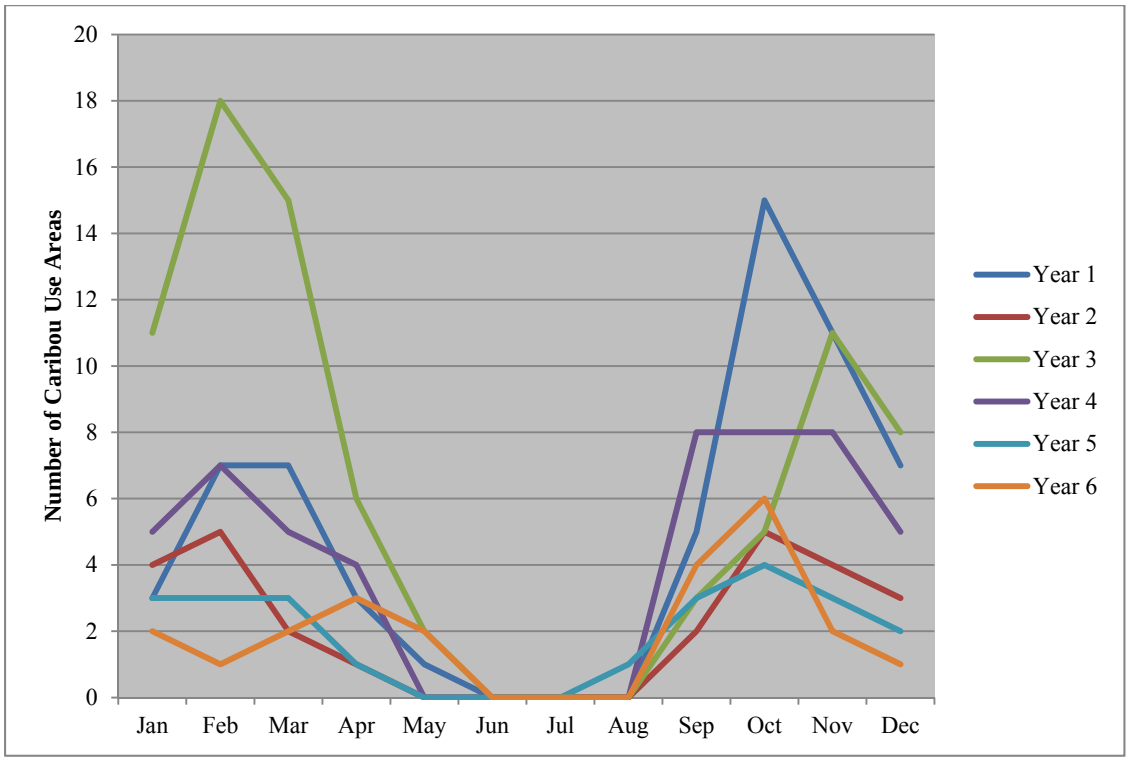
> *We go through [*Napasulu*]. Cause that [*Putu*] part is too shallow. When it's like the first break up you can [get through] but after that it's too shallow.* (SRB&A Nuiqsut Interview November 2013)

*I didn't take this one [*Putu*] it was too shallow. I just went along the main channel. It was too shallow for this one. When it is deep enough it's off season. I'd say, probably July, June, I would say about June or July when it really rains. After breakup. Sometimes in August it gets deep enough.* (SRB&A Nuiqsut Interview November 2013)

Snowmachine use by active harvesters generally occurs beginning in September through April or May depending on the snow cover. During Year 6, snowmachine use occurred from September through May, with peaks in September, October, and April (Figure 4). In Year 6, 10 percent of use areas were accessed by snowmachine, which is similar to recent years but less than in Year 1 (22 percent) and Year 3 (16 percent). One respondent noted first using his snowmachine in Year 6 during October:

Yes, actually I did [go hunting] last month I think with the first snow. Good thing you mentioned it… October, no luck there either. [We went] by snowmachine. I think we went just once. (SRB&A Nuiqsut Interview November 2013)

Figure 4: Snowmachine Use by Month, Years 1-6

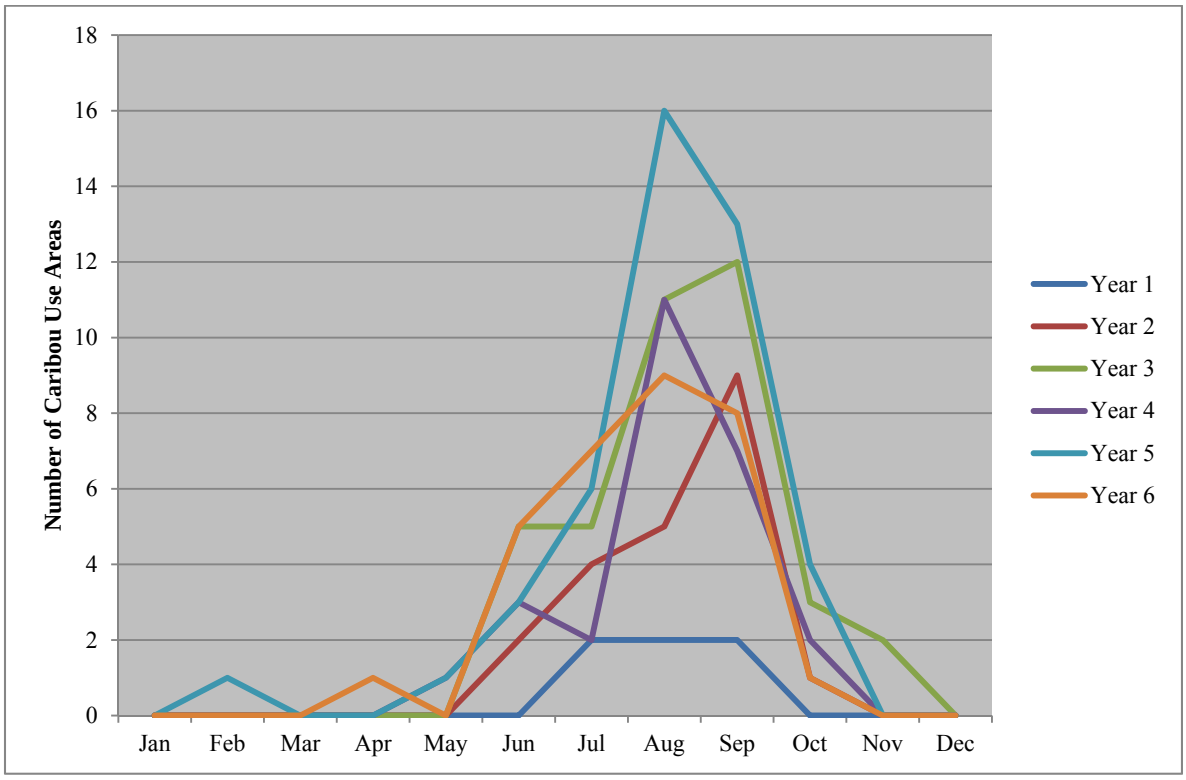


Four-wheeler use is usually limited to the summer and fall months, starting in May/June and tapering off in October/November (Figure 5). Year 6 respondents followed this pattern except that at least one respondent reported using a four-wheeler in the month of April. Respondents reported accessing a higher percentage of use areas with four-wheelers during the past two study years (Years 5 and 6; 17 percent and 11 percent, respectively) than during previous study years, when four-wheelers accounted for less than 10 percent of use areas. In Year 6, respondents' four-wheeler use peaked in August and September. The following respondent described the start of his four-wheeler season as follows:

This year we went [four-wheeling] west in September [which is early]. Crossing the lakes right after they froze up, [it was] kind of scary. We went to Fish Creek, crossed Oil Lake,

went through the flats…We got to Fish Creek and fished for grayling and waited for caribou to pop up. (SRB&A Nuiqsut Interview November 2013)

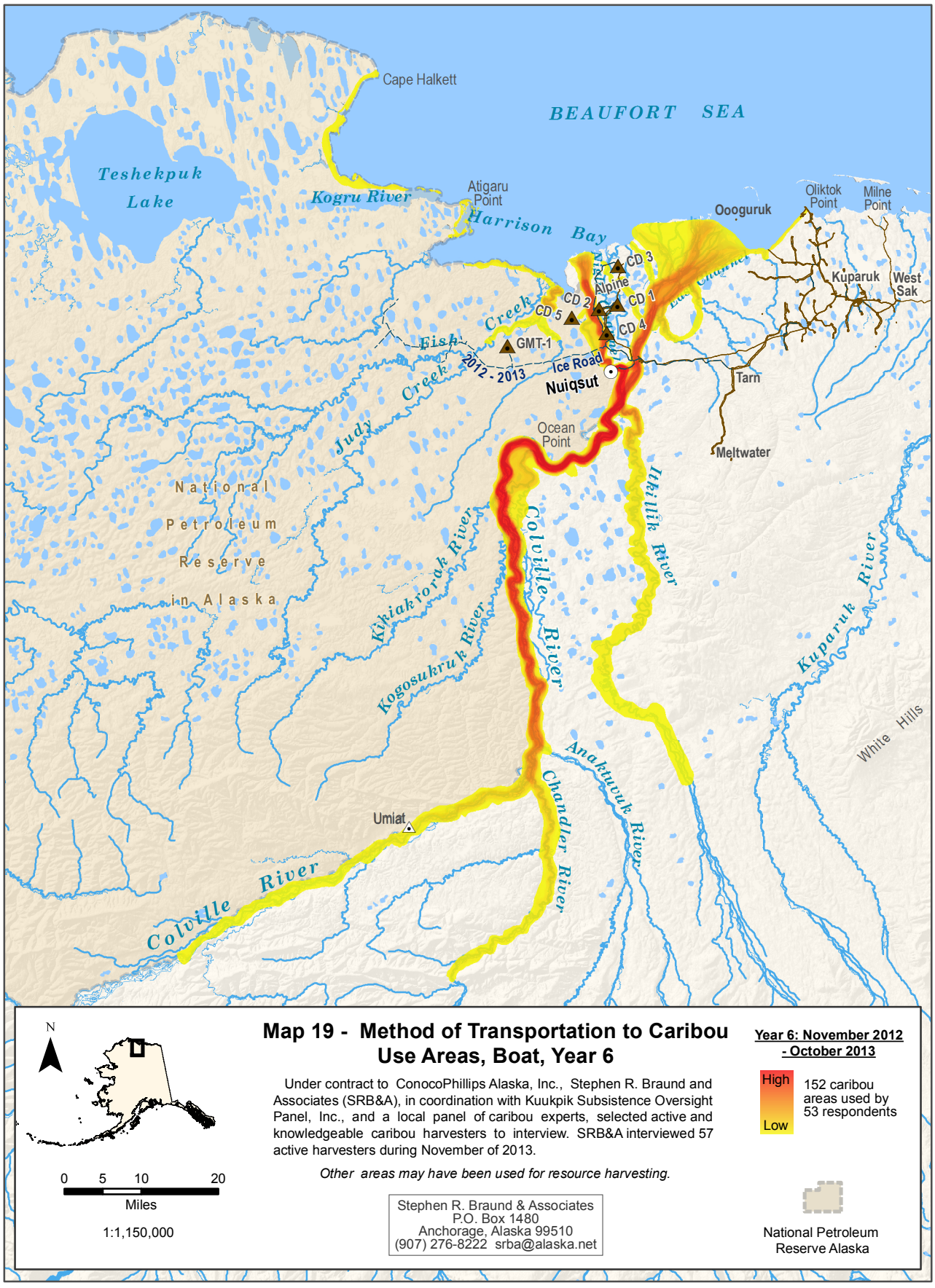
Figure 5: Four-wheeler Use by Month, Years 1-6



Caribou use areas by transportation method are shown on Maps 19 through 24. Map 19 shows that Year 6 respondents traveled by boat primarily along the Colville River, with the highest overlaps occurring along the Nigliq Channel, the East Channel of the Colville Delta, and upriver along the Colville River to the mouth of the Anaktuvuk River. Fewer overlapping use areas occur along Fish Creek, the middle Colville Delta, Miluveach and Kachemach rivers, Itkillik River, Chandler River, the Colville River beyond the mouth of Chandler River, and in coastal areas. Boating use areas for Year 6 are similar to those for previous years, shown on Map 20. Notable differences are that during Year 6 (Map 19) respondents described traveling farther along the Colville and Itkillik rivers than they have during all previous years.

In Year 6, four-wheeler hunting areas were generally located west of the Colville River near the community (Map 21). Four-wheeler travel generally did not extend farther than 10 to 15 miles from the community, with the exception of a few four-wheeler use areas extending towards and past Fish Creek. A majority of four-wheeler use areas extended west toward the Ublutuoch River or south toward Ocean Point. Year 6 four-wheeler activity (Map 21) was very similar to Years 1 through 5 (Map 22), although with less activity occurring between the Ublutuoch River and Fish Creek.

Compared to hunting by four-wheeler, snowmachine hunting generally occurs over a larger area and varies the most from year to year. During Year 6, respondents traveled past Fish Creek and Judy Creek in the west, north to the Beaufort Sea coast, and south to Ocean Point and around the Kikaktrorak, Kogosukruk, and Itkillik rivers (Map 23). Residents have described traveling greater distances from the community by snowmachine during previous study years (Map 24).



Map 19 - Method of Transportation to Caribou Use Areas, Boat, Year 6

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 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

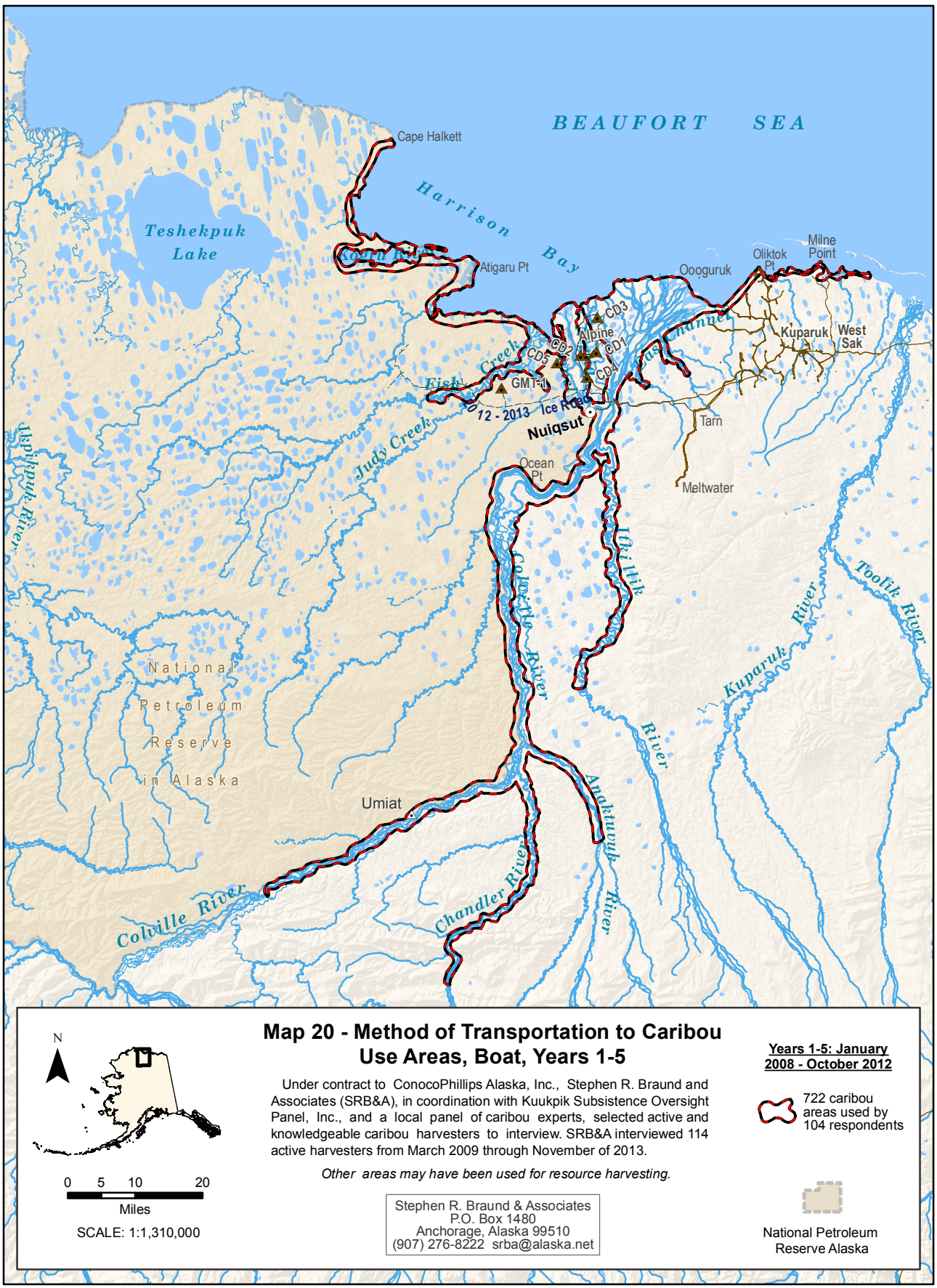
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

Year 6: November 2012 - October 2013

High
Low

152 caribou areas used by 53 respondents

National Petroleum Reserve Alaska



Map 20 - Method of Transportation to Caribou Use Areas, Boat, Years 1-5

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 114 active harvesters from March 2009 through November of 2013.

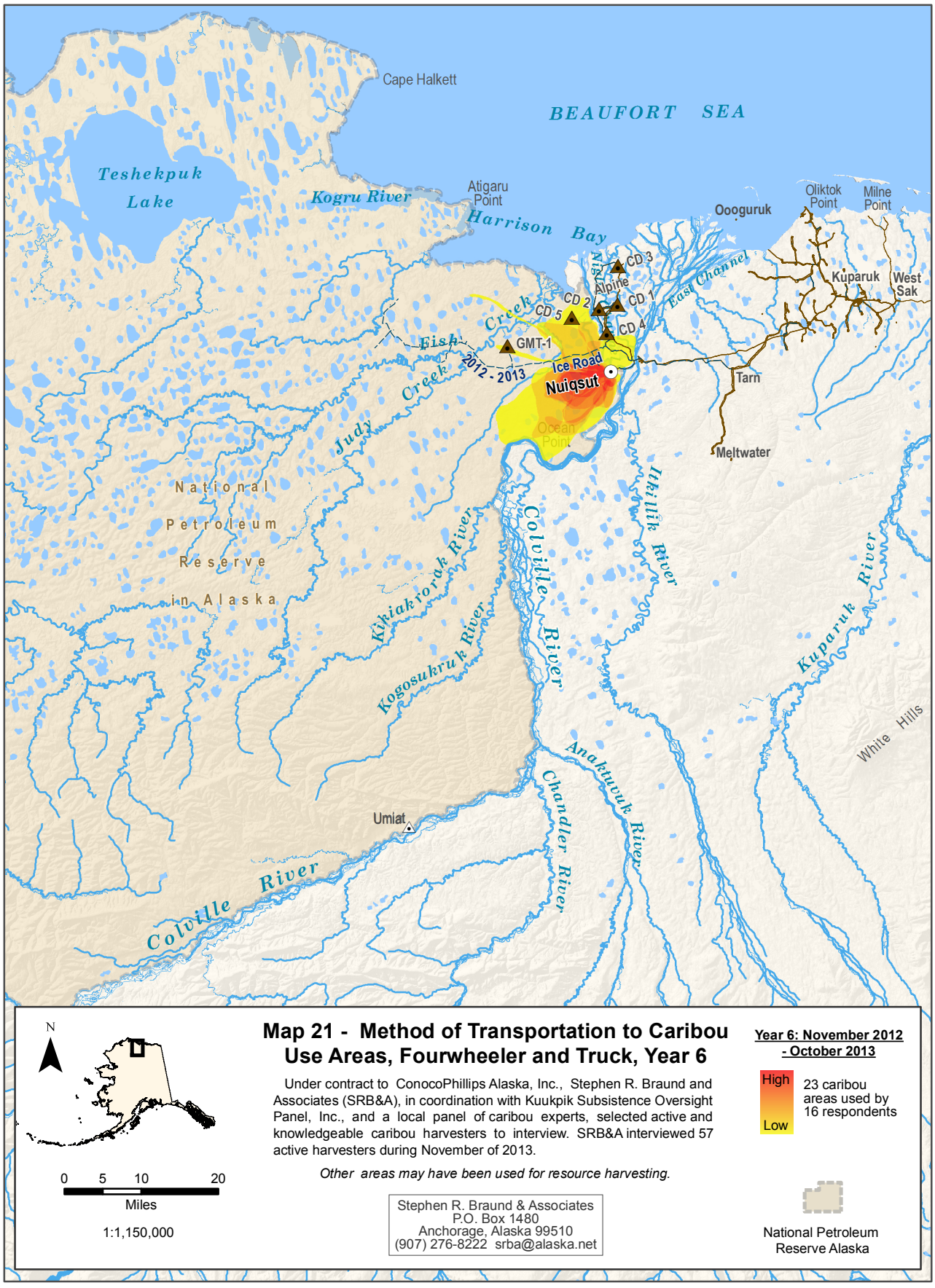
Other areas may have been used for resource harvesting.

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

Years 1-5: January 2008 - October 2012

722 caribou areas used by 104 respondents

National Petroleum Reserve Alaska



Map 21 - Method of Transportation to Caribou Use Areas, Fourwheeler and Truck, Year 6

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 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

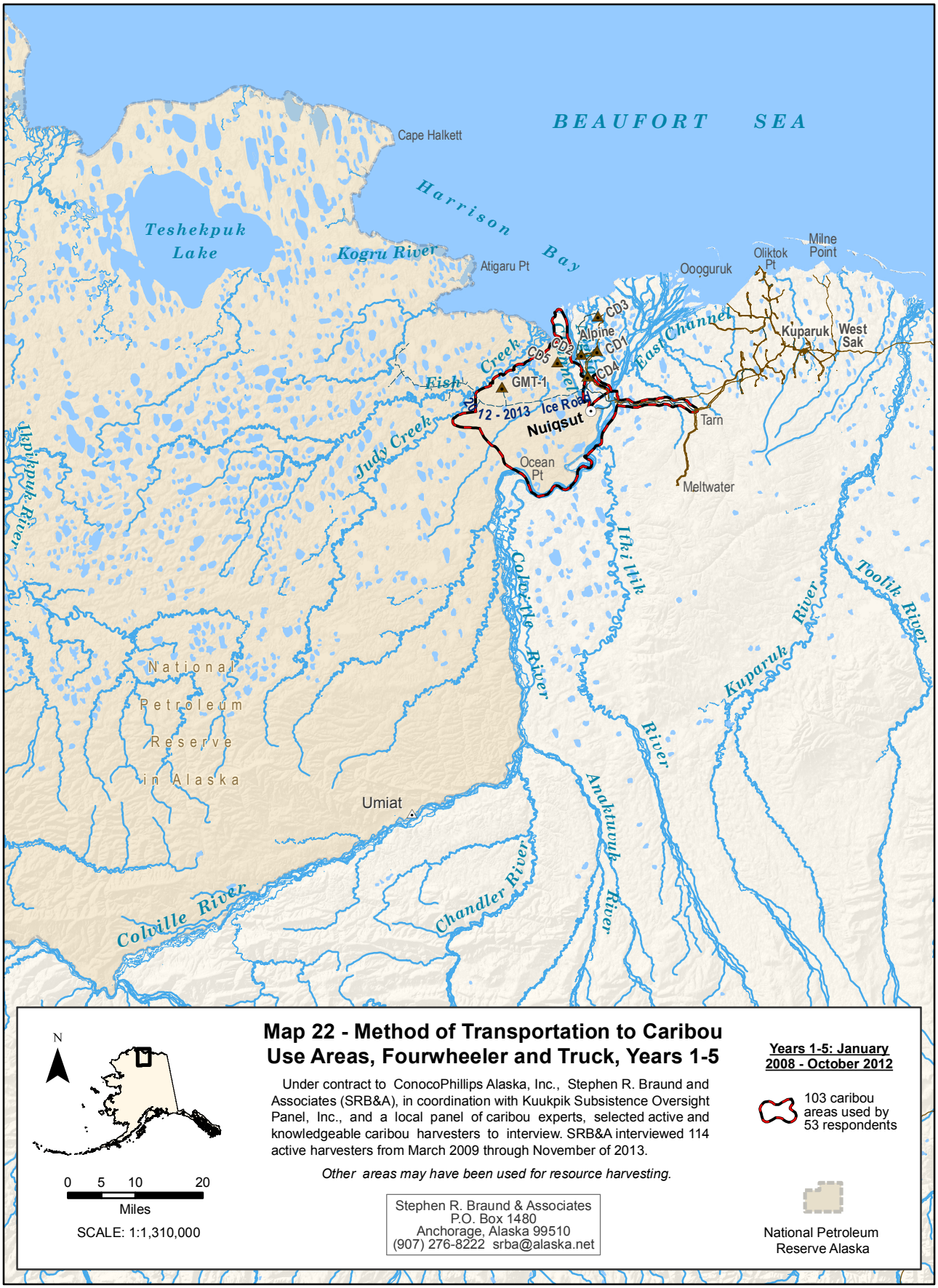
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

Year 6: November 2012 - October 2013

High
Low

23 caribou areas used by 16 respondents

National Petroleum Reserve Alaska



Map 22 - Method of Transportation to Caribou Use Areas, Fourwheeler and Truck, Years 1-5

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 114 active harvesters from March 2009 through November of 2013.

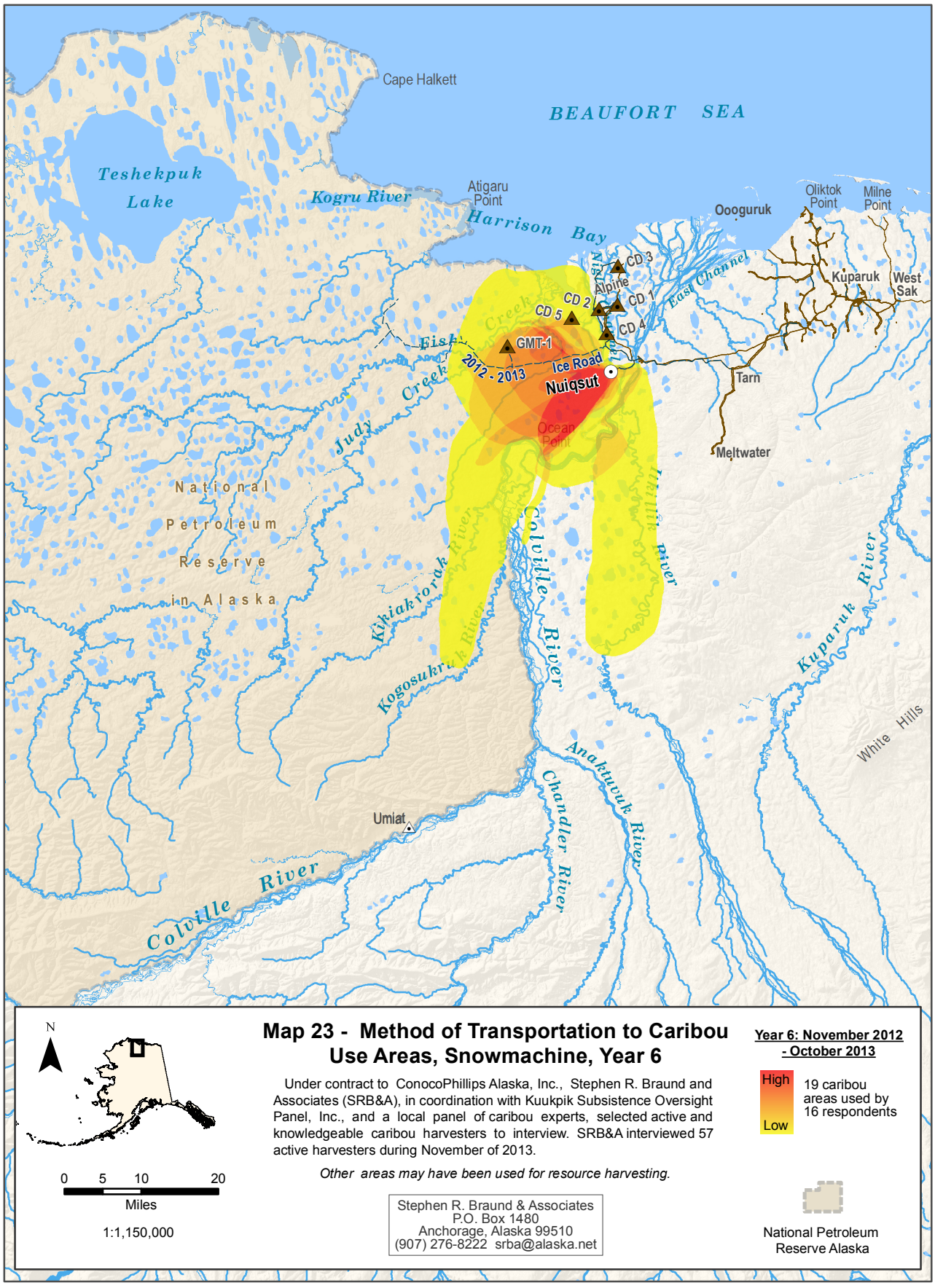
Other areas may have been used for resource harvesting.

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

Years 1-5: January 2008 - October 2012

103 caribou areas used by 53 respondents

National Petroleum Reserve Alaska



Map 23 - Method of Transportation to Caribou Use Areas, Snowmachine, Year 6

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 57 active harvesters during November of 2013.

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

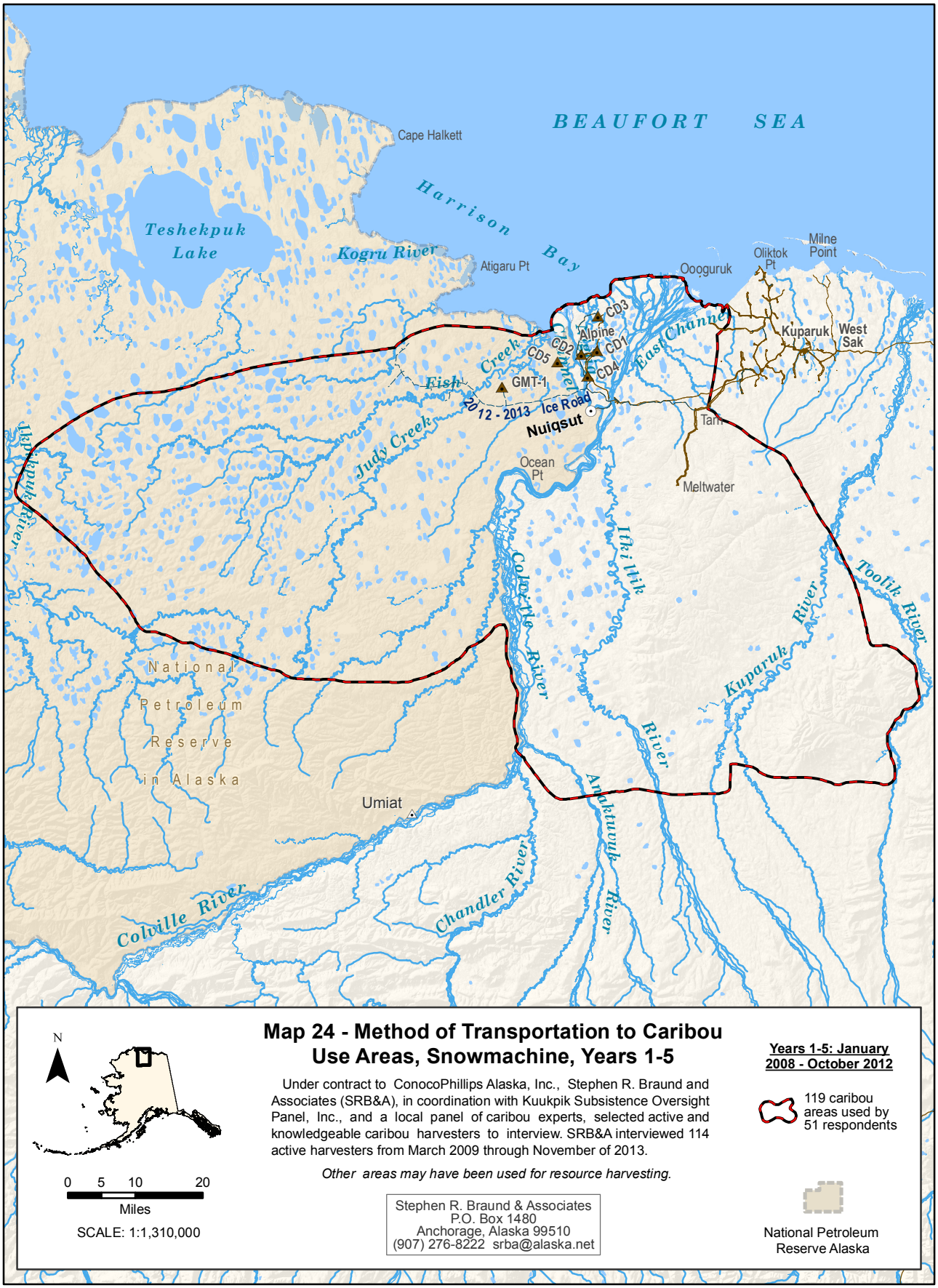
Year 6: November 2012 - October 2013

High

Low

19 caribou areas used by 16 respondents

National Petroleum Reserve Alaska



N

0 5 10 20

Miles

SCALE: 1:1,310,000

Map 24 - Method of Transportation to Caribou Use Areas, Snowmachine, Years 1-5

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 114 active harvesters from March 2009 through November of 2013.

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

Years 1-5: January 2008 - October 2012

119 caribou areas used by 51 respondents

National Petroleum Reserve Alaska

Differences in the maximum extent of hunting areas may reflect overall decreased overland travel or it may be a product of differences in the yearly sample. In recent years hunting by snowmachine is generally less common than hunting by boat or even four-wheeler, and hunting long distances by snowmachine is even less common. Therefore the maximum extent of yearly snowmachine hunting areas may vary substantially with the inclusion (or exclusion) of certain hunters. Other factors that affect the maximum extent of use areas each year include snow conditions (i.e., are snow conditions adequate for extensive snowmachine travel?) and the location/availability of caribou during the winter months. One individual described a general reduction in winter time hunting as follows:

> *In the winter time, you can just about go anywhere but we get limited too… our lifestyle has changed and we are hunting more [in the] summertime for moose and caribou.* (SRB&A Nuiqsut Interview November 2013)

Harvest Success

Table 10 shows the percentage of caribou use areas in which respondents reported successful harvests. During Year 1 respondents reported the highest percent of successful use areas (78 percent); the percentage of successful use areas subsequently declined to 61 percent in Year 2 and has ranged from 54 percent (Year 6) to 64 percent (Year 5) during the remaining study years. In Year 6, at 54 percent, respondents reported a lower percentage of areas in which they had successful caribou harvests. In Year 6, the average number of caribou harvested per use area (1.4) was also the lowest of all study years, but not substantially (Table 11). In previous years, the average number of caribou harvested per use area ranged from 1.5 (Year 2) to 2.7 (Year 1). The average number of caribou harvested at each individual harvest location has remained relatively even over the years between 1.7 and 2.0 caribou.

Table 10: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests, Nuiqsut, Years 1-6

	Percentage of Caribou Use Areas					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Yes (successful)	78%	61%	58%	55%	64%	54%
No (unsuccessful)	22%	39%	42%	45%	36%	46%
Total	100%	100%	100%	100%	100%	100%
Number of Trips	137	187	215	194	211	196
Chi Square p = 0.000						

Stephen R. Braund & Associates, 2014.

Table 11: Mean Number of Caribou Harvested Per Harvest Location and Subsistence Use Area

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Mean Number Caribou Harvested Per Harvest Location	2.0	1.7	1.8	2.0	1.7	1.8
Mean Number Caribou Harvested by Use Area	2.7	1.5	1.7	1.7	1.6	1.4

Stephen R. Braund & Associates, 2014.

3Table 12 reports the percentage of caribou harvest locations and the percentage of caribou harvested for each study year by 12 caribou hunting areas. The study team identified these 12 geographic caribou hunting areas based on residents' descriptions of those areas as separate hunting activities (e.g., Nigliq, Fish Creek, coastal area west of Nuiqsut, upriver to Sentinel Hill, upriver to Umiat) (see Map 25). Map 25 depicts the geographic boundary of each hunting area group for Years 3 through 6, and categorizes each area as yellow, orange, or red. The yellow areas represent the smallest percentage of the total caribou harvest (less than two percent), the orange areas represent the next largest percentage of the total caribou harvest (between two and 15 percent), and the red areas represent the largest percentage of the total caribou harvest (15 percent or more). The Coastal West area (Area 6) is the only area that has accounted for less than two percent of the total harvest during all study years, whereas other areas, such as Fish Creek, Other Colville Delta, and Coastal East, have alternated between providing less than two percent of the harvest and between two and 15 percent of the harvest. Areas along the Upper Colville River (Sentinel Hill, Colville River South, Itkillik River), have consistently provided between two and 15 percent of the harvest. The only areas that have consistently provided more than 15 percent of the harvest during all four study years are Nigliq Channel (Area 1) and West of Nuiqsut (Area 11). The two most recent study years show the East Channel (Area 2) accounting for a higher percentage of harvests and the Ocean Point area (Area 8) accounting for a lower percentage.

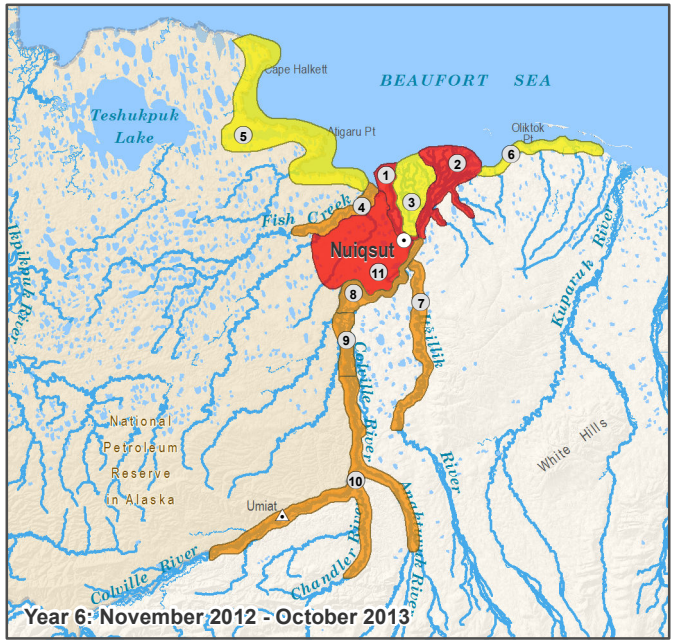
Table 12 shows that during Year 6 the Nigliq Channel (Area 1) accounted for the highest portion (27 percent) of caribou harvested, higher than in any previous year. The area west of Nuiqsut (Area 11) was the area that accounted for the second largest percent of caribou harvested (20 percent) by Nuiqsut respondents during Year 6, followed by the East Channel of the Colville (Area 2) with 18 percent of the total harvest. Of the orange areas, the Colville River South (Area 10) shows the greatest percentage of harvest (nine percent) followed by Sentinel Hill (Area 9) and Itkillik River (Area 7) tied at six percent; Ocean Point (Area 8) (four percent); and Fish Creek (Area 4) (three percent). Areas contributing less than two percent of the total harvest in Year 6 were Other Colville Delta (Area 3) and Coastal West (Area 5), tied at one percent. The Coastal East (Area 6) did not account for any Year 6 harvests of caribou, and the area called "Other" in Table 11 (Area 12) accounted for four percent of the total harvest. The area called "Other" is not shown on the map, as it is defined as any area falling outside the 11 areas depicted on Map 25. Table 12 shows that harvests at Ocean Point were uncharacteristically low during Year 6, and harvests at the Nigliq Channel constituted a higher percentage during Year 6 than any previous year. During the Year 6 Nuiqsut Caribou Panel review meeting, one panel member suggested that the decreasing harvests in the Ocean Point area could have to do with increased activity to the south of the community related to exploration near Umiat[3]. The higher percentage of harvests along the Nigliq Channel may be in part due to a number of respondents harvesting caribou from a herd that crossed the Colville River and passed near the community. Map 25 shows that areas closest to Nuiqsut (West of Nuiqsut, Nigliq Channel, and East Channel of the Colville) together accounted for the majority of reported Nuiqsut caribou harvests (65 percent) during Year 6.

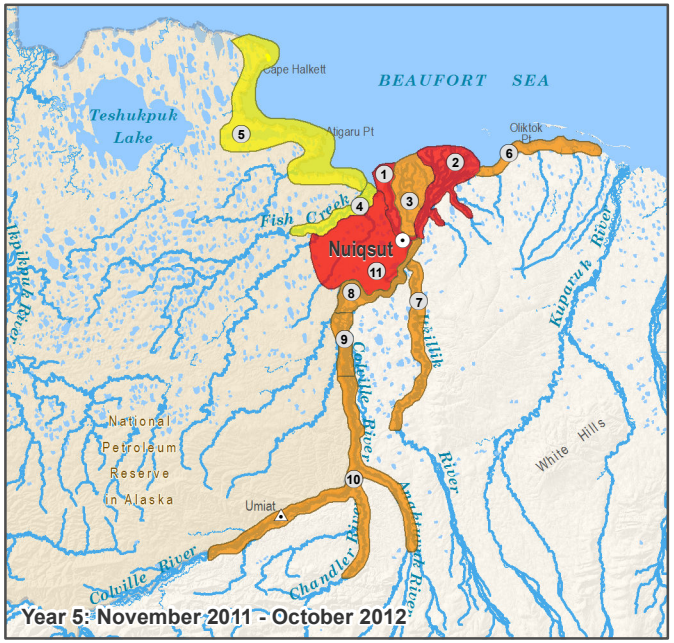
Table 13 shows the number of harvest locations by the number of caribou harvested for study years 1-6. In general, respondents reported harvesting seven or fewer caribou at any given harvest location during all study years. Typically respondents reported harvesting one or two caribou per location. During Year 6, respondents reported harvesting either one or two caribou at 75 percent of harvest locations (within the range of previous years), three caribou at 17 percent of locations (higher than in previous years), and between four and seven caribou at the remaining nine percent of harvest locations. No respondent reported harvesting more than seven caribou at any individual harvest location in Year 6.

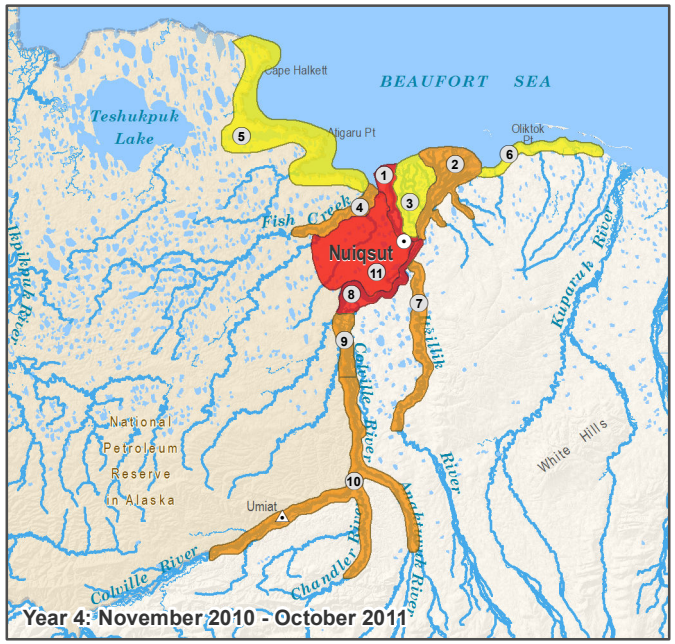
[3] CPAI is not involved in exploration near Umiat

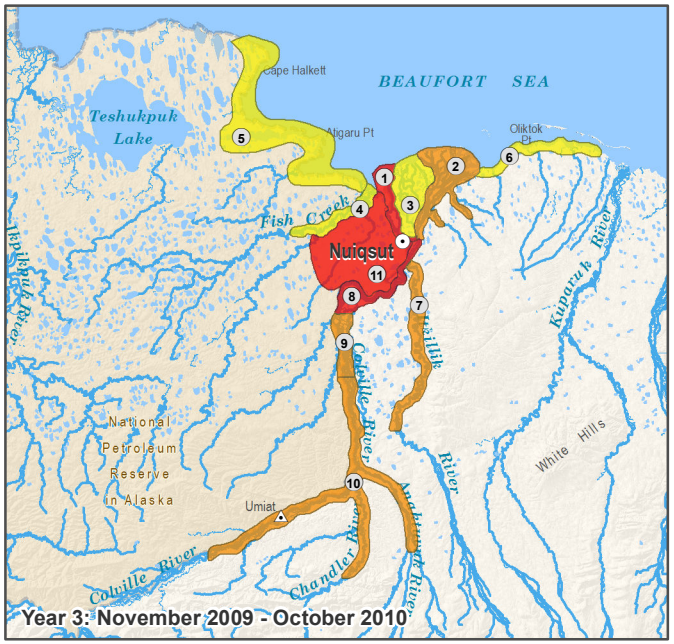
Table 12: Percentage of Caribou Harvest Locations and Caribou Harvests by Caribou Hunting Area

		Percentage of Caribou Harvest Locations						Percentage of Total Caribou Harvests					
		Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
1	Nigliq Channel	19%	18%	16%	17%	15%	23%	23%	22%	18%	15%	15%	27%
2	East Channel Colville	8%	8%	8%	12%	17%	14%	8%	8%	7%	10%	20%	18%
3	Other Colville Delta	2%	1%	2%	1%	1%	1%	2%	1%	1%	1%	2%	1%
4	Fish Creek	8%	7%	1%	1%	1%	3%	7%	7%	1%	2%	0%	3%
5	Coastal West	1%	0%	1%	0%	2%	1%	1%	0%	1%	0%	1%	1%
6	Coastal East	3%	0%	1%	1%	1%	0%	3%	0%	1%	1%	4%	0%
7	Itkillik River	7%	4%	5%	7%	5%	7%	6%	4%	5%	4%	4%	6%
8	Ocean Point	22%	23%	21%	19%	16%	5%	17%	20%	15%	17%	11%	4%
9	Sentinel Hill	9%	10%	8%	8%	6%	9%	9%	9%	7%	5%	3%	6%
10	Colville River South	4%	11%	10%	4%	6%	11%	3%	11%	7%	4%	3%	9%
11	West of Nuiqsut	14%	17%	23%	30%	30%	21%	18%	17%	30%	40%	34%	20%
12	Other	3%	1%	6%	1%	1%	4%	3%	1%	6%	1%	1%	4%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stephen R. Braund & Associates, 2014.													









Map 25 - Nuiqsut Caribou Hunting Area Groups: Years 3, 4, 5 and 6

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.

L e g e n d

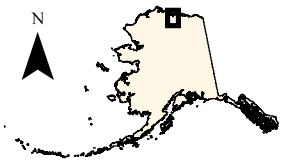
Greater than 15 percent of total harvest	Between two and 15 percent of total harvest	Less than two percent of total harvest

Areas categorized as follows:

1. Nigliq Channel
2. East Channel Colville
3. Other Colville Delta
4. Fish Creek
5. Coastal West
6. Coastal East
7. Itkillik River
8. Ocean Point
9. Sentinal Hill
10. Colville River South
11. West of Nuiqsut

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

Other areas may have been used for resource harvesting.



0 12.5 25 50
Miles

Scale 1:2,650,000

Projection: Alaska Albers Equal Area Conic, NAD 1983

Table 13: Number of Caribou Harvested by Number of Harvest Locations, Years 1-6

Number of Caribou Harvested	Number (%) of Harvest Locations					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	95 (52%)	75 (49%)	99 (51%)	58 (36%)	120 (62%)	66 (46%)
2	44 (24%)	48 (32%)	60 (31%)	47 (29%)	40 (21%)	42 (29%)
3	19 (10%)	16 (11%)	22 (11%)	19 (12%)	16 (8%)	24 (17%)
4	7 (4%)	8 (5%)	7 (4%)	17 (10%)	9 (5%)	8 (6%)
5	13 (7%)	4 (3%)	5 (3%)	10 (6%)	4 (2%)	1 (1%)
6	1 (1%)	1 (1%)	2 (1%)	6 (4%)	4 (2%)	1 (1%)
7	2 (1%)	0	0	1 (1%)	0	1 (1%)
8	0	0	0	2 (1%)	0	0
9	0	0	0	1 (1%)	1 (1%)	0
10	0	0	0	1 (1%)	0	0
11	0	0	0	1 (1%)	1 (1%)	0
15	1	0	1	0	0	0
Stephen R. Braund & Associates, 2014.						

Duration of Trips

The typical duration of caribou hunting trips has maintained a similar pattern across all six years. Residents typically take day trips to at least 81 percent of their caribou hunting areas (84 percent in Year 6) (Table 14). Residents typically took trips lasting between two and six nights to at least seven percent of caribou use areas during each study year (10 percent during Year 6). Respondents also reported the longest trip they took to each area during the study year (Table 15.) Table 15 shows that in Year 6, respondents' longest trip lasted one or more weeks at four percent of use areas, and two to six nights at 14 percent of use areas. Eight percent of use areas fell into the one night category. Following an ongoing trend, respondents took only same day trips to a majority (74 percent) of use areas.

Table 14: Caribou Hunting Typical Trip Duration, Nuiqsut, Years 1-6

	Percentage of Caribou Use Areas					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
More than 2 weeks	0%	1%	0%	0%	0%	2%
1-2 Weeks	1%	1%	1%	1%	1%	1%
2-6 Nights	7%	15%	7%	8%	9%	10%
1 Night	5%	2%	2%	1%	2%	4%
Same Day	87%	81%	90%	90%	88%	84%
Total	100%	100%	100%	100%	100%	100%
Number of Trips	135	176	212	193	210	196
Chi Square p = .028						

Stephen R. Braund & Associates, 2014.

Table 15: Caribou Hunting Longest Trip Duration, Years 1-6

	Percentage of Caribou Use areas					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
More than 2 weeks	1%	2%	0%	0%	0%	2%
1-2 Weeks	3%	6%	4%	3%	2%	2%
2-6 Nights	20%	24%	12%	12%	11%	14%
1 Night	6%	5%	4%	4%	2%	8%
Same Day	70%	63%	80%	81%	85%	74%
Total	100%	100%	100%	100%	100%	100%
Number of Trips	97	163	211	193	209	196
Chi Square p = .011						

Stephen R. Braund & Associates, 2014.

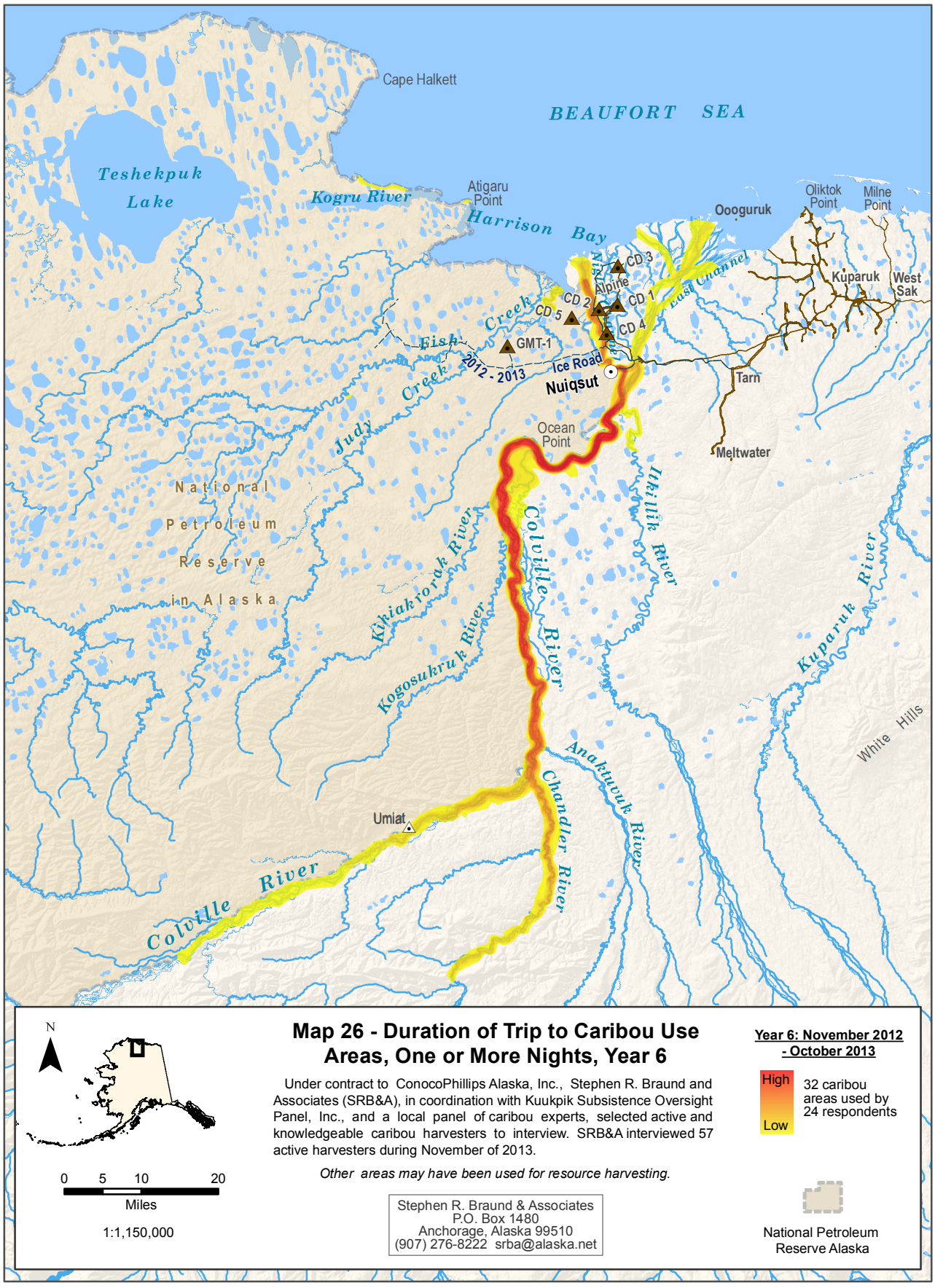
Map 26 depicts use areas where respondents reported staying for one or more nights, and Map 27 depicts use areas where respondents reported taking same day trips. The red areas depict higher number of overlapping use areas on each map and do not reflect differences in trip length. As shown in Map 26, respondents primarily reported taking overnight trips when traveling upriver by boat from the community; this is evident by the higher number of overlapping use areas compared to other areas. To a lesser extent, respondents also reported taking overnight trips in areas downriver from the community along the Nigliq Channel and, even less commonly, along the East Channel of the Colville River. Overnight trips also occurred at a minimal number of use areas near Fish Creek and along the coast near Atigaru Point and Kogru River. No overnight trips were reported during overland (i.e., snowmachine or four-wheeler) trips. Same day trips (shown on Map 27) more commonly occurred in overland areas and are more evenly distributed across all boating areas such as in the Colville Delta, upriver from the community toward Anaktuvuk River, along the Itkillik River, and near the mouth of Fish Creek.

While this report lumps all "same day" trips into one category for duration, it is important to note that there is wide variation in the duration of same day trips. In some cases, residents may start hunting in the afternoon and then hunt all night, returning to the community the next morning. Because these individuals are not stopping and camping during their hunt, these trips are categorized as "same day trips." One individual described the long hours he spends when hunting for caribou and seals in the ocean:

> *When we went to the ocean we stayed there for 20 to 24 hours. We would be out there for like 18 hours and then head home. All summer long.* (SRB&A Nuiqsut Interview November 2013)

In general, resource availability, distance from the community, harvest season, and associated subsistence activities are the primary reasons given for camping trips versus day trips. In addition, the duration of day trips also varies widely depending on the availability of caribou and factors such as waiting for caribou to cross the river. The following quote illustrates the patience that is required by hunters when waiting for caribou to cross into areas where they are accessible to hunters:

> *They were on this side [of the river] and we waited a couple hours until they swam across. We were out seal hunting [and when we were] coming back to the village that's when we saw the herd. We tried to get them on this side but they were running on the beach [rather than crossing]. They actually kept moving back and forth. They were on the beach [of Nuiqsapiaq]. We were actually around that island for like eight hours.* (SRB&A Nuiqsut Interview November 2013)



Map 26 - Duration of Trip to Caribou Use Areas, One or More Nights, Year 6

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 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

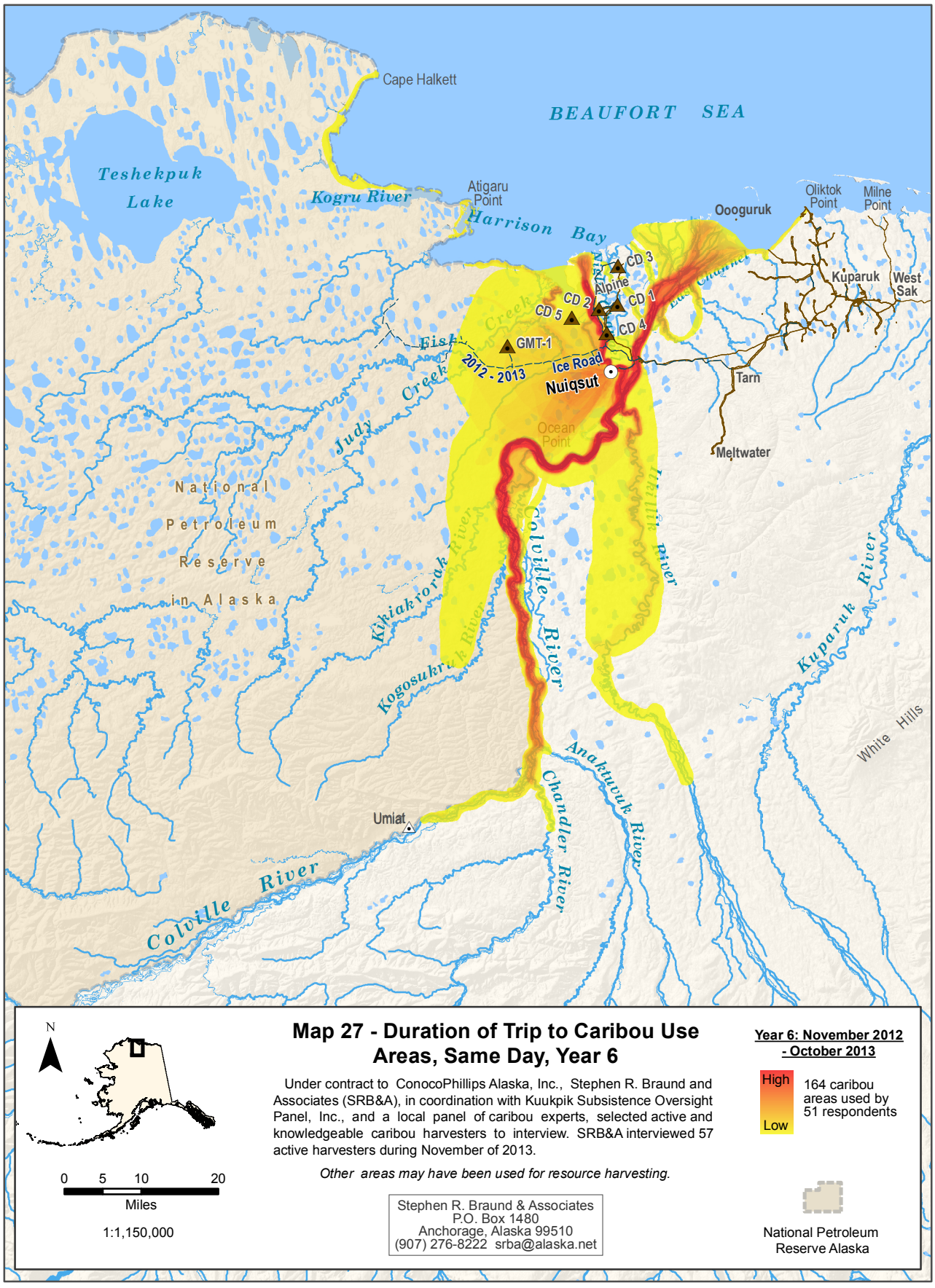
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

Year 6: November 2012 - October 2013

High
Low

32 caribou areas used by 24 respondents

National Petroleum Reserve Alaska



Map 27 - Duration of Trip to Caribou Use Areas, Same Day, Year 6

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 57 active harvesters during November of 2013.

Other areas may have been used for resource harvesting.

Stephen R. Braund & Associates
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Anchorage, Alaska 99510
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Year 6: November 2012 - October 2013

High
Low

164 caribou areas used by 51 respondents

National Petroleum Reserve Alaska

Several other individuals described their duration of trips in Year 6 as follows,

> *I'd say [I went] about 30 times. Pretty much every year, I go over there to [camp]. Longest I stayed was a week and a half. I try to stay at least three to four days at the most. I bring my brother-in-law out there and they kept wanting to come back [and hunt more].* (SRB&A Nuiqsut Interview November 2013)

> *We usually go out there and we spend like three days out there at my* aapa's *camp. Three days and then we come back and gas up and head back up. It's always three days* (SRB&A Nuiqsut Interview November 2013)

> *Nigliq Channel – my* aaka [grandmother] *has a cabin up here. We wouldn't go to the ocean, just to the cabins. We took two-day trips, three-day trips; probably four days [was the longest], we try to fish [while we are] looking for caribou. I told my* aaka *they're coming from the west now because of the oil fields.* (SRB&A Nuiqsut Interview November 2013)

Frequency of Trips

The distribution of the number of trips taken to caribou use areas remained relatively consistent over the first four study years, with about 50 percent of use areas visited between one and three times, and the other 50 percent of use areas visited four or more times per year (Table 6). During Years 5 and 6, a slightly larger percent of use areas were visited between one and three times (66 percent in Year 5 and 61 percent in Year 6). Nuiqsut active harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 6 (between four and nine percent of use areas) compared to Years 1 and 2 (zero percent) (Table 16).

Table 16: Caribou Hunting Number of Trips, Nuiqsut, Years 1-6

	Percentage of Caribou Use Areas					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
20+	0%	0%	9%	7%	4%	7%
6-20 trips	30%	28%	21%	28%	16%	19%
4-5 trips	23%	21%	19%	15%	15%	13%
2-3 trips	27%	26%	27%	29%	34%	28%
1	20%	24%	24%	21%	32%	33%
Total	100%	100%	100%	100%	100%	100%
Number of Trips	121	174	212	193	211	196
Chi Square p = .001						

Stephen R. Braund & Associates, 2014.

A number of residents reported traveling along Nigliq Channel frequently throughout the summer, on their way to and from fish camps or the ocean. These trips are generally also seen as opportunities to search for and harvest caribou when they are available. One individual described,

> *Just by boat [along Nigliq Channel], from the end of June until the middle of August. About 20 to 25 times, because we usually put our net out and check it. There was one caribou that went from the coast and came through our village.* (SRB&A Nuiqsut Interview November 2013)

The frequency of trips to a certain use area depends on a variety of factors including distance of the use area from the community, availability of transportation or fuel, hunting success, and personal reasons. One respondent noted the increase in the frequency of her husband's hunting trips in Year 6 due to their purchasing a new outboard motor in the previous year. She described,

> *We finally got an outboard so he was going out and about. I had to provide the gas. He was getting them in the end of July and part of July. Maybe [he got] like four or six [caribou], somewhere around there. Gave some out and stocked up our own freezer. Having this boat really makes a difference. He is going [hunting] way more than 20 times. Roughly every day when we have gas he goes out…. Out and about every chance he could get.* (SRB&A Nuiqsut Interview November 2013)

Herd Size

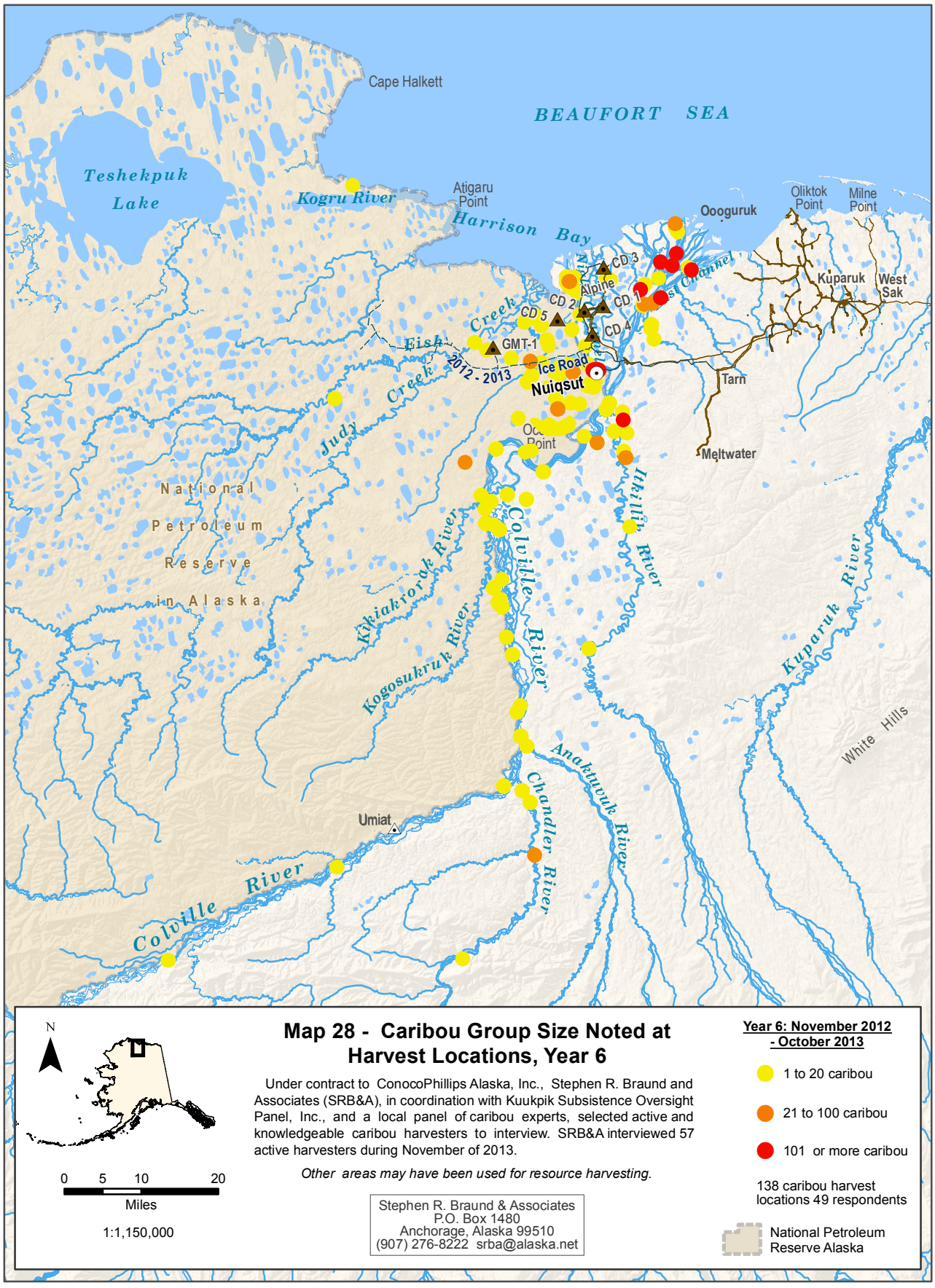
In response to a request from a member of the Nuiqsut Caribou Panel, in Year 5 the study team began asking respondents to estimate how many caribou were present at each harvest location they reported. Their grouped responses are provided in Table 17. In a majority of cases (78 percent of harvest locations for which harvesters provided responses), residents reported harvesting caribou from groups of 20 or less. The distribution of herd sizes reported at harvest locations is similar between Years 5 and 6. Compared to Year 5, a slightly higher percentage of Year 6 caribou harvests were in herds estimated at 100 or more caribou (21 percent in Year 6 versus 13 percent in Year 5) (Table 17).

Table 17: Caribou Group Size Noted at Caribou Harvest Locations, Year 5-6

Group Size	Percent of Harvest Locations Year 5	Percent of Harvest Locations Year 6	Percent of Caribou Harvested Year 5	Percent of Caribou Harvested Year 6
1000-2000	2%	1%	3%	1%
500-999	1%	3%	0%	5%
100-499	3%	10%	10%	15%
81-99	0%	0%	0%	0%
71-80	1%	0%	1%	0%
61-70	1%	0%	2%	0%
51-60	2%	1%	3%	1%
41-50	2%	2%	4%	3%
31-40	1%	2%	0%	2%
21-30	1%	3%	2%	5%
11-20	13%	11%	14%	14%
2-10	41%	38%	42%	39%
1	34%	29%	19%	16%
Total Number	176	138	311	267

Stephen R. Braund & Associates, 2014.

Map 28 depicts the herd size noted at reported harvest locations, with 100 or more caribou depicted in red, between 21 and 80 caribou depicted in orange, and 1 to 20 caribou depicted in yellow. As shown on the map, herds of over 100 caribou were reported near the lower portion of the East Channel in an area surrounding Pisiktagvik, Helmericks, and Nuiqsapiaq, in addition to the area directly surrounding Nuiqsut and on the Itkillik River. One individual described a herd of approximately 300 caribou present at Pisiktagvik, saying, "Also we went up *Pisiktagvik*, we saw a whole group crossing, about maybe 300, so



Map 28 - Caribou Group Size Noted at Harvest Locations, Year 6

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 57 active harvesters during November of 2013.

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

Year 6: November 2012 - October 2013

- 1 to 20 caribou
- 21 to 100 caribou
- 101 or more caribou

138 caribou harvest locations 49 respondents

National Petroleum Reserve Alaska

we got a whole bunch on that island right there" (SRB&A Nuiqsut Interview November 2013). Herds of between 21 and 100 caribou were reported in several locations to the west of the community, in the Colville Delta, and south of the community near the Itkillik, Kikiakrorak, and Chandler rivers. Nearly all caribou harvested upriver from Ocean Point were harvested in groups of 20 or less.

Harvest Amounts (Household Harvest Surveys)

This section presents the results of the Year 6 household caribou harvest surveys alongside harvest data available from SRB&A, ADF&G, and NSB harvest studies from previous years. Table 18 compares harvest information over time. The percentage of households using caribou has remained above 90 percent during every available study year since 1985 and was 95 percent in 2013. The percentage of households attempting to harvest caribou has varied over time, with the percentage in Year 6 (79 percent) somewhat higher than the previous two years. Despite 79 percent of households attempting to harvest caribou, only 63 percent of households were successful, a difference of 16 percentage points. The difference in the percentage of households trying to harvest and successfully harvesting caribou was higher in 2013 than in any previous study year. However, the percentage of successful households was not notably lower than in previous years, which have ranged from 45 percent of successful households in 2002-03 to 90 percent in 1985. The estimated number of caribou harvested in 2013 (586) was higher than in most previous study years with the exception of 1993 (672), and the estimated per capita harvests (166 pounds) were also higher than previous study years with the exception of 1993 (228 pounds).

Similar to the last several study years, the 2013 household harvest survey included one household that harvested substantially more than any other household in the community. In 2013, this household's harvests accounted for over one third of all harvests reported by the community. When asked about the high quantity of caribou harvested, the household head indicated that there is more than one harvester in his household and that they have been distributing caribou to other households who are unsuccessful in their hunts or unable to hunt. This household also indicated that they are harvesting more and more caribou in recent years. It is important to keep this household in mind when comparing current harvest amounts to previous years.

Table 18: Nuiqsut Caribou Harvests 1985-2013

	Percentage of Households									
Year	Percent Using	Percent Attempting to Harvest	Percent Harvesting	Percent Giving	Percent Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per Household	Per Capita Lbs	Source
1985	98%	90%	90%	80%	60%	513	60,021	790	150	ADF&G 2014
1992		81%				278	32,551	310	78	Fuller and George 1999
1993	98%	74%	74%	79%	79%	672	82,169	903	228	Fall and Utermohle Unpublished
1994-95						258	30,186	364	73*	Brower and Hepa 1998; Braem et al. 2011
1995-96						362	42,354	455	99*	Bacon et al. 2009; Braem et al. 2011
1999-00						413			112	Pedersen and Taalak *Unpublished* as cited in Braem et al. 2011
2000-01						496	57,985	453	134*	Bacon et al. 2009; Braem et al. 2011
2002-03	95%	47%	45%	80%	49%	397	46,449	442	118	Braem et al. 2011
2003-04	97%	74%	70%	81%	81%	564	65,988	617	157	Braem et al. 2011
2004-05	99%	62%	61%	81%	96%	546	63,882	597	147	Braem et al. 2011
2005-06	100%	60%	59%	97%	96%	363	42,471	442	102	Braem et al. 2011
2006-07	97%	77%	74%	66%	69%	475	55,575	579	143	Braem et al. 2011
2010	94%	86%	76%			471	55,107	593		SRB&A 2012
2011	92%	70%	56%	49%	58%	408	47,736	523	134	SRB&A 2013
2012	99%	68%	62%	65%	79%	501	58,582	598	148	SRB&A 2014
2013	95%	79%	63%	62%	75%	586	68,534	692	166	Year 6 HH Surveys
Mean of observed values	97%	72%	66%	75%	74%	464	54,906	566	132	

Blank cells indicate data not available

*Per capita pound estimates for the 1994-95, 1995-96, and 2000-2001 study years were not originally published but were subsequently calculated by Braem et al. (2011) based on Alaska Department of Labor and Workforce Development (ADOLWD) population estimates for those years.

Observations of Changes in Harvest Patterns

During the active harvester interviews, caribou harvester respondents were asked if any of the following hunting attributes had changed from the previous year: hunting area, frequency of trips, duration of trips, months of use, and harvest amounts. In each case where they answered that a change had occurred, harvester respondents were asked to describe the change and to state what they believed (or thought) caused the change. Table 19 summarizes the percent of respondents reporting a given type of change. Overall, the percentages of respondents reporting changes in hunting area, frequency, duration, and harvest amount in Year 6 were within the range of previous years, with the exception of "Hunting Area Changed," which was slightly higher than in previous years. As shown in Table 20, respondents also indicated whether they harvested enough caribou. In Year 6, 54 percent of respondents indicated that they did not harvest enough caribou, higher than in previous year. In Years 1 through 5, the percentage of respondents not harvesting enough caribou ranged from 16 percent (Year 4) to 53 percent (Year 2).

Table 19: Percentage of Respondents Reporting Changes in Harvest Activities, Years 1-6[4]

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Hunting Area Changed	31%	28%	39%	33%	36%	40%
Frequency Changed	50%	77%	65%	60%	63%	67%
Duration Changed	39%	32%	21%	21%	23%	26%
Months Changed	19%	15%	12%	21%	21%	18%
Harvest Amount Changed	75%	85%	68%	72%	54%	63%

Stephen R. Braund & Associates, 2014.

Table 20: Percentage of Respondents Reporting Not Harvesting Enough Caribou, Years 1-6

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Reported Did Not Harvest Enough	47%	53%	21%	16%	41%	54%

Stephen R. Braund & Associates, 2014.

Changes in Harvest Amount

During Year 6 interviews, 63 percent of Nuiqsut respondents reported a change in harvest amounts, slightly higher than in Year 5 (54 percent) but lower than in Years 1 through 4 (Table 19). Fifty-four percent of respondents reported harvesting less than the previous year, nine percent harvested more, and 37 percent harvested about the same amount of caribou (Table 21). The percentage of respondents harvesting less caribou in Year 6 is within the range of previous study years, while the percentage harvesting more caribou is the same as in Year 5 and lower than all previous study years (Table 21).

[4] In the Year 1 and Year 2 reports, the percentage of respondents reporting changes in harvest activities was calculated based on the total number of respondents interviewed (including elders). In subsequent study years, the percentage of respondents is based on the total number of respondents who participated in the active harvester interview (not including elders who had not hunted during the previous year), as these questions were only asked of active harvesters. Thus, the percentages depicted for Years 1 and 2 are calculated from a slightly different dataset of observations (i.e., active harvesters and elders) than those depicted in the subsequent study year reports (i.e., active harvesters only).

Table 21: Type of Change in Harvest Amount, Years 1-6

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Harvest more	11%	15%	21%	17%	9%	9%
Harvest less	64%	70%	47%	55%	45%	54%
Harvest the same	25%	15%	32%	28%	47%	37%

Stephen R. Braund & Associates, 2014.

Table 22 shows a cumulative list of reasons given for a decrease in harvest from the previous year, which have been organized under broader categories. Over all six study years, Personal Factors have been the most frequently cited types of causes for harvesting less caribou (77 observations), followed by causes related to Resource Distribution or Migration (68 observations) and Development Activities (29 observations). Each observation was coded to reflect the respondents' direct response. For example, if a respondent indicated they harvested less because the caribou were not in the area, their response was coded as "Resource Availability." If the respondent indicated that they harvested less because of helicopter traffic making the caribou harder to harvest, then their response was coded as "Helicopter Traffic." In Year 6, "resource availability" was the most commonly reported reason for harvesting less caribou, followed by "personal reasons," and "lack of transportation/equipment."

Table 22: Reasons for Decrease in Harvest Amount, Nuiqsut, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**9 (26%)**	**10 (26%)**	**16 (47%)**	**22 (52%)**	**6 (17%)**	**14 (38%)**	**77 (35%)**
Personal reasons	0	3	3	7	1	6	20
Lack of transportation/equipment	2	1	3	4	0	3	13
Employment/lack of time	1	2	2	4	0	2	11
Change in subsistence providers	1	1	2	4	2	1	11
Take fewer trips	0	1	6	1	2	0	10
Change in subsistence dependents	3	2	0	2	0	0	7
Use area changed	0	0	0	0	0	2	2
Need less	2	0	0	0	0	0	2
Smaller hunting area	0	0	0	0	1	0	1
Resource Distribution or Migration Total	**12 (35%)**	**16 (41%)**	**6 (18%)**	**8 (19%)**	**13 (37%)**	**13 (35%)**	**68 (31%)**
Resource availability	8	9	2	4	9	10	42
Migration changed or diverted	3	5	0	0	1	2	11
Change in distribution/migration	0	1	0	3	1	0	5
Moved out of area	0	0	3	1	0	0	4
Timing of migration	0	0	0	0	0	1	1
Resource in smaller groups	1	0	0	0	0	0	1
Further from community	0	1	0	0	0	0	1
Earlier migration/arrival	0	0	1	0	0	0	1
Later migration/arrival	0	0	0	0	1	0	1
Move to different areas	0	0	0	0	1	0	1

Table 22, Continued: Reasons for Decrease in Harvest Amount, Nuiqsut, Years 1-6

	Number of Observations						
Development Activities Total	**9 (26%)**	**3 (18%)**	**2 (6%)**	**3 (7%)**	**9 (26%)**	**3 (8%)**	**29 (13%)**
Helicopter traffic disturbance	4	0	0	2	5	2	13
Airplane traffic disturbance	2	1	0	1	1	0	5
Development	2	1	2	0	0	0	5
Air traffic	1	0	0	0	2	0	3
Traffic disturbance	0	0	0	0	0	1	1
Off road vehicles disturbance	0	0	0	0	1	0	1
Oil drilling	0	1	0	0	0	0	1
Resource Behavior Total	**0 (0%)**	**2 (5%)**	**5 (15%)**	**0 (0%)**	**4 (11%)**	**2 (5%)**	**13 (6%)**
Farther from riversides/farther inland	0	2	4	0	2	2	10
Skittish behavior in species	0	0	1	0	2	0	3
Don't Know Total	**0 (0%)**	**2 (5%)**	**1 (3%)**	**5 (12%)**	**1 (3%)**	**0 (0%)**	**9 (4%)**
I do not know	0	2	1	5	1	0	9
Environmental Factors Total	**0 (0%)**	**3 (8%)**	**2 (6%)**	**1 (2%)**	**1 (3%)**	**1 (3%)**	**8 (4%)**
Change in food availability	0	2	0	0	0	0	2
New species in region	0	0	0	0	0	1	1
Climate affecting travel	0	0	0	1	0	0	1
Wind	0	0	1	0	0	0	1
More rain	0	0	0	0	1	0	1
Predators	0	0	1	0	0	0	1
Increase in predators	0	1	0	0	0	0	1
Hunting Success - General Total	**3 (9%)**	**0 (0%)**	**2 (6%)**	**0 (0%)**	**0 (0%)**	**1 (3%)**	**6 (3%)**
Worse success	0	0	1	0	0	1	2
More difficult	2	0	0	0	0	0	2
Reduced harvest opportunities	0	0	1	0	0	0	1
Travel farther to harvest resource	1	0	0	0	0	0	1
Competition or Hunting Pressure Total	**0 (0%)**	**1 (3%)**	**0 (0%)**	**1 (2%)**	**0 (0%)**	**3 (8%)**	**5 (2%)**
Competition with sport hunters	0	0	0	0	0	2	2
Hunting pressure	0	0	0	0	0	1	1
Sport hunting and fishing	0	0	0	1	0	0	1
Sport hunting methods disturbing migration routes	0	1	0	0	0	0	1
Development Infrastructure Total	**1 (3%)**	**1 (3%)**	**0 (0%)**	**0 (0%)**	**1 (3%)**	**0 (0%)**	**3 (1%)**
Pipeline	1	1	0	0	0	0	2
Oil field infrastructure	0	0	0	0	1	0	1
Contamination Concerns Total	**0 (0%)**	**1 (3%)**	**0 (0%)**	**1 (2%)**	**0 (0%)**	**0 (0%)**	**2 (1%)**
Contamination from air pollution	0	1	0	0	0	0	1
Concern of disease/infection	0	0	0	1	0	0	1

Table 22, Continued: Reasons for Decrease in Harvest Amount, Nuiqsut, Years 1-6

	Number of Observations						
Other Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (2%)**	**0 (0%)**	**0 (0%)**	**1 (0%)**
Miscellaneous	0	0	0	1	0	0	1
Grand Total	**34**	**39**	**34**	**42**	**35**	**37**	**221**

Stephen R. Braund & Associates, 2014.

Personal factors cited by residents for harvesting less caribou in Year 6 included general personal reasons such as age or health factors and family commitments, a lack of transportation or equipment, employment or lack of time, a change in subsistence providers, and a change in use area. One individual reported focusing on different resources in Year 6, saying, "Mostly going after seals; getting more familiar [with ocean hunting]" (SRB&A Nuiqsut Interview November 2013). Another individual observed "It is too far out for me [to hunt]; I am not young anymore" (SRB&A Nuiqsut Interview November 2013).

The availability of working boats, snowmachines, four-wheelers, and other subsistence supplies or equipment such as fuel and ammunition can greatly affect a residents' ability to hunt and harvest caribou. Several individuals reported a decrease in their harvest amounts due to a lack of proper equipment including boats and freezers:

> *I didn't get any caribou this year because my boat broke down after my first trip, and I was never able to go out again because I didn't get the parts.* (SRB&A Nuiqsut Interview November 2013)

> *Less, mainly because of my boat [not working]. The older you get, the less times you want to go out on the land, because it's hard on the body.* (SRB&A Nuiqsut Interview November 2013)

> *I usually get more, but our freezer's was acting up so we had to get a new one [no storage].* (SRB&A Nuiqsut Interview November 2013)

In addition to personal reasons, respondents also cited a general lack of caribou in their hunting areas for decreased harvest success in Year 6 (13 observations). Several individuals noted that the caribou were too far inland to access when hunting by boat. Residents' comments regarding the availability of caribou in Year 6 included the following:

> *[I harvested] less. I got two last year [and none this year]. I just couldn't find any, and the ones we saw were way out there.* (SRB&A Nuiqsut Interview November 2013)

> *They were mostly inland; there were just a few that were close to the river.* (SRB&A Nuiqsut Interview November 2013)

> *[I harvested] less. I would have gotten more they were just in bad spots, too far or they were in sand bar and I don't want to butcher them there. I like my meat clean.* (SRB&A Nuiqsut Interview November 2013)

A number of respondents directly attributed their decreased harvests in Year 6 to human factors such as development activities (three observations) or sport hunters (five observations). Several individuals attributed their difficulty harvesting caribou to disturbance from helicopter traffic:

I usually get a little bit more than eight. I was having a hard time finding them. [I think it was because] there was a lot of chopper activity in Fish Creek. (SRB&A Nuiqsut Interview November 2013)

[I harvested] less, there was quite a few air traffic [issues]. I don't think it will ever change. I usually catch three to four in September, [but] not this year, it was kind of hard. Except for that one day in July. We didn't really see them after that. They usually move east and west across the delta, stay northwest, by fall and freeze up they come along here by my aaka's *cabin in between* Puviksuk *and my* aaka's *cabin. Some of them split and went around town and met somewhere in the west of town.* (SRB&A Nuiqsut Interview November 2013)

[Less this year] Yeah when me and my dad went out. He barely came in with anything. I think it was because of the helicopters. Too much activity. Didn't see many. (SRB&A Nuiqsut Interview November 2013)

In addition to impacts from traffic, several individuals believed that hunting pressure was to blame for their decreased hunting success. While two individuals expressed that sport hunting activities along the Dalton Highway were affecting the migratory routes of the caribou, one respondent believed that local hunters also have an impact on caribou movement. These individuals observed,

I normally catch more [caribou] than that. I usually get them in August when I am getting ready for whaling, I get them if we are coming back after whaling if we come back before the rut. [I didn't get any caribou in August this year because] hardly any spotted. There was maybe 300 people that go [caribou hunting] off on the Dalton Highway, and they don't let them cross the [Sagavanirktok] River, there are too many bow hunters long the Sagavanirktok River. Really impacting us bad, especially this year because we haven't seen any. They hunt over there in June and July. (SRB&A Nuiqsut Interview November 2013)

Yeah [I got] less caribou this summer. Not many of them come by or like Fish Creek used to see some lots. What I heard they by Anaktuvuk Pass – by Atigun Pass I think? I think the hunters they chased them away; they [were] going to come, but they never come where they were supposed to. Finally [they] come around in July. They've been chasing them back up there. They're getting turned around all the way. On the Haul Road they've been hunting up there. (SRB&A Nuiqsut Interview November 2013)

Less. All getting less caribous. I'm not really blaming the industrials. It generational, through 10, 15 years of hunting, we're scaring them. They do talk to each other, let each other know this is a dangerous area for them to be. (SRB&A Nuiqsut Interview November 2013)

Table 23 shows the reasons given for harvesting more caribou in Year 6. Over the six study years, personal factors are the most common reason for harvesting more caribou, followed by resource distribution/migration factors. Respondents provided three observations related to harvesting more caribou in Year 6: better transportation/equipment, resource availability, and traveling farther to harvest resource.

One individual noted that while the caribou were less available, he harvested more because he expended more effort in general:

I sure did [get more caribou than last year]. I kind of got more than I expected this year. Because the caribou herd was hard to find and we had to go on long hikes to get caribou so when we did these things we were making sure we got them. Because of the herd not coming through they were scattered and harder to get. (SRB&A Nuiqsut Interview November 2013)

Another respondent noted that after a number of years with limited transportation, they were recently able to purchase a new outboard motor and were therefore able to harvest more caribou in Year 6; she added, "I am very proud [of my husband] and very happy [because we harvested more caribou]" (SRB&A Nuiqsut Interview November 2013).

Table 23: Reasons Given for Increase in Harvest Amount, Nuiqsut, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**4 (80%)**	**6 (75%)**	**6 (50%)**	**7 (58%)**	**2 (50%)**	**1 (33%)**	**26 (59%)**
Personal reasons	2	2	1	5	0	0	10
Take more trips	1	3	2	0	0	0	6
Change in subsistence dependents	1	0	1	1	1	0	4
Change in subsistence providers	0	0	1	1	1	0	3
Better transportation/equipment	0	0	1	0	0	1	2
Need more	0	1	0	0	0	0	1
Resource Distribution or Migration Total	**1 (20%)**	**2 (25%)**	**5 (42%)**	**4 (33%)**	**2 (50%)**	**1 (33%)**	**15 (34%)**
Resource availability	0	2	2	4	2	1	11
Moved into area	0	0	2	0	0	0	2
Migration changed or diverted	0	0	1	0	0	0	1
Closer to community	1	0	0	0	0	0	1
Hunting Success - General Total	**0 (0%)**	**0 (0%)**	**1 (8%)**	**0 (0%)**	**0 (0%)**	**1 (33%)**	**2 (5%)**
Travel farther to harvest resource	0	0	0	0	0	1	1
Better success	0	0	1	0	0	0	1
Don't Know Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (8%)**	**0 (0%)**	**0 (0%)**	**1 (2%)**
I do not know	0	0	0	1	0	0	1
Grand Total	**5**	**8**	**12**	**12**	**4**	**3**	**44**

Stephen R. Braund & Associates, 2014.

Changes in Trip Frequency

As shown in Table 19, the percentage of harvester respondents reporting a change in trip frequencies has varied over the six study years, from 50 percent (Year 1) to 77 percent (Year 2). In Year 6, 67 percent of respondents reported a change in the frequency of their hunting trips, within the range of previous years; 42 percent of respondents reported taking fewer trips (on the high end of the range of previous years), and 25 percent reported taking more trips (on the low end of the range of previous years) (Table 24).

Table 24: Type of Change in Trip Frequency, Nuiqsut, Years 1-6

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Take more trips	25%	36%	32%	26%	27%	25%
Take fewer trips	25%	42%	33%	34%	36%	42%

Stephen R. Braund & Associates, 2014.

Over the six study years, personal factors have been the most frequently cited causes of an increase in trip frequency, followed by resource distribution/migration factors and development activities (Table 25).

Table 25: Reasons for Increase in Trip Frequency, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**1 (8%)**	**6 (35%)**	**16 (80%)**	**9 (60%)**	**10 (63%)**	**8 (47%)**	**50 (52%)**
Personal reasons	0	6	7	7	5	3	28
Better transportation/equipment	0	0	7	2	1	2	12
Sharing more	1	0	0	0	0	2	3
Need more	0	0	2	0	1	0	3
Change in subsistence providers	0	0	0	0	2	0	2
Change in subsistence dependents	0	0	0	0	0	1	1
Use area changed	0	0	0	0	1	0	1
Resource Distribution or Migration Total	**6 (50%)**	**7 (41%)**	**4 (20%)**	**4 (27%)**	**4 (25%)**	**6 (35%)**	**31 (32%)**
Resource availability	4	7	2	4	3	6	26
Migration changed or diverted	2	0	0	0	0	0	2
Moved out of area	0	0	1	0	1	0	2
Moved into area	0	0	1	0	0	0	1
Development Activities Total	**3 (25%)**	**2 (12%)**	**0 (0%)**	**0 (0%)**	**2 (13%)**	**1 (6%)**	**8 (8%)**
Traffic disturbance	1	1	0	0	0	1	3
Development	2	1	0	0	0	0	3
Helicopter traffic disturbance	0	0	0	0	1	0	1
Airplane traffic disturbance	0	0	0	0	1	0	1
Don't Know Total	**0 (0%)**	**1 (6%)**	**0 (0%)**	**1 (7%)**	**0 (0%)**	**0 (0%)**	**2 (2%)**
I do not know	0	1	0	1	0	0	2
Environmental Factors Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (7%)**	**0 (0%)**	**1 (6%)**	**2 (2%)**
Increase in predators	0	0	0	0	0	1	1
Weather	0	0	0	1	0	0	1
Competition or Hunting Pressure Total	**0 (0%)**	**1 (6%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (1%)**
Competition with sport hunters	0	1	0	0	0	0	1
Development Infrastructure Total	**1 (8%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (1%)**
Pipeline	1	0	0	0	0	0	1
Economic Factors Total	**1 (8%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (1%)**
Mitigation funds	1	0	0	0	0	0	1
Resource Behavior Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (0%)**	**1 (1%)**
Farther from riversides/farther inland	0	0	0	0	0	1	1
Grand Total	**12**	**17**	**20**	**15**	**16**	**17**	**97**

Stephen R. Braund & Associates, 2014.

Under personal factors, general personal reasons were the most frequently cited reasons for an increase in the frequency of hunting trips in Year 6 (three observations), followed by better transportation/equipment, an increase in sharing, and a change in subsistence dependents (Table 25). A few individuals indicated that they hunted more frequently because of a need or desire to harvest more caribou to share with family members:

> *I think I went out more this year because I was helping my grandma and driving the boat. And I was here the whole summer.* (SRB&A Nuiqsut Interview November 2013)

> *Yes, we went way more. Just going out more trying to find the caribou and also trying to get more caribou to help my grandma and other people out.* (SRB&A Nuiqsut Interview November 2013)

> *Probably a little more than last year only because I was looking for more. I just wanted more caribou because I sent some to my mom in Fairbanks. This year I try to get more. I have to go on more and more trips than last year.* (SRB&A Nuiqsut Interview November 2013)

Residents also hunted more frequently because of the recent availability of working transportation. Two respondents observed,

> *I went out more this fall than last fall. I just wasn't – I didn't have a good snowmachine last fall. I got a brand new snowmachine last winter [so I went more this fall].* (SRB&A Nuiqsut Interview November 2013)

> *I went more this year than last year. No [I didn't go out the year before]. My dad finally got an outboard on the boat [last year] but I was working and no one was able to watch my kids, so I didn't get to go [last year]. Makes it a lot more fun when you have your own transportation, even though it comes with headaches.* (SRB&A Nuiqsut Interview November 2013)

Six individuals cited general resource availability for taking more trips in Year 6, indicating that they had to hunt more frequently to find caribou. These respondents generally indicated that the caribou were not in their usual hunting areas or were too far inland. One individual believed the lack of caribou in their hunting areas was due to development activities and the presence of predators, while the other respondents did not provide an explanation for the lack of caribou. Respondents' observations included the following:

> *[The number of trips I took] was a little more. No game around. When that big old herd came through Nuiqsut, I never caught any.* (SRB&A Nuiqsut Interview November 2013)

> *[I went on more trips because there were] less caribou. It's like they knew we were there and were staying away from the river. The big ones were staying on the top. That last time [last year] I lucked out and caught two of them down here [near Sentinel Hill]. It looked like they were getting ready to cross the river down here. Their migrating [routes], the trails, it's always the same. But now that they started all of this [development] stuff – the tuttus [caribou] used to be right in here [west of the community] and now it's way over here [toward Judy/Fish Creeks]. Everybody was having a hard time too. At one time when the caribous migrated, there used to be thousands. That's the only time that I knew; there were thousands of them [nearby], but a whole lot of people came over there and got them, and after that nothing else.* (SRB&A Nuiqsut Interview November 2013)

> *[I went on] quite a few [more trips]. Well it is hard to tell like when the noise from the chopper, like you can hear it, you don't try to disturb it but they always fly in and spread the caribou out. [Have to look more]. Once they are spooked, there have been quite a few wolverine too, mostly in this area [west of the community]. I don't know why there are more wolverines, there*

are more wolves to the south or wolverines or grizzly bears. They mostly just run away from those wolves to this side. They don't come in a bunch, they are all spread out. Yes [the caribou are more spread out now], because of the wolves. In a herd of three to five in one pack and the others disperse. [Caribou are] pretty smart. (SRB&A Nuiqsut Interview November 2013)

I think [my frequency of trips] was more. Coming out this way it was more trips, because the caribou were out further. We had to wait and keep on going out and wait for them to come this way. (SRB&A Nuiqsut Interview November 2013)

Definitely took more trips. Caribou were scarce all year long. When we did catch them we shared them. I went out more with less success. (SRB&A Nuiqsut Interview November 2013)

In Year 6, reasons for a decrease in trip frequency were primarily Personal Factors (21 observations), followed by Economic Factors (four observations) and Resource Distribution/Migration (three observations).

Table 26: Reasons for Decrease in Trip Frequency, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**9 (90%)**	**16 (80%)**	**19 (95%)**	**22 (88%)**	**17 (71%)**	**21 (75%)**	**104 (82%)**
Personal reasons	2	2	8	10	8	10	40
Lack of transportation/equipment	4	10	6	5	4	2	31
Employment/lack of time	3	3	5	7	4	6	28
Change in subsistence providers	0	0	0	0	1	1	2
Better transportation/equipment	0	0	0	0	0	1	1
Change in subsistence dependents	0	0	0	0	0	1	1
Need less	0	1	0	0	0	0	1
Resource Distribution or Migration Total	**0 (0%)**	**4 (205)**	**1 (5%)**	**1 (4%)**	**3 (13%)**	**3 (11%)**	**12 (9%)**
Resource availability	0	4	0	0	2	3	9
Change in distribution/migration	0	0	0	0	1	0	1
Moved into area	0	0	0	1	0	0	1
Moved out of area	0	0	1	0	0	0	1
Economic Factors Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (4%)**	**4 (14%)**	**5 (4%)**
Increased cost of living/expenses	0	0	0	0	1	4	5
Don't Know Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**2 (8%)**	**1 (4%)**	**0 (0%)**	**3 (2%**
I do not know	0	0	0	2	1	0	3
Development Activities Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (4%)**	**0 (0%)**	**1 (1%)**
Development	0	0	0	0	1	0	1
Development Infrastructure Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (4%)**	**0 (0%)**	**1 (1%)**
Oil field infrastructure	0	0	0	0	1	0	1
Environmental Factors Total	**1 (10%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (1%)**
Less snow	1	0	0	0	0	0	1
Grand Total	**10**	**20**	**20**	**25**	**24**	**28**	**127**

Stephen R. Braund & Associates, 2014.

Personal factors causing respondents to hunt less frequently included general personal reasons, employment/lack of time, and lack of transportation/equipment.

A number of respondents indicated that they had hunted less because they were too busy with work and family commitments. A few respondents indicated that out-of-town employment conflicted with their ability to go caribou hunting. Other individuals had family commitments such as looking after their children or working on their house and therefore did not spend as much time looking for caribou. Nuiqsut respondents observed,

> *Less trips. Because I'm working out of town now. I work three weeks on three weeks off.* (SRB&A Nuiqsut Interview November 2013)
>
> *Fewer trips than previous years. I work out at Alpine.* (SRB&A Nuiqsut Interview November 2013)
>
> *Work, I was working all the time. Works always come first for me. Whenever I had free time, I'd try and go scout some caribous.* (SRB&A Nuiqsut Interview November 2013)
>
> *Maybe less [due to] work. I was working at the store for a while and pretty occupied at the time. Just had my daughter. And didn't have time to go boating. And when I did it was like two, three times.* (SRB&A Nuiqsut Interview November 2013)
>
> *Less [frequently] than normal for me. I was pretty busy with kids. And usually I go, I usually go out every day when there is a net set at Nanuq, and I check those nets every day. Just to check the net and go home. It is easier to do fish and we catch caribou whenever they come around and that is not very often. When the caribou are across the river, or we hear about them, we go out.* (SRB&A Nuiqsut Interview November 2013)
>
> *I went less. I was more busy and more sore with like whaling, family, funerals. Starting to get back on my feet and putting a net out. First time putting my net out.* (SRB&A Nuiqsut Interview November 2013)

In addition to a lack of time, a number of individuals also cited a lack of functioning transportation equipment or a lack of money to buy gas as reasons for fewer hunting trips in Year 6.

> *Less than the year before because I sold my boat and snowmachine. I was traveling with other people. I was hitching rides. But the ASRC dividend is about to change my life for me [will be able to buy new transportation].* (SRB&A Nuiqsut Interview November 2013)
>
> *I took fewer trips. It costs money, and I was running low.* (SRB&A Nuiqsut Interview November 2013)
>
> *Less [hunting]. I was unemployed last year [so I had less gas money].* (SRB&A Nuiqsut Interview November 2013)
>
> *I went out less than last year, hardly any money to go out, gas costs so much. They stopped the gas vouchers at the city. They freezed it. I'd get them every month and give them to [hunting partner]. They stopped it.* (SRB&A Nuiqsut Interview November 2013)

As indicated in the above discussions, the relationship between employment and subsistence hunting can be both a positive and negative one. While employment can prevent residents from hunting as much due to less time on the land, a lack of income can also prevent residents from hunting caribou because they do not have the means to purchase the necessary fuel and equipment.

While some respondents hunt more frequently when caribou are less available in order to ensure a successful harvest, others reduce their hunting if they believe they will not be successful. These individuals generally base their decisions about whether they should go hunting on reports from other hunters about the whereabouts of the caribou (i.e., if other hunters indicate there are no caribou around, these respondents will not go hunting). One individual reported that he took fewer trips in Year 6 because he was *more* successful harvesting caribou. He observed, "Probably less trips this year, pretty much got something every time I went out. I was more successful" (SRB&A Nuiqsut Interview November 2013).

In addition to the above factors, several Nuiqsut harvesters cited their advanced age for a decrease in caribou hunting in Year 6. One individual noted that his sons have taken over much of the hunting duties in the household. He said, "My sons did hunting in the summer. I go less when they go. When they can bring stuff home, I don't have to go" (SRB&A Nuiqsut Interview November 2013).

Changes in Trip Duration

The percentage of active harvesters reporting a change in their trip duration in Year 6 was within the range of what was reported in previous years, with 26 percent of harvester respondents reporting a change in Year 6 compared to 23 percent in Year 5, 21 percent in Years 3 and 4, 32 percent in Year 2, and 39 percent in Year 1 (Table 19). Sixteen percent of Year 6 respondents reported taking longer trips compared to the previous year, and 11 percent reported taking shorter trips (Table 27). The percentage of respondents taking longer trips is higher than the previous three years but lower than in Years 1 and 2.

Table 27: Type of Change in Trip Duration

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Take longer trips	33%	25%	9%	12%	13%	16%
Take shorter trips	6%	8%	12%	9%	11%	11%

Stephen R. Braund & Associates, 2014

Table 28 shows the reasons given for taking longer hunting trips in Years 1 through 6. During all study years, "Resource Distribution or Migration" was the primary factor for taking longer trips. In addition to causes related to resource distribution/migration, residents also cited Personal Factors and Resource Behavior as reasons for taking longer trips. Under the category of "Resource Distribution or Migration," resource availability was the only cause given (six observations), higher than in any previous year since Year 1.

A number of respondents noted that caribou were generally unavailable in their hunting areas and therefore they had to spend more time looking for them, or the caribou were in their hunting areas but too far inland from the rivers to access (see Resource Behavior, Table 28). These individuals' observations included the following:

> *Longer trips to get more caribou. You know over here (west on the coast) the caribou were just wandering around and feeding but they were too far inland. Yes. No caribou in a three hundred mile range. Three or four years ago there was nothing. Right now [November 2013] there is no traffic around here so right now there is a lot of caribou around here.* (SRB&A Nuiqsut Interview November 2013)

> *At the same time they were just harder to get at. Let's say we'd have to dock the boat and take five mile hikes. Taking hikes out to the fields and scaring them closer to the fields so we don't have to pack them out.* (SRB&A Nuiqsut Interview November 2013)

> *They were the same, long trips because it was all day up and all evening back. Longer trips. Stopping more and more instead of going straight up and back. Stop places and look around.*

Everyone was having a hard time [finding caribou] so we were looking around more. (SRB&A Nuiqsut Interview November 2013)

Respondents also cited personal reasons for taking longer trips. One individual reported staying out longer after purchasing a more efficient outboard motor:

I did extend my travel by boat. Longer trips, I can stay out longer and stay out looking. Now that I have a motor I can stay out when I want to. It is a good outboard. 20 gallons, 20 hours. All summer long I was out in the ocean. (SRB&A Nuiqsut Interview November 2013)

Table 28: Reasons for Taking Longer Trips, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Resource Distribution or Migration Total	**9 (56%)**	**3 (33%)**	**0 (0%)**	**3 (43%)**	**2 (29%)**	**6 (55%)**	**23 (42%)**
Resource availability	4	3	0	3	2	6	18
Migration changed or diverted	5	0	0	0	0	0	5
Personal Factors Total	**0 (0%)**	**3 (33%)**	**3 (60%)**	**3 (43%)**	**3 (43%)**	**3 (27%)**	**15 (27%)**
Personal reasons	0	3	3	3	1	1	11
Better transportation/equipment	0	0	0	0	1	1	2
Sharing more	0	0	0	0	0	1	1
Change in transportation method	0	0	0	0	1	0	1
Hunting Success - General Total	**2 (13%)**	**1 (11%)**	**2 (40%)**	**1 (14%)**	**1 (14%)**	**0 (0%)**	**7 (13%)**
Travel farther to harvest resource	1	1	1	1	1	0	5
More difficult	1	0	0	0	0	0	1
Worse success	0	0	1	0	0	0	1
Development Activities Total	**5 (31%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**5 (9%)**
Helicopter traffic disturbance	2	0	0	0	0	0	2
Airplane traffic disturbance	2	0	0	0	0	0	2
Development	1	0	0	0	0	0	1
Resource Behavior Total	**0 (0%)**	**1 (11%)**	**0 (0%)**	**0 (0%)**	**1 (14%)**	**2 (18%)**	**4 (7%)**
Farther from riversides/farther inland	0	1	0	0	1	2	4
Economic Factors Total	0	1	0	0	0	0	1
Increased cost of living/expenses	0	1	0	0	0	0	1
Grand Total	**16**	**9**	**5**	**7**	**7**	**11**	**55**

Stephen R. Braund & Associates, 2014.

The primary reasons for taking shorter trips over all study years were related to Personal Factors (Table 29). A smaller number of respondents reported factors related to Resource Distribution or Migration and Economic Factors. In Year 6, respondents cited increased cost of living/expenses (two observations), followed general personal reasons, employment/lack of time, lack of transportation/equipment, and resource availability (all one observation each) for the decrease in trip length.

Table 29: Reasons for Taking Shorter Trips, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**2 (100%)**	**2 (100%)**	**6 (86%)**	**3 (60%)**	**5 (6%)**	**3 (50%)**	**21 (68%)**
Personal reasons	1	0	5	2	4	1	13
Employment/lack of time	1	1	0	0	1	1	4
Lack of transportation/equipment	0	1	1	1	0	1	4
Resource Distribution or Migration Total	**0 (0%)**	**0 (0%)**	**1 (14%)**	**1 (20%)**	**2 (22%)**	**1 (17%)**	**5 (16%)**
Resource Availability	0	0	1	1	2	1	5
Economic Factors Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (11%)**	**2 (33%)**	**3 (10%)**
Increased cost of living/expenses	0	0	0	0	1	2	3
Don't Know Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (20%)**	**0 (0%)**	**0 (0%)**	**1 (3%)**
I do not know	0	0	0	1	0	0	1
Environmental Factors Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (11%)**	**0 (0%)**	**1 (3%)**
More rain	0	0	0	0	1	0	1
Grand Total	**2**	**2**	**7**	**5**	**9**	**6**	**31**

Stephen R. Braund & Associates, 2014.

Several residents indicated that their shorter hunting trips were due to a lack of money for gas or a lack of suitable transportation:

> *Maybe shorter this year. I was on another boat with my cousin and his boat didn't make it far enough. His boat can't go through shallow water.* (SRB&A Nuiqsut Interview November 2013)

> *We used to go longer – gas prices, inflation – we're so impacted.* (SRB&A Nuiqsut Interview November 2013)

> *The gas prices are what really get us, we have to wait to get a paycheck. Some people would rather use their boat and wait for a later time, and us we don't own a boat, so we borrow one or go with somebody.* (SRB&A Nuiqsut Interview November 2013)

One individual reported taking shorter trips because of a lack of caribou in his hunting area, saying, "I take shorter trips, most of the time I go out and there are no caribou so I would just come back" (SRB&A Nuiqsut Interview November 2013).

Changes in Use Area

As shown in Table 19, 40 percent of harvester respondents reported that their hunting area was different in Year 6 compared to the previous year. This was slightly higher than in previous years, which ranged from 28 percent of respondents in Year 2 to 39 percent in Year 3. Twenty-eight percent of Nuiqsut caribou harvester respondents reported a general change in the location of their use area in Year 6 (similar to Years 4 and 5), 11 percent reported that they used a smaller hunting area, and two percent reported expanding their use area (Table 30).

Table 30: Type of Change in Use Area, Nuiqsut, Years 1-6

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Use area changed	6%	19%	14%	29%	29%	28%
Smaller hunting area	11%	0%	11%	0%	4%	11%
Expanded use area	0%	0%	7%	0%	4%	2%
Travel farther to harvest resource	14%	4%	5%	2%	0%	0%
Change in harvest methods	0%	0%	0%	2%	0%	0%
Personal reasons	0%	2%	0%	0%	0%	0%
Take fewer trips	0%	2%	0%	0%	0%	0%
Change in timing of the hunt	0%	2%	0%	0%	0%	0%
Utilizing new or different areas	0%	0%	2%	0%	0%	0%
Move to different areas	0%	2%	0%	0%	0%	0%

Stephen R. Braund & Associates, 2014.

Table 31 shows the reasons given for the more general observation of "Use Area Changed." Over all six study years, Personal Factors were the most commonly cited reasons for a change in use area, followed by Resource Distribution or Migration factors, Environmental Factors, and Development Activities. In Year 6, resource availability was the most commonly cited single reason for a change in use area (eight observations), followed by development activities (five observations). However, the combined observations under Personal Factors (12 observations) were higher than any other category of responses.

Table 31: Reasons Given for a Change in Use Area, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**4 (24%)**	**4 (25%)**	**19 (84%)**	**15 (68%)**	**13 (46%)**	**12 (44%)**	**67 (50%)**
Personal reasons	1	1	10	11	6	3	32
Lack of transportation/equipment	2	2	5	4	3	4	20
Better transportation/equipment	0	0	4	0	1	3	8
Employment/lack of time	1	1	0	0	0	2	4
Change in subsistence providers	0	0	0	0	1	0	1
Change in transportation method	0	0	0	0	1	0	1
Smaller hunting area	0	0	0	0	1	0	1
Resource Distribution or Migration Total	**5 (29%)**	**7 (44%)**	**2 (9%)**	**2 (9%)**	**11 (39%)**	**8 (30%)**	**35 (26%)**
Resource availability	1	2	0	1	4	8	16
Migration changed or diverted	4	2	0	0	1	0	7
Change in distribution/migration	0	1	0	1	3	0	5
Further from community	0	1	0	0	1	0	2
Moved out of area	0	0	2	0	0	0	2
Harvest resource closer to community	0	0	0	0	1	0	1
Move to different areas	0	1	0	0	0	0	1
Moved into area	0	0	0	0	1	0	1

Table 31, Continued: Reasons Given for a Change in Use Area, Years 1-6

Environmental Factors Total	**1 (6%)**	**3 (19%)**	**2 (9%)**	**4 (18%)**	**2 (7%)**	**2 (7%)**	**14 (11%)**
Shallower rivers/lakes	0	0	1	3	0	1	5
Climate affecting travel	0	2	0	0	0	0	2
River channel changed	0	0	0	0	0	1	1
Climate	0	0	0	0	1	0	1
Less snow	1	0	0	0	0	0	1
Wind	0	1	0	0	0	0	1
Warmer temperatures	0	0	0	0	1	0	1
Water quality	0	0	0	1	0	0	1
Weather	0	0	1	0	0	0	1
Development Activities Total	**4 (24%)**	**1 (6%)**	**0 (0%)**	**1 (5%)**	**1 (4%)**	**5 (19%)**	**12 (9%)**
Development	1	1	0	1	1	1	5
Traffic disturbance	1	0	0	0	0	2	3
Helicopter traffic disturbance	1	0	0	0	0	1	2
Air traffic	0	0	0	0	0	1	1
Airplane traffic disturbance	1	0	0	0	0	0	1
Development Infrastructure Total	**2 (12%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**2 (2%)**
Pipeline	1	0	0	0	0	0	1
Ice roads	1	0	0	0	0	0	1
Resource Behavior Total	**1 (6%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (4%)**	**0 (0%)**	**2 (2%)**
Farther from shore	0	0	0	0	1	0	1
Farther from riversides/farther inland	1	0	0	0	0	0	1
Economic Factors Total	**0 (0%)**	**1 (6%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (1%)**
Increased cost of living/expenses	0	1	0	0	0	0	1
Grand Total	**17**	**16**	**23**	**22**	**28**	**27**	**133**

Stephen R. Braund & Associates, 2014.

The area where Nuiqsut residents hunt each year is dependent on a number of factors, including the location or distribution of the caribou, environmental factors such as river levels or snow conditions, human factors such as development activities or hunting competition, and the availability of transportation methods to access certain areas. In Year 6, a number of respondents indicated that they hunted in different areas in search of caribou. One individual indicated that they traveled farther than usual in Year 6 looking for caribou, saying, "I had to go looking longer and went farther" (SRB&A Nuiqsut Interview November 2013). Another individual made a similar comment, saying,

> *I travelled further. There is simply no caribou. Sometimes you don't see any or they are too far and you can't get to them. You want to catch them near the river.* (SRB&A Nuiqsut Interview November 2013)

One respondent reported traveling into Fish Creek looking for caribou because he was unable to find them elsewhere; for this individual, hunting in Fish Creek is relatively uncommon. He said, "I took that one trip inside Fish Creek. That was a different thing" (SRB&A Nuiqsut Interview November 2013).

In contrast, two individuals indicated that because they were able to harvest caribou closer to the community, they did not travel as far as they did during the previous year. One respondent described,

> *The past few years I went further [than this year]. I was surprised that they were close. They seem to be slower coming back this way. It seems like they are a little closer this year than last year. Guys were going 20 to 30 miles last year [looking for caribou]. It could be air traffic up here, it could be the studies and stuff that is in this area [affecting the distribution of caribou].* (SRB&A Nuiqsut Interview November 2013)

Five individuals attributed their change in use area in Year 6 to development activities. Two respondents described an increase in activities in the vicinity of Fish Creek and a corresponding change in the distribution of caribou which affected their hunting area:

> *Like I said I wasn't having any luck in this area [near Fish Creek]. I think it is because they were looking at GMT1 [surveying the area]. I got satellite collar imagery, and it is really familiar to – the caribou avoided the GMT1 area. They went around, it is because they are doing a lot of surveys over there. Helicopters. I've seen a lot of choppers inside Fish Creek. I ran into BLM out there. [The exploration around] GMT1 and Fish Creek are diverting the herd around their proposed development. The caribou are going south. A lot more activity this year, close to 1,100 Conoco Phillips helicopter flights[5]. If you take a look a Cassin 6 and Cassin 1, those are wells, there is a big resemblance as to how and where the caribous are going. It has gotten worse. I can see with the caribou are not coming into this area. During the summer Conoco did a lot of studies over there. The wells, hydrology, UAF [University of Alaska – Fairbanks] is down there at Fish Creek, studying the fish.* (SRB&A Nuiqsut Interview November 2013)

> *[My hunting area was] different; there was so much activity going on northwest of town so the caribou kept moving away from that [area] towards us. None of them ever crossed the Nigliq Channel. We used to see those big herds cross but none of them did. I think it was due to all of those Conoco studies around CD5. Like camping people, fisheries people, there were camps – scientists and stuff like that.* (SRB&A Nuiqsut Interview November 2013)

Another individual reported focusing their efforts in certain areas to avoid increased traffic east of the Colville Delta:

> *Too many choppers, planes, they disturb everything, my hunting and whatnot. They were cleaning up the tundra, but it was okay. When we were up here [on the east side], we avoided the other planes that were out here [east of the channel] and we stayed on the west side mainly because there were so many choppers out there. You could see Hercules planes flying on this side [down toward Ocean Point]. We saw canoers down here, maybe they were digging for bones or something.* (SRB&A Nuiqsut Interview November 2013)

One Nuiqsut harvester observed that the impact of traffic on caribou distribution has lessened in recent years, indicating that industry has been making a greater effort to avoid flying in certain areas during the peak hunting season. This individual explained,

> *It was sort of like different from last year, for some reason they decided to go towards west side Harrison Bay area. That's what happens when they were being crowded by planes and helicopters. I think they [industry] are starting to understand that during the migration of caribou, they're staying away [from those areas]. That was some difference we finally saw. Maybe that's the reason they [caribou] start coming through town.* (SRB&A Nuiqsut Interview November 2013)

In addition to causes related to resource availability and development activities, residents' hunting area may also be affected by what type of transportation is available to them in a given year. For example, a new outboard motor may result in more extensive riverine travel, while a repaired snowmachine may result in more overland use. Several individuals described,

[5] CPAI noted that this number reflects the number of helicopter landings, rather than separate flights.

I was able to get all the way down to Big Bend [on Colville River] because of the jet boat. (SRB&A Nuiqsut Interview November 2013)

Yeah [our use area changed] because we finally got an outboard. He [my husband] can really travel all over. (SRB&A Nuiqsut Interview November 2013)

[My use area] is a little different [this year] from the simple fact that I didn't have a four-wheeler to get on the west side. (SRB&A Nuiqsut Interview November 2013)

Residents also cited personal reasons, such as lack of time to go to their usual hunting areas, health problems, lack of money to buy fuel, and personal interest in exploring new areas, for their change in use area in Year 6. One individual reported discovering a new hunting area where he goes to spot for caribou:

Yeah, where this lake dried out [near Ocean Point], we didn't use to go there and now a days we go there. You can take a long hike and there is like a little hidden valley back there it started drying out three or four years ago. That lake drained out because of erosion. We go out by boat and then hike out to the lake. (SRB&A Nuiqsut Interview November 2013)

Changes in Hunting Months

Eighteen percent of Nuiqsut caribou harvester respondents reported a change in their hunting months in Year 6, within the range of previous years (between 12 percent and 21 percent) (Table 19). A majority of these respondents (16 percent) reported a general change within their normal harvest season, rather than an overall shift in the timing of their hunting season (Table 32).

Table 32: Type of Change in Months of Harvest by Type of Change, Nuiqsut, Year 1, 2, 3, 4, 5 and 6

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Later hunting season	11%	0%	5%	0%	0%	0%
Earlier hunting season	0%	0%	0%	0%	2%	2%
Harvest season changed	9%	15%	7%	21%	20%	16%

Stephen R. Braund & Associates, 2014.

Over the six study years, Personal Factors were the most commonly cited reasons for a change in harvest seasons, followed by Resource Distribution or Migration factors (Table 33). In Year 6, nearly all observations related to a change in harvest season were under the category of Personal Factors (seven observations). In addition, resource availability, weather, and better success were all mentioned once as reasons for a change in harvest season.

Several individuals noted a difference in the timing of the caribou hunting activities between Year 5 and Year 6. Some individuals indicated that work commitments prevented them from hunting during certain months, while others reported a change in the timing of their hunting activities due to the availability of caribou. A couple of respondents described stopping their hunting season early because they already had enough caribou or subsistence foods, while one respondent indicated that they hunted at a time when then usually do not hunt, because of the need for caribou. Several individuals observed,

Sometimes I go in July until October. My boys they got caribou, that's why [I stopped earlier]. I went to scout for moose [instead]. (SRB&A Nuiqsut Interview November 2013)

I usually go other months, but we needed caribou. So I went out. [I usually go] before it starts freezing [later in the year]. (SRB&A Nuiqsut Interview November 2013)

Had too much food. Had lots of whales, didn't even need to go out hunting because the harvesting was good. When you have so much Eskimo food, and there's a lot of people that

share, I've been getting some caribou from my brother and nephew that's why I didn't need to go out hunting. My freezer was full. (SRB&A Nuiqsut Interview November 2013)

Because I was working at Alpine two weeks on two weeks off I barely got to go. I just quit last month. I was going to find a job here. (SRB&A Nuiqsut Interview November 2013)

A few respondents reported that they could not hunt during the late fall or winter because of the lack of transportation. Two harvesters observed,

If I have a snowmachine [I go hunting in September], but I haven't had one. (SRB&A Nuiqsut Interview November 2013)

After whaling no I did not [go looking for caribou]. My cousin borrowed my snowmachine and sank it. We got it [back]; it is running, but not the same. (SRB&A Nuiqsut Interview November 2013)

Table 33: Reasons Given for a Change in Harvest Season, Years 1-6

	Number of Observations						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**All Years**
Personal Factors Total	**4 (57%)**	**5 (63%)**	**5 (71%)**	**12 (86%)**	**8 (67%)**	**7 (70%)**	**41 (71%)**
Lack of transportation/equipment	2	2	2	3	6	3	18
Personal reasons	0	2	0	7	1	1	11
Employment/lack of time	2	0	1	2	0	1	6
Better transportation/equipment	0	0	2	0	1	0	3
Need more	0	0	0	0	0	1	1
Change in subsistence providers	0	0	0	0	0	1	1
Change in subsistence dependents	0	1	0	0	0	0	1
Resource Distribution or Migration Total	**3 (43%)**	**2 (25%)**	**2 (29%)**	**1 (7%)**	**2 (17%)**	**1 (10%)**	**11 (19%)**
Resource availability	0	2	1	0	2	1	6
Later migration/arrival	3	0	0	0	0	0	3
Change in distribution/migration	0	0	0	1	0	0	1
Moved out of area	0	0	1	0	0	0	1
Environmental Factors Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**2 (17%)**	**1 (10%)**	**3 (5%)**
Weather	0	0	0	0	0	1	1
Climate	0	0	0	0	1	0	1
Harsh winter	0	0	0	0	1	0	1
Development Activities Total	**0 (0%)**	**1 (13%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (2%)**
Airplane traffic disturbance	0	1	0	0	0	0	1
Don't Know Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (7%)**	**0 (0%)**	**0 (0%)**	**1 (2%)**
I do not know	0	0	0	1	0	0	1
Hunting Success - General Total	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**0 (0%)**	**1 (10%)**	**1 (2%)**
Better success	0	0	0	0	0	1	1
Grand Total	**7**	**8**	**7**	**14**	**12**	**10**	**58**

Stephen R. Braund & Associates, 2014.

Harvested Enough Caribou

In Year 6, 54 percent of Nuiqsut respondents indicated that they did not harvest enough caribou, an increase from the previous five study years, which ranged from 16 percent (Year 4) to 53 percent (Year 2) (Table 20). The higher percentage of harvesters who did not harvest enough caribou in Years 2 and 6 correspond with lower reported harvests by active harvester respondents during those two study years (despite higher overall harvests reported by the community as a whole). Respondents discussed a variety of reasons for not harvesting enough caribou during the Year 6 study period, often referring back to their reasons for harvesting fewer caribou in Year 6 (see Table 22). In addition to not harvesting enough caribou because of a decrease in their caribou harvests, respondents also reported having more people to provide for or share with in Year 6. Several respondents indicated that while they harvested "enough" to get them through the year, they would have liked more caribou. As one individual described,

> *I wouldn't say 'enough,' just [enough] to get by, you know. I would like more than what I got. I have a big family; I tend to give quite a little bit out. I would like 15 to 20 caribou. Sometimes a lot I bring with me; some goes to family and people here in the village who aren't hunting. I give some away to elders and single mothers with no one to hunt for them. I try not to overstock myself or let any go to waste.* (SRB&A Nuiqsut Interview November 2013)

Cultural values related to sharing are often one reason behind residents' running out of caribou for their own households. Even if a hunter needs a caribou for his own immediate family, he or she will still share a substantial portion with other households, especially to households with elders or with single parents who do not have the time or resources to hunt. Several individuals described how they distribute their harvests throughout the community and with other communities as follows:

> *We've got a pretty decent big family, and we split everything for our grandma. We need as much caribou as we can get. [We were] out of caribou before winter.* (SRB&A Nuiqsut Interview November 2013)

> *No not enough. We got people from Barrow who need caribou too. Maybe one dozen [caribou is the ideal number]*. (SRB&A Nuiqsut Interview November 2013)

> *I could use a couple more. Because you know we share. Especially this time of year because it's Thanksgiving.* (SRB&A Nuiqsut Interview November 2013)

> *No, not enough. One caribou will feed your family but you got to worry about other families too. If you catch one you can't just keep it, so you have to share it between households. I would say about 10 [caribou is ideal]. Yeah – 10 or 12 [caribou], that would be enough to last all winter. When you haven't had it in a while and someone brings it over it is so exciting, when someone brings it over it is like a delicacy now, it is like a treat now. Caribou are so hard to find now, it is such a treat. When you catch one it is gone in a week because you are sharing it between so many families. We all watch out for each other when it comes to caribou. The other day a buddy of mine dropped off a caribou. There were 13 of us living in my house, so that one caribou went a long way for us. My kids, they love it. When you cut it up they can't get enough.* (SRB&A Nuiqsut Interview November 2013)

A number of respondents indicated that they ran out of caribou before the year's end, and some indicated that in November 2013 they had no caribou in their freezers and were depending on others to share with them. A few respondents indicated they were relying on other sources of food, such as moose meat and fish, because they had no caribou meat left. Additional comments regarding respondents' stock of caribou in Year 6 include the following:

> *I actually was short [on caribou]; my freezer is dry on caribou. I cooked a lot of it, and half of it shared with everybody. I'd say [I need] about five caribou to last through the year and that kind of feeding within your own household.* (SRB&A Nuiqsut Interview November 2013)

> *They've been giving us some. We need more; it would be nice to have more. My boys have been complaining they want* paniqtaq *[dried caribou meat]*. (SRB&A Nuiqsut Interview November 2013)

We wanted caribou at one point in time but we got it. So we were kind of good but we didn't get enough. Could have used more. There wasn't much caribou around. Like I said they had to go this way [east] or they had to turn and go this way. (SRB&A Nuiqsut Interview November 2013)

I needed more caribou, I just finished my last [bit]. I am trying to conserve it. Now I am down to a little bit of moose meat. (SRB&A Nuiqsut Interview November 2013)

I told my son to go get some more alright and he never go back yet. There was quite a few caribou that way, 10-15 miles. Just get one and never go back. Been getting running out and I said "Go get some caribou!" At least we had some moose! (SRB&A Nuiqsut Interview November 2013)

I would say, no not enough. Maybe this year… no we didn't have enough last year. Just didn't catch enough. I don't know why, they were not out there this year. They were deeper into the tundra, away from the water. To get them we would have to hike a mile to shoot them and pack them a couple miles to the boat. (SRB&A Nuiqsut Interview November 2013)

Well we needed some more so that is why we traded off with fish, the fish I catch. And Mother Nature is always holding us back [so we can't get out hunting]. (SRB&A Nuiqsut Interview November 2013)

Not enough caribou this year, had to borrow some. I hate borrowing caribou. (SRB&A Nuiqsut Interview November 2013)

Observations of Harvested Caribou Health and Condition

The percent of respondents reporting one or more "abnormalities" in caribou has ranged from 25 percent to 64 percent over the study years (Table 34). The percentage of respondents observing caribou abnormalities in Year 6, at 25 percent, was on the low end of the range of previous years (Table 34), as was the total number of caribou with abnormalities (74 in Year 1 versus only 14 in Year 6) (Table 35).

Table 34: Respondent Observations of Abnormalities in Harvested Caribou, Nuiqsut, Years 1-6[6]

	Percentage of Respondents					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Health	47%	26%	18%	26%	34%	16%
Other	3%	4%	0%	0%	4%	4%
Parasites	22%	4%	5%	3%	4%	0%
Quality	8%	4%	4%	10%	14%	4%
Size	31%	13%	18%	14%	27%	12%
One or More Abnormalities	64%	38%	40%	29%	45%	25%

Stephen R. Braund & Associates, 2014.

[6] These observations likely include instances of Brucellosis, a common disease in the Teshekpuk and Central Arctic Herd that is characterized by pus-filled swellings and swollen joints.

Table 35: Number and Percent of Abnormal Caribou by Type of Abnormality, Nuiqsut, Years 1-6

	Number (%) of Abnormal Caribou						Number (%) of Abnormal Caribou Used					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Health	24 (32%)	16 (47%)	13 (35%)	23 (85%)	30 (60%)	9 (64%)	4 (17%)	4 (25%)	2 (15%)	10 (43%)	7 (23%)	6 (67%)
Other	1 (1%)	2 (6%)	0 (0%)	0 (0%)	2 (4%)	2 (14%)	--	2 (100%)	--	--	0 (0%)	1 (50%)
Parasites	13 (18%)	5 (15%)	8 (22%)	3 (11%)	2 (4%)	0 (0%)	11 (85%)	5 (100%)	7 (88%)	0 (0%)	0 (0%)	--
Quality	3 (4%)	2 (6%)	2 (5%)	6 (22%)	11 (22%)	2 (14%)	2 (67%)	1 (50%)	2 (100%)	1 (17%)	1 (0%)	1 (50%)
Size	43 (58%)	9 (26%)	16 (43%)	12 (44%)	33 (66%)	7 (50%)	38 (88%)	8 (89%)	15 (88%)	1 (8%)	20 (61%)	3 (43%)
One or More Abnormalities	74	34	37	27	50	14	52 (70%)	20 (59%)	25 (68%)	11 (41%)	25 (50%)	9 (64%)

Stephen R. Braund & Associates, 2014.

The two principle descriptors used to describe observed abnormalities during all study years are "health" (between nine and 30 caribou) and "size" (between seven and 43 caribou) (Table 35). In Year 6, health-related abnormalities were reported in 64 percent of abnormal caribou (nine caribou), and size-related abnormalities were reported in 50 percent of abnormal caribou (seven caribou). In Year 6, respondents reported using a majority of the caribou with health-related abnormalities (six of nine); this was more common in Year 6 than in other study years, when respondents only used between 15 percent and 43 percent of caribou with health-related abnormalities (Table 35). Year 6 respondents used 43 percent of abnormal caribou with size-related abnormalities. For all types of abnormalities, respondents reported using nine of the 14 caribou with reported abnormalities in Year 6, or 64 percent, within the range of used abnormal caribou in previous study years (Table 35). They used 25 of 50 in Year 5 (50 percent), 11 of 27 in Year 4 (41 percent), 25 of 37 in Year 3 (68 percent), 20 of 34 in Year 2 (59 percent), and 52 of 74 in Year 1 (67 percent). During Year 6 household surveys, 17 percent of households reported harvesting a sick or injured caribou, on the low end of the three years with available data (table 36). Respondents used three percent of sick or injured caribou.

Table 36: Household Harvest Survey Observations of Sick/Injured Caribou, 2011, 2012, and 2013

Study Year	Percent of HH Reporting Sick/Injured Caribou	Number (%) of Sick/Injured Caribou*	Number (%) of Sick/Injured Caribou Used by HH
2011 (Year 4)	18%	26 (7%)	5 (19%)
2012 (Year 5)	23%	40 (9%)	6 (15%)
2013 (Year 6)	17%	33 (7%)	1 (3%)

Stephen R. Braund & Associates, 2014.

As shown in Table 37, in Year 6 "disease/infection" (seven observations) was the most commonly reported type of abnormality by active harvesters, followed by "decrease in resource size" (six observations) and "injured resource" (four observations). In addition, respondents reported one observation each of "change in texture of meat," "change in smell of meat," "resource appears unhealthy," and "taste" (Table 37).

When asked to provide an explanation for disease/infection or a decrease in resource size, residents most commonly responded that they did not know the cause of the observed abnormality. Observations of abnormal caribou often included mentions of wounds, pus-filled or discolored organs, and an accompanying lack of fat. Several individuals mentioned that particularly sick caribou do not flee when approached by humans. Hunters provided the following observations of diseased, infected, and skinny caribou:

> *There was couple caribous that were skinny, when I saw that skinny caribou was, right on these islands [Lonely Island]. We got really close to it, not even 20 feet away, just sat there and laid down. On that caribou we could see all the ribs. I have no idea [why].* (SRB&A Nuiqsut Interview November 2013)

> *The one out by the dumps had a bad liver; it has the spots. We should have taken it out and bagged it up but when we cut open the leg it had the greenish liquid. We didn't take that one but we got that other caribou.* (SRB&A Nuiqsut Interview November 2013)

> *It had some grayish white spots on the liver. Three [infected areas]: one on the leg, one on the rib, and one on the neck, and it had a yellow pus bubble. I just knew it was sick when I saw the spots on the liver. There were three pus bubbles on it.* (SRB&A Nuiqsut Interview November 2013)

It was a male. Medium. It was in July. There was some yellow spots on it. Around the belly area. Um, [shooter] said it was still good. It was a medium size there was no fat on it. We were going for it until we got real close to it. It wasn't scared of us, it was just roaming the place and going back and forth about five times until it just rested on that one island. It just lay there. No I have no idea [why it was sick]. (SRB&A Nuiqsut Interview November 2013)

Table 37: Types of Observed Abnormalities, Nuiqsut, Years 1-6

	Number of Observations					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Disease/Infection	22	11	13	20	29	7
Decrease in Resource Size	10	7	10	12	33	6
Injured Resource	0	0	0	0	0	4
Change in Texture of Meat	0	3	0	4	8	1
Change in Smell of Meat	2	1	0	5	6	1
Resource appears unhealthy	0	0	0	0	1	1
Taste	1	0	0	0	1	1
Increase in Resource Size	1	0	4	0	0	0
New Species in Region	0	1	0	0	0	0
Abnormal Resource Death	1	0	0	0	0	0
Physical Abnormalities	0	3	0	0	1	0
Parasites	0	1	0	0	0	0
Change in resource quality	0	0	2	0	0	0
More Parasites	3	1	1	3	1	0
Fewer Parasites	5	0	2	0	0	0

Stephen R. Braund & Associates, 2014.

As the following quotes suggest, a number of abnormal caribou were described as having predator- or hunter- caused injuries:

Beginning of July maybe four times, went up through Kupigruak up to around this area, that is where we got that real sick one. It was walking really slow foaming out of it's mouth. We just shot it looked at it, cut the head off and left it. It had a lot of bear scratched on it. It had maggots and scratches. It was still healthy with the big white beard. It was acting different. Not too sure what it was from. Not too sure what it was from. Maybe a little bit more parasites this year, billions of bugs this year. It was warmer this summer. (SRB&A Nuiqsut Interview November 2013)

They look healthy but the one that [harvester] shot it was like a tear on the neck. I don't know if it was a tear from a predator. It was a fresh tear. The meat underneath wasn't dried. I don't know if it was from a predator but it kind of looked like it but it might have been from walking through the willows. Yeah we still used it. Butchered it and brought it home and it was fine. Took a bunch of pictures of it. (SRB&A Nuiqsut Interview November 2013)

One female with a broken leg. Right front leg. I don't know [why it was broken]. We saw a lot of wolf tracks all around and grizzly tracks. And the breast had a lot of milk in it so maybe the wolf caught the baby. I just cut off the leg and left it out for the other scavengers. The one female I think. (SRB&A Nuiqsut Interview November 2013)

> *That was injured. It kind of just looked like it had been shot. It looks like something shot it in the belly and went into the leg and it had torn the muscles. We skinned it but we took the head off and just left it because it was not good. I kept the skin.* (SRB&A Nuiqsut Interview November 2013)

When a caribou is diseased and considered inedible, Nuiqsut hunters will generally cut the head of the caribou off and leave the carcass where it was shot. One respondent explained the cultural meaning behind this traditional practice, noting that bad luck could come to those who do not follow it:

> *The sick one that I got, I was around one of these lakes. It was around here on the other side of the lakes that one was a bull but then it was skinny. I could see the spine and ribs. The fur was falling off. I knew it was sick, I didn't know what kind of sickness it would have so I just cut the head off. It is a tradition of ours [to cut the head off of the caribou and leave it], if you don't do it, it will bring out bad luck. I am not sure [what was wrong with the sick caribou]. Around that same area I caught one that had pneumonia. Its lung was a little ball and I squeezed it and it burst in my hands.* (SRB&A Nuiqsut Interview November 2013)

One respondent noted that a seemingly healthy caribou they harvested had an unusual taste and texture. This individual described,

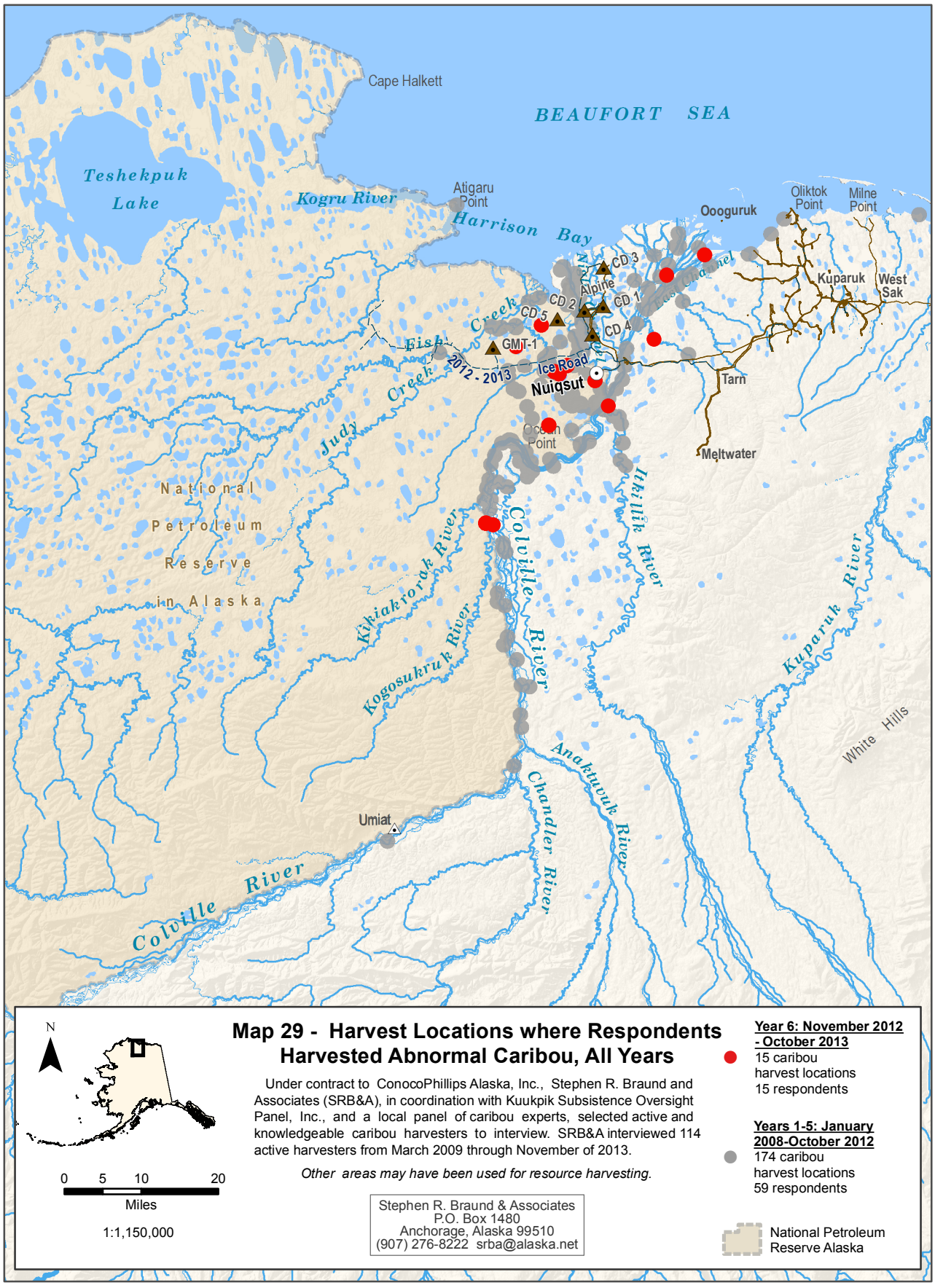
> *[The caribou] tasted different. It didn't taste like caribou. Kind of a soft meat, but - like, blank [tasting]. Didn't taste like caribou meat. You know how some caribou if you boil it a long time it gets soft, boil it less it gets hard? I tried boiling it less [to harden it up], but it didn't help.* (SRB&A Nuiqsut Interview November 2013)

The locations where Year 6 respondents reported harvesting caribou they perceived to be abnormal are depicted in red on Map 29, and locations identified during previous study years are shown in gray. For the Year 6 time period, respondents reported harvesting "abnormal" caribou primarily to the overland area west of the community and around the East Channel. In addition, a couple of abnormal caribou locations were reported near the mouth of Kogosukruk River and at the mouth of the Itkillik River. In Year 6, all "abnormal" caribou were harvested north of Sentinel Hill.

Impacts on Harvesting Activities

In Year 6, 56 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting[7], higher than in Years 4 and 5, but lower than in Years 1 through 3 (Table 38). The higher percentage of study participants (72 percent) reporting impacts in 2008 (Year 1) is due in part to Year 1 respondents including impacts that had occurred since the Alpine development had begun. During Years 2 through 6, researchers tried to document only impacts that had occurred during the respective study time period. In addition, in this and the previous years' report researchers reviewed all six years of data to improve the focus on only impact reports that are Alpine-related. Hence, the data on reported impacts for Year 1 through 3 may differ from data reported in previous study year reports, as the previous study year reports include impacts that did not result directly from Alpine activities. The presence of other activities on the North Slope is still relevant to understanding overall impacts on caribou harvesting activities and puts Alpine-related impacts into context, and therefore these "other" impacts are summarized below. The study team recorded all impacts reported by respondents and did not make determinations regarding what

[7] The impacts discussed in this section are those that respondents believed were related to Alpine activities. It is not possible to verify the source of all impacts, and in some cases respondents were unsure of the source of an impact.



Map 29 - Harvest Locations where Respondents Harvested Abnormal Caribou, All Years

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 114 active harvesters from March 2009 through November of 2013.

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

Year 6: November 2012 - October 2013
15 caribou harvest locations
15 respondents

Years 1-5: January 2008-October 2012
174 caribou harvest locations
59 respondents

National Petroleum Reserve Alaska

Table 38: Respondent Reported Alpine-Related Impacts on Caribou Hunting, Nuiqsut, Years 1-6

	Percent of Respondents						Percent of Observations					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Helicopter traffic	61%	40%	47%	22%	30%	49%	28%	26%	49%	54%	55%	46%
Plane traffic	42%	32%	16%	9%	11%	12%	22%	21%	16%	18%	20%	12%
Other traffic	25%	19%	2%	3%	0%	11%	10%	12%	2%	7%	0%	9%
Oil company personnel	6%	2%	4%	0%	0%	9%	2%	1%	4%	0%	0%	7%
Man-made structures	61%	32%	9%	5%	13%	21%	30%	22%	9%	11%	18%	19%
Regulations	14%	11%	0%	0%	2%	0%	6%	7%	0%	0%	3%	0%
Seismic lines or activity	0%	11%	18%	0%	0%	5%	0%	7%	18%	0%	0%	4%
Other	6%	6%	2%	5%	2%	2%	4%	4%	2%	11%	5%	1%
Any Impact	72%	64%	58%	31%	48%	56%						
Number of Respondents/ Observations	36	53	57	58	57	57	87	82	55	28	40	67

Stephen R. Braund & Associates, 2014.

constituted an impact or not. In other words, if a respondent indicated that a development activity impacted their caribou hunting, then that activity was recorded as an impact and reported as an impact in this report. However, if a respondent stated that the development activity did not impact them or their hunting ("I saw some helicopters, but they did not bother me"), then it was not recorded as an impact or reported as an impact in this report.

While some hunters believe that the general presence of oil development on the North Slope (including infrastructure and associated air traffic) affects the availability of caribou to local hunters, if a respondent did not report a "direct impact" related to the Alpine development (i.e., at the same time and place as their hunting activities), then their concerns are not represented in Table 38, but instead appear in the "General Observations" discussion below. Because the study team does not ask respondents systematically to report whether Alpine affects their caribou hunting in general, but instead asks respondents about specific, direct impacts, these more general observations are not tallied in this report. Thus, the percentage of harvesters who believe that their caribou hunting activities are negatively impacted by the Alpine and Alpine Satellites developments, either directly or indirectly, could be underrepresented in Table 38.

As in the case of Years 1 through 5, the most commonly reported Alpine-related impact is associated with helicopter traffic, with 49 percent of harvester respondents reporting helicopter traffic impacts in Year 6. These observations account for 46 percent of all impact observations in Year 6 (Table 38). The percentage of respondents reporting helicopter-related Alpine impacts is higher than it was in Years 2 through 5 and lower than in Year 1. The percentage of respondents reporting impacts related to plane traffic (12 percent) was similar to the previous few study years which ranged from nine percent to 16 percent. Reported plane impacts were highest in Years 1 and 2.

The percentage of respondents reporting impacts from other traffic in Year 6 (11 percent) was higher than the previous three study years but lower than in Years 1 and 2 (25 and 19 percent, respectively). Impacts related to man-made structures were highest in Year 1 (61 percent of respondents), decreased substantially in Year 3 (nine percent of respondents) and then gradually increased in Years 5 and 6 (13 and 21 percent, respectively). Man-made structures were the second most commonly reported impact observations in Year 6. The reader should be aware that in Years 1 and 2, respondents were more likely to report indirect effects (i.e., caused by the action but later in time or farther removed in distance) related to pipelines and infrastructure, such as changes in caribou migration and resource availability due to pipeline obstructions. The study team has made greater efforts to focus respondents on direct impacts (i.e., at the same time and place as the action) in recent study years. Therefore, while residents and Nuiqsut Caribou Panel members continue to express concerns about the impacts of pipelines and other infrastructure on caribou migration, they are less likely to report pipelines as direct impacts on their caribou hunting (i.e., impacts that occurred while they hunted) in recent years.

Impacts related to oil company personnel, although only reported by nine percent of respondents and accounting for seven percent of observations, were higher in Year 6 than in any other study year. Other lesser-reported impacts in Year 6 included seismic lines or activity (four percent) and "other" (one percent). No respondents reported impacts related to Regulations in Year 6.

During the Year 6 household harvest surveys, the study team asked each household whether they had experienced impacts related to Alpine. As shown in Table 39, 35 percent of households reported experiencing Alpine-related impacts on their caribou hunting in 2013, eight percent mentioned other (non-Alpine related) impacts, and 10 percent mentioned that they did not experience any Alpine impacts because they avoid the Alpine area altogether. Alpine-related impacts were reported more frequently during the 2013 household surveys compared to 2011 and 2012, but less than in 2010. As the question only cued the respondents regarding Alpine-related impacts and did not ask about avoidance, it is likely that responses related to "other" (non-Alpine) impacts and "avoiding Alpine area" are under-represented.

Table 39: Household Observations of Impacts, 2010-2013

Year	Percentage of Nuiqsut Households		
	Alpine-related Impacts	Other Impacts	Avoiding Alpine Area
2013	35%	8%	10%
2012	32%	18%	4%
2011	20%	9%	9%
2010	41%		

Stephen R. Braund & Associates, 2014.

Figure 6 shows the number of reported impacts on caribou hunting of all types by month for the six study years, and Figures 7 through 12 show individual impact reports by month for the six study years. The peak months for reported impacts in all six years are June, July, and August, the same months as peak caribou hunting activity (Figure 6, Figure 1). As with most other study years, Year 6 impacts were most commonly reported to occur during the month of July. Helicopter impacts also peaked in July, with 20 observations of impacts, but were also reported in similar numbers during the months of June and August (Figure 7). Plane impacts peaked at five observations in June and July but also occurred at lower levels year-round (Figure 8). Oil personnel impacts were higher in Year 6 than in previous years and were most frequently reported to occur during the months of June and July and to a lesser extent in August (Figure 9). Man-made structure impacts were reported at low levels during the winter and in July, and seismic impacts (in this case, clean-up crews associated with seismic activities from the previous winter) were reported to occur during the month of September (Figures 10 and 12).

Figure 6: Reported Impacts by Month, Years 1-6

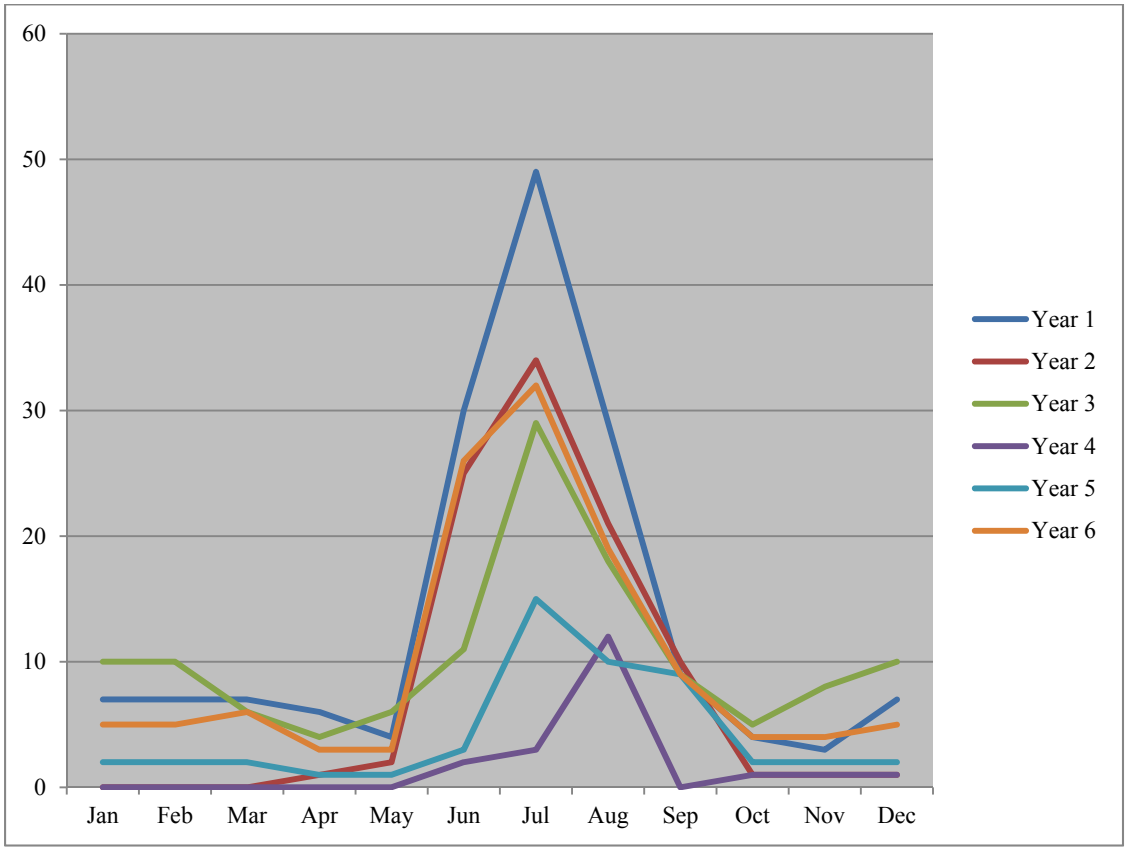


Figure 7: Reported Helicopter Impacts on Caribou Harvest Activities by Month: Years 1-6

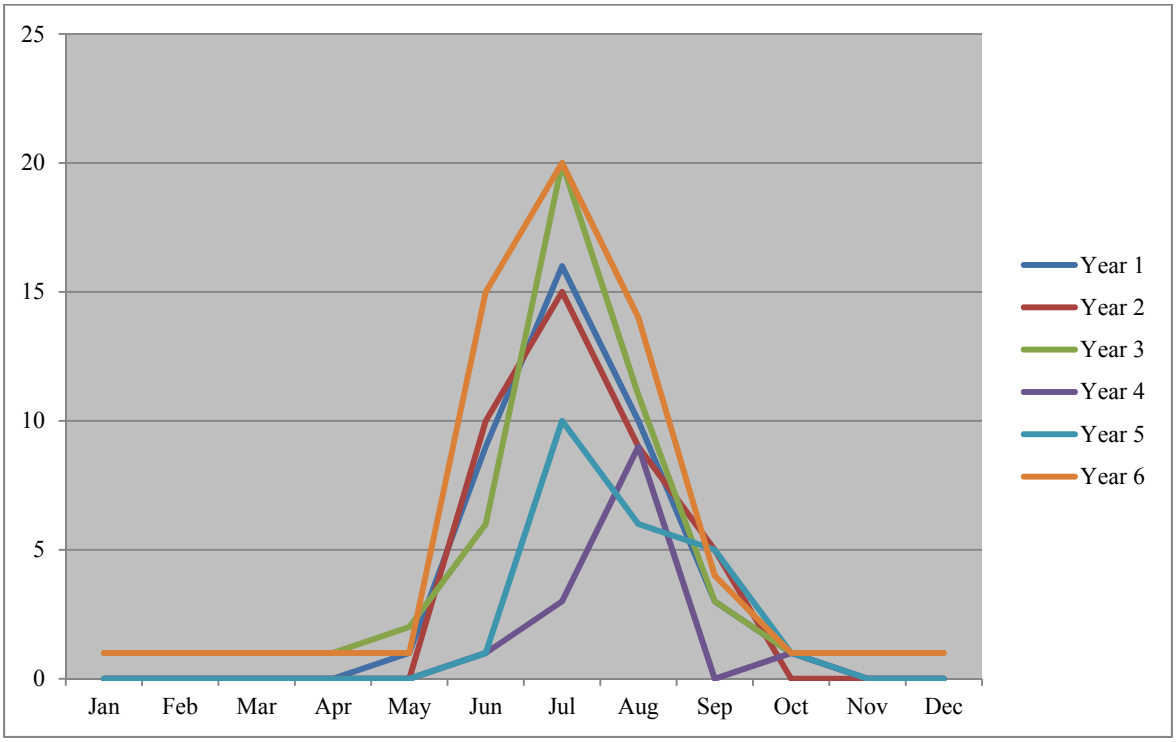


Figure 8: Reported Airplane Impacts on Caribou Harvest Activities by Month: Years 1-6

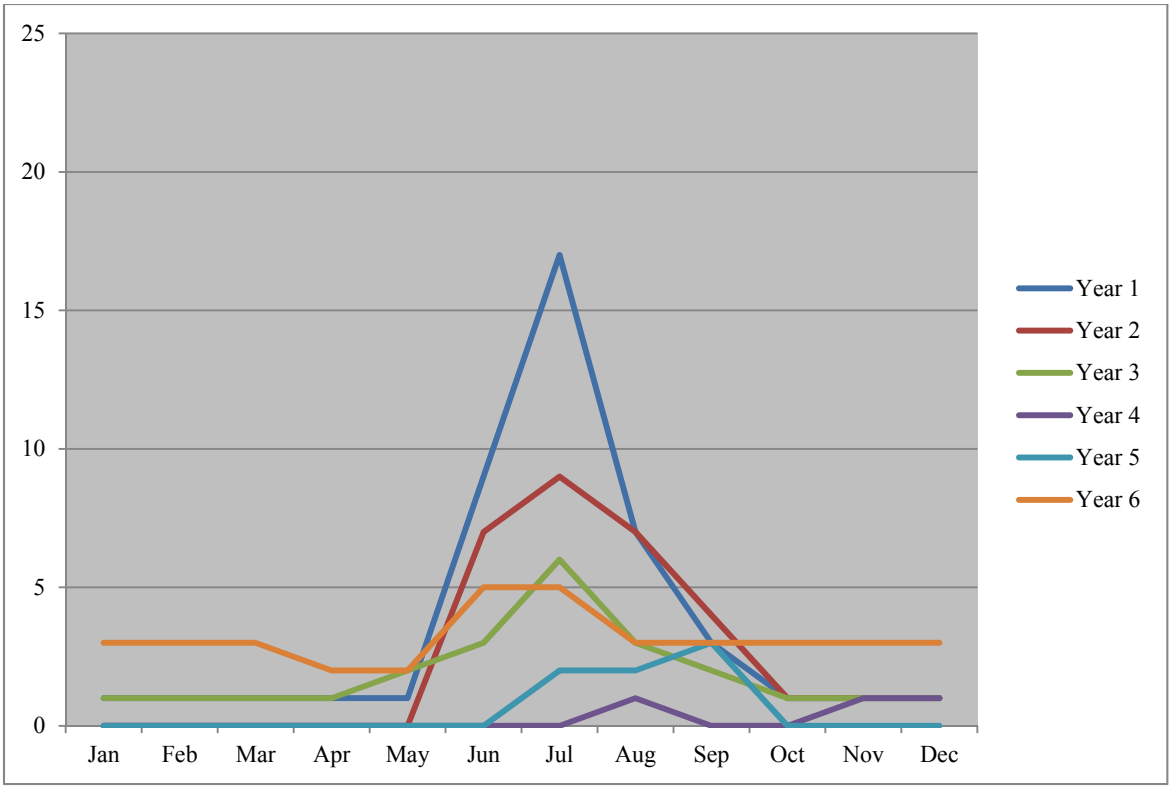


Figure 9: Reported Oil Company Personnel Impacts on Caribou Harvest Activities by Month: Years 1-6

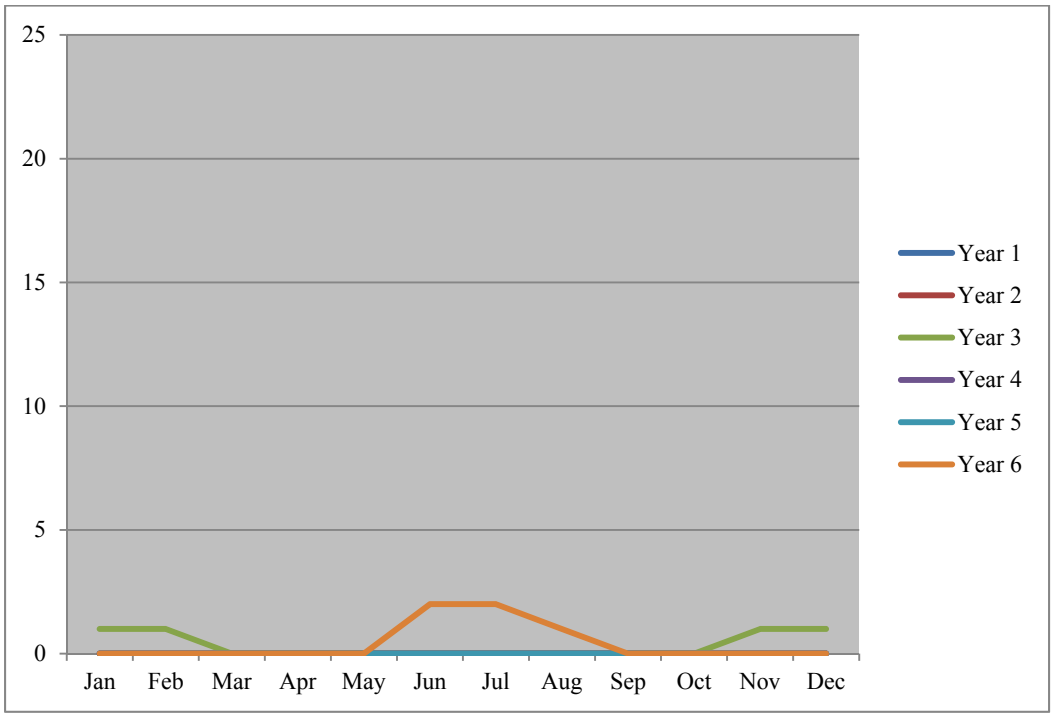


Figure 10: Reported Man-Made Structure Impacts on Caribou Harvest Activities by Month: Years 1-6

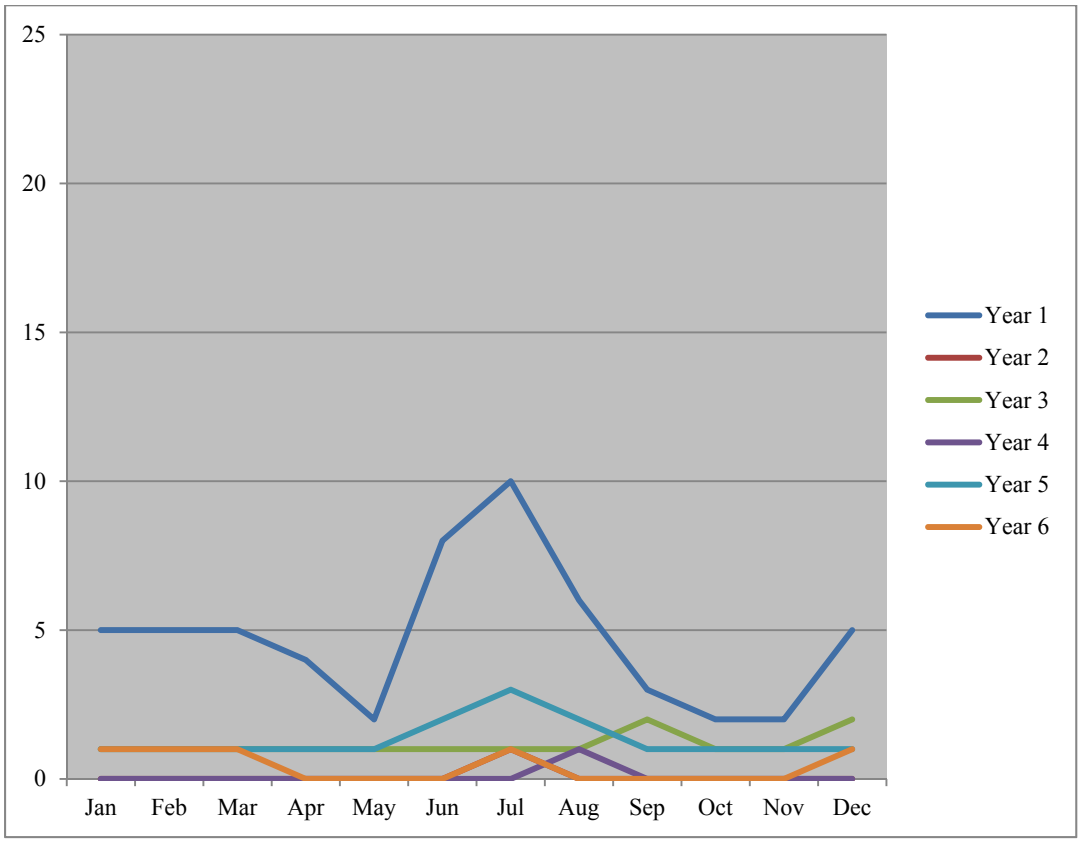


Figure 11: Reported Regulation Impacts on Caribou Harvest Activities by Month: Years 1-6

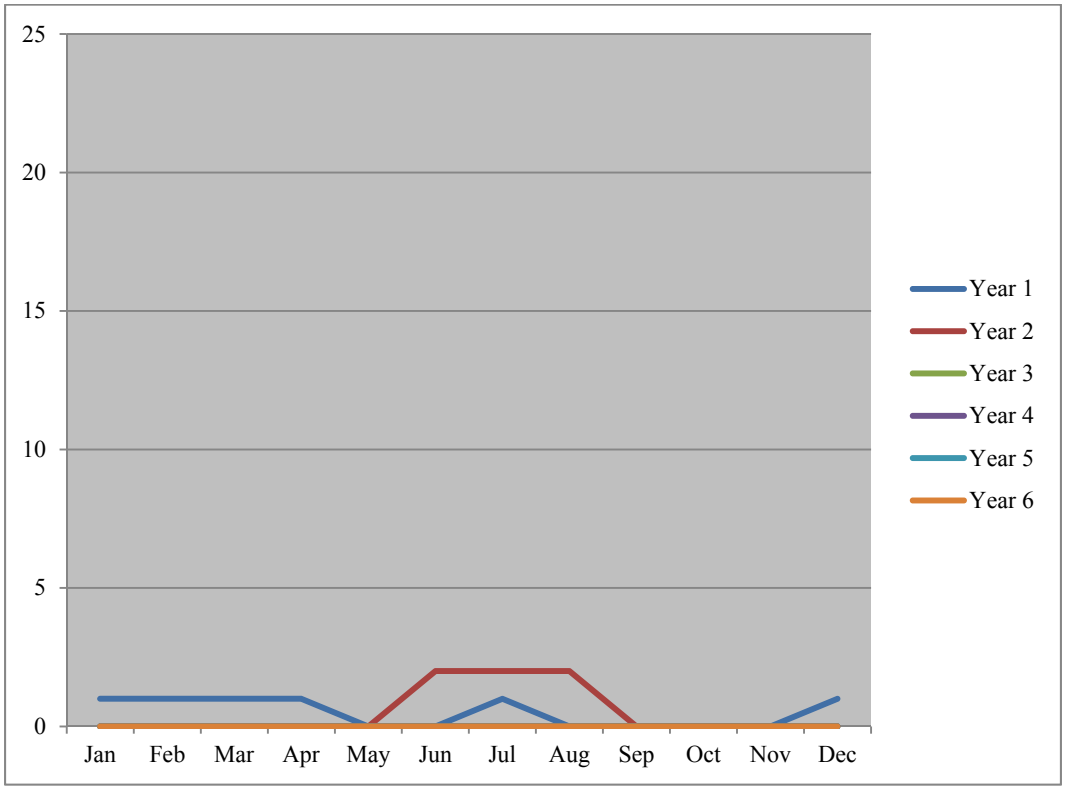
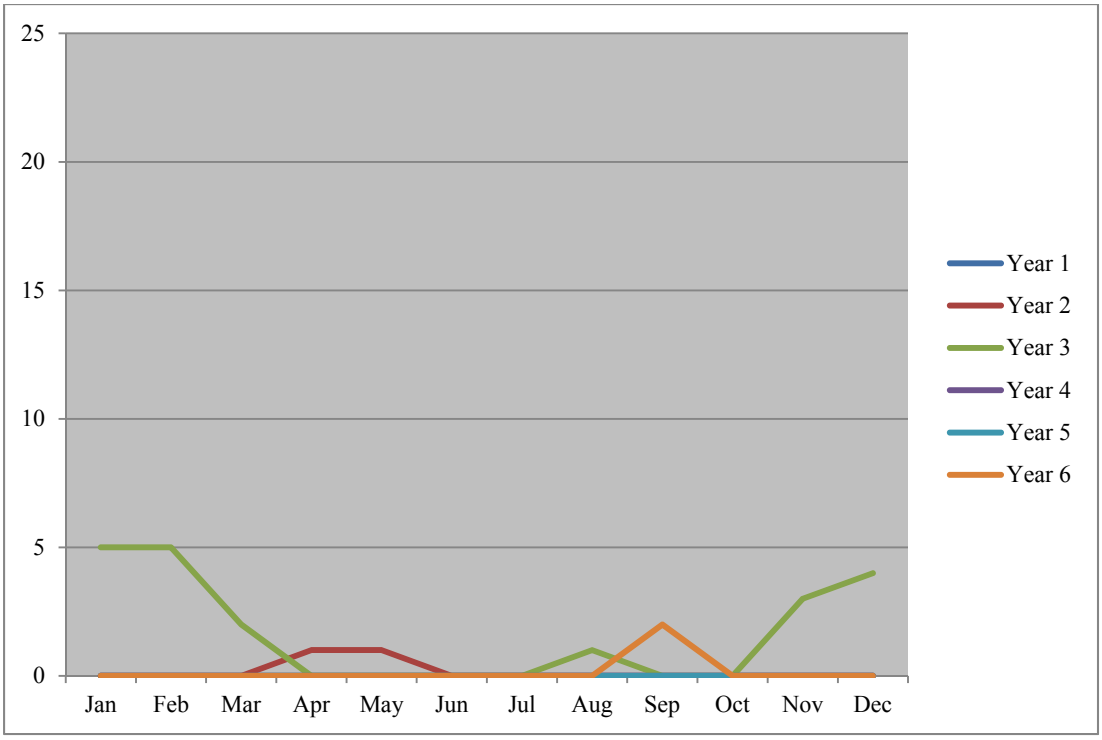


Figure 12: Reported Seismic Line and Activity Impacts on Caribou Harvest Activities by Month: Years 1-6



Map 30 shows the locations of Alpine-related impacts reported by Year 6 respondents. In some cases, respondents could not identify the location of an impact or indicated that the impact occurred multiple times over a longer time period (and therefore did not point out each location). The study team generally recorded impact locations only when the respondent could identify the specific (i.e., point) locations where they were when the impact occurred; however, in some cases, when residents indicated that the impact occurred over a larger area, these impact locations were documented as a polygon instead of a point. As shown on Map 30, the majority of Alpine-related impacts were reported to occur along the Nigliq Channel and were concentrated near the Nigliq camp as well as near CD4. While a majority of these were helicopter traffic impacts, respondents also reported other traffic, plane, and seismic activity impacts at these locations. In addition to reporting impacts along Nigliq Channel, residents also reported helicopter impacts along the East Channel of the Colville delta, as well as east of the Colville delta along Kachemach Creek (plane impact) and Miluveach River (helicopter traffic).

Impacts of Helicopter Traffic

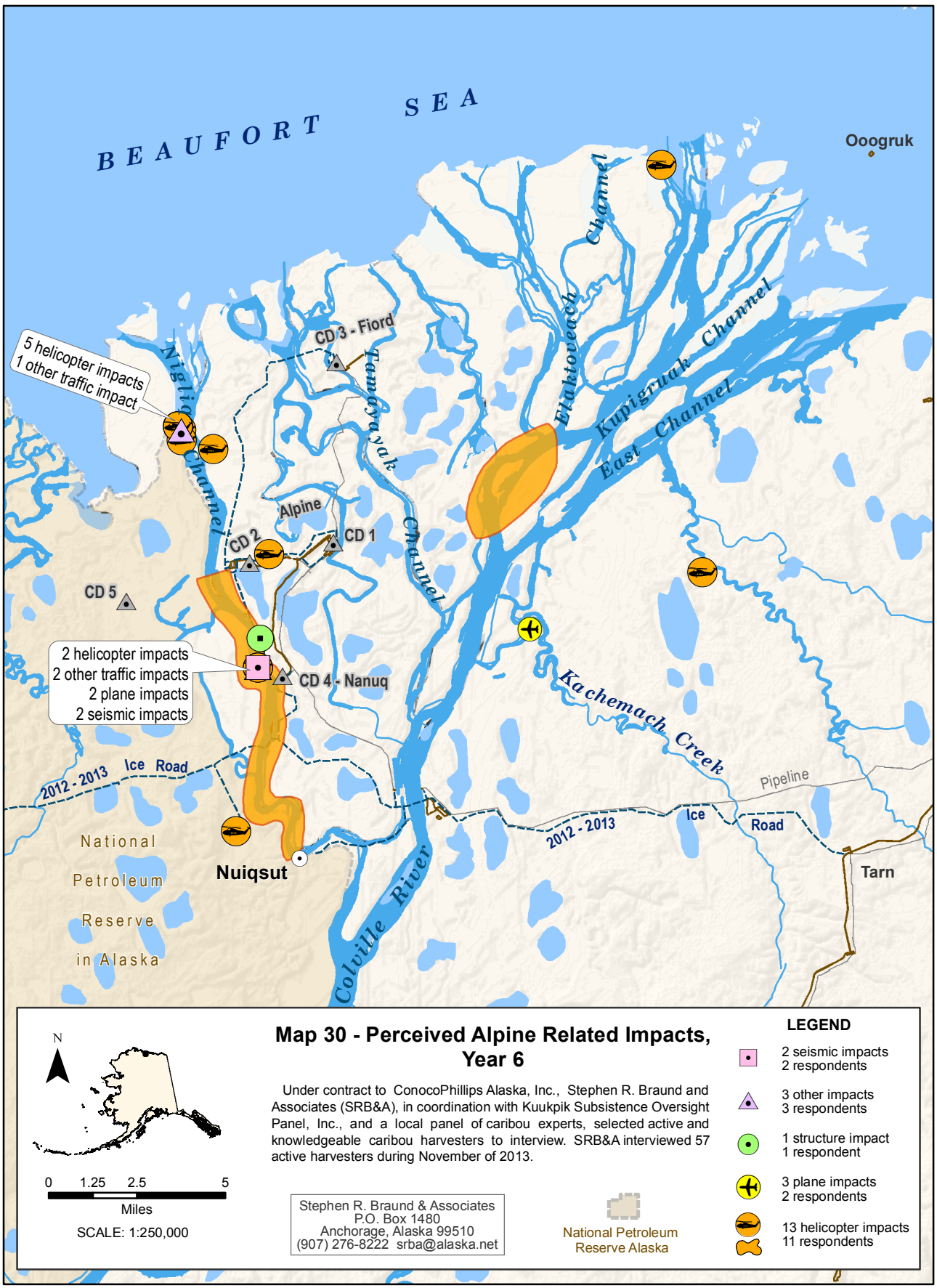
As shown in Table 38, 49 percent of respondents reported helicopter impacts in Year 6, a larger percentage than previous study years, with the exception of Year 1 (61 percent), which included observations since Alpine began. Helicopter impacts accounted for 46 percent of the reported impacts during the Year 6 study period (Table 38). As shown on Map 30, helicopter impacts were reported along the Nigliq Channel near Nigliq camp (in the lower portion of the channel), between the community and CD2, near CD2 and CD4, and directly to the northwest of the community. In addition, several helicopter impacts were reported to the east, near the mouth of the East Channel, near Pisktagvik, and along Miluveach River. When asked to describe the helicopters causing impacts, respondents most frequently described the helicopters as blue and white or did not know or remember the helicopter owner or physical description. Six individuals simply indicated that the helicopter was an Alpine Helicopter, and three reported Air Logistics helicopters, which residents generally understand to be operated for CPAI (Table 40).

Table 40: Respondent Descriptions of Helicopters Associated with Impacts, Nuiqsut, Years 3-6

	Number of Observations			
	Year 3	**Year 4**	**Year 5**	**Year 6**
Blue and White Helicopter	8	6	10	9
Helicopters - Unknown Owner	9	7	4	9
Alpine Helicopter	4	0	5	6
Air Logistics Helicopter	4	0	2	3
Helicopter, Blue and Orange	0	1	0	1
Red and Black Helicopter	0	0	0	1
Other oil company helicopter	0	0	0	1
Conoco Phillips Helicopter	1	0	0	0
Red Helicopter	1	0	0	0
Helicopter, Blue	0	1	0	0
Total	27	15	21	31

Stephen R. Braund & Associates, 2014.

Respondents indicated that helicopter traffic resulted in the caribou being disturbed or diverted from their migratory path towards another area. Nuiqsut caribou harvesters have observed that helicopter traffic is more disruptive to caribou behavior or movement than other types of traffic. Some respondents noted specific instances in which helicopters disrupted the caribou they had been hunting, while others believed


BEAUFORT SEA
Oooguruk
Elaktoveach Channel
Kupigruak Channel
East Channel
Fiord
CD 3 - Fiord
Tamayayak Channel
Nigliq Channel
5 helicopter impacts
1 other traffic impact
Alpine
CD 2
CD 1
CD 5
2 helicopter impacts
2 other traffic impacts
2 plane impacts
2 seismic impacts
CD 4 - Nanuq
Kachemach Creek
Pipeline
2012 - 2013 Ice Road
2012 - 2013 Ice Road
National Petroleum Reserve in Alaska
Nuiqsut
Colville River
Tarn
N
0 1.25 2.5 5
Miles
SCALE: 1:250,000
Map 30 - Perceived Alpine Related Impacts, Year 6
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 57 active harvesters during November of 2013.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
LEGEND
2 seismic impacts
2 respondents
3 other impacts
3 respondents
1 structure impact
1 respondent
3 plane impacts
2 respondents
13 helicopter impacts
11 respondents

that helicopter traffic in general had diverted the caribou away from their hunting areas. A number of individuals indicated that the traffic was associated with studies being conducted for the GMT1 development in addition to exploratory activities associated with other potential developments to the west and northwest of the community. These respondents described:

> *Yes, west of the Nigliq there was lots of air traffic, June, July, and August. That whole area really. When that ice road was built – all over Fish Creek there was ice road stuff. Blue and white [helicopters]. They are picking up their crew and bags and things. They just land, go 50 feet, and land again. Like, this year they were doing, they had 1,200 flights[8] just for airplanes and helicopters. Helicopters are the worst kinds [of traffic].* (SRB&A Nuiqsut Interview November 2013)

> *The helicopters, they tend to scare the caribou off too. The noise and flying solo and stuff. It's around this area in here, in between here. The one that goes to Umiat all the time, it flies around. It belongs to Alpine[9]. You always see it flying when you are out there. It could also be that chopper that they always send the surveyors out on, by Ublutuoch. They are out there surveying for CD5. That is throughout the whole summer practically. That is usually the time we go out caribou hunting is August and September when there are no bugs out there.* (SRB&A Nuiqsut Interview November 2013)

> *This year we went to do some exploring and we saw where they want to do that CD5 project. There is a lot of activity checking on the ice road and stuff. It is usually just Air Logistics, although I have seen a new orange one out there this summer too (helicopter). I don't know if it is Fish and Game though. They do their studies in the summer.* (SRB&A Nuiqsut Interview November 2013)

> *Also the helicopters – they are scaring off the caribou. We had to call the people around here and tell them to hold off the flight. They are always flying their helicopters around here [west of Nigliq, around the CDs]. I don't know [what they are doing] but they are from Alpine. Always out there from – well, out there year round. Well, summer time is the worst. They get water samples and stuff, and when it comes June for breakup, they always want to get water samples rushing from the rivers. It's already broken up and too much water. They always try and let the residents make money by guiding [them to those areas] but there is no way to get out there [poor conditions]. Planes weren't the issue this year for me, just helicopters. It was really affecting other hunters.* (SRB&A Nuiqsut Interview November 2013)

Several respondents described the reactions of caribou when helicopters are nearby. Harvesters frequently indicate that the caribou freeze or become hesitant to cross over river channels when there is heavy air traffic. Others report observing the caribou diverting their route to avoid traffic altogether or turning back in the direction they came. Nuiqsut caribou harvesters provided the following observations regarding caribou behavior in the presence of helicopter traffic:

> *When we were at these caribou that chopper was really flying over – back and forth, back and forth. It was a white and blue one, it was going back and forth, north and south, east and west. I think the caribou were just standing there waiting for it to leave, and then they took off.* (SRB&A Nuiqsut Interview November 2013)

[8] CPAI notes that this number refers to the number of helicopter landings, rather than individual flights.

[9] CPAI notes that Alpine helicopters do not travel to Umiat.

Maybe the choppers, I don't know they were kind of towards the CD3 area but the caribou are trying to go towards the ocean, along the coast and I think they were getting scared away and they were going on different route and totally they would get turned around and go back the way they came. Early August. I don't know what color the helicopter was but you can hear them and see the caribou be effected. We would sit in one spot and watch the caribou and they would stop, the chopper would make noise and they would stop…. They were probably coming from Alpine to CD3 unless they were flying from Helmericks to Prudhoe. (SRB&A Nuiqsut Interview November 2013)

Yeah, there was a lot of helicopter traffic going from Alpine to this way [to the east]. Keep on going back and forth. There was one yellow, and another one blue and red. It came from Alpine, and then went this way. They changed the caribou [route]. Where we were waiting for caribou, when that helicopter came from Alpine, then the caribou turned and went eastward. (SRB&A Nuiqsut Interview November 2013)

Helicopter traffic. There was a herd that was coming from the east side going west and we were at our cabin on Nigliq Channel and when the caribou were coming in [closer to the cabin], a chopper flew over them and turned them around. At that time we were hunting for the blanket toss. Just when they were coming towards us, a chopper flew up and went straight towards the caribou. It was a blue and white one. My uncle was angry; he called them. He was so upset. It went right straight towards the caribou and it turned them around. That was in June. Just mostly helicopters. This year there was a lot of them. My uncle was sure mad when those got diverted. That chopper pilot knew it too. No they didn't care. No regards. A lot of people talk about that. Town folk say a lot that the chopper activity was really bad. (SRB&A Nuiqsut Interview November 2013)

This part [the upper part of Nigliq Channel and the East Channel]…They are always running from the helicopter. They run from any kind of noise. The only ones that won't run are the caribou that live in Prudhoe that are not scared. Probably just July I would say, I didn't see much [helicopter traffic] in August because I was inland looking for moose. Those were the normal blue and white ones, they were hovering and landing and picking back up, within a couple of hundred feet of the ground. I think we will find that these helicopters will always be an impact. (SRB&A Nuiqsut Interview November 2013)

Several individuals reported an increase in the frequency of helicopter traffic in Year 6, compared to recent years. Respondents often attributed the traffic to biological and other studies associated with oil and gas development. One harvester observed,

Yeah the whole area right here and here [east and west of the channel] – studies, studies, studies – nothing but studies. What can they do? What more can you study? Blue and white all summer long. The whole summer we had three or four times more [than usual] in this [Nigliq] area, and maybe 10 times more [than usual] in this area [East Channel] There was so much back and forth to Alpine, every two or three hours. That's unusual. And over a thousand flights in this whole area – what can you do? How can you solve the problem with so many helicopters? It [the disruption] stopped for one year [after the meeting with Conoco and the NSB]. Chopper flights here and there along the coastline. (SRB&A Nuiqsut Interview November 2013)

In a few cases, respondents indicated that the presence of helicopters was bothersome to them, even if there were no caribou around. In other words, the noise disturbance had a negative effect on their hunting experience. One individual noted the discomfort he experiences when hunting near development activities:

That helicopter. I know they like to patrol, but it felt like they were patrolling us. We weren't breaking any rules. We were waiting for the caribou and it seemed like they were making the caribou go a different route. And then the plane, too – when it lands [it disturbs the caribou]. At first I thought [the sound] was a wolf! But it was traffic! (SRB&A Nuiqsut Interview November 2013)

One individual reported that her husband had encountered a helicopter flying at a low altitude while he was caribou hunting and noted that helicopter traffic was ongoing throughout the summer. She described,

When he went on the boat, he mentioned a blue and a white chopper that they always have out there. Should have been 1,500 feet in that area, but it was lower and flying around. I think it disrupted their hunting. Well, we hear it [helicopter traffic] every day. I can hear it from the community. You can see them to the north and west of town, the blue and white one [helicopter]. (SRB&A Nuiqsut Interview November 2013)

Impacts of Airplane Traffic

Airplane traffic was the third most commonly reported impact during the Year 6 respondent interviews. Twelve percent of respondents reported impacts from airplanes during the Year 6 study period, accounting for 12 percent of all reported impacts (Table 38). When asked to describe airplanes causing impacts, in three cases respondents did not know the source or owner of the airplane; in two cases, respondents believed the airplane was Alpine-related and in another two cases respondents described the airplane as a cargo plane (Table 41).

Table 41: Descriptions of Airplanes Associated with Airplane Traffic Impacts, Nuiqsut, Years 3-6

	Number of Observations			
	Year 3	**Year 4**	**Year 5**	**Year 6**
Airplane - Unknown Owner	2	3	0	3
Alpine Airplane	0	1	2	2
Cargo Airplane	4	1	1	2
Supercub	0	0	0	1
Cessna	1	0	0	0
Twin Otter	1	0	2	0
Shared Services Airplane	0	0	2	0
Yellow Airplane	1	0	0	0
Total	9	5	7	8

Stephen R. Braund & Associates, 2014.

Airplane traffic is generally less of a concern to hunters as residents indicate that the noise levels are lower and less disruptive to caribou, particularly when planes are flying at higher altitudes. However, a number of respondents expressed the view that despite being less disruptive than helicopter traffic, airplane traffic still contributes to impacts on caribou movement near Nuiqsut. This is particularly true when the plane is flying at a low altitude or circling over areas where caribou are present. As one individual said, "It is okay when they are flying high but when they are flying low it is kind of annoying" (SRB&A Nuiqsut Interview November 2013). Several individuals noted that the daily plane traffic into Nuiqsut and Alpine is disruptive to caribou. Two respondents described,

All kinds - not just helicopters, the whole thing! [The plane] brings supplies in probably every day to the Alpine. Everything comes in. What can we do? (SRB&A Nuiqsut Interview November 2013)

> *Even the planes – when they're going to Alpine they're real loud. I would say they fly over there once every two weeks.* (SRB&A Nuiqsut Interview November 2013)

One respondent recounted an event on the East Channel wherein a plane that seemed to be traveling from Kuparuk to Nuiqsut circled over a group of hunters as they were waiting for caribou. The respondent noted that the plane was a disturbance to both hunters and caribou and described the occurrence as follows:

That was over there [East Channel]. That's their route going through Kuparuk to Nuiqsut, usually you'd see – it was unusual to see that plane hovering over twice and take off. Maybe they thought we were stranded or concerned about us. But then it was kind of disturbing, too, when you see that aircraft over us. Well, from the noise, I think they were scaring the caribou because the aircraft was really low. You could see the pipeline right there! *(SRB&A Nuiqsut Interview November 2013)*

Impacts of Other Traffic

Eleven percent of respondents reported impacts related to other traffic (i.e., not helicopters or airplanes) in Year 6 (Table 38). These observations accounted for nine percent of Alpine impact observations. In Year 6, reports of "other traffic" impacts included truck traffic and airboats. One individual reported camping along the Nigliq Channel and hearing the truck traffic near Alpine, saying, "That road is just a mile or two from where we were camping, so you can hear the trucks. At first I thought it was a wolf! But it was traffic" (SRB&A Nuiqsut Interview November 2013). Another respondent noted that the lights from the trucks also disrupt the caribou during the winter months, saying, "The traffic affects the caribou during the winter. The lights mess up the caribou. That was in March" (SRB&A Nuiqsut Interview November 2013). In addition to trucks, several individuals reported airboat traffic in the vicinity of their hunting areas. Residents note that airboats are extremely loud and can affect caribou; two respondents observed,

> *That big airplane boat that was stationed over here, we saw it in this river, the hover craft, we saw it parked right inside these little channels [off of east channel]. It was parked here, you could hear it. Really loud. That was towards the end of August.* (SRB&A Nuiqsut Interview November 2013)

> *And those big noisy boats. You could hear them make lot of noise. Yeah, it was going in there [middle Colville]. Those noisemakers. Last summer, this summer we just hear them; we never go in [the middle Colville] this summer. Around here you could hear them. Maybe around here [there is] too much noise. Maybe that's why they don't go across here no more [on the Nigliq Channel]. We're going to have lot of impact over here this year. Going to be a lot of noise going this way. I don't know where the caribou are going to go.* (SRB&A Nuiqsut Interview November 2013)

Oil Company Personnel

Nine percent of respondents reported impacts related to oil company personnel in Year 6, accounting for seven percent of impact observations (Table 38). Several individuals reported seeing oil company personnel to the west of Nigliq Channel while they were hunting or near camps.

> *They [oil company personnel] are all on this side of the river. If they put CD5 there it would be a big problem. That is right around the area that we hunt.* (SRB&A Nuiqsut Interview November 2013)

> *I didn't notice at Fish Creek actually surveyors but they were walking. And they were just being picked up by helicopter at the end of the day those surveyors walk a good 30 miles a day. I see some people walking over there. A lot continuously all summer.*

In one case, a respondent indicated that they were told not to travel into a certain area by surveyors or personnel along the Nigliq Channel:

> *Well – people [personnel] saying we couldn't go past this spot [telling them they could not go in certain areas]. [That was] pretty close to the Nigliq Channel, where they're trying to build the bridge. Right by her [grandmother's] cabin. She's telling them no [the ice road is] going to mess up her fishing and the little bit of caribou she catches out there.* (SRB&A Nuiqsut Interview November 2013)

Impacts of Man-made Structures

Impacts related to man-made structures were reported by 21 percent of Year 6 respondents, compared to 13 percent in Year 5, five percent in Year 4, nine percent in Year 3, 32 percent in Year 2, and 61 percent in Year 1 (Table 38). The higher percentage of Year 1 respondents reporting impacts related to man-made structures is likely due to researchers in Year 1 collecting data on changes that started since the beginning of the Alpine development. In the case of man-made structures, a number of Nuiqsut residents believe that the pipelines constructed in association with the Alpine development have resulted in general changes to the caribou migration. Active harvester interviews following Year 1 focused on recording impacts that occurred during the study time period and that directly affected caribou harvesters. However, some residents in Year 6 continued to make more general comments regarding the impacts of pipelines and other infrastructure on the migration or behavior of the caribou. In addition, respondents noted difficulty hunting near infrastructure due to concerns about shooting toward pipelines or toward areas where there is human activity. Active harvesters who reported experiencing impacts from man-made structures during the Year 6 study period mentioned pipelines (seven observations) and general infrastructure (six observations) (Table 42).

Table 42: Descriptions of Sources of Man-Made Structures Associated with Impacts, Nuiqsut, Years 3-6

Man-Made Structure Descriptions	Number of Observations			
	Year 3	Year 4	Year 5	Year 6
Pipeline	2	1	6	7
Infrastructure	1	1	1	6
Ice Roads and Bridges	2	0	0	0
Waste	0	1	0	0
Total	5	3	7	13

Stephen R. Braund & Associates, 2014.

Some individuals believe that the physical presence of the pipelines, in addition to the light reflecting from the pipelines, divert the caribou from their usual migration routes:

> *I still have a complaint [about the pipeline]: it is just too shiny. It reflects too much.* (SRB&A Nuiqsut Interview November 2013)

> *I think the pipeline in a big factor in the caribou migration being disturbed. Because when I first came to Nuiqsut in 1993, we would be at Nanuq downriver and the caribou would come straight across – Fish Creek, hundreds of caribou – and then the pipeline came and…. And that year – 1993 – I got 10 fat bulls in July. We got a whole bunch of caribou right about where they put that pipeline. After the pipeline the caribou don't go through there anymore. They either go, their route changed, go through Fish Creek and come this way. The pipeline definitely changed their route.* (SRB&A Nuiqsut Interview November 2013)

> *When it gets bright out and sunny, those caribou don't like that reflection and it diverts them. No, you can still see it. Nobody painted that pipeline.* (SRB&A Nuiqsut Interview November 2013)

Several harvesters reported instances where they could have harvested a caribou but chose not to because of the nearby presence of infrastructure. As one individual observed, "We avoid the pipeline because the safety of the pipeline; we don't go to the pipeline. What can we do?" (SRB&A Nuiqsut Interview November 2013). Another respondent observed that certain types of infrastructure in the area of the CD5 development may frighten the caribou because they resemble humans. This individual explained,

> *Well, that CD5 and the new area where they're making the bridge crossing is kind of disturbing, majorly. Yep, it is. Mainly helicopter traffic [causing the disturbance], and the camp itself. It's basically – it's the wells, and they're a good 15 to 20 feet high. It looks like a big person standing out there, and when you get close to it, it's a well. That really disturbs the animals out there. Those wells that are covered with a black material makes them very visible; you can see them from a good 15, 20 miles away. When you approach it, it's just a well. Whatever's around there used to hang around there until it was covered with a tarp. Looks like a person walking. There's a bunch of them out there. You can tell where they're at; when we're looking for people on a rescue mission, we'll mistake them for a person.* (SRB&A Nuiqsut Interview November 2013)

Another respondent possibly discussing the same infrastructure referred to them as "Christmas trees," and said, "[No other impacts] besides the 'Christmas trees' – the wells they plug with a Christmas tree. You can see them. Out in this area near Fish Creek" (SRB&A Nuiqsut Interview November 2013).

Impacts of Regulations

No respondents reported experiencing impacts related to regulations in Year 6 (Table 38).

Impacts of Seismic Lines

Only five percent of respondents reported impacts related to seismic lines in Year 6 (Table 38). Two respondents observed seismic lines when hunting caribou and indicated that the presence of the lines is a disturbance to them. As one described, "I think the caribou stay away from it – it looks awful" (SRB&A Nuiqsut Interview November 2013). Another individual indicated that the caribou seem to avoid areas of seismic activity and said,

> *Maybe on the seismic – it's always the most distracting, because there's a lot of wires, and you are crossing [over] wires. When they do the seismic, the caribou seem farther out. Even in wintertime, when we see lots of seismic activities going on. You could see it right there, just laying on the ground in the land area. They're bright orange and you can see them for miles and miles.* (SRB&A Nuiqsut Interview November 2013)

One individual expressed concerns about future seismic operations on his Native allotment; however, this was not a Year 6 impact:

> *I'm gonna have a lot of questions next year about that. Because my native allotment – that's where the caribou migrate through. My land is right there, this part, and they're thinking of doing seismic on my land. I just got a letter from the borough, that CGG [Veritas] or whatever [seismic company]. They're going to go around my land.* (SRB&A Nuiqsut Interview November 2013)

Non-Alpine Impacts

In addition to impacts attributed to the Alpine or Alpine Satellites developments, the study team also documented non-Alpine impacts when volunteered by respondents. In these cases, respondents indicated that the impact was from a different source, or they were unsure of the source of the impact and the study team assigned the impact as "non-Alpine" due to its location (i.e., outside of the general area of current or planned Alpine Satellites developments). As shown in Table 43, 28 percent of Nuiqsut respondents reported at least one type of non-Alpine impact in Year 6. A majority of these reported impacts were related to helicopter traffic (36 percent of observations) or airplane traffic (32 percent of observations). The percentage of respondents reporting non-Alpine impacts in Year 6 was lower than in Year 5 (55 percent) but on the higher range of all previous years, which ranged from five percent of respondents (Year 3) to 31 percent (Year 1).

"Non-Alpine" impacts in Year 6 frequently occurred upriver from the community and along the East Channel of the Colville River. A few individuals discussed air traffic in the vicinity of Umiat, but these reports were less frequent than in Year 5. Several respondents described encountering helicopter and plane traffic during their upriver hunting trips:

> *I'd say helicopters made it difficult. Upriver. Like, lets see. There was a lot of traffic at Umiat and going back and forth to Prudhoe and back, wherever they go. That made an impact this year. They were blue and white one and there was a yellowish one.* (SRB&A Nuiqsut Interview November 2013)

> *That was by Sigulak Bluff right there. There was these helicopters – they would fly real low, right above us, right where we were camping. And we were trying to look for moose, too, at the same time. August. It was blue and white.* (SRB&A Nuiqsut Interview November 2013)

> *That was that one up there [helicopter upriver]. Same thing [as last year]; that's why we stopped right there, because of the chopper. We knew we wouldn't get close to any caribous if that chopper was around. Red and blue – but it was white, with the red and blue stripes. But we couldn't get the number.* (SRB&A Nuiqsut Interview November 2013)

> *There was [traffic], but it was by Umiat. There was planes going in and out by Umiat.* (SRB&A Nuiqsut Interview November 2013)

Several individuals discussed impacts related to other oil companies conducting exploratory activities near the East Channel. One respondent described air traffic between Northstar Island and a staging area near Miluveach River; this individual noted that the activities seemed to occur in areas commonly used by caribou when migrating through the area.

> *A lot [of traffic] continuously – all summer long. It's the surveyors. They're surveyors out there. I don't know who they are, but all summer long they're just there. I think they're the ones – I don't remember the color – but I think it's the same helicopter that takes off and lands at Alpine all the time, but they're dropping off these equipment for surveying and bridge planning – whatever they're planning – to make these bridges for these roads. Basically at Miluveach, they're really utilizing that area to drop [supplies] off. They just so happen to utilize the area where the caribou are. Wherever they're setting their camps and drill sites is the best route [for the caribou]. When these animals travel, they travel on the lowest slopes possible and the most level, and where these people want to drill just so happen to be on a [migration] route. Right at the creek, and this is a flat area. You can see clearly for at least four miles; it's so flat, you can see as far as you want – but they basically use these two mounds for grazing areas; they're the feeding grounds, and when the disturbance comes they*

Table 43: Non-Alpine Impacts on Caribou Hunting, Nuiqsut, Years 1-6

	Percent of Respondents						Percent of Observations					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Helicopter traffic	11%	9%	2%	7%	30%	12%	22%	45%	33%	40%	42%	36%
Man-made structures	6%	4%	0%	0%	2%	14%	11%	18%	0%	0%	2%	32%
Plane traffic	17%	6%	4%	5%	27%	4%	39%	27%	67%	40%	33%	14%
Other traffic	3%	0%	0%	0%	4%	0%	6%	0%	0%	0%	4%	9%
Oil company personnel	0%	0%	0%	0%	5%	2%	0%	0%	0%	0%	7%	5%
Regulations	3%	0%	0%	0%	4%	0%	6%	0%	0%	0%	4%	5%
Seismic lines or activity	0%	2%	0%	2%	0%	2%	0%	9%	0%	10%	0%	0%
Other	8%	0%	0%	2%	5%	5%	17%	0%	0%	10%	7%	0%
Any Impact	31%	15%	5%	16%	55%	28%						

Stephen R. Braund & Associates, 2014.

force them to go to Pisiktagvik and then Alpine. The helicopters are flying from Northstar to there. And from Oliktok to Northstar Island, the offshore drill rig. Every time that helicopter came in they just scare them around and the caribou move to where they left. (SRB&A Nuiqsut Interview November 2013)

Other reported sources of non-Alpine impacts in Year 6 included plane traffic from commercial airlines, private plane traffic, tourists, sport hunting activities diverting the caribou, and state agencies conducting scientific research. Nuiqsut respondents made the following comments:

The plane comes from Deadhorse and it's always flying the same routine and this year it's been flying way too low. [The plane is going] to Umiat. It cuts across and straight up[river]. I'm not too sure [how the caribou react]. I just know they change their main trail. And now they're going lower south from the coast to get to where they're trying to go. I believe they're trying to get to Teshekpuk area, [where it is] cooler, less traffic. (SRB&A Nuiqsut Interview November 2013)

Actually we have been getting some private planes. I have seen a couple of Supercubs out there, just flying over the village, I have seen four or five private planes go over the village. (SRB&A Nuiqsut Interview November 2013)

You could see the planes, small planes, [landing on the] sandbars. Those little cubby planes. Maybe Fish and Game – I don't know. (SRB&A Nuiqsut Interview November 2013)

No [Hercules plane] weren't bothering the animals, but I just didn't like it out there at all. There were three other boats way up there, they had a jet unit. The Hercules planes were coming here and towards Barrow, too. (SRB&A Nuiqsut Interview November 2013)

Also there are those private plane, those Pipers they come by here too. We don't know what they are doing, they will fly in circles. They are not oil company planes, they are private planes. This summer me and my boys saw those big plane, like those planes with big tires, they can land anywhere. (SRB&A Nuiqsut Interview November 2013)

There was that yacht; we were going to go in there, but that yacht was in the way. That was at Helmericks…no, at Pisiktaġvik, they were in here on the other river that goes out through here somewhere. We tried to go in there, but that yacht [turned us around]. (SRB&A Nuiqsut Interview November 2013)

Also when they are coming from Deadhorse the oil companies, I have heard thousands of caribou cross the road, and migrate this way, trying to get across and the vehicles will keep on going and the caribou get spooked and turn around and go back [and not cross the road]. Security should allow the caribou to pass, block the road. It could be this year; these caribou could also be affected by wolves or wolverines. (SRB&A Nuiqsut Interview November 2013)

Well maybe the Fish and Game will…because we seen a couple of [Alaska Department of] Fish and Game [people] at Helmericks cabin. We were hunting caribou on this side. They started patrolling [hunting activities] nowadays. So you really need a hunting license! (SRB&A Nuiqsut Interview November 2013)

I wanted to shoot one of those caribou out at Oliktok Point, they were big, big guys. Sure wanted to get those. They were big, big guys. In some ways, when the caribou were up against the pipeline you can't shoot them. Over at Oliktok. We hardly see anything along Nigliq. (SRB&A Nuiqsut Interview November 2013)

It is always just the road hunters [off of the Dalton Highway], that is our biggest issues. (SRB&A Nuiqsut Interview November 2013)

Changes in Caribou Hunting Areas Over Time

As stated in the NSB's permit stipulations related to the Nuiqsut Caribou Subsistence Monitoring Project, one purpose of this study is to document "changes in use of subsistence areas and identification of the causes for any changes." In the Year 5 report, the study team addressed this question by including comparative maps and a discussion of changes in use areas and hunting patterns over time based on Nuiqsut traditional knowledge. While the maps from two different time periods (1997-2006 and 2008-2012) indicated possible shifts in residents' use areas over time, direct comparison was difficult for several reasons. First, the maps represented the differing time periods (10 years versus five years) and there may have been small differences in mapping methods between the two studies. Second, while the overlapping use area maps provided in this report are useful for determining areas where more hunters go, they do not provide information on the frequency of use of an area. Each subsistence use area is represented equally regardless of whether it is visited one time or 20 times, so decreased or increased use of an area may not be evident simply by looking at the use area maps. Finally, comparing the two mapped data sets did not provide information on the causes of changes in use areas.

Another way the study team addressed the question of changes in use of subsistence areas was by reporting the percentage of households who indicated during household surveys that they did not experience any Alpine-related impacts because they avoid the Alpine area altogether. This question was not cued, but rather volunteered by respondents and later coded into the harvest survey database. As noted in SRB&A (2009), "the percentages of active hunters affirming cued impacts and benefits generally is higher than the percentage of active hunters who volunteer impacts and benefits." Therefore, since the question was not cued, the results may have underrepresented the percentage of individuals who avoid the Alpine area.

In Year 6, to better understand whether Nuiqsut residents' use areas have changed from the past and the causes of these changes, the study team added a question that read, "Are there any areas where you used to hunt that you no longer use or avoid?" If the respondent answered yes, the study team asked for a description of the area and the cause of the change. Each response was categorized by place name and cause(s). The question was cued, rather than volunteered, and it addressed all areas, not just Alpine. Therefore the study team documented a higher number of responses regarding avoidance or decreased use of caribou hunting areas.

As shown in Table 44, 61 percent of Year 6 respondents reported no longer using or avoiding certain areas. The remaining 39 percent of respondents indicated there had been no change in their hunting area over time. The most commonly mentioned places avoided were Alpine/Alpine Satellites (13 observations), followed by Fish Creek and Nigliq Channel (four observations each), and the East Channel, Tamayayak Channel, and shallow areas (three observations each) (see Maps 1 and 2 for placename locations) (Table 45). Note that some respondents reported more than one area; therefore the number of observations (n=45, Table 45) is greater than the number of respondents reporting avoidance of previously used hunting areas (n=35, Table 44).

Table 44: Respondents Reporting Avoidance of Previously Used Hunting Areas

	Number of Respondents	Percent of Respondents
Yes	35	61%
No	22	39%
Total	57	100%

Stephen R. Braund & Associates, 2014.

Table 45: Places of Avoidance

Locations Avoided	Number (%) of Observations (n=45)
Alpine/Alpine Satellites	13 (29%)
Fish Creek	4 (9%)
Niqliq Channel	4 (9%)
East Channel	3 (7%)
Shallow Areas	3 (7%)
Tamayayak Channel	3 (7%)
Colville Delta	2 (4%)
Puviksuk	2 (4%)
West of Nuiqsut	2 (4%)
Atigaru Point	1 (2%)
East of Colville River	1 (2%)
East of Nigliq Channel	1 (2%)
Itkillik River	1 (2%)
Kachemach River	1 (2%)
Kuparuk River	1 (2%)
Lake near Kachemak	1 (2%)
Teshekpuk Lake	1 (2%)
Upper Colville River	1 (2%)
Notes: See Maps 1 and 2 for placename locations	

Stephen R. Braund & Associates, 2015.

Respondents who reported avoiding or no longer hunting in certain areas sometimes cited multiple different causes for a change; hence, there are a total of 53 cause observations, compared to 45 location observations. As shown in Table 46, development-related causes were most commonly cited (32 observations), followed by environmental causes (18 observations), and personal reasons (two observations). Development-related causes included the presence of development in general, activities associated with development (e.g., air traffic), concerns about contamination, security restrictions, and safety concerns (See Table 46). Environmental causes were also commonly reported and included decreased water levels, decreased availability of caribou (without a cause given), or changes in terrain. A couple of individuals cited personal reasons for no longer hunting in a certain area (Table 46).

As shown in Table 47, the causes cited for avoiding the area near Alpine/Alpine Satellites included development activities (e.g., traffic), infrastructure (e.g., the presence of pipelines/buildings/roads), concerns about contamination, safety concerns (e.g., shooting near areas with pipelines or oil company workers), and security restrictions (e.g., concerns about being confronted by oil company personnel or not understanding hunting policies in developed areas).

One respondent described his avoidance of Alpine areas as "natural instinct," and another individual discussed a general tendency to avoid development areas. These individuals described,

> *We don't hunt around the CDs and the drill rigs; we usually try to keep away from them. I used to hunt this area [by area where CD5 proposed], but not anymore. We usually see some caribou around there; I guess it's just natural instinct to not go around that area.* (SRB&A Nuiqsut Interview November 2013)

> *Yes, these Alpine fields. Because what I think of it is that they are taking over our land, but at the same time, they're paying us to take our oil, and us Natives want caribou around our village like we usually do but at the same time we aren't getting that because of the oil fields. Caribou don't go over there. I don't go near Alpine.* (SRB&A Nuiqsut Interview November 2013)

Table 46: Causes of Avoidance

Avoidance Cause	Number of Observations
Development Causes	**32 (60%)**
Development Activities	8
Development - General	4
Contamination Concerns	6
Development Infrastructure	7
Safety Concerns	3
Security Restrictions	4
Environmental Causes	**18 (34%)**
Environmental Factors	12
Resource Availability	6
Personal Reasons	**2 (4%)**
Don't Know	**1 (2%)**
Total Observations	**53**
Stephen R. Braund & Associates, 2015.	

Table 47: Causes Cited for Avoidance by Place

Locations Avoided	Causes Cited for Avoidance										
	Environmental Factors		Development Factors						Personal Reasons	Do Not Know	Total
	Environmental Factors	Resource Availability	Development Activities	Development Infrastructure	Contamination Concerns	Security Restriction	Safety Concerns	Development General	Personal Reasons		
Alpine/Alpine Satellites	0	1	3	4	1	3	2	4	0	0	18
Fish Creek	2	1	0	1	0	0	0	0	1	0	5
Niqliq Channel	0	0	1	0	2	0	0	0	0	1	4
Tamayayak Channel	0	0	1	1	1	1	0	0	0	0	4
East Channel	0	0	0	1	2	0	0	0	0	0	3
Shallow areas	3	0	0	0	0	0	0	0	0	0	3
Colville Delta	0	2	0	0	0	0	0	0	0	0	2
Puviksuk	1	1	0	0	0	0	0	0	0	0	2
West of Nuiqsut	0	0	2	0	0	0	0	0	0	0	2
East of Nigliq Channel	0	0	1	0	0	0	1	0	0	0	2
Atigaru Point	0	1	0	0	0	0	0	0	0	0	1

Locations Avoided	Causes Cited for Avoidance										
	Environmental Factors		Development Factors						Personal Reasons	Do Not Know	Total
	Environmental Factors	Resource Availability	Development Activities	Development Infrastructure	Contamination Concerns	Security Restriction	Safety Concerns	Development General	Personal Reasons		
East of Colville River	1	0	0	0	0	0	0	0	0	0	1
Itkillik River	1	0	0	0	0	0	0	0	0	0	1
Kachemach River	1	0	0	0	0	0	0	0	0	0	1
Kuparuk River	1	0	0	0	0	0	0	0	0	0	1
Lake near Kachemak	1	0	0	0	0	0	0	0	0	0	1
Teshekpuk Lake	0	0	0	0	0	0	0	0	1	0	1
Upper Colville River	1	0	0	0	0	0	0	0	0	0	1
Total Number of Observations	12	6	8	7	6	4	3	4	2	1	53
Stephen R. Braund & Associates, 2015											

Other respondents discussed more specific reasons for avoiding the Alpine areas. A number of individuals cited concerns about shooting toward infrastructure or being confronted by security. These respondents described,

> *Just hardly ever out there [near the oilfields]. Don't want to shoot the pipeline.* (SRB&A Nuiqsut Interview November 2013)

> *CD4. Can't shoot towards the areas. Basically when that time happens, they're [the caribou are] on the east side [of the Nigliq Channel] and we wait until they're on the west side to get them.* (SRB&A Nuiqsut Interview November 2013)

> *Maybe those two [structures] close to the river, at CD[4]. [We can't shoot that way] even though there's caribou around there. Because there's buildings. Even that other pipeline on that side – Kuukpik [Channel] – that one we try and avoid.* (SRB&A Nuiqsut Interview November 2013)

> *Up here around the CD Alpine area, when we first came up in 1996 we used to hunt in that area. I stopped going there because of Alpine. It is harder to travel. You are scared they are going to come and get you, and worried people will come and escort you away. I heard it happen, but I would ignore them if they come and bother me.* (SRB&A Nuiqsut Interview November 2013)

> *This area no more, this area now going to be drilled up and that's the primary area and now it's going to be drilled up because of CD5. For the safety of the pipeline and also the safety of the people that are working around the rig. I try to avoid that area because it's an industrial zone now.* (SRB&A Nuiqsut Interview November 2013)

In addition to concerns about safety and security, a couple of respondents indicated that they avoid hunting near Alpine due to concerns about contamination. Both of these respondents recalled harvesting sick caribou in the vicinity of development:

I try not to hunt on Nigliq because a couple of them [caribou] hanging around CD4 have been sick – got pussy lungs and liver. They're abnormal. [Used to hunt near CD4] and every time I made my catch between here and Nigliq it was a sick one. (SRB&A Nuiqsut Interview November 2013)

I avoid going towards catching caribou close to Alpine, and Kuukpik area [East Channel], because one time I got a sick caribou there. That was a few years ago – three, four years ago. (SRB&A Nuiqsut Interview November 2013)

During the Year 6 draft review meeting with the Nuiqsut Caribou Panel, one panel member discussed his concerns about contamination of the tundra and its effects on caribou health. He also indicated that the caribou may shift away from industrial areas because they are avoiding contaminated foods. In addition, panel members noted a difference in caribou to the east of the Colville delta and those to the west of the delta. During active harvester interviews, one individual reported avoiding the East Channel in Year 6 because of concerns about contamination from a non-Alpine related incident:

This year I didn't go between the Nigliq and East Channel. This year I didn't have a heart for it. Last year I didn't go down Tamayayak, but not this year. I didn't want to go around that area with the blow out. (SRB&A Nuiqsut Interview November 2013)

While some individuals reported avoiding the areas directly around infrastructure, others reported avoiding larger areas, such as Nigliq Channel and Tamayayak Channel because of the general presence of oil and gas activities or because they believed that the caribou were less available in those areas:

Towards the CD4 areas. I don't see much [caribou] around those. I just stay along the riverbanks. I'm not too sure why [the caribou are less available]. Maybe truck activities. (SRB&A Nuiqsut Interview November 2013)

This whole area in the delta, Tamavayak Channel, that is the only place I don't do anymore. I used to go there by boat. Too many structures and building and pipes. (SRB&A Nuiqsut Interview November 2013)

Well mostly like this [year], we mostly avoided some of these areas [west of Nuiqsut] because there are activities. I don't know what they are doing right now. (SRB&A Nuiqsut Interview November 2013)

I used to always go, over here, past Alpine, that whole area was our hunting ground, Tamayayak Channel, go through Colville River and go out though Tamavayak, there used to always be caribou there. [Now] too much traffic, regulations have to follow. I would go there for geese hunting. (SRB&A Nuiqsut Interview November 2013)

Four respondents reported traveling to Fish Creek less frequently than in the past or avoiding the area altogether, for varying reasons. One individual cited personal reasons for this change, saying,

Fish Creek, I don't go up there anymore. I just don't like that place. I avoid it all the time. Since I was a young boy, that's the only time I went out there, since I was nine years old. That's the last time I went out there. (SRB&A Nuiqsut Interview November 2013)

Another individual cited a decreased availability of caribou in the vicinity of Fish Creek:

> *Fish Creek towards Tingmeachsiovik [River], before they put the bridge on, [there] used to be caribous around there*[10]*. They used to hang around there, but I don't know. Now [because of] that bridge they don't go over there. Used to be some, lots of caribou out that way [by] Atigaru [Point]. And [now] hardly any caribous. They used to go look for caribous around there.* (SRB&A Nuiqsut Interview November 2013)

In addition, one respondent reported increased difficulty accessing Fish Creek due to shallow water:

> *It's been a while since I go towards Fish Creek. We usually don't ever go out the mouth [of Nigliq], we just stop at the cabin. We would have to go all the way around the shallow area or get into Fish Creek.* (SRB&A Nuiqsut Interview November 2013)

Other areas mentioned by respondents as places where they no longer hunt included the area east of the Colville delta, Puviksuk, and a lake near Kachemach River. Respondents provided various explanations for their reduced use of these areas, including environmental reasons that affect their ability to travel, concerns about hunting near development areas, and reduced availability of caribou:

> *East side, on this overland area, [I] stopped hunting by snowmachine. It is too flat and doesn't have a lot of lakes and creeks like on the west side. Sometimes, if we go up Kuparuk River, that takes awhile.* (SRB&A Nuiqsut Interview November 2013)

> *I only avoid the east side up here. East side of the Colville. There is too much activity out there. I would hate to have a stray bullet hit the pipeline or hit one of the facilities. It is fine and we can hunt out there, but one guy did it and got arrested and the meat confiscated. That was quite a few years ago. Everybody avoids the east side more today. Once in a while there will be boaters heading out that way towards the Tamayayak River.* (SRB&A Nuiqsut Interview November 2013)

> *At Puviksuk, right across because, they [caribou] usually always cross right there but I haven't gone there in a while. This year it was pretty bad [in terms of availability].* (SRB&A Nuiqsut Interview November 2013)

> *Yeah like in the Puviksuk area, because there are a lot of deep ruts in the tundra. Between Itkillik River and Ocean Point, I got stuck out there once and it took me six hours to get out. My parka was soaked from sweat. I got it out and came home. [My wife] told me not to go that way, and I didn't listen.* (SRB&A Nuiqsut Interview November 2013)

A number of individuals cited environmental factors for changes in their hunting areas (Figure 13). Several respondents provided general statements that some areas where they used to hunt are now inaccessible by boat due to shallow waters. One individual specifically reported decreased hunting along Itkillik River and upper Colville River, saying, "Itkillik River is too shallow, and we used to go way up there, up the Colville, but it is too shallow" (SRB&A Nuiqsut Interview November 2013).

> *Other than the shallow waters. Try to park where there's a big open area, where you can see 360 degrees, where you can see all around you. I think it would be a little shallow at the end of the year, that's how it usually is. Two years ago the water was really deep. It was weird. You would think you would know where the shallow parts are.* (SRB&A Nuiqsut Interview November 2013)

[10] It is unclear what bridge the respondent is referring to.

Just [avoid] the shallow areas. (SRB&A Nuiqsut Interview November 2013)

Well we did, we pretty much go anywhere you feel like going. Just avoid the shallow areas. (SRB&A Nuiqsut Interview November 2013)

One respondent reported discovering a lake that seemed to be emitting methane gas and indicated that he now avoids the area due to concerns about safety. This respondent described,

Yeah, like a couple of years ago – two summers ago – let's see, right across here [near Kachemach], I have been going to this lake with my boat but now what we noticed is that there is some bubbles are coming up in the lake and we thought, 'that is not fish; that must be methane gas.' One time I took my nephew in there, we were looking for caribou, and I happened to go inside that creek and when we got to that lake, we saw a lot of bubbles coming up. That methane lake. It is right on his aaka's *land. We stay away from that area now. I checked it out this summer, and it is still bubbling.* (SRB&A Nuiqsut Interview November 2013)

In contrast to the above individuals, a number of respondents (22 individuals) reported no change in their hunting area at all. As several hunters summarized,

No, [I go to the] same places. I haven't changed; just about the same amount goes through the same areas. (SRB&A Nuiqsut Interview November 2013)

No [there aren't any places I avoid]. I'm still learning a lot about the land. (SRB&A Nuiqsut Interview November 2013)

No, usually we go around the same ways. Like around here, south of the big bend on Colville. Umiat is a good place to get moose. (SRB&A Nuiqsut Interview November 2013)

No [same areas]. Back when I was a kid, they would come off the river and they would come through town. It's been many years, and it finally happened this year. It was surprising, it was good to see. Hopefully it happens again and again and again. When I was a kid they would come up through the river and come right through the town. (SRB&A Nuiqsut Interview November 2013)

General Observations Regarding Status of Caribou Herds in Year 6

This section summarizes residents' general Year 6 observations relevant to the behavior, distribution, or migration of caribou in 2013. This section includes observations that are not readily organized into the sections above, or observations made during the final section of the active harvester interviews, where respondents were asked, "Was there anything else abnormal about the behavior, distribution, or migration of caribou in 2013?" In Year 6, respondents' observations trended toward the following topics:

- Herd of caribou migrated near the community for the first time in years
- General scarcity of caribou in hunting areas/caribou staying farther from riversides
- Changes in caribou migratory routes
- Health of caribou
- General concerns about development

A frequent topic of discussion during Year 6 interviews was related to a herd of caribou (approximated to be several hundred) that migrated through the community. A number of respondents indicated that they were able to harvest from this herd; however, others did not. Respondents indicated that the herd was on the east side of the Nigliq Channel, and that residents were instructed by community elders to let the herd

cross the river before shooting. Several respondents described the importance of letting the leader of a herd pass so that the remaining caribou will follow in its tracks and not be diverted:

> *When I was younger [the large herds migrating through] was an every year thing. Now it's a blue moon kind of thing. We had elders guiding us over the radio, telling us not to start the harvests until they came on this side. Me and my brother were just reloading and going to start shooting, and then it came on the radio "Wait for them to cross the river!"* (SRB&A Nuiqsut Interview November 2013)

> *They been going through there, and I make an announcement when I heard caribou coming from the east. I make an announcement to tell people not to meet them before they go through. Because they always go back and people have to know that. The first one has to go through. I put on CB and I announce!* (SRB&A Nuiqsut Interview November 2013)

A number of respondents discussed that a migratory event of this type through the village was one that had at one time been a common occurrence but has now changed to a more unpredictable event. Several individuals mentioned that it had been at least 10 years since the community had a migration of caribou through the village. Many respondents were unsure why the caribou had chosen to come through the community in 2013 although a few respondents believed the cause to be related to industrial activity, hunters, or plane and helicopter traffic:

> *I was happy that the caribou came through town again, not sure why they came back. It was pretty cool though. I think it was because there was so much activity to the north and west so they diverted their migration this way. But really they used to come though Nuiqsut. CD4 got a lot bigger and Alpine might have too.* (SRB&A Nuiqsut Interview November 2013)

> *We haven't seen caribou run through town for I'd say close to 10 years and usually they'd be in the hundreds. I think they did that because there were probably hunters, or planes, or I'd say the choppers, whatever their migration or something.* (SRB&A Nuiqsut Interview November 2013)

> *Didn't have to go up river because they were all around here. Finally for the first time in 13 years. During this fall after whaling, they started coming towards town, and when they reached the dump road, they go by the dump and started going south. They made a trail; they follow it every time. They'll normally use that trail every time.* (SRB&A Nuiqsut Interview November 2013)

Despite the occurrence of a caribou herd migrating through the village, many respondents remarked on the overall scarcity of caribou in respondent's caribou hunting areas and the distribution of caribou in further inland areas away from the rivers that many respondents use to travel on and search for caribou. Reasons provided by respondents for the overall scarcity and farther locations included development activities (particularly traffic), predators, and climate change. Describing the overall scarcity of caribou in their areas several individuals noted,

> *The herds that usually come around this area, they tend to come back and not so close to the village anymore. We are starting to take longer trips and waiting longer to catch them. Sometimes we don't even see anything, and we could go all the way up to Fish Creek if we wanted to and not see anything sometimes. Anytime you wanted you used to be able to get them, but now there is hardly anything.* (SRB&A Nuiqsut Interview November 2013)

> *People are not seeing as many. Not that much, it [the caribou population in this area] is getting less and less. I think it is because of all of this activity going on over here with [GMT1*

and Cassin 6 and 1]. The caribou are pretty much all scattered. (SRB&A Nuiqsut Interview November 2013)

More than last year, there was hardly anything last year. There were some that were further and further. The past few years every year seems to be different. Last year there was hardly anything before. It seems to vary every year. That is kind of like they are trying to come back, and everything going around. The year before when Alpine was going up and there were caribou all over the coast, today you don't see that anymore. A lot of hunters blame that Meltwater [Kuparuk Drill Site 2P] road; they go way down south and west of here. They turn back around when they hit that road and head back east. Someone said they see the tracks headed this way and once they got to the road they turned back around. When they were first exploring Alpine there was a lot of air activity that drove them away. They tried to slow them down and there have been so many complaints, they say they are trying not to fly between August and September. That is when the caribou are nice and fat. (SRB&A Nuiqsut Interview November 2013)

Several active harvesters reported that caribou were further from the rivers in 2013. Few individuals knew the reasons for the caribou being located farther from the rivers but indicated that this affected their caribou harvests because the caribou were too far inland to be hunted. Two individuals described their observations, saying,

Just that there's very few along the river now. Usually you see one going up the river but this year I didn't see any. Maybe because I didn't go as much. I'm not sure, probably avoiding the river, just wanting to stay inland. But other than that, not very much of aircrafts, but I'm not as much as I was last year. (SRB&A Nuiqsut Interview November 2013)

This past summer I hardly see any caribou upriver. Other than when we're moose hunting we seen some, but they were way out. The only ones I caught were on the 5th and the 8th [of November]. (SRB&A Nuiqsut Interview November 2013)

Two individuals suggested that the caribou were further from the rivers due to predators, particularly wolves. Another person attributed overall skittish behavior of caribou to the large number of wolves in the area that pose a constant threat to the caribou.

During one interview, two active harvesters discussed that the scarcity of caribou in the Nuiqsut area could be due to changes in the climate and weather patterns. These two individuals discussed their observation as follows:

I think they [the caribou] are way off. Maybe climate change, weather patterns. We notice the weather is so warm when it should have been cold. [They are] staying in cooler places.

It's unusual to see our caribou in the dead of winter; they're mostly south at this time of year. The weather trends [are affecting the caribou]. (SRB&A Nuiqsut Interview November 2013)

As with many of the observations by respondents during the six study years, residents continued to discuss the changes in the migration routes and behavior of the caribou herds. The most common causes cited for these changes focused on oil development and related activities, sport hunters and traffic associated with the Dalton Highway, community hunting practices, and predators. Residents' observations regarding the effects of oil development and related activities such as plane and helicopter traffic included the following:

Yeah, all of the caribou migrated through there. When I was a young man, I would wait for them there [near Fish Creek] with my uncle. Uncle used to say "you go right at that point" meaning at Nigliq. Used to be they migrated… even to Teshekpuk Lake. You know the caribou

calving grounds, north of Teshekpuk… caribou kind of roam, up to the Brooks Range, up to Wainwright, this is the western herd…This is something else too. My own personal view is it because of the lights from the structures, the oil field infrastructure, and the smell. The smell from Prudhoe Bay, you notice with the haze that comes in. Those caribou have a good sense of smell. (SRB&A Nuiqsut Interview November 2013)

Only thing I could say is they're confused, because they get to this area where they usually go and they can't go there. They're trying to find any way to get to the west side. This one was about, I'd say more than a thousand, but one went a few miles and crossed. [They're] lost. Migration where they've been going has changed. Where they're used to going they can't go anymore. They have the pipeline by CD3 they have to go farther. Same way with the pipeline that goes the other way. I'm surprised that they even go past that. Some will go. Ever since they put that up they only go through there the west side. (SRB&A Nuiqsut Interview November 2013)

[For the] first time we see a little bit of herd this summer come from the east, because the migrations of the caribou has changed a lot. The Porcupine Herd comes from the east, that's along the coast, and the Teshekpuk Herd comes from the west; that's the western herd. The migration of the western herd has diverted southward. We used to see them coming in from the coastline, but now we see them coming from the south. Mainly [because of] too much traffic. (SRB&A Nuiqsut Interview November 2013)

Two respondents attributed the appearance of caribou in the village in 2013 to improved communication and realization by industries and agencies that reduced air traffic in the vicinity of Nuiqsut will improve caribou hunting conditions by lessening the disruption to the herd. They said,

It was sort of like different from last year, for some reason they decided to go towards west side Harrison Bay area. That's what happens when they were being crowded by planes and helicopters. I think they're starting to understand that during the migration of caribou they're staying away. That was some difference we finally saw. Maybe that's the reason they start coming through town. (SRB&A Nuiqsut Interview November 2013)

They finally realized that it's not for them to be around the area flying around the area when they're migrating that's one thing they finally understood. Alpine. That's why we're finally seeing the caribou come by because there's been less traffic, and that's been a good sign for them. (SRB&A Nuiqsut Interview November 2013)

In addition to oil development activities, sport hunters were commonly cited by respondents as contributing to the disruption of the caribou migration. The majority of comments focused on the disruption that occurs at the Dalton Highway, especially when the first herds are disrupted:

There used to be thousands of caribou in that area in the 70s. [For the] first time we see a little bit of herd this summer come from the east, because the migrations of the caribou has changed a lot. The Porcupine Herd comes from the east, that's along the coast, and the Teshekpuk Herd comes from the west; that's the western herd. The migration of the western herd has diverted southward. We used to see them coming in from the coastline, but now we see them coming from the south. Mainly [because of] too much traffic. Bow hunters and head hunters. I think they don't usually wait for the first herd to come by and then the second herd gets diverted. (SRB&A Nuiqsut Interview November 2013)

I also think it's changing because the hunting on the Dalton Highway is increasing as the years go by. Migratory routes, I mean that highway goes all the way. I mean there are hunters

going all the way from Atigun Pass to Prudhoe. I grew up letting the first ones pass. I'd like to see a small time frame when the hunting along the Dalton highway is limited so the caribou would be past. So they could get to the east coast. (SRB&A Nuiqsut Interview November 2013)

Several individuals also commented that certain residents are also diverting the first caribou herds that come to Nuiqsut and that these actions are causing the same disruption to the caribou herds' migration as the sport hunters on the Dalton Highway. Another individual added that four-wheeler hunting activities also disrupt the caribou movment in the area. These individual said,

I guess they are acting differently. They used to pass here. The first summer we spent here the caribous were coming through herd after herd. By that big lake, Anaviak [?] Lake. I am surprised they migrated into the village and right along the pipeline. I think they were following it. They follow the coast usually. I Guess that pipeline kind of forced them, corralled them, until they hit that [river]…There were boats that met the caribou, those were the ones that were scolded by the elders. They were scolded [the hunters that went on the main channel/east channel to get the caribou]. We didn't see them come back this way they went back a different route. (SRB&A Nuiqsut Interview November 2013)

A lot of people got a lot of caribou, especially those 4 wheelers. Those elders complain about it, because it drives them back out west. (SRB&A Nuiqsut Interview November 2013)

One individual added that predators can have an effect on caribou distribution and that in 2013 the presence of predators to the west of the community kept the caribou close to Nuiqsut.

Several active harvesters also reported general observations regarding the health of caribou in 2013. While the majority of comments focused on the presence of sick caribou, several others noted that the caribou were healthy and of good quality in 2013. Residents described the sick caribou they observed or harvested in 2013 saying,

In this Colville River Delta, it has impacted the taste of the caribou. They are eating the lichen in this general area, and when you notice all the fumes coming out of Alpine they are mixing into the lichen too. I wouldn't want to catch a caribou here I would have to go way up river. Up past Chandler…Yeah it looks the same until you eat it. Everything is the same except for the taste. Eskimo's have acquired that particular taste… when Alpine started that is when I noticed the change. (SRB&A Nuiqsut Interview November 2013)

Yeah the [caribou they got] were healthy but then they saw those other people getting sick caribou then they backed up. They feel bad shooting a sick caribou, they don't want to waste the meat. They would end up throwing it away you know. Green slime. I have seen it before myself every so often. Now I think there are more and more of sick caribou compared to maybe 20 years ago. I came across [green slime] caribou every once and awhile when I used to go hunting. (SRB&A Nuiqsut Interview November 2013)

I think between our camp and here, but then we started hearing other people were getting sick caribou and they slacked off on caribou. They have been hunting a lot of moose though. (SRB&A Nuiqsut Interview November 2013)

As mentioned above, two individuals noted the caribou they harvested in 2013 were generally healthy and of good quality. They said,

They were all healthy. They caribous for the past couple of years have been so healthy. And lots of fat on them. For some reason they're getting healthier. Maybe all that vegetation is

really growing around here because we haven't been having hot weather, and it's making it more abundant for them. Maybe that's why they're getting more abundant. That's one good thing about our caribous anyway. (SRB&A Nuiqsut Interview November 2013)

They were all healthy caribous. Last year I had quite a few [sick ones]. I have no idea [what the difference was]. Might be a part of a different herd. All of my caribou were good this year. Last one I got tasted really good. (SRB&A Nuiqsut Interview November 2013)

The last general topic that residents discussed in 2013 focused on concerns related to development activity. These respondents voiced concerns primarily related to overall development activities with an emphasis on the negative effect of traffic, particularly from helicopters. Others voiced concerns regarding the construction of the bridge over the Nigliq Channel, scientific and industry studies, high noise levels, and the potential impacts from the proposed construction of a natural gas pipeline from the North Slope to Southcentral Alaska. Their comments included the following:

[My hunting area hasn't changed], just all the traffic on this area that's it. Oh and there's this new one that's been going from Meltwater [Kuparuk Drill Site 2P] down. I noticed we have to go way farther out just to see them. It starts about this time of the year, December all the way to April the traffic is there. You'd be lucky to catch a caribou during that time. I don't even go in that area. As soon as they build that ice road, I avoid it. And then the 20 miles I go around there. (SRB&A Nuiqsut Interview November 2013)

Also if they get that bridge in up here, there was lots of activity… ice road coming off of the dump road, and a spur road going up… 40 miles ice road. If they ever build that road up here there is going to be a major impact on caribou because that area is the caribou migration area. (SRB&A Nuiqsut Interview November 2013)

I hope next year is a lot better, hope their studies are done. I know we will be restricted off of that road[11]*. Once that road goes in there will be nothing to the north, then if they keep coming in there will be nothing to the west, then move further south. We used to always wait for caribou to cross up in the Delta and along the coast….* (SRB&A Nuiqsut Interview November 2013)

Well the planes do come, but it don't scare them. No, the helicopters are the ones that scare the caribous. (SRB&A Nuiqsut Interview November 2013)

It think it's going to get worse when the natural gas [pipeline] comes in; I don't think we're going to see any more caribou. We heard they're going to build another pipeline right near the pipeline. (SRB&A Nuiqsut Interview November 2013)

But the noises are, you know, it just spooks them that is it. It is the same noises, helicopter, any kind of noise, like when you are out there alone you could hear something. (SRB&A Nuiqsut Interview November 2013)

Teshekpuk and Central Arctic Herd Trends

This section summarizes current Teshekpuk Herd (TH) and Central Arctic Herd (CAH) trends, based primarily on information provided by ABR, Inc. (ABR, Inc. 2010) and available in the 2014 report on the Alpine Satellite Development Plan (ASDP) caribou monitoring study (Lawhead, Prichard, Macander, and Welch, 2014). Data on 2013 Nuiqsut caribou hunting activities are incorporated and discussed where

[11] CPAI notes that hunters will be allowed to use and access the road for hunting activities.

relevant. In addition, a summary of Nuiqsut traditional knowledge related to caribou abundance, migration, and distribution is provided in Appendix E.

The ASDP caribou monitoring study area, which is centered on the Colville River, is used at various times of the year by two neighboring herds of caribou (Rangifer tarandus)—the TH and the CAH. Based on extensive radio-tracking by the ADF&G, NSB, Bureau of Land Management, and CPAI 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. 2014). In addition to radio-telemetry 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. Residents of Nuiqsut, located on the Nigliq Channel of the Colville River delta, therefore rely primarily on caribou from the CAH and TH. According to Pedersen (2008), a greater proportion of Nuiqsut caribou harvests comes from the TH (approximately 60 percent) versus the CAH (approximately 30 percent).

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 (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) (Carroll et al. 2005, 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, Parrett 2009) to southeast in the winter range of the CAH since 2004–2005 (Lawhead et al. 2007, 2008, 2009, 2010, 2011, 2012, 2013; Lenart 2009, 2011; Parrett 2011).

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 (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, and 64,106 caribou on the most recent photocensus in July 2008 (Parrett 2009), the greatest size yet recorded for the TH.

The CAH is the primary herd using the oilfield region on the central arctic coastal plain. From the early 1970s to 2002, the CAH grew at an overall rate of 7 percent 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 percent 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). A photocensus conducted in July 2008 by ADFG produced an estimate of 66,772 caribou, the greatest size yet recorded for this herd (Lenart 2009) and representing a 13 percent average annual rate increase since 2002. A photocensus conducted by ADFG in July 2011 yielded an estimate of approximately 55,000 animals in the herd, representing a 14 percent decline from the previous (2008) estimate (Lawhead and Prichard, 2012). Another photocensus had been conducted in 2010, but the results were considered unsatisfactory. Both the 2010 and 2011 censuses for the CAH and the TH experienced difficulties due to mixing of the two herds (Lawhead and Prichard, 2012).

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 2009, Lawhead and Prichard 2010). 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 2009, 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 ANWR (Lenart 2009, Lawhead et al. 2010). Use of the Colville River delta by caribou is highest during the summer insect season (late June to early August), which is also when residents of Nuiqsut most frequently harvest caribou in that area.

The caribou monitoring study implemented by ABR, Inc. provides data on the number and density of caribou in four different survey areas: National Petroleum Reserve – Alaska (NPRA) (west of the Colville River delta beyond Fish Creek), Colville River Delta, Colville East (east of the delta), and Itkillik River toward the Kuparuk oilfields. Surveys of the Colville River Delta occurred on five different survey dates. According to Lawhead et al. (2014), the density of caribou in the NPRA survey area was low during all 2013 surveys. During an April 17-19 survey, caribou were scattered in areas to the west and east of the community with a few caribou also in the vicinity of the Colville Delta. No surveys were conducted during the spring migration or early calving season. During a late calving season survey (June 6, 8-10) caribou were primarily distributed to the south and east of the community. Later in June (June 23-24), surveys identified a group of caribou approximated at 32 in the East Channel area near Pisiktaġvik. Nuiqsut hunters also reported a sizable group of caribou in a similar area in early July, from which several individuals harvested caribou. Data from August 7-8 transect surveys in 2013 show few caribou in the area, while a couple of weeks later (August 18-19), a number of caribou were recorded to the west and south of the community, particularly near Fish Creek and Judy Creek. Caribou were spotted even closer to the community during a September 10-11 survey (Lawhead et al., 2014: Table 2, Figure 5). No transects were flown in July. During the postcalving season, few caribou were documented in the Colville East survey area; surveys generally document high densities of caribou in the Colville East area during that time. Lawhead et al. notes that, since 2003, CAH caribou have moved farther east during the midsummer months. In general, few caribou were recorded in the Colville River delta survey area. Large numbers of caribou have occurred during some years such as in 1992, 1996, 2001, and 2007; however, according to previous survey, satellite, and GPS telemetry data, large herds of caribou on the Colville delta or crossing the delta has been relatively uncommon overall.

Lawhead et al. (2014) notes that the yearly distribution of caribou from the TH and CAH herds is dependent on a variety of factors, including herd range, snow cover, vegetative conditions, and habitat type. For example, areas with recent snowmelt are favorable to caribou due to new, high quality, vegetative growth. In addition, the density of caribou along creeks and in coastal areas is higher during the peak mosquito season. Annual weather conditions, therefore, have a substantial effect on the distribution of caribou and their resulting availability to local hunters. Because the Colville River delta is "at the interface of the annual ranges of the TH and CAH," (Lawhead et al., 2014) and in most years does not see large movements or aggregations of caribou from either herd, any factor that influences their distribution and/or behavior, including weather patterns, food availability, and/or development-related disturbances, could have substantial impacts, either positive or negative, on the availability of caribou to Nuiqsut harvesters.

Summary

SRB&A, with the Nuiqsut Caribou Panel, has completed six years of monitoring of impacts of CD4 and other CPAI satellite developments on Nuiqsut residents' caribou hunting activities. The monitoring data are based on interviews with a sample of active Nuiqsut caribou harvesters as well as household harvest surveys. Sixty respondents were interviewed in Year 6 (57 active harvesters), compared with 58 in Year 5 (including 57 active harvesters), 59 in Year 4 (including 58 active harvesters), 60 in Year 3 (including 57 active harvesters), 54 in Year 2 (including 53 active harvesters) and 40 in Year 1 (including 37 active harvesters). Elder interviews occurred during each of the six study years.

Fifty-seven active harvester respondents reported 196 caribou use areas for the Year 6 time period (November 2012 to October 2013). They also identified 143 successful harvest locations, compared to 182 in Year 1 (reported by 34 harvesters), 160 in Year 2 (reported by 52 harvesters), 199 in Year 3 (reported by 55 harvesters), 166 in Year 4 (reported by 55 harvesters), and 200 in Year 5 (reported by 57 active harvesters). In Year 6 the research team also conducted a household harvest survey yielding an estimate of 586 caribou harvested by all Nuiqsut households in a twelve month period from January to December 2013 compared to the 501 caribou in Year 5, 408 caribou in Year 4, and 471 caribou in Year 3. The average pounds harvested per household in the 2013 survey (692 pounds) is higher than that reported in Year 4 (523 pounds) and Year 5 (598 pounds) but within the range of harvest estimates made over the 15 available study years and somewhat higher than the average of all study years. The higher harvests in Year 6 can be attributed to a single household who reported harvesting substantially more caribou than in the previous year, accounting for over one third of the community's total harvests. The gap between the percentage of households attempting to harvest caribou and those households successfully harvesting caribou was highest in 2013 for all available study years; 16 percent of Nuiqsut households reported trying to harvest caribou and being unsuccessful in their attempts. The next poorest success rate among Nuiqsut households was reported in 2011 (Year 4) at 14 percent of households unsuccessful.

Active harvester interview participants identified 196 caribou subsistence use areas and 143 caribou harvest locations for the Year 6 study year, the majority of which were located along the Colville River (including Nigliq Channel and the East Channel) and west of the community toward Fish Creek. The extent of riverine travel was relatively similar during all study years, although in Year 6 use areas extended beyond Umiat at a greater distance than in previous years. In contrast to previous years, active harvesters during Year 6 interviews reported a smaller use area to the west of the community toward Fish Creek. Year 6 also shows a smaller overland area compared to some other previous study years. Actual harvests of caribou were concentrated along the Nigliq Channel, the East Channel, near the mouth of Itkillik River, and in the area to the west between the village of Nuiqsut and Fish Creek. Fewer harvest locations were reported in Year 6 compared to previous years, and therefore there were fewer areas of high harvest density. Overall, harvest locations during the summer months occurred in similar locations for all five years of the study, with the majority of harvests occurring close to the community and harvests occurring with less frequency with increased distance from the community.

While certain hunting characteristics (e.g., trip frequency, duration, and travel method) have remained similar over the six study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. Boats were the most common method of transportation used over all study years, followed by snowmachine or four-wheeler. Respondents more commonly reported using four-wheelers during the last two study years (Years 5 and 6). Following an ongoing trend, respondents took only same day trips to a majority (74 percent) of use areas. The frequency of hunting trips to use areas has remained relatively stable overall study years, although Nuiqsut harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 6 compared to Years 1 and 2. A number of factors affect harvest timing and success, including weather and ice conditions, the timing of caribou migration into traditional hunting areas, and outside factors such as industrial or other activities that potentially affect caribou behavior. In Year 6, caribou hunting activities peaked in the month of July. Harvest success in terms of the percentage of successful hunting areas declined between Years 1 and 4 (from 78 percent to 55 percent), rose slightly in Year 5 (to 64 percent), and declined again in Year 6, at 54 percent of use areas with successful harvests.

Caribou harvest amounts have remained relatively stable over time. In Year 6, the community of Nuiqsut harvested an estimated 68,534 pounds of caribou, providing an average of 692 pounds per household, or 166 pounds per capita. Estimated harvests in Year 6 were higher than the average of previous study years, with only two study years (1985 and 1993) showing higher estimated household harvests. Household uses of caribou were similar to previous years, with 95 percent of households using caribou, and 79 percent of households attempting harvests of caribou. Rates of sharing were also comparable to previous years, with

75 percent households receiving caribou from other households and 62 percent giving caribou. The gap between the percentage of households attempting to harvest caribou and those households successfully harvesting caribou was highest in 2013 for all available study years; 16 percent of Nuiqsut households reported trying to harvest caribou and being unsuccessful in their attempts. The next poorest success rate among Nuiqsut households was reported in 2011 (Year 4) at 14 percent of households unsuccessful.

The percentages of active harvester respondents reporting changes from the previous year in hunting areas, hunting months, trip frequency, trip duration, and harvest amounts are somewhat similar over all study years. A slightly higher percentage of respondents reported a change in their hunting area compared to the previous years. Year 6 shows a similar percentage of respondents who reported a change in their harvest amount compared to the previous year, at 63 percent of respondents compared to between 54 percent and 85 percent in all previous study years. Year 6 results show an increase in the percentage of respondents (54 percent) reporting that they did not harvest enough caribou, the highest of all study years. For all six study years combined, Personal Factors have been the most frequently cited types of causes for harvesting less caribou (77 observations), followed by causes related to Resource Distribution or Migration (68 observations) and Development Activities (29 observations).

The percent of harvesters observing caribou with abnormalities declined over the first four study years from 64 percent in Year 1 to 29 percent in Year 4. However, this increased in Year 5 to the highest percentage of respondents (45 percent) since Year 1 (64 percent), and decreased to a low of 25 percent of respondents observing an abnormality. The number of caribou with one or more reported abnormalities was also lower in Year 6 than in previous years. The two principle types of abnormalities observed in Year 6 were "size" and "health." "Disease/Infection" was the most common abnormality observation, followed by "Decrease in Resource Size".

Fifty-six percent of harvesters in Year 6 reported one or more Alpine-related impacts on caribou hunting, an increase from Year 5 (48 percent) and Year 4 (31 percent) but lower than the first three study years. An increase in reported impacts was also evident during the Year 6 household harvest surveys, with 35 percent of households reporting impacts related to Alpine. Similar to previous years, the most commonly reported impact in Year 6 was associated with helicopter traffic, with 49 percent of harvesters reporting helicopter traffic impacts during the Year 6 study period. Impacts associated with man-made structures (e.g., pipelines, roads, other infrastructure) were higher in Year 6 than in recent study years, at 21 percent of respondents, but lower than in Year 1. Twelve percent of respondents reported impacts associated with airplane traffic.

Nuiqsut harvesters have increasingly reported impacts from other (non-Alpine) sources, as exploration, development, and research activities have increased within the region. The majority of these impacts were related to helicopter and plane traffic.

Respondents were asked a new question in Year 6 regarding whether there were any areas where they used to hunt that they no longer use or avoid. Sixty-one percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previous used. Twenty-three percent of active harvester respondents specifically reported avoiding the Alpine/Alpine Satellites areas. Development activities, contamination concerns, development infrastructure, and safety concerns were the primary reasons cited for avoiding the Alpine/Alpine Satellites areas.

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APPENDIX A: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE HARVESTER INTERVIEW YEAR 6

NUIQSUT CARIBOU MONITORING PROTOCOL, 2013

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

SECTION A: CARIBOU HUNTING ACTIVITIES, NOVEMBER 2012 – OCTOBER 2013

1. Did you go caribou hunting between November 2012 and October 2013? YES ___NO___ (IF NO, INTERVIEW OVER)
2. Where did you hunt for caribou between November 2012 and October 2013? (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?**	**Sex of harvested caribou (M/F)**	**Harvest months (by harvest location)**
POLY 1									
POLY 2									
POLY 3									
POLY 4									
POLY 5									

3. Compared to 2012, was your hunting area different in 2013? YES _____ NO _____

3a. [IF YES], HOW? _____

_____

3b. [IF YES], WHY? _____

_____

4. Compared to 2012, was the # of hunting trips in 2013 the same, less, or more? LESS _____ SAME ____ MORE ____

4a. [IF LESS OR MORE], WHY? _____

_____

5. Compared to 2012, was the duration of trips in 2013 the same, less, or more? LESS _____ SAME ____ MORE ____

5a. [IF LESS OR MORE], WHY? _____

_____

6. Compared to 2012, were the months you hunted for and harvested caribou in 2013 different? YES _____ NO ____

6a. [IF YES], HOW? _____

_____

6B. [IF YES], WHY? _____

_____

7. Compared to 2012, was the # of caribou you harvested in 2013 the same, less, or more? LESS _____SAME __ MORE ___

7a. [IF LESS OR MORE], WHY? _____

_____

8. Did your household harvest enough caribou in 2013 to meet your needs? YES_____ NO _____

8a. [IF NO], WHY? _____

_____

9. Are there any areas where you used to hunt that you no longer use or avoid? YES_____ NO _____

9a [IF YES], WHY? _____

SECTION B: ASSESSMENT OF HARVESTED CARIBOU, 2013

1. Thinking about the caribou you shot or harvested in 2013, did you notice any of the following?

(If none, Skip to Section C)

_____ Disease, infection, discolored meat (health)

_____ Unusual taste or smell (quality)

_____ Unusual fat content or overall size (size)

_____ Unusual quantity of parasites (flies)

_____ Other observations

2. For caribou with the above observations, 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: _____

_____

_____

_____

_____

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

Did you use this caribou? YES _____ NO _____

SECTION C: IMPACTS ON CARIBOU HUNTING, 2013

1. In 2013, did you experience any impacts on your caribou hunting related to CD4 or any other Alpine Satellite Developments? _____ YES _____ NO

[If YES, complete the following table]:

In 2013, did you experience any impacts related to CD4 or Alpine Satellite…	**√ if YES**	**Mark Location on Map [POINTS ONLY] (√ if done)**	**Month**	**Please describe** **[*For helicopter and plane traffic, collect data about color of aircraft and aircraft number, if possible]**
Helicopter traffic*				
Plane traffic*				
Other traffic				
Oil company personnel				
Structures (e.g., pipelines) blocking hunter access				
Regulations				
Seismic lines or activity				
Other				

SECTION D: ADDITIONAL OBSERVATIONS ABOUT CARIBOU, 2013

1. Was there anything else abnormal about the behavior, distribution, or migration of caribou in 2013? YES _____ NO ____

1a. [IF YES], Please Explain: _____

APPENDIX B: NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY FOR 2013

NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY FOR 2013

In its permit to ConocoPhillips Alaska, Inc. (CPAI) for development of CD4, the North Slope Borough required that CPAI implement a subsistence monitoring program to measure the impacts of CD4 and other Alpine Satellite developments on Nuiqsut subsistence hunting and harvesting. CPAI contracted Stephen R. Braund & Associates to monitor Nuiqsut caribou harvests to fulfill this requirement. SRB&A is working with KSOPI 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. Your individual information will remain anonymous.

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

Between January and December 2013…

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 try 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 (only harvested or shot by residents in your household; do not count other households' harvests) in 2013? _____

5. Were any of the harvested caribou sick or injured? _____ YES _____ NO, Use? _____ YES _____ NO

6. Did you or anyone in your household receive caribou from other households? _____ YES _____NO

7. Did you or anyone in your household give caribou to other households? _____YES _____ NO

8. Did any Alpine-related activities in 2013 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**]

APPENDIX C: NUIQSUT CARIBOU MONITORING INFORMED CONSENT, YEAR 6

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
November 2013
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. This is the sixth year of the study.

While in your community, we would like to interview knowledgeable subsistence harvesters about their caribou subsistence use between November 2012 and October 2013. We would also like to document the thoughts of Nuiqsut residents about changes in subsistence harvest and use patterns as well as impacts to caribou hunting during the study period.

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.

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.

Signature & Date	Printed Name

APPENDIX D: HARVEST ACTIVITY AND HARVESTED RESOURCE ASSESSMENT CODES

Table D-1: Harvest Activity Assessment Codes

Numeric Code	Code Name	Notes
	How Codes	
100	Harvest more	Respondent harvested more caribou (this does not apply to respondents who used more caribou, i.e., received more caribou from relatives).
150	Take more trips	Respondent took a higher number of caribou hunting trips compared to the previous study year.
151	Take longer trips	Respondent's caribou hunting trips were of a longer duration compared to the previous study year.
200	Harvest less	Respondent harvested less caribou (this does not apply to respondents who used less caribou, e.g., received less caribou from relatives).
250	Take fewer trips	Respondent took a lower number of caribou hunting trips compared to the previous study year.
251	Take shorter trips	Respondent's caribou hunting trips were of a shorter duration compared to the previous study year.
293	Smaller hunting area	Respondent used a smaller overall area to hunt caribou compared to the previous study year.
294	Later hunting season	Respondent started hunting caribou later in the hunting season compared to the previous study year.
297	Expanded use area	Respondent used a larger overall area to hunt caribou compared to the previous study year.
310	Travel farther to harvest resource	Respondent reported traveling a greater distance in search of caribou compared to the previous study year.
312	Travel shorter distances	Respondent reported traveling a shorter distance in search of caribou compared to the previous study year .
340	Use area changed	The respondent did not travel to usual caribou hunting areas.
341	Harvest season changed	The timing of the caribou hunting season was earlier or later than usual, or the respondent did not hunt during a particular hunting season.
352	Utilizing new or different areas	Respondent traveled to new areas in search of caribou.
857	Resource moved to different areas	The caribou was not in the respondent's usual hunting area at the usual time; this does not include observations of caribou migration being diverted.
	Why Codes	
110	Need more	Used in response to why respondent harvested or used more caribou.
120	Better transportation/equipment	Used in response to why a respondent too longer or more frequent trips (e.g., "I went out more because I got my outboard fixed")

Numeric Code	Code Name	Notes
150	Take more trips	Used in response to why respondent harvested or used more caribou (i.e., "I got more caribou this year because I went hunting more").
200	Harvest less	Used in response to why a respondent did not harvest enough caribou during the study year.
210	Need less	Used in response to why respondent harvested or used less caribou.
212	Sharing More	Used in response to why respondent harvested more caribou or did not harvest enough caribou (i.e., "I had to harvest more caribou this year because I was hunting for another household").
220	Personal Reasons	Includes general factors related to age, illness, or personal interest. More specific personal reason codes include "Employment /Lack of Time" and "Change in subsistence providers/dependents".
250	Take fewer trips	Used in response to why respondent harvested or used less caribou (i.e., I couldn't go out hunting as much this year, so I didn't get as many caribou").
252	Reduced harvest opportunities	Used in response to why a respondent did not harvest enough caribou during the study year (e.g., "I didn't' harvest enough. I never saw any caribou when I was out hunting").
255	Change in subsistence dependents	Used in response to why respondent harvested more or less caribou (i.e., "We harvested less caribou because our son moved away and we don't need as much").
256	Change in subsistence providers	Used in response to why respondent used more or less caribou (i.e. "I had less caribou because my son (main provider) moved away").
260	Employment/Lack of Time	Used in response to why respondent harvested less caribou, took fewer trips, or took shorter trips ("i.e., I didn't go hunting as much because I had to work").
270	Increased cost of living/expenses	Used in response to why respondent took fewer trips, shorter trips, or longer trips (i.e., "I went hunting less because gas is so expensive" or "I stayed out longer because I didn't want to come home empty-handed. Gas is too expensive").
290	Lack of transportation/equipment	Used in response to why respondent took fewer trips, harvested fewer caribou, or why their use area changed (i.e., "I didn't go hunting west of Nuiqsut in the fall because my four-wheeler broke down").
301	Worse success	Used in response to why respondent did not harvest enough or harvested less (e.g., "I had poor success this year" or "I never got lucky this year").
310	Travel farther to harvest resource	Used in response to why respondent took longer trips (i.e., "I stayed out longer because we had to go farther to find caribou").
321	Competition with sport hunters	Used in response to why respondents harvested less caribou or took more trips.
351	Better success	Used in response to why respondent harvested more caribou (e.g., "I was more successful this year").

Numeric Code	Code Name	Notes
503	Shallower Rivers/Lakes	Used in response to why respondents' use area changed (i.e., "We didn't hunt up Anaktuvuk River this year because it was too shallow").
505	Climate affecting travel	Used in response to why respondents' use area changed (i.e., "We didn't hunt up Anaktuvuk River this year because it was too shallow").
508	Wind	Used in response to why respondents' use area changed (i.e., "We didn't go to Fish Creek this year because the wind was blowing and the ocean was too rough").
532	Weather	Used in response to why respondent's use area changed (i.e., "I didn't go upriver this year. It was too hot up there and there were too many mosquitoes").
600	Traffic Disturbance	Used in response to why respondent took more trips, harvested less caribou, or did not harvest enough caribou (i.e., "I harvested less caribou because of air traffic/development/oil drilling/pipelines"). This code is used when the respondent does not elaborate on how the activity affected their subsistence uses (i.e., "I harvested less caribou because the caribou were diverted by the pipeline").
603	Airplane Traffic Disturbance	
650	Development	
659	Oil Drilling	
661	Pipeline	
663	Contamination from air pollution	
701	Sport hunting methods disturbing migration routes	Used to describe a diversion of caribou migration specifically attributed to sport hunting activity, including associated hunting pressure, airplane traffic, and hunting methods.
806	Resource Availability	A general response to any change in harvest activities (i.e., "I harvested less because I couldn't find any caribou").
808	Skittish behavior in species	Used in response to respondent harvesting less caribou (i.e., "I harvested less caribou; the caribou were moving around a lot and staying inland because of the helicopter traffic").
809	Predators	Used in response to respondent harvesting less caribou (i.e. "I harvested less caribou because there are more wolves killing them").
818	Increase in Predators	Used in response to respondent harvesting less caribou (i.e. "I harvested less caribou because there are more wolves killing them").

Numeric Code	Code Name	Notes
850	Migration changed or diverted	Used when a respondent indicates that the caribou migration has changed or been diverted, usually by human activities or man-made infrastructure (i.e., "I didn't harvest any caribou because all the air traffic diverted them south of the community").
851	Further from Village	Used to describe an animal being farther from the community than respondent is accustomed to; specific to the resource's distance from the community.
853	Earlier Migration/Arrival	Used in response to respondent harvesting less caribou (i.e., "I harvested less this year; I usually harvest some in October, but the caribou left early").
856	Change in Resource's Food Availability	Used to describe an animal moving to another area in search of better feeding grounds (i.e., "the caribou overgrazed the area and moved west to find better feeding").
857	Move to Different Areas	Used to describe caribou moving to different areas within the study year.
865	Change in distribution/migration	Used to describe respondents' general observation that caribou were not in the area, either through a change in distribution or migration.
870	Moved into area	Used in response to respondent harvest more caribou (i.e., "We got more this year; there were more caribou in the area this year.")
871	Moved out of area	Used in response to respondent harvesting less caribou (i.e., "I didn't harvest as much caribou this year; there weren't any caribou around).
872	Farther from riversides/farther inland	Used to describe caribou being less available along riversides, usually due to disturbance from boat or air traffic.
998	I Do not Know	Used when a respondent states "I don't know."
999	Not ascertained	Used when the researcher did not obtain a response to the question.

Table D-2: Harvested Resource Assessment Codes

Numeric Code	Code Name	Notes
	How Change	
814	Increase in Resource Size	Includes overall size (e.g., larger than usual animals) or fat content
815	Decrease in Resource Size	Includes overall size (e.g., smaller bulls) or fat content
820	New Species in Region	The respondent observed or harvested a type of caribou not previously seen or rarely seen (e.g., "Mountain caribou," reindeer)
829	Physical Abnormalities	Deformity the resource was born with
830	Change in Texture of Meat	Includes color of meat
831	Disease/Infection	Includes cysts, nodules, pus on insides, etc. Something that the resource contracted.
842	Change in Smell of Meat	Respondent harvested a caribou with unusual-smelling meat.
845	Change in Resource Quality	Respondent harvested a caribou that was of lesser quality than usual (e.g., "One of the caribou didn't have much flavor like they usually do").
876	More Parasites	Respondent observed more parasites than usual in harvested caribou.
877	Fewer Parasites	Respondent observed fewer parasites than usual in harvested caribou.
	Why Change	
509	Warmer Temperatures	In response to why there is a decrease in caribou size (e.g., "They were skinny; maybe it was too hot").
521	Wildfires	In response to why there is a new species in region.
603	Airplane Traffic Disturbance	In response to why there is a decrease in caribou size (i.e., "The caribou are running around a lot because of the airplanes").
605	Air Traffic	In response to why there is a decrease in caribou size (i.e., "The caribou are running around a lot because of the airplanes").
654	Human Waste/Pollution	Used when a respondent specifically cites general pollution or human waste as the cause of a caribou abnormality.
656	Oil Spill Contamination	Used when a respondent specifically cites contamination from oil spills as the cause of a caribou abnormality.
663	Contamination from Air Pollution	Used when a respondent specifically cites air pollution, usually related to oil development, as the cause of a caribou abnormality.
812	Resource in Smaller Groups	Used to describe caribou being more sparsely populated and distributed into smaller groups rather than one large herd.
823	Contamination	Used when a respondent cites contamination in general as a cause of an abnormality in caribou.
831	Disease/Infection	Used when a respondent cites disease/infection as the cause of the abnormality (e.g., "This caribou had a lot of parasites, I think because it was sick").

832	Parasites	Used when a respondent believes that parasites are the cause of the abnormality (e.g., sick or diseased looking caribou)
841	Resource Injury	Used when a perceived abnormality is caused by the resource being wounded previously by a bullet or predator.
876	More Parasites	Used when a respondent believes that parasites are the cause of the abnormality (e.g., sick or diseased looking caribou)
879	Reindeer	Used as an explanation for an abnormality in caribou (i.e., "That caribou was much smaller than usual. I think it was a reindeer").
908	Natural Causes	Used when the respondent indicates that the cause of the abnormality is natural (i.e., "There were a lot of flies under the skin, more than I've ever seen. I think it was because of the time of year").
998	I do not know	Used when a respondent states "I don't know."
999	Not Ascertained	Used when the researcher did not obtain a response to the question.

APPENDIX E: TRADITIONAL KNOWLEDGE OF CARIBOU IN THE COLVILLE RIVER DELTA

Although the purpose of the Nuiqsut Caribou Subsistence 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. This appendix provides a preliminary summary of Nuiqsut traditional knowledge about caribou, particularly as it relates to the Colville River Delta, and caribou hunting activities over time. This summary is based on interviews with Nuiqsut elders conducted by SRB&A during the first year of the Nuiqsut Caribou Subsistence Monitoring Project (SRB&A 2010), in addition to a review of traditional knowledge in existing literature and a review of historic descriptions of caribou hunting activities by Nuiqsut residents. 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. Statements from elders who had lived in the Colville River Delta before the establishment of the present-day community of Nuiqsut can provide a glimpse of caribou migratory patterns as well as Iñupiaq harvesting patterns prior to oil and gas development in the region.

General Caribou Migratory Patterns

During a 1978 elder's conference, Elijah Kakinya described the general patterns of caribou in Colville River region and noted that, according to oral history, these patterns had remained consistent over time. His description is similar to more recent descriptions of the typical migratory patterns of caribou, in that the caribou tend to congregate along the coast during the summer and travel inland during the late fall and early winter:

> *See here, these caribou, after being along here toward the ocean during the summer, when it is starting to almost become winter they always head up to the trees going by way of us. Up towards inland. And then, even so, after being up there all during the winter, again toward here, after wintering up there they would head toward the ocean to go fawn. It is said ever since that time long ago, way before our time, when there must have been some people [in the area], they would act always in this manner, thus. From since that time long ago they are ones who act in this manner…. Going by way of our place, via Killiq [River]. Through over farther more that way, and over through the other side of Killiq [River], through Killiq, through south of there, through us, through Ulu and through Narvavak. Up in that certain area we see that they had that route ever since that time long ago. Being that way since that time long ago.* (Kakinya 1978)

During SRB&A interviews in 2009, 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.

Nuiqsut Harvesting Areas and Hunting Patterns

The use of the Colville River Delta by the Iñupiat is evident in the various historic and prehistoric archaeological sites found in the area. Many of these sites contain the remnants of caribou hunting and harvesting activities (Hoffman et al., 1988). One elder provided a detailed description of the various traditional 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)

During SRB&A's interviews, 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)

According to historic accounts, inhabitants of the Colville River tended to follow the caribou migration; staying in settlements near the coast during the summer and traveling inland during the winter. During times of resource scarcity, such as in the late 19th century when the caribou were depleted, families may have traveled to alternate hunting grounds; however, the Colville River remained an important area which residents returned to time and time again. During a 1978 elders' conference, Levi Greist, whose ancestors came from the Nuiqsut area, noted that his ancestors had at one point moved away from the Colville River due to a lack of caribou, only to return to the area at a later time:

> *They had gone to Saġvaġniqtuuq [Sagavanirktok River], we learned, because that Colville River did not have much caribou and they followed along to a place which had some caribou. They would return, though, to that area over here, my relatives, including both my grandparents.* (Greist 1978)

Greist went on to describe how the Iñupiat at Nigliq would travel to the mouth of Itkillik River (referred to as *Killiq*) by boat just before freeze-up. From there, they would travel inland following the caribou by dogteam:

> *And then when they are ready there at Niġliq those Eskimos there, hoping to cut the distance which they would have to travel by dogteam, would quickly proceed to go upriver to that certain place up there which is their usual stopping place, Killiq-Killiq, it is said- and it is there that we would await winter. And then as soon as it freezes we would go up along through Killiq up to the mountains. At that time long ago there would be no caribou there, there were no caribou there. Although it would have a few caribou, those which would cross up and over the hills wherever. Although one could find some once in a while. But the sheep which are on the mountains would never leave. They would always be there in their usual habitat all the time.* (Greist 1978)

A historical account of the seasonal activities of people living in the Colville River delta was provided by William Irving (1953) and reproduced in Hoffman et al. (1988). His account, in addition to elder accounts of historic hunting activities, indicate that the Colville River delta was most heavily used by the Iñupiat during the late spring and summer months when caribou were most available in that area. The late fall and winter months were more frequently spent traveling inland to winter hunting grounds. Irving described,

> *…the people of the lower river would begin seal hunting in May, more than a month before the visitors from the mountains arrived at Neklek [Nigliq] in the delta and finished their trading with people from Barrow. They would customarily spend the fall and winter at fishing sites and make regular excursions into the tributary valleys on the west side of the Colville to look for caribou if these were not abundant near camp. Seals were not hunted in the winter as a rule, and were probably not as important in the diet as caribou and fish.* (Irving 1953 as cited in Hoffman et al. 1988)

Changes in Caribou Over Time

During public hearings in the late 1970s and early 1980s, Nuiqsut elders were already beginning to observe changes in caribou, which they believed were a direct result of oil and gas development. During a scoping meeting related to oil and gas leases in the Beaufort Sea, Sarah Kunaknana stressed the importance of the coastal areas to various wildlife species including caribou. She observed that "the caribou are abundant in

the summertime on the shoreline" (Sarah Kunaknana, USDOI, MMS 1979). Through an interpreter, Nannie Woods, also of Nuiqsut, noted a general decline in the availability of caribou compared to the past:

> *There were lots of caribou that we hardly see anymore…But she thinks that she hardly see caribou anymore. Life is getting hard and she can barely…she is one of the elders, elders here at Nuiqsut.* (Nanny Woods, USDOI, MMS 1979)

Starting in the 1990s, Nuiqsut residents continued to express concerns about changes to caribou during public hearings related to the National Petroleum Reserve – Alaska. They stressed, over and over again, the importance of the Colville River delta and surrounding areas to caribou. Residents generally indicated that caribou were readily available near Nuiqsut, but expressed concern that this may change if oil and gas development continued its westward expansion toward Nuiqsut:

> *Lot of caribous, but very seldom we get the Porcupine [caribou]. If they do come in they'll get all the way up here if we have southwesterly wind blowing steadily for a week and hot. Lot of mosquitos. They'll come, otherwise they will stop up there by Canning, not Canning but Sagavanirktok, and then move back east.* (Thomas Napageak, USACE 1996)

> *Last spring we were fortunate to have caribou in our region as well as this fall. And they've been seeing caribou in the area north of us and I think it has been mainly due to less activity by these people here. I doubt that they would have been seen if these people had come around doing their activity. I think that once they start up again, our caribou are going to go elsewhere because they will see them. The residents of Nuiqsut hunt seasonally when the time comes that certain game are perfect to catch and not all the time.* (Ruth Nukapigak; USDOI, BLM 1998)

> *In Nuiqsut, the effect of subsistence harvest patterns will be very high because not only will the bowhead whale always be reduced or eliminated by construction activities, but the caribou hunt will be reduced as well by construction activities and the pipelines.* (Thomas Napageak; USDOI, MMS 1990)

> *Like last summer, there was a herd of caribous coming out from the east and they were crossing the Nerluk [Nigliq] Channel, and some people were killing some caribous.* (Joe Kasak; USDOI, MMS 1990)

> *Ever since we moved here our people have given testimonies and I know about there being a lot of them. I don't speak up very often but at this time I want to talk about this area that used to have caribou in the winter when we lived in Barrow. When the caribou was in short supply we would travel to Tasiqpak [Teshekpuk] knowing that we would find caribou and to the area close to Kuuguluk [Kogru River?]. Before we moved back to Nuiqsut I used to also do my hunting at Umiat. That area [NPR-A] is a prime hunting ground and if they could choose other sites [to develop], that would be fine by me. It is a very prime hunting area.* (Archie Ahkiviana; USDOI, BLM 1998)

Public hearings in Nuiqsut related to the Alpine Satellites Development in the early 2000s show an increasing concern among Nuiqsut residents related to the impacts of the Alpine and Meltwater (Kuparuk Drill Site 2P) developments in addition to potential impacts from development of Alpine Satellites. Elder Sarah Kunaknana described changes that had already occurred within the region, saying,

> *Much of the development nearby already has altered migratory paths of the wildlife, caribou for example, they don't migrate in the areas traditionally. That change is significant. And for that reason, she would like the Alpine site as a good measuring tape for this because their migrations are altered and these have--the migrations have changed and right now they are*

in a dilemma of oil and subsistence resources that are utilized. (Sarah Kunaknana; USDOI, BLM 2004)

During the hearings, residents noted that the proposed placement of Alpine Satellites infrastructure was in the pathway of traditional caribou migratory routes:

And CD-5 is an area where caribou migrate on the coastal plain during summer. If we go that route and CD-5 and the bridge is down there, we will have the same problem we did in the Prudhoe Bay and the Kuparuk area with our caribou. (Frank Long, Jr.; USDOI, BLM 2003)

...around where you guys are planning to propose in putting your guys' infrastructures (Alpine) and stuff like that, that is one of the main caribou crossings on the Colville River delta. (Isaac Kaigelak; USDOI, BLM 2003)

In more recent years, Nuiqsut elders have expressed the belief 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 [Kuparuk Drill Site 2P]. 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 Tamayayak 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 [Kuparuk Drill Site 2P], when they build that pipeline to Alpine, they stopped seeing them. Oliktok, to Meltwater [Kuparuk Drill Site 2P]. (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, quite 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 [Kuparuk Drill Site 2P]. They stay by Prudhoe nowadays. That Meltwater [Kuparuk Drill Site 2P] 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)

During a study by the Alaska Native Science Commission (ANSC) related to NPR-A development, elder Annie Lampe discussed her observations about the impacts of pipelines on the availability of caribou in traditional hunting areas, noting that residents no longer harvest as many caribou directly along the Nigliq Channel:

There's a pipeline. We always get the caribou, up there, down there, that way. Now we have to go that way [west] to go get caribou. Because the structures we have to go the other

direction to harvest. Got to go through out to the ocean and then go get caribou way over there. Much longer routes than usual. (Annie Lampe; ANSC 2009)

During the same study, another Nuiqsut resident discussed changes in caribou hunting patterns, due to avoidance of oil and gas infrastructure. This individual noted that some hunters no longer travel to traditional hunting areas because of the presence of oil and gas activity, even if the caribou are available in those areas:

And then you kind of prepare where you're going to go hunt. In the old days you go where the animals went. Now you have to [go] where you won't be disturbed or you won't feel like you will disturb someone else in their work, vice versa. So you go to an area. I won't see any oil rigs out in Nuiqsut. I won't see airplanes going over me. Hopefully, I'll see a caribou. It's not as good as out north where all the rigs are. It's a lot calmer and peaceful to go out where there are no activities. A lot of us hunters are going south more and more than we used to. (Unknown Respondent; ANSC 2009)

In addition to impacts from pipelines, 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)

As recently as 2011, elder Marjorie Ahnupkana provided observations at a public hearing regarding the drastic changes she had observed over her lifetime. In two different statements, she noted a general decrease in large herds of caribou near Nuiqsut:

You don't see caribous like three to five thousand at a time coming this way. She have seen more than that in her lifetime, and none of those come through here anymore. They are being dispersed before they get to Colville. (Marjorie Ahnupkana; AECOM 2011)

Again, the caribou from the east side has been diverted because of tremendous drill sites; a lot of pipelines crisscross. Our caribou from the east don't come directly through Nuiqsut.

> *They're 15, 20 miles south of here, meaning we have to travel that (much) further to harvest our caribou at some point. If the caribou are left alone by the industries, they will migrate right around through their migration path. But if they are being harassed, they're going to go further south, meaning we have to travel further south towards Umiat to subsist. And they say (that this is) the first time that that has happened to this village.* (Marjorie Ahnupukana; AECOM 2011)

Elders have also commented on changes in the health and quality of caribou in recent years. 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. During a meeting with the Nuiqsut Caribou Panel in Year 5, an elder discussed changes in the fat content of caribou and believed these changes were due to warming trends:

> *Yeah, it changed a lot. They get used to get fat around July and nowadays in July they have a thin fat because the weather gets hot, and [that is] how come they get fat later. Towards September, that is the only time the fat gets a little thicker… Yeah, [on] hot days the caribou are running around too much to get away from the mosquitos.* (SRB&A Nuiqsut Caribou Panel Meeting November 2012)

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)