

**Nuiqsut Caribou Subsistence Monitoring Project:
Results of Year 7 Hunter Interviews and Household Harvest
Surveys**

Prepared for
ConocoPhillips Alaska, Inc.

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EXECUTIVE SUMMARY

This Year 7 report presents the first seven 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.

Year 7 (2014) coincided with the first year of construction activity for the CPAI's CD5 project. Construction activity began in December 2013 with construction of the annual Alpine re-supply ice road from Kuparuk as well as ice roads in the project area. Gravel mining activities at the ASRC mine site began in February 2014 and went through April 2014 as the overburden was removed at the mine site and the gravel mined, transported and put in place at the CD5 road, drillsite and associated bridge abutments. Gravel was also placed at the Kuukpik Spur Road and storage pad during the same season; however, this project was not complete and required additional gravel mining and placement during the winter of 2015.

In addition to the gravel work, in 2014, construction started on the four bridges on the CD5 access road. The three smaller bridges were all completed during the winter January – April 2014 season. Construction at the Nigliq Channel bridge was completed in two phases; the first phase (January-April 2014) included construction of the bridge abutments as well as the pile driving activity for the bridge piers and the second phase (October to December 2014) involved installation of the bridge deck which was completed all from gravel roadway surface to limit activity in the channel.

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 seventh annual report is based primarily on hunter observations and a comprehensive household caribou harvest survey.

In November of 2014, SRB&A interviewed 61 residents (60 active harvesters and one knowledgeable resident who had not hunted during the previous year) regarding their caribou hunting activities over the previous 12 months (November 2013 to October 2014). SRB&A also planned to conduct a caribou harvest survey in Year 7 as it had in Years 3 through 6. However, the study team learned that the Alaska Department of Fish and Game (ADF&G) was planning to conduct a comprehensive household harvest survey in the community of Nuiqsut for the 2014 calendar year (January 2014 through December 2014). To reduce community burden by replicating study efforts, and in response to a request from the Native Village of Nuiqsut, ADF&G agreed to include one SRB&A staff member in the harvest survey fieldwork and to share all caribou related harvest data with SRB&A for incorporation into this report.

Data from the Year 7 active harvester interviews complement similar data on hunting activities collected for Year 1 (2008), Year 2 (2009), Year 3 (2010), Year 4 (2011), Year 5 (2012), and Year 6 (2013). In addition, ADF&G's Year 7 household harvest survey data complement caribou harvest data collected by SRB&A for Year 3 (2010), Year 4 (2011), Year 5 (2012), and Year 6 (2013) in addition to data collected by the North Slope Borough (NSB) and ADF&G in previous years.

Active harvester interview participants identified 206 caribou subsistence use areas and 248 caribou harvest locations for the Year 7 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 in Year 7 was relatively similar to previous study years. Compared to the previous few study years, Year 7 use areas show higher overlapping use to the west and south of the community toward Judy Creek and Ocean Point. In addition, the overall extent of overland travel in Year 7 was larger than in the previous three study years (Years 4 through 6), and similar to Years 2 and 3. The concentration of harvests in Year 7 were similar to those from Years 1 through 5, while Year 6 showed few areas of concentrated harvests. In Year 7, harvests were most concentrated at Nigliq camp on the Nigliq Channel as well as in scattered areas around the East Channel (including near *Pisiktaġvik*), near the mouth of Fish Creek, upriver near Ocean Point, Kikiakrorak, and Sentinel Hill/Umiraq, and overland to the west of the community toward Ublutuooh River. A slight increase in activity to the north of the community along the new Spur Road is evident in Year 7.

While certain hunting characteristics (e.g., trip frequency, duration, and travel method) have remained similar over the seven study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. In Year 7, caribou hunting activities, in terms of the percentage of use areas (rather than frequency of trips), peaked in the months of July and August, similar to most previous study years. Boats were the most common method of transportation used over all study years, followed by snowmachine or four-wheeler. Respondents more commonly reported using snowmachines in Year 7 compared to the previous few years (Years 4 through 6). In general, over all study years, respondents take primarily day trips to their caribou use areas. In Year 7, residents' longest hunting trips lasted between one night and over two weeks at 15 percent of their hunting areas. The frequency of hunting trips to use areas has remained relatively stable over all study years, with at least two-thirds of areas visited more than once yearly. Year 7 harvest success in terms of the percentage of successful hunting areas was within the range of previous years, with respondents reporting successful harvests at 61 percent of hunting areas, compared to between 54 percent and 78 percent in previous years.

Caribou harvest amounts have remained relatively stable over time, although recent years have shown an increase in estimated harvests. In Year 7, the community of Nuiqsut harvested an estimated 773 caribou, higher than any previous study year. Household uses of caribou were similar to previous years, with 90 percent of households using caribou, and 66 percent of households attempting harvests of caribou. The difference between the percentage of households attempting to harvest and successfully harvesting caribou was smaller in 2014 compared to the previous few years, indicating higher success rates for those who did go hunting. These results are consistent with Year 7 active harvester interviews, where a higher number of caribou harvests were reported by hunters.

During Year 7, of the 11 pre-defined hunting areas, the area "West of Nuiqsut" accounted for the highest portion (39 percent) of caribou harvested, higher than in any previous year. The area West of Nuiqsut was the only area contributing more than 15 percent of the harvest in Year 7. While the percentage of harvests in certain areas such as Nigliq Channel and East Channel were lower in Year 7 than in recent previous years, the overall number of caribou harvested in Year 7 was substantially higher. Despite contributing a smaller percentage of the total harvest, the number of caribou harvested along East Channel Colville actually rose in Year 7 from 46 to 58. The area that showed the greatest increase was the area West of Nuiqsut, which quadrupled from 51 reported harvests in Year 6 to 216 in Year 7.

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. Overall, the percentages of respondents reporting changes in hunting area, frequency, duration, and harvest amount in Year 7 were within the range of previous years, with the exception of "Months Changed" which was slightly lower than previous years. In Year 7, 32 percent of respondents indicated that they did not harvest enough caribou, a decline from the previous two years; this is consistent with a general increase in reported harvests in Year 7.

The percentage of respondents observing caribou abnormalities in Year 7, at 23 percent, was lower than in previous years (Table 33). Likewise, the total number of caribou with abnormalities in Year 7 was lower than in most years except Year 6. Health problems were the primary type of observation in caribou in Year 7, followed by abnormal size. The two principle types of abnormalities observed in Year 7 were “size” and “health.” “Disease/infection” was the most commonly reported type of abnormality by active harvesters, followed by “decrease in resource size.”

In Year 7, 42 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting, lower than all other years except Year 4. Similar to previous years, the most commonly reported Alpine-related impact in Year 7 is associated with helicopter traffic, with 32 percent of harvester respondents reporting helicopter traffic impacts. The second most commonly reported impact in Year 7 was man-made structures (20 percent of respondents), followed by plane traffic.

Fifty-eight percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previously used. The Alpine/Alpine Satellites areas were the most frequently mentioned for reasons related to development infrastructure and activities, as well as safety concerns and security restrictions. Other areas avoided due to development-related causes included *Kuupaqullurak* (near the new bridge crossing), Tamayyak River, and the Colville Delta in general. Other areas where residents reported decreased use for personal or environmental reasons included Fish Creek, Itkillik River, and Anaktuvuk River.

ACKNOWLEDGEMENTS

Stephen R. Braund & Associates (SRB&A) would like to thank the community of Nuiqsut for their cooperation and assistance in completing the first seven 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 61 Nuiqsut caribou hunters and elders who provided us with the information for Year 7 of this study.

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ACRONYMS AND ABBREVIATIONS

ABR	ABR Inc.—Environmental Research & Services
ADF&G	Alaska Department of Fish and Game
CPAI	ConocoPhillips Alaska, Inc.
GIS	Geographic Information System
KSOPI	Kuukpik Subsistence Oversight Panel, Inc.
NPR-A	National Petroleum Reserve – Alaska
NSB	North Slope Borough
SPSS	Statistical Package for the Social Sciences
SRB&A	Stephen R. Braund & Associates
USGS	U.S. Geological Survey

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.

Year 7 (2014) coincided with the first year of construction activity for the CPAI’s CD5 project. Construction activity began in December 2013 with construction of the annual Alpine re-supply ice road from Kuparuk as well as ice roads in the project area. Gravel mining activities at the ASRC mine site began in February 2014 and went through April 2014 as the overburden was removed at the mine site and the gravel mined, transported and put in place at the CD5 road, drillsite and associated bridge abutments. Gravel was also placed at the Kuukpik Spur Road and storage pad during the same season; however, this project was not complete and required additional gravel mining and placement during the winter of 2015.

In addition to the gravel work, in 2014, construction started on the four bridges on the CD5 access road. The three smaller bridges were all completed during the winter January – April 2014 season. Construction at the Nigliq Channel bridge was completed in two phases; the first phase (January-April 2014) included construction of the bridge abutments as well as the pile driving activity for the bridge piers and the second phase (October to December 2014) involved installation of the bridge deck which was completed all from gravel roadway surface to limit activity in the channel.

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 seventh 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 seven years of hunter information derived from face-to-face interviews conducted in Nuiqsut between March 2009 and April 2015.

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 7 to design and implement the study. Year 7 active harvester interviews gathered information for harvesting activity between November 2013 and October 2014 and household harvest surveys gathered information for the 2014 calendar year (January to December 2014). Interviews, surveys, and meetings (including the NSB meeting in Barrow) for Year 7 took place between November 2014 and April 2015. Thus, the methods describe 2014 and 2015 monitoring program activities, while the results and discussion describe the Year 7 study period caribou harvest amounts, hunting activities, and impacts (spanning from November 2013 to December 2014).

Community Engagement

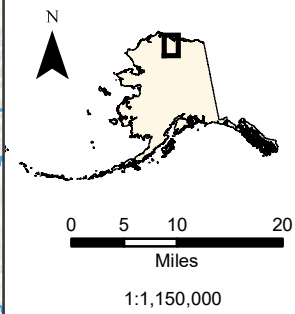
One of the goals of this project is to promote and facilitate community involvement in the monitoring program. The primary method of facilitating ongoing community involvement for the Year 7 monitoring program was through contact with the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI) and the previously formed Nuiqsut Caribou Panel. SRB&A met with the Nuiqsut Caribou Panel on November 3, 2014 to discuss the previous hunting season and upcoming fieldwork. The November 3 meeting was attended by eight panel members and four SRB&A staff members who were in Nuiqsut to conduct Year 7 active harvester interviews. The following is a summary of meeting topics:

- Panel members discussed the decreasing use of Native place names by the younger generation and the increasing use of industry names.
- The panel reviewed the list of active Nuiqsut caribou harvesters that SRB&A has developed and suggested that SRB&A coordinate with the city's cultural coordinator to confirm that the list of active harvesters is adequate.



Map 1 - Nuiqsut Overview and Placenames

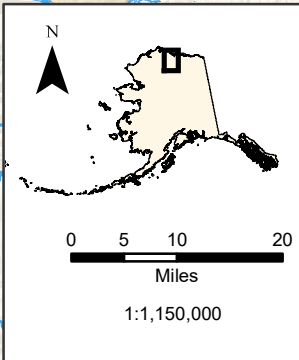
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.



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Local Placename

National Petroleum Reserve Alaska



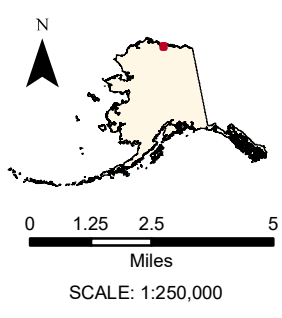
Map 2 - Nuiqsut Overview and Surrounding Infrastructure

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

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ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Existing Pad
- CPAI Proposed Pad
- Above Ground Pipeline
- Gravel Footprint
- Ice Road
- National Petroleum Reserve Alaska



**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 Kuupik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January 2015.

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- Local Placenames
- ▲ CPAI Existing Pad
- ~ Above Ground Pipeline
- ~ Gravel Footprint
- ~ Ice Road
- National Petroleum Reserve Alaska

- Panel members discussed the health of the caribou during the previous hunting season, with some indicating that there were a lot of sick caribou harvested and others reporting relatively healthy caribou.
- Panel members discussed continuing concerns about the impact of pipelines and helicopter activity associated with wildlife studies on caribou migration and behavior.
- Panel members also discussed the CD5 road and bridge and concerns about the impact of these new structures and future structures on caribou movement. They also reported difficulties crossing the road to CD5 on snowmachines due to the road being too high.
- Poor communication between the community and CPAI was another topic of discussion, with individuals stating that it was difficult to get ahold of CPAI's liaisons in Nuiqsut and that dissemination of daily helicopter reports was not happening within the community.
- One individual recommended that CPAI hire a local resident to be their liaison.
- Panel members recommended the use of local monitors to monitor the CD5 road and document how caribou react near the road.
- Panel members discussed the contaminants study funded by CPAI and believed the number of samples taken from the Central Arctic herd (often referenced as the Porcupine Herd by local residents) was inadequate.
- Another concern was related to the decreasing herd size in both the Teshekpuk and Central Arctic herds and how that will affect local hunters.
- Several individuals discussed the impact of bow hunters along the Dalton Highway on caribou migration and abundance.
- Panel members reviewed and commented on preliminary Year 6 findings.
- As in previous years, caribou panel members discussed the need for a cumulative impacts study as well as the incorporation of radio collar data into SRB&A's reports.
- Panel members also expressed a desire to meet with ABR Inc.—Environmental Research & Services (ABR, Inc.) again.

SRB&A held two separate meetings with the Nuiqsut Caribou Panel and KSOPI on April 28, 2015, to review the results of the Year 6 report and discuss the monitoring study. Their comments were addressed in the final Year 6 report. At the meeting, panel members also provided broader comments regarding the monitoring study. One panel member expressed doubt that the results of the monitoring study are being used effectively to lessen impacts on local residents.

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, Year 6, and Year 7 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.) 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. (see Year 5 report)

The study team addressed all of these components during Year 5. The study did not add any study components during Year 7.

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 protocol for Year 7 fieldwork (Appendix A). 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 (Appendix B).

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, Year 6, and Year 7 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 7 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 7)
- 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 caribou¹

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

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.

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. This question remained on the protocol for Year 7.

The second section of the interview (Assessment of Harvested Caribou), gathered data about the following abnormalities in the respondent's harvested caribou in Year 7:

- 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 7 related to CD4 or other Alpine Satellite developments. If respondents indicated that they had experienced impacts in Year 7, then researchers asked them specifically about the following potential impacts:

- Helicopter traffic
- Plane traffic
- Other traffic
- Oil company personnel
- 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 subsequent years (Years 4 through 6) (see SRB&A 2010 and SRB&A 2011 for a description of the previous efforts to complete the household surveys). In Year 7, the study team learned that ADF&G was planning to conduct a comprehensive household harvest survey in the community of Nuiqsut for the 2014 calendar year (January 2014 through December 2014). In addition, SRB&A received a phone call from the Native Village of Nuiqsut requesting that SRB&A assist with the ADF&G surveys to ensure methodological consistency.

SRB&A modeled its caribou harvest survey on ADF&G survey questions for comparability with past harvest studies. Thus, in order to reduce community burden by replicating study efforts and in response to the Native Village of Nuiqsut's request, SRB&A set up a teleconference with ADF&G to discuss how to coordinate the two studies. ADF&G agreed to include an SRB&A staff member in the harvest survey fieldwork and to add the following questions which are included in SRB&A's household survey but not in ADF&G's survey:

- Were any of the caribou harvested by your household sick or injured? Did you use the sick caribou?
- Did any Alpine-related activities in 2014 make your household's caribou hunting more difficult?

ADF&G agreed to share all caribou related harvest data with SRB&A for incorporation into the Year 7 report. One SRB&A staff member traveled to Nuiqsut from March 23 through March 30, 2015, to assist with the ADF&G household harvest survey in Nuiqsut. SRB&A received the results of the ADF&G harvest survey and incorporated the 2014 harvest data into this report. However, due to the low response rates for the household harvest survey questions regarding harvests of sick caribou and Alpine-related impacts (34 percent of households), SRB&A did not incorporate these data into the Year 7 report.

Respondent Selection Process

Active Harvester Interviews

In order to collect accurate data for the Year 7 caribou hunting season, it was necessary to interview currently active caribou harvesters. The study team attempted contact with all Year 1 through Year 6 respondents with the goal of achieving consistency between study years. As anticipated, not all Year 1 through Year 6 respondents were available to participate in Year 7 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 7 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

ADF&G conducted the 2014 household harvest surveys. Their methods for household selection will be available in their forthcoming report.

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

ADF&G conducted the 2014 household harvest surveys. Their survey and analysis methods will be available in their forthcoming report.

Fieldwork Summary

Active Harvester Interviews

The study team traveled to Nuiqsut twice to conduct Year 7 active harvester interviews in November 2014 and January 2015. As shown in Table 1, SRB&A researchers interviewed 61 Nuiqsut residents (60 active harvesters and one Nuiqsut resident who had not hunted during the previous year but who provided traditional knowledge). Over the seven study years, SRB&A has developed a list of 111 active caribou harvesters in Nuiqsut (Table 1), which include all residents interviewed and/or identified as active harvesters during Years 1 through 7. 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 sons or daughters 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 7. A person was not eligible for an interview if he or she did not go caribou hunting during Year 7, 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 111 active harvesters, 104 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 120 individuals who had participated in one of the six 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 7, with a focus on respondents who have participated in multiple study years or have been highly recommended as active harvesters. SRB&A interviewed 61 individuals, or 59 percent of those eligible for interviews (Table 1). As shown in Table 2, during each previous study year, between 53 percent and 70 percent of respondents also participated in Year 7.

The Year 7 sample included 10 respondents not interviewed in a previous study year. Differences in the makeup of the seven samples could potentially account for observed differences in results between the seven 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 (see Table 2).

Table 1: Fieldwork Summary, Year 7

# of Permanent Occupied Households (2014) ¹	Population (2014) 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
108	415	111	104	61 (59%)	56	2

¹Based on eligible households identified during ADF&G's 2014 household harvest surveys.
²Estimated based on reported household occupants during ADF&G household harvest surveys for the 2014 study year.

Stephen R. Braund & Associates, 2016.

Table 2: Respondent Summary, Years 1 – 7

Respondent	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Number of Active Harvester Respondents	36	53	57	58	57	57	60
Number of Respondents also Interviewed in Year 7	21 (58%)	27 (51%)	31 (54%)	32 (55%)	38 (67%)	40 (70%)	-

Stephen R. Braund & Associates, 2016.

The following tables (Tables 3 through 6) show descriptive data for the Year 1 through Year 7 respondents. During all seven study years, over 80 percent of respondents were born on the North Slope (Table 3). The percentage of Year 7 respondents born in Nuiqsut stayed within the range of the previous six 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 distribution of decades in which respondents were born remained fairly consistent in Year 7 compared to Year 6 (Table 4). The percentage of respondents born in the 1990s rose from three percent in Year 1 to a high of 25 percent in Year 7; 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 1980s dropped in Year 7 from 36 percent to 24 percent. Years 5, 6, and 7 also had a small percentage of hunters who were born in the 21st century; the study team allowed hunters under the age of 16 to participate in the study if accompanied by their parents. 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, 75 percent in Year 6, and 79 percent in Year 7) 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 and Year 7 (Table 6).

Table 3: Respondents' Residence at Time of Birth²

Residence	Percent of Active Harvester Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Nuiqsut	26%	40%	32%	44%	40%	44%	41%
Other North Slope Community	62%	48%	52%	44%	47%	48%	48%
Elsewhere in Alaska	9%	8%	13%	9%	9%	8%	10%
Outside Alaska	3%	4%	4%	2%	4%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	56	54	53	50	58

Stephen R. Braund & Associates, 2016.

Table 4: Decade Born

Decade	Percent of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1940s	6%	10%	0%	2%	2%	4%	2%
1950s	18%	12%	15%	9%	19%	12%	14%
1960s	32%	17%	27%	16%	17%	20%	24%
1970s	21%	17%	16%	18%	11%	8%	8%
1980s	21%	31%	25%	36%	32%	36%	24%
1990s	3%	13%	16%	20%	17%	18%	25%
2000s	0%	0%	0%	0%	2%	2%	3%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	55	56	53	50	59

Stephen R. Braund & Associates, 2016.

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 7 was 60 of 61 interviews

Table 5: Years of Residence in Nuiqsut

Years of Residence	Percent of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
5 years or less	3%	2%	2%	0%	0%	2%	0%
6-10 years	3%	6%	5%	2%	2%	4%	7%
11-19 years	12%	19%	16%	25%	23%	20%	14%
20 plus years	82%	73%	77%	73%	75%	75%	79%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	56	55	53	51	58

Stephen R. Braund & Associates, 2016.

Table 6: Respondent Gender

Gender	Percent of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Male	97%	92%	96%	95%	95%	87%	90%
Female	3%	8%	4%	5%	5%	13%	10%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	36	53	57	58	55	52	60

Stephen R. Braund & Associates, 2016.

Household Caribou Harvest Surveys

The total number of eligible households for ADF&G’s 2014 household surveys was 108. ADF&G completed a total of 58 (54 percent) household surveys in the community of Nuiqsut. Additional information regarding ADF&G’s sample will be available in their forthcoming report.

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 seven data sets. The number of records in each data set for the seven study years is shown in Table 7. 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 7: Nuiqsut Datasets

Nuiqsut Dataset Component	Number of Records						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Active harvester respondent characteristics (age, residence duration, place of birth)	36	53	57	58	57	57	60
Subsistence use areas	137	187	215	194	211	196	206
Harvest locations	182	152	196	162	195	143	247
Observations of changes in harvest patterns	36	53	57	58	56	57	57
Observations of changes in condition of caribou	87	67	71	68	83	51	67
Impacts on harvest activities	111	109	81	72	102	107	89
Number of Active Harvester Respondents	36	53	57	58	57	57	60

Stephen R. Braund & Associates, 2016.

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 C 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 with impacts and other data; and points associated with harvest locations and impact locations. Altogether, SRB&A digitized 206 Year 7 use areas and 247 Year 7 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

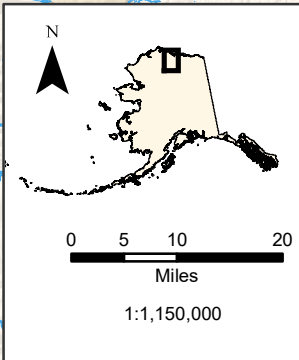
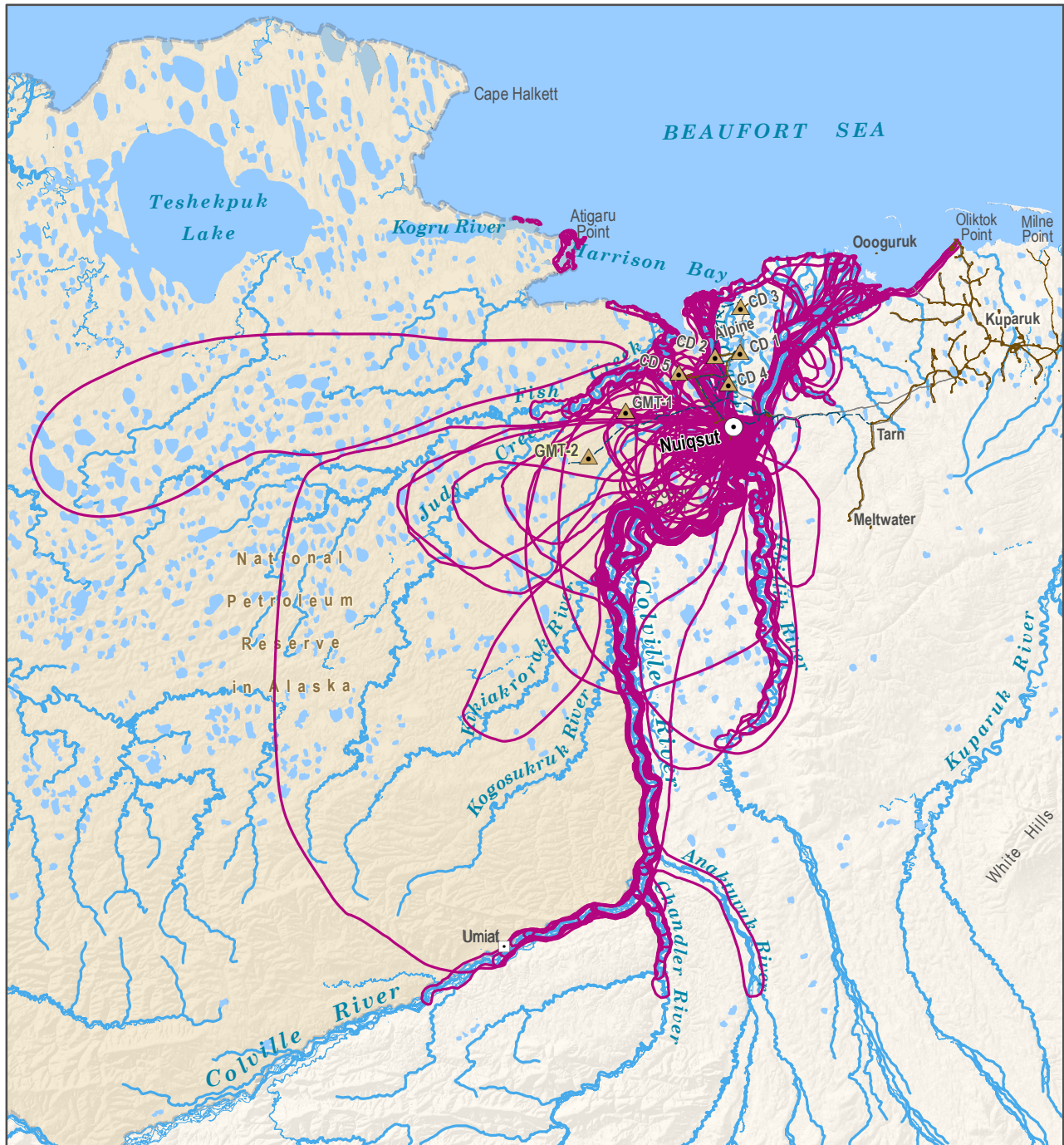
The relevant tables from the Access database were linked to the GIS database so that GIS staff could develop maps querying specific feature information. The SRB&A GIS mapping system consists of three possible methods of presenting mapped information. The first method is represented by Map 4 and is referred 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 7 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. 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

ADF&G conducted the 2014 household harvest surveys. Their survey and analysis methods will be available in their forthcoming report

Data Review

SRB&A submitted a draft of the Year 7 report to CPAI in January 2015 and received comments on the draft report from CPAI in March 2015. A revised draft was sent to CPAI in April 2015 and the study team presented the results of the Year 7 report to the NSB on May 2, 2016. The study team then met with the Nuiqsut Caribou Panel on May 9, 2016 to present draft year 7 findings (preliminary results were presented to them at the November 2015 meeting). Following the review meetings with the NSB and Nuiqsut Caribou Panel, the study team revised and finalized the Year 7 report.



Map 4 - Spaghetti Example: Caribou Subsistence Use Areas, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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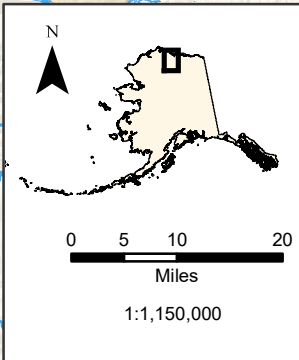
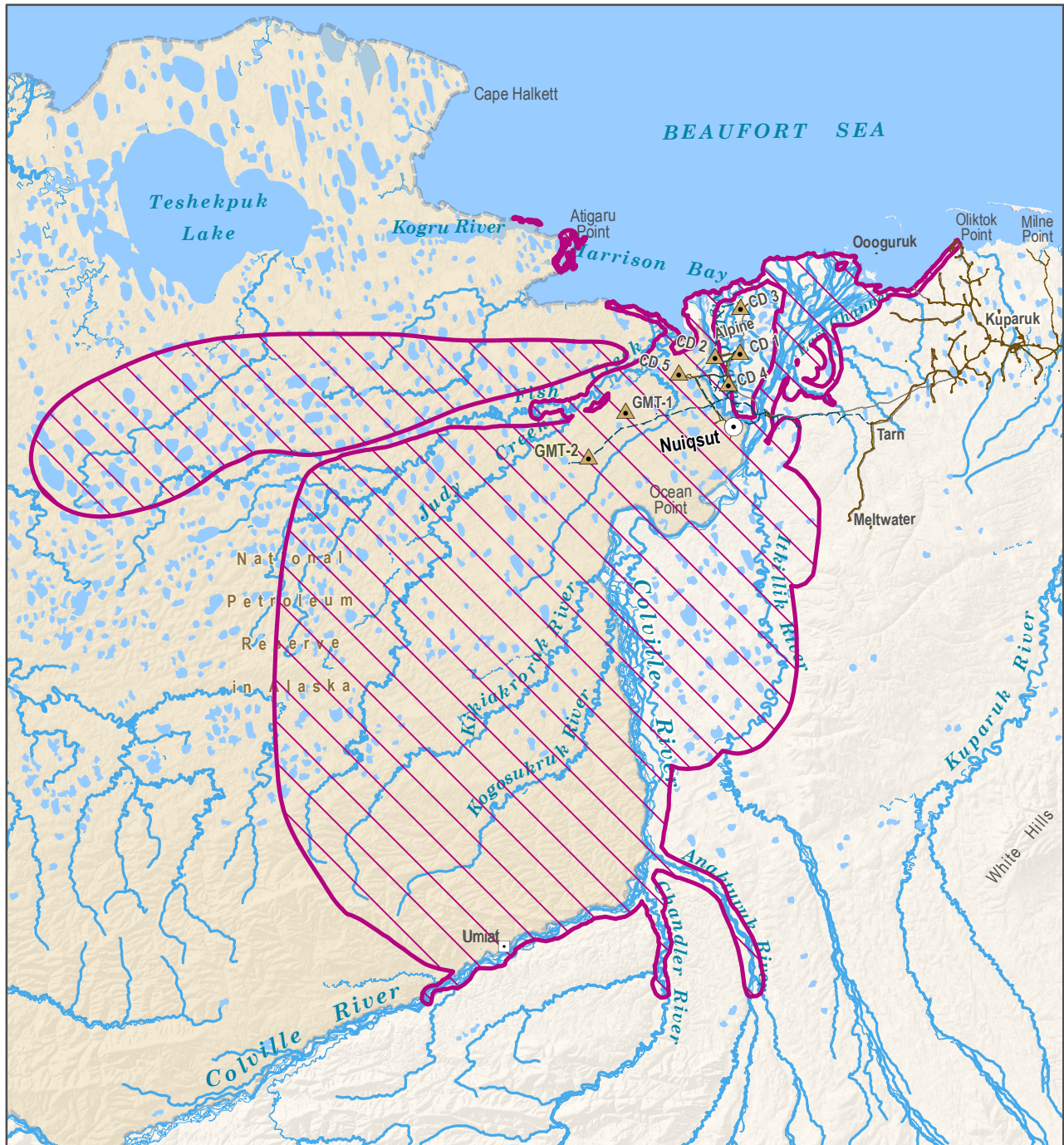
Year 7: November 2013 - October 2014



206 caribou areas used by 60 respondents



National Petroleum Reserve Alaska



**Map 5 - Dissolved Polygon Example:
Caribou Subsistence Use Areas, Year 7**

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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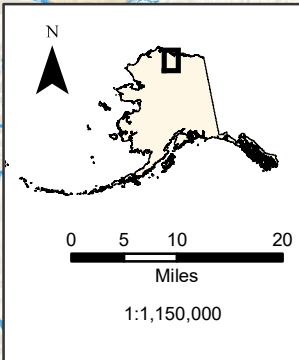
**Year 7: November 2013
- October 2014**



206 caribou
areas used by
60 respondents



National Petroleum
Reserve Alaska



Map 6 - Caribou Subsistence Use Areas, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014

High 206 caribou areas used by 60 respondents
Low

National Petroleum Reserve Alaska

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

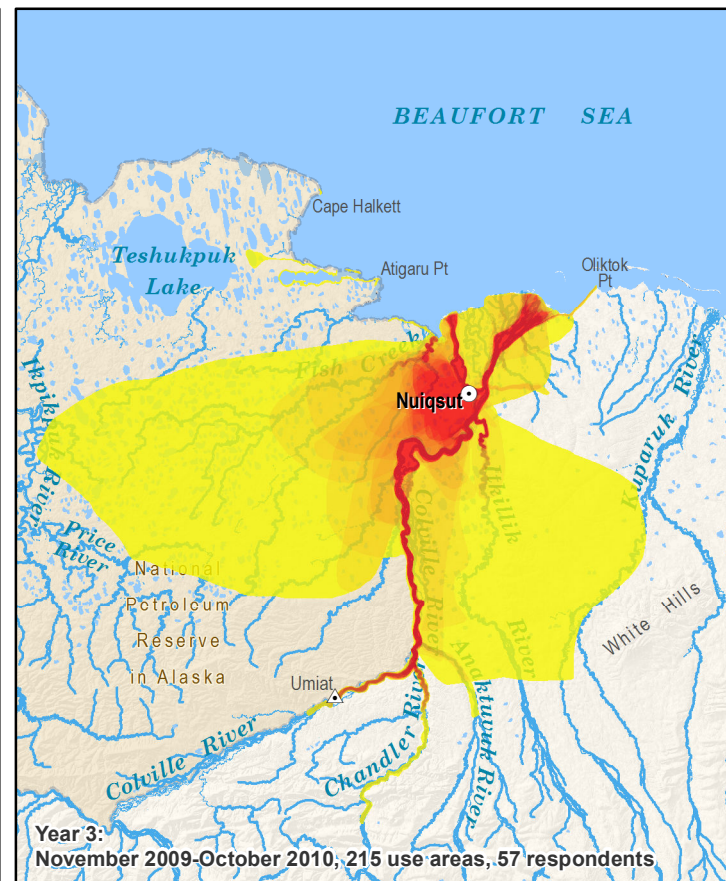
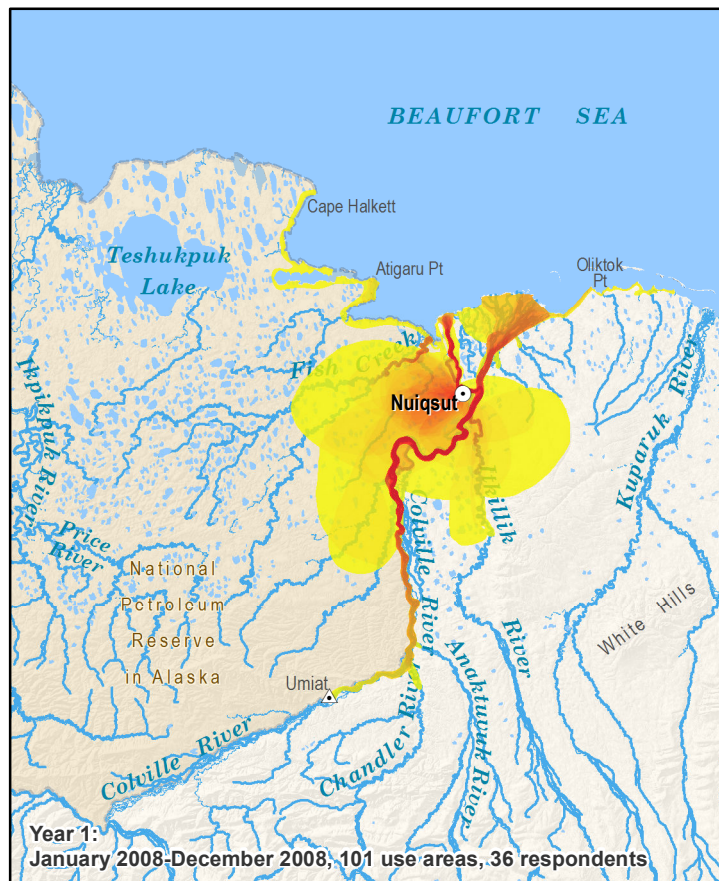
Nuiqsut respondents reported 206 caribou subsistence use areas for the Year 7 study period. In addition to providing the location of their Year 7 caribou hunting areas, respondents identified the location of the 248 harvest sites within the use areas. The locations and characteristics of Year 7 caribou use areas and harvest sites are described below.

Location of Caribou Use Areas and Harvest Sites

Nuiqsut Year 7 caribou use areas, as reported by 60 Nuiqsut respondents, are depicted on Map 6. Year 1 through Year 7 caribou use areas are depicted side by side on Map 7. During the Year 7 time period (November 2013 through October 2014), 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 and south of the community, in search of caribou. Residents' riverine travel extended along Nigliq Channel and the East Channel of the Colville River, along Fish Creek, upriver along the Colville River beyond Umiat, and along the Itkillik, Chandler and Anaktuvuk rivers. Hunters also traveled along the coast east of the community to Oliktok Point and west of the community to Atigaru Point and Eskimo Islands. Overland travel extended west beyond Fish Creek and to the south of Teshekpuk Lake, in addition to south and west of the community in an area surrounding the Itkillik, Kikiakrorak, Kogosukruk rivers. A couple of hunters reported traveling extensive distances west and south of the community, including an area south of Teshekpuk Lake and another area southwest toward Price River and connecting back to the Colville River near Umiat. The highest numbers of overlapping caribou use areas in Year 7 occurred along the Nigliq Channel, the lower portions of the East Channel of the Colville River and Itkillik River, upriver along the Colville River to its confluence with the Chandler River, and in an overland area west and south of the community in an area between the community, Ublutuooh River, and Ocean Point. A moderate number of overlapping use areas extended overland farther toward Judy Creek and the mouth of Kikikakrorak River, farther upriver along the Colville and Itkillik rivers, near the mouths of the East Channel of the Colville River and Fish Creek, and near Atigaru Point.

Compared to the previous few study years, Year 7 use areas show higher overlapping use to the west and south of the community toward Judy Creek and Ocean Point. In addition, the overall extent of overland travel in Year 7 was larger than in the previous three study years (Years 4 through 6), and similar to Years 2 and 3. Residents' riverine travel was similar to previous study years. One individual reported successfully traveling along Anaktuvuk River, which is generally not navigable due to low water levels.

Maps 8 and 9 depict caribou use areas for all seven study years, using two different methods. Map 8 shows overlapping use areas for all 1,344 polygons provided over the seven study years combined, while Map 9 shows overlapping use areas for seven polygons – one merged polygon for each study year. The highest numbers of overlapping use areas during all study years (Map 8) 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 the lower portion of Fish Creek; and in an overland area between the community, Fish Creek, and Ocean Point. Over the course of the seven 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



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

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 124 active harvesters from March 2009 through January of 2015.

LEGEND

Overlapping Polygons
 High
 Low

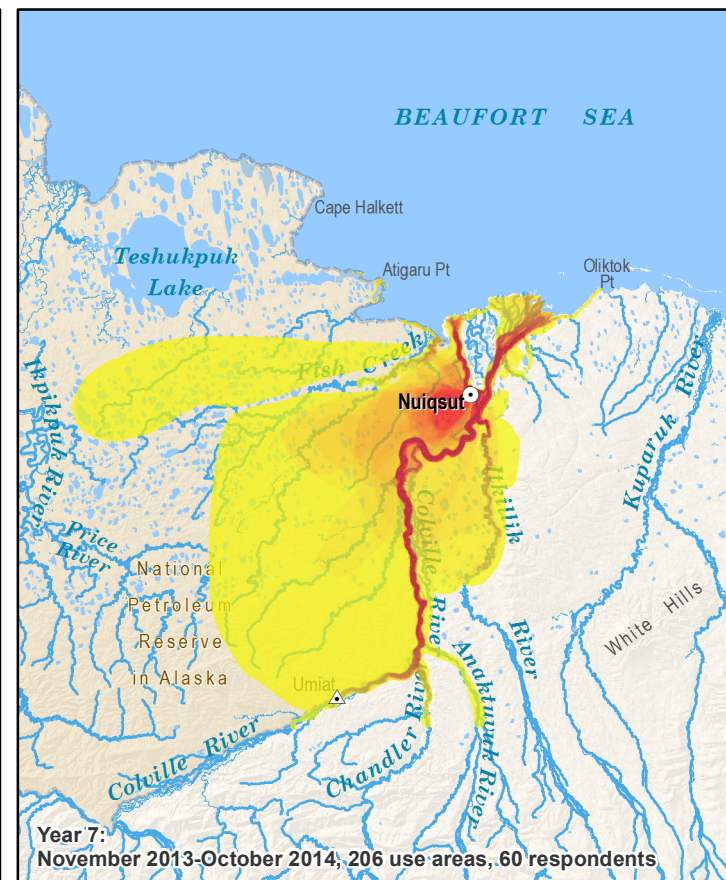
National Petroleum Reserve Alaska

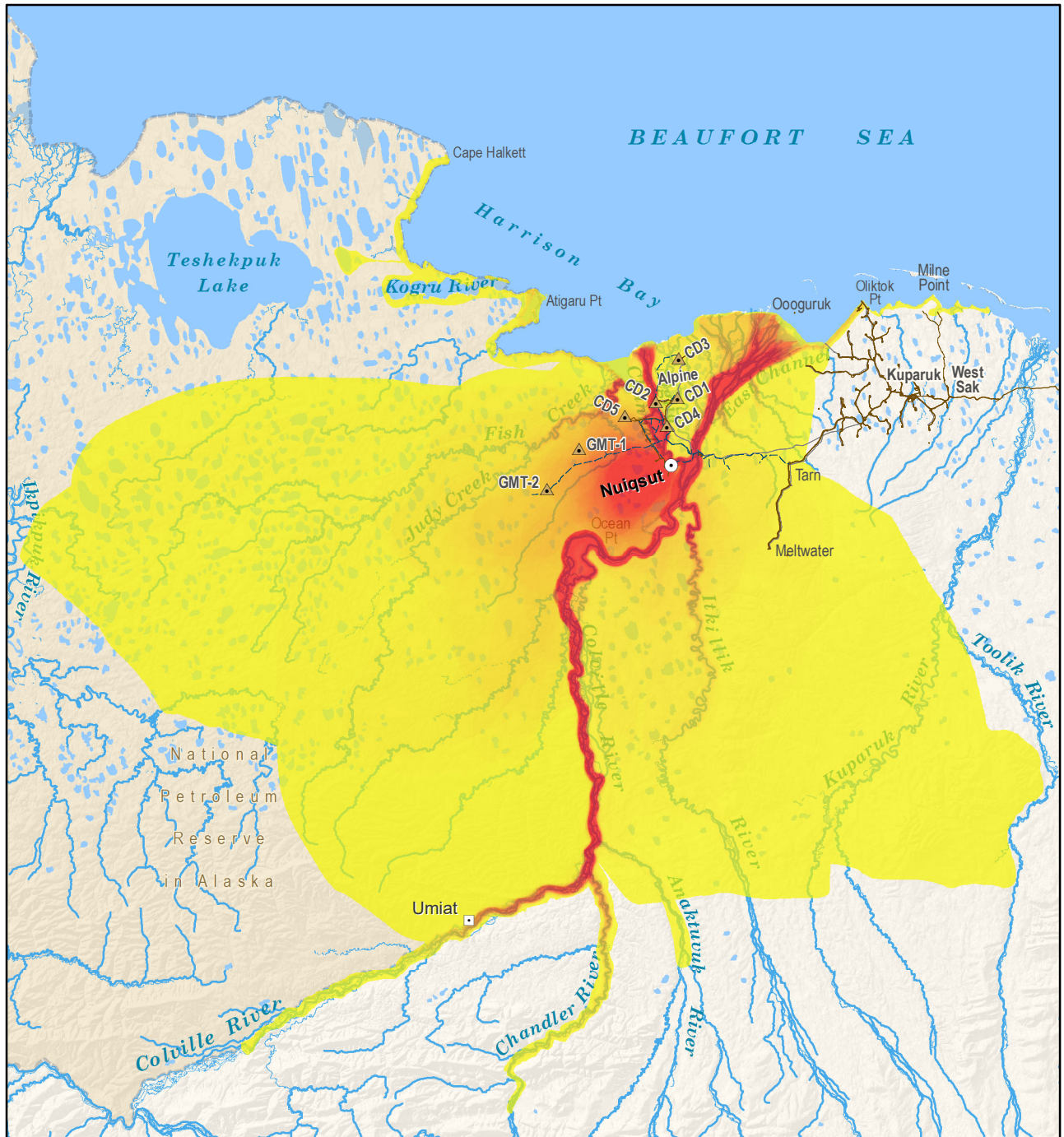
Other areas may have been used for resource harvesting.

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0 12.5 25 50 Miles

SCALE: 1:1,500,000





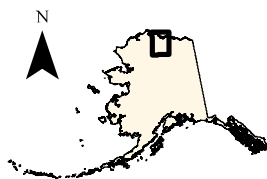
**Map 8 - Caribou Subsistence Use Areas,
Years 1-7 Combined**

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 124 active harvesters from March 2009 through January of 2015.

Other areas may have been used for resource harvesting.

**Years 1-7: January
2008- October 2014**

High 1344 caribou
areas used by
124 respondents
Low



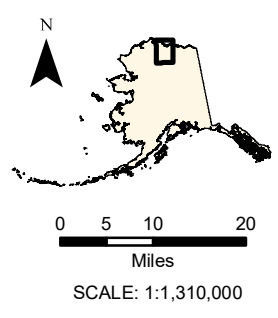
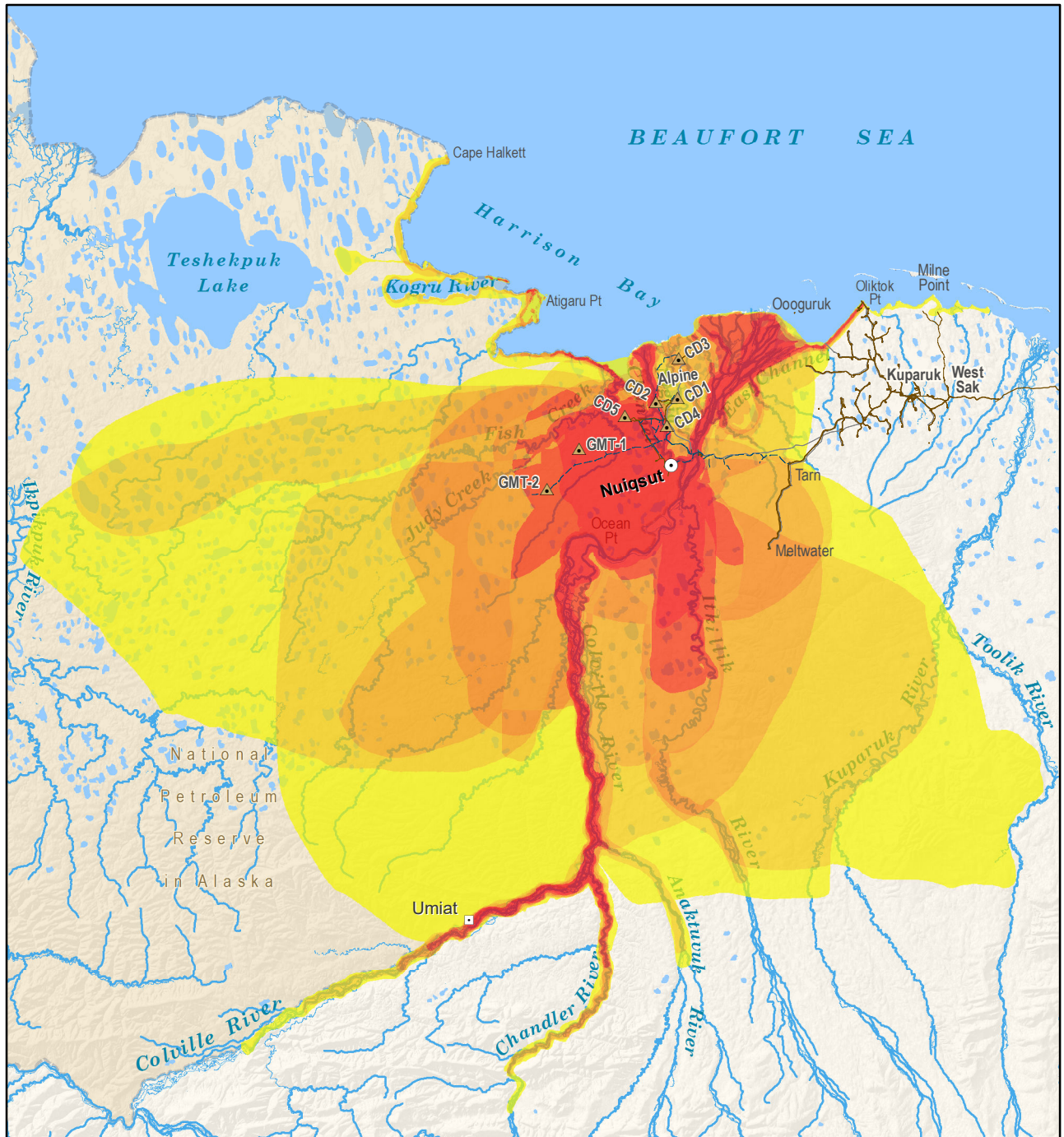
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Map 9 - Caribou Subsistence Use Areas, Years 1-7 Graded

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 124 active harvesters from March 2009 through January of 2015.

Other areas may have been used for resource harvesting.

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Number of study years

-  1
-  2
-  3
-  4
-  5
-  6
-  7

1344 caribou areas used by 124 respondents

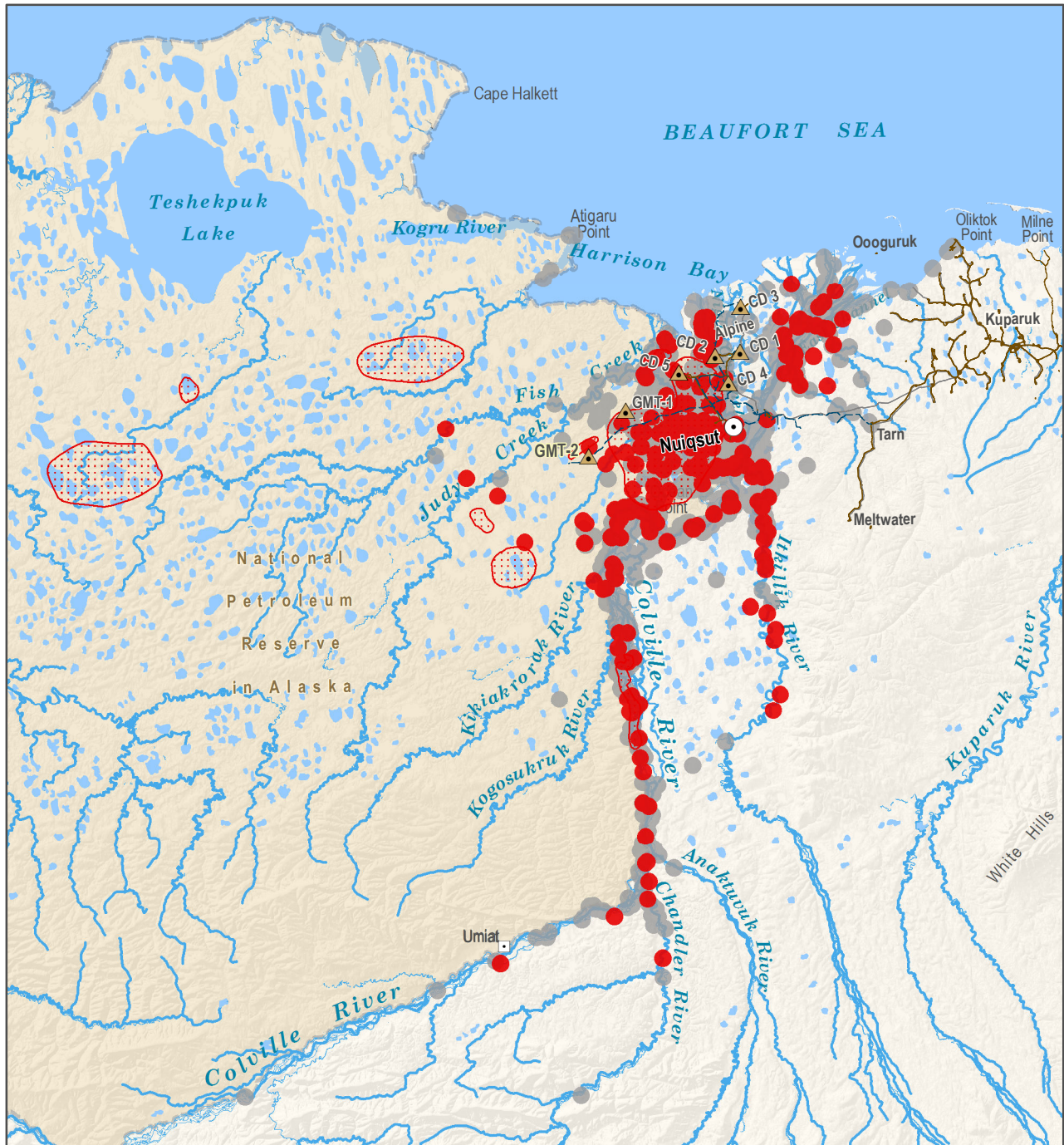
coastal subsistence use areas extending from Cape Halkett to beyond Oliktok Point (Map 8). Year 7 (Map 6) differs from the cumulative Year 1 through 7 use areas (Maps 8 and 9) in that during Year 7 use areas do not extend as far east overland as they have some other years, nor do they extend as far along the Chandler or Colville rivers as they have in previous years. Coastal use areas were also less extensive in Year 7 than in some previous years. Similarities between Map 6 (Year 7 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.

Map 9 depicts overlapping use areas for all seven years, but instead of portraying all 1,344 polygons individually, this map includes only one polygon per study year. Areas that were used during all seven study years are portrayed in dark 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 various shades of orange and yellow. Areas used during a majority (four to seven) 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 Ikillik 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 Ikillik 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 7 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). In some cases, respondents were unable to identify the exact location of the caribou they harvested, or they harvested a large number of caribou spread over a general area, and those areas were documented as polygons rather than as points. Fifty-six respondents reported harvesting caribou at 248 harvest locations in Year 7. Respondents reported successful harvests in the Colville River Delta; upriver to Umiat; along Chandler River, Ikillik River, and Fish Creek; and in overland areas to the west of Nigliq Channel. A high concentration of caribou harvests took place along the Nigliq Channel, the East Channel, Ikillik 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 seven study years. Over the course of the seven study years, 117 respondents have noted 1,278 caribou harvest locations, most of which are shown on Map 11 (Map 11 does not include harvest locations that were reported as polygons). The highest concentrations of harvest locations occur along the Nigliq Channel to the north of the community, particularly at Nigliq camp, along the East Channel near *Pisiktagvik*, within a few miles of Nuiqsut overland to the west, along the Colville to the south, near the mouth of Ikillik 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. The concentration of harvests in Year 7 are similar to those from Years 1 through 5, while Year 6 showed few areas of concentrated harvests. In Year 7, harvests were most concentrated at Nigliq camp on the Nigliq Channel as well as in scattered areas around the East Channel (including near *Pisiktagvik*), near the mouth of Fish Creek, upriver near Ocean Point, Kikiakrorak, and Sentinel Hill/Umiraq, and overland to the west

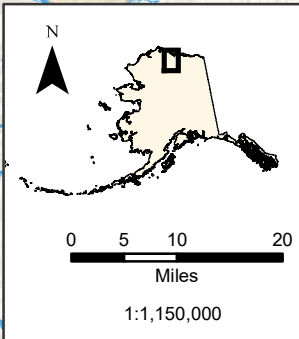


**Map 10 - Caribou Harvest Locations,
Years 1 - 7**

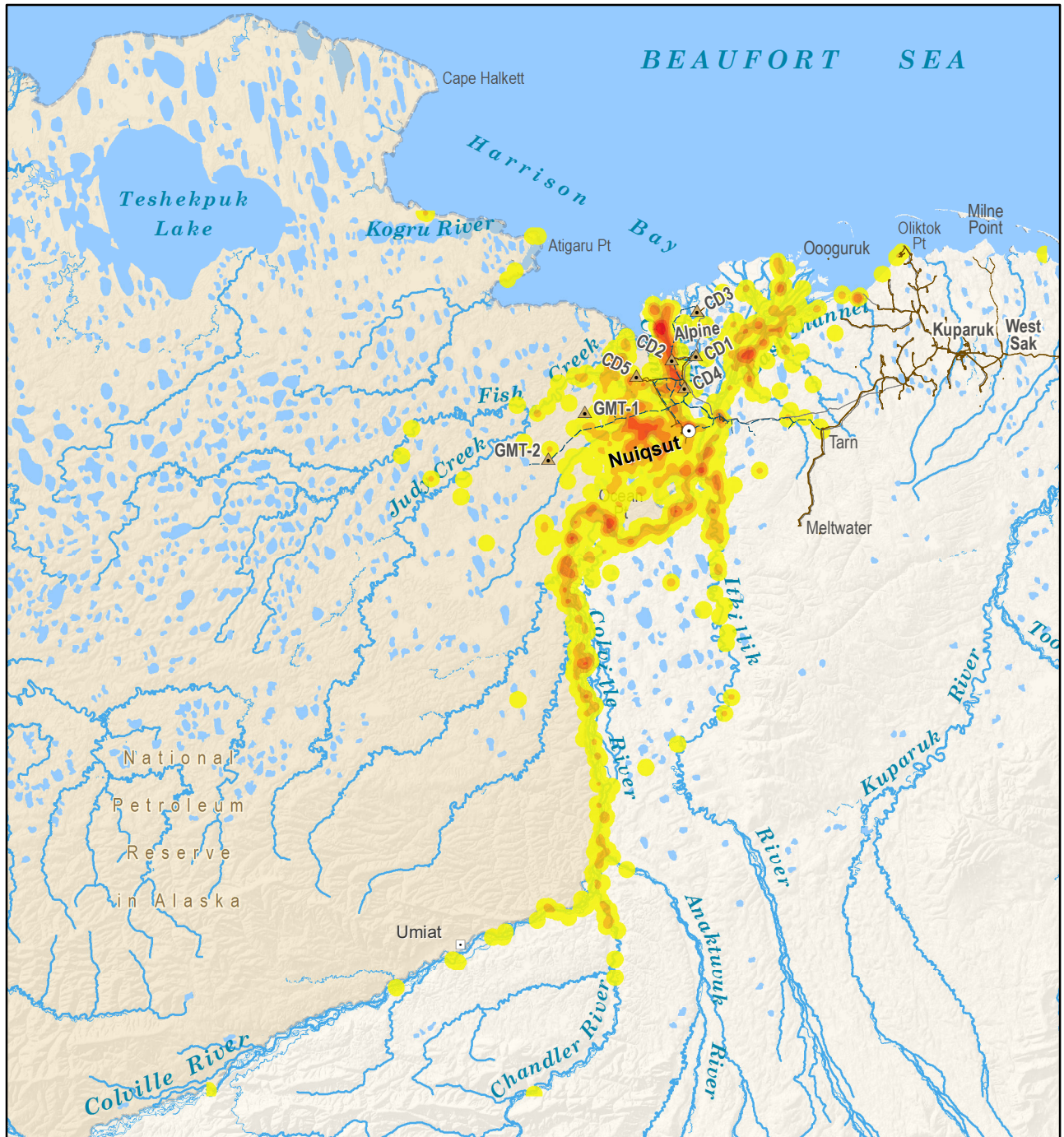
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 124 active harvesters from March 2009 through January of 2015.

Other areas may have been used for resource harvesting.

- Year 7: November 2013 - October 2014**
 248 caribou harvest locations
 56 respondents
- Years 1-6: January 2008 - October 2013**
 1030 caribou harvest locations
 108 respondents
-  National Petroleum Reserve Alaska



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Map 11 - Caribou Harvest Density, Years 1 - 7 Combined

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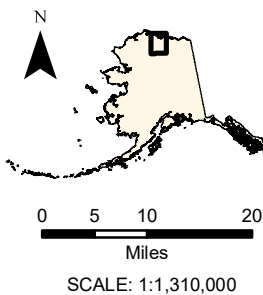
Other areas may have been used for resource harvesting.

Harvest Density

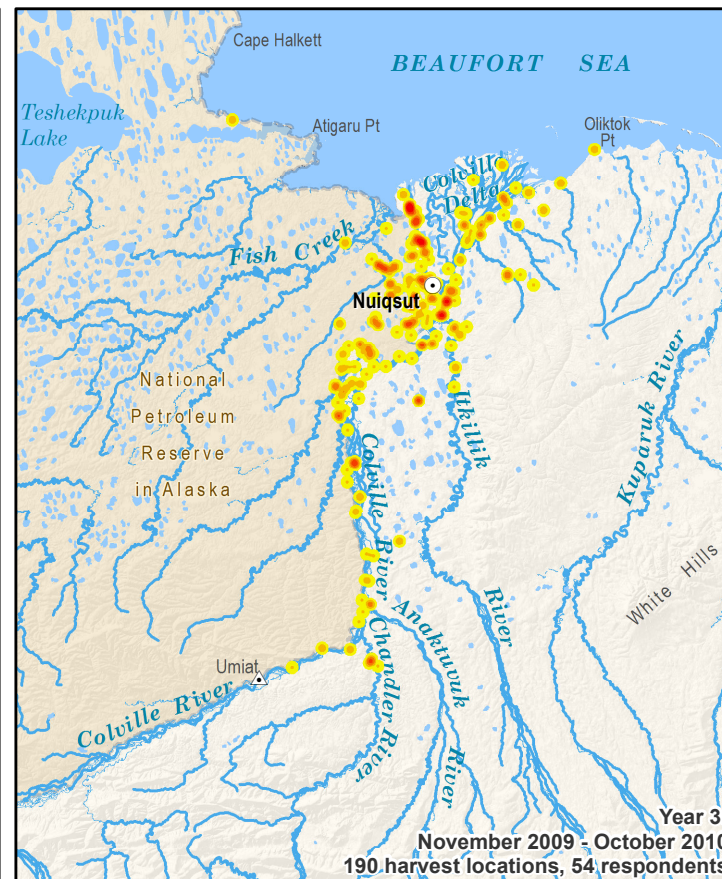
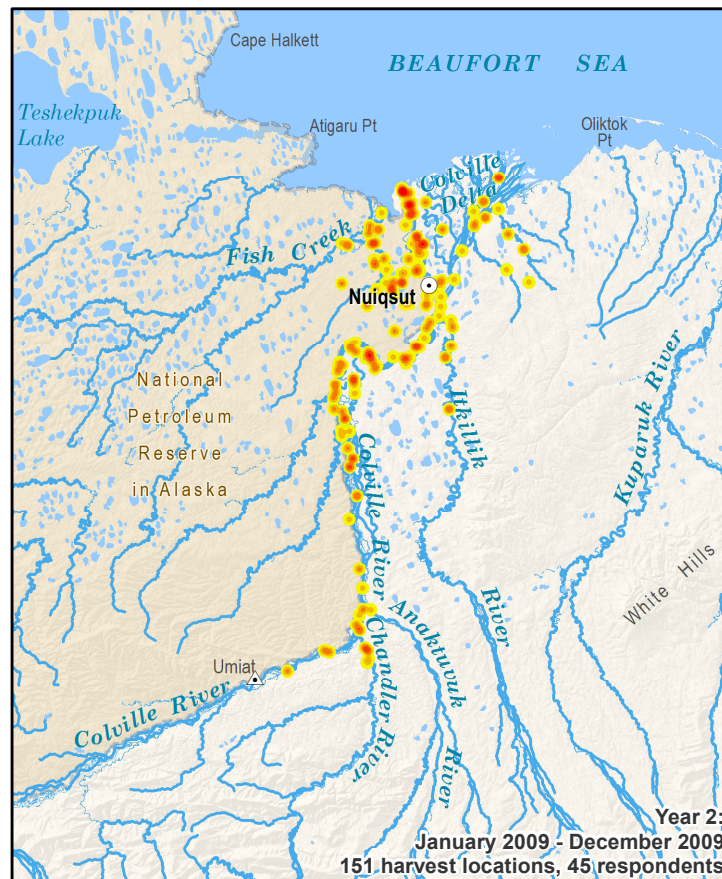
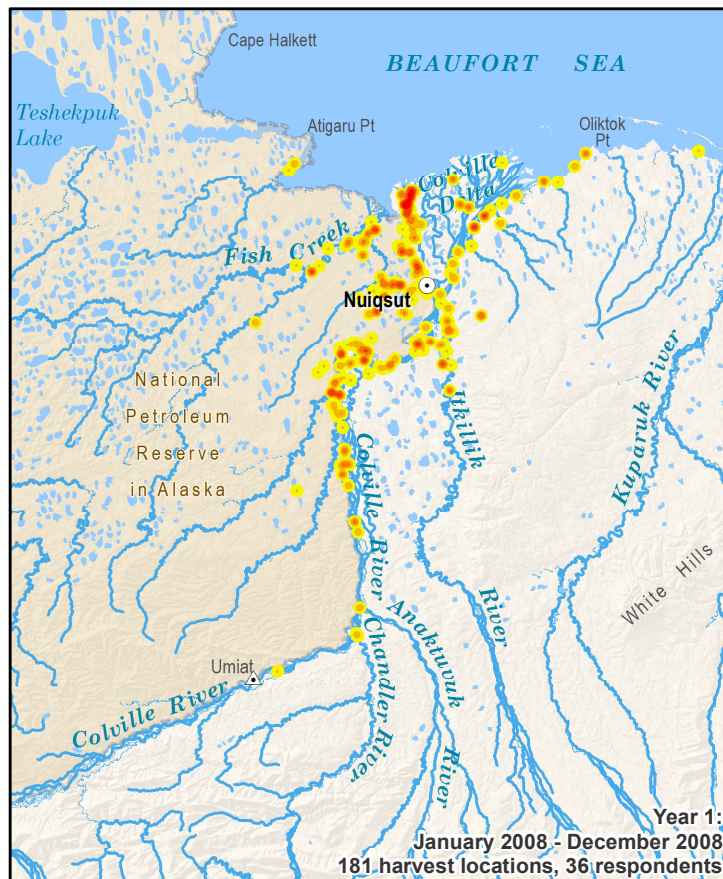
- Fewer caribou harvested
-
- More caribou harvested

1242 caribou harvest locations, 117 respondents

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Map 12 Caribou Harvest Density: Years 1-7 Individually

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 124 active harvesters from March 2009 through January of 2015.

LEGEND

Harvest Density

- Fewer caribou harvested
-
- More caribou harvested

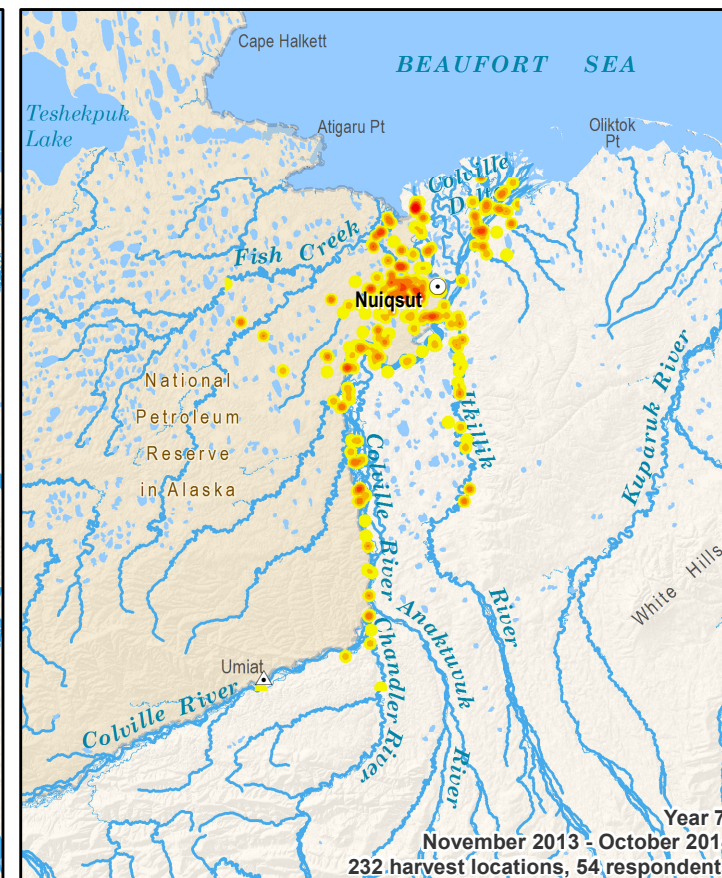
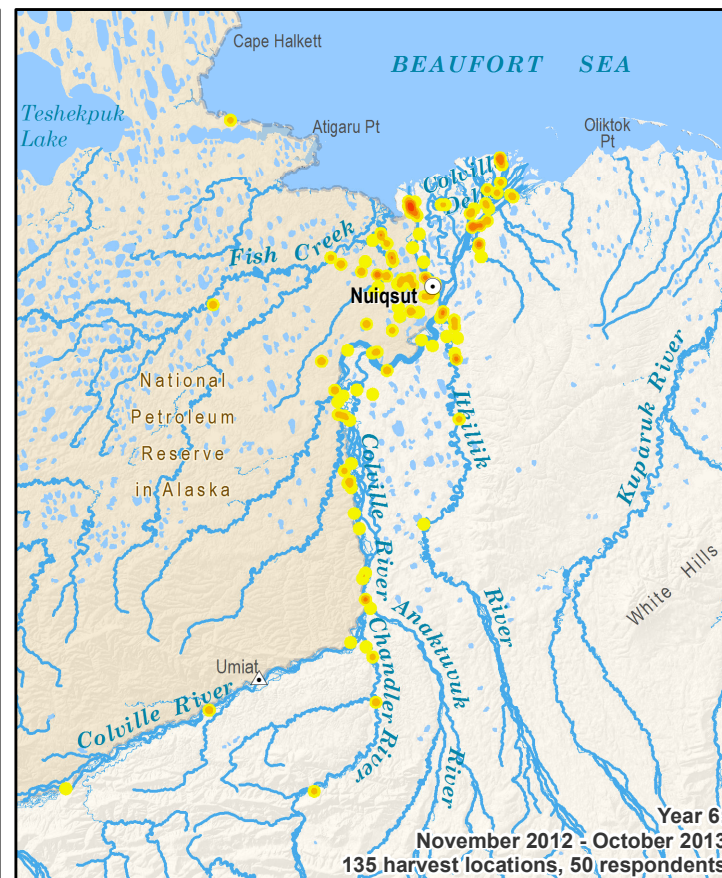
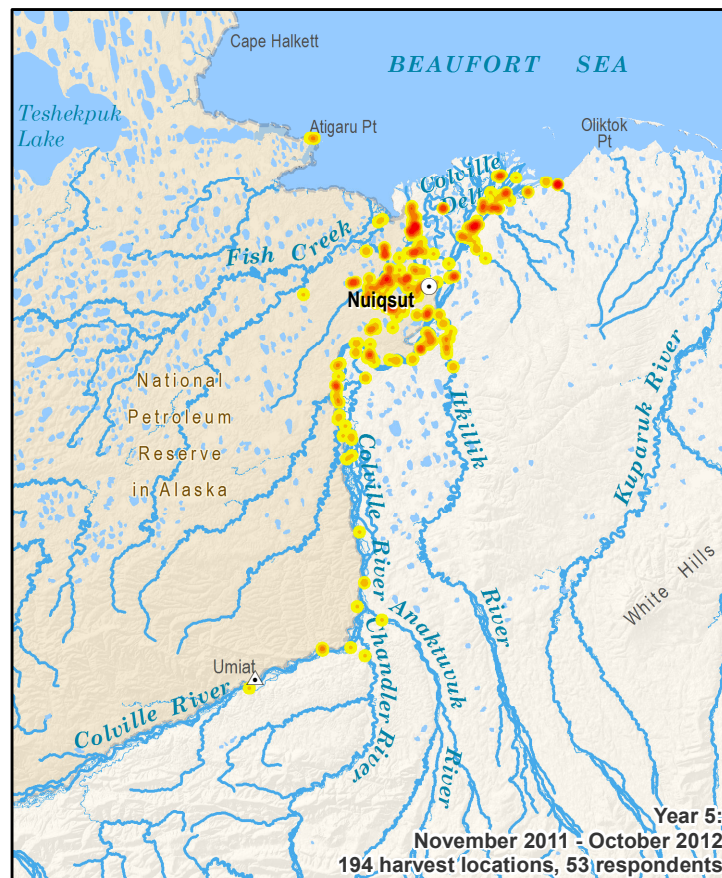
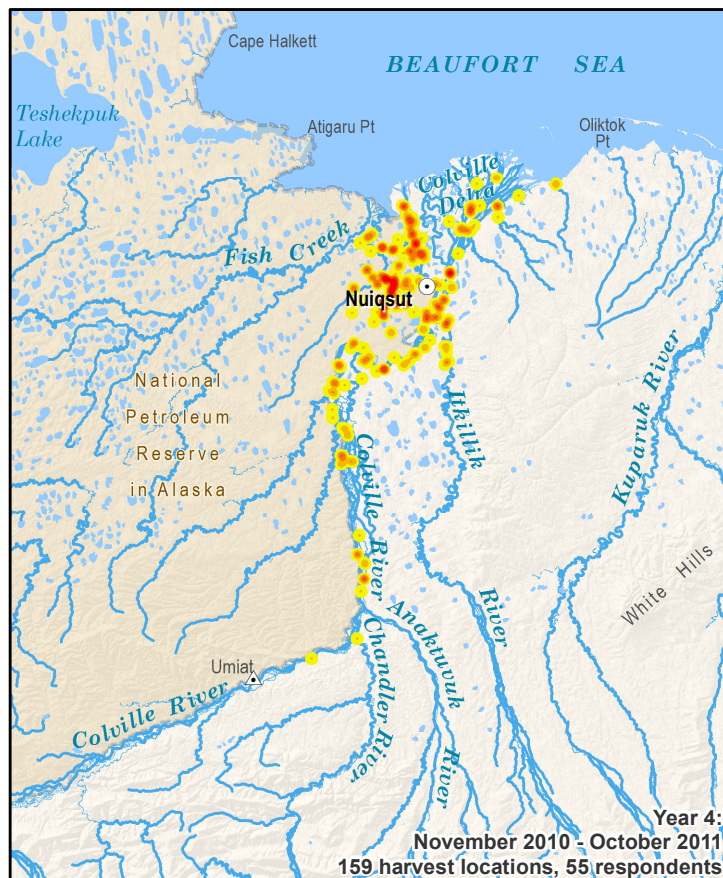
National Petroleum Reserve in Alaska

0 5 10 20 Miles

Other areas may have been used for resource harvesting.

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SCALE: 1:1,500,000



of the community toward Ublutuoch River. Areas of moderate harvest density occurred at various points along the Colville River as far as Chandler River, upriver along the Itkillik River, and southwest from the community toward Judy 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 Kupigrak Channel). The highest numbers of overlapping river use areas occur along the Nigliq Channel to the Nigliq area, upriver to the Chandler River, along the upper portion of the East Channel of the Colville River, and near the mouth of Itkillik River. Compared to past few study years, Year 7 river hunting activities did not extend as far along the Chandler River. However, a higher rate of overlapping use areas occurs farther upriver than in recent years. Year 7 continued the trend of less river-based hunting along Fish Creek compared to 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 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. Respondents indicated that the caribou have traditionally crossed at different points along Nigliq Channel, and hunters will wait at these locations for the herds to cross once they approach the river:

Respondent 1: I did [hunt along Nigliq]. I go to my aapa's cabin. There was caribou right there. I didn't go in there [Kuupaquullurak]. There was caribou at my aapa's cabin.

Respondent 2: That would be from June through August. I know my grandma spent like three weeks over there that one time.

Respondent 3: I didn't go that time. I don't know, that was maybe eight times [I went] out there. Maybe I stayed three days, two days [at a time]. Three days was the longest. I got a lot of caribou up there. I can't even count how many I got up there this year. We would hang out at the camp, with my grandma, eat and stuff, and then just watch the caribou cross the river there. That was cool too, like I have a video of them going across the water, and all of us was in a perfect line, as soon as they go in the water. (SRB&A Nuiqsut Interview November 2014)

[I've been] going back to my grandma's camp. We went out there late June, early July, just to the camp. I just went through [Kuupaquullurak] to check it. I was breaking in my dad's motor, so I was checking it [to see where it could go]. I ended in July and I went back to work and my cousin took over for me taking it out. I'd say [I went out] about six or seven times. Yeah, all of them [were camping]. We stayed out there from two to three days at a time. We'd come back home for a day, get supplies and go back out. We got five of them [caribou] with the first herd that came by. (SRB&A Nuiqsut Interview November 2014)

When you go on this side, where there's that Y, on Nigliq Channel, caribou on there all the time. Yeah, on real hot days, they get away from the mosquitoes and they go to those islands right there [mouth of Colville River, near north and east of Nigliq camp]. I seen in early June a small herd on this shore right here because we come out on these islands, heading south on this bank right here. We just watched them because we were heading out seal hunting, we didn't know where they were going to cross, we stayed out a lot longer than we planned to and when we got back we didn't know where they went. (SRB&A Nuiqsut Interview January 2015)

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:

Let's see. I went there July, late July. I got one at the channel. In that creek [Kuupaqullurak]? No, on this end I did [go in]. It gets pretty shallow. I went around here. Yeah, late summer, the caribou were crossing this way across Nigliq Channel and toward the coast. I was crossing Nigliq at the cabin. On this side [west]. There were about 1,000. There were three herds that went through here. Yeah, nearly 1,000. The Porcupine were coming across, there were like three herds. They went through Nanuq. [I took a] day trip. Also we have our cabin down here by Nigliq. We were there working on the cabin. The caribou herds were right here and they cut across here. They have a route. Like through here and then they go west. We go there [to the cabin on Nigliq] every day [but] I'm looking for fish [not caribou]. (SRB&A Nuiqsut Interview November 2014)

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 *Pisiktagvik* and Helmericks, although hunters sometimes describe shallow water conditions in this part of the Colville Delta. Similar to hunting along Nigliq Channel, hunting activities along the East Channel are often conducted while respondents travel to and from the ocean hunting for seals. A number of harvesters reported encountering herds of caribou, estimated to be as many as 200, along the East Channel of the Colville Delta during Year 7:

I went to my cabin out here by Helmericks, on the main river, on Kupigruak River. I went out that way a couple times, we seen the caribou but they were waaaayyyy inland. There was lots too. We seen lots [of caribou], hundreds, they were herding up. That was the height of summertime, around the hottest temperature, around mid-July. Around that time of year they are hardly around our area. (SRB&A Nuiqsut Interview November 2014)

I went all the way to [where East Channel meets ocean]. When I first went out there I saw caribou right on the point somewhere in there. I saw about 50. I wasn't looking for a caribou at that time. Usually they [caribou] travel when it's real hot, they go close to the ocean, there's not very much mosquitoes on that side. Drive there and pick them up on a boat. Pisiktagvik. Around Pisiktagvik there. I saw some on the east side of East Channel, right along the ocean. That was first of August, late July. [I went out] at least three times. (SRB&A Nuiqsut Interview January 2015)

[I hunt by] boat or four-wheeler. We go right over by Helmericks [by boat]. We go up this river, they migrate through here. I know in July they're always coming through here. Napasulu. This one has normal water. I never went through [the Putu]. I went all the way almost to Helmericks.... Yeah, since [the caribou] come up to the ocean all on this side, looking to stay away from the boats, sometimes we go to Nigliq here and wait for them over here since they're always going around the channel [bypassing the hunters on the East Channel]. The first year when I tried to hunt there they said that they're never around there. That was in 2000. Then I had to go somewhere else [referring to the middle channel]. If we go, sometimes we go to Nuiqsapiaq and we just keep going out until we get some caribous. We don't have any luck the first day, second day, we just keep coming out until we find one. Yeah, we could do it in a day as long as we don't hit bottom and get stuck. (SRB&A Nuiqsut Interview January 2015)

One Nuiqsut harvester described waiting for caribou from the Porcupine herd (many local hunters refer to certain Central Arctic herd caribou as Porcupine caribou) to cross near *Pisiktagvik*, indicating that this is a relatively common place for the caribou to cross but also noting the unpredictable nature of caribou movement:

[I hunted by] Pisiktaġvik, right there. They [caribou] came from the east. The Porcupine herd. Yeah. There were several boats. Whichever way the wind is blowing is how they travel. We try to save our gas. I know I went to a camp and sometimes you just wait for them. Sometimes they don't move at all and when the wind picks up a little they like to travel in a headwind. Not too often. We will go up to look for seals, we see caribou but they're far in between [the rivers]. There should be a migration path right there [east to west] but I don't know where that is; we usually get them here when they're coming from the Porcupine herd, right close by the Pisiktaġvik. (SRB&A Nuiqsut Interview January 2015)

A number of respondents noted that they may wait for the caribou to near the riverside for hours, only for them to turn around and head in a different direction. As one respondent described, “Yeah, we went up to *Pisiktaġvik*. And there were six boats and we were waiting for the caribou to come to the river, but they came and turned around” (SRB&A Nuiqsut Interview November 2014). 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:

I usually go out to Helmericks, I go down Kachemach River, about as far as I could go, like seven to eight miles. No you can't go out through there, you have to take this one. Go out that way [Napasalu]. Oh you can't even go that far, but there are always caribou in there [Kachemach] in the summertime. (SRB&A Nuiqsut Interview November 2014)

It's on the east fork [East Channel]. I'd say I went this way and then came back in, ah, Kachemach [River] yeah. There's a way you can go inside Kachemach and go to the other one [Miluveach]. I think it connects this way and then you go out here. In June I went through Putu, the shortcut, and then [I used] Napasulu the other times. [I went] eight times in July. (SRB&A Nuiqsut Interview November 2014)

As noted above, a number of hunters travel to the ocean throughout the summer to harvest seals, and some reported hunting caribou in coastal areas at this time. Several individuals reported checking certain coastal areas to see if caribou were accessible. Harvesters have noted that during the hot summer months, the caribou have traditionally gathered at certain points along the coast seeking relief from the insects. However, accessing coastal areas can be difficult to shallow nearshore waters. Atigaru Point and Eskimo Islands are particularly common coastal areas where caribou are known to gather. Several individuals described,

Atigaru Pt., you said? Yeah, I actually went to the point right there, it's pretty high right in there. We seen some [caribou], but they were too far inland, so we headed back out to the ocean to the ice [to hunt seal]. That was in August, early August. (SRB&A Nuiqsut Interview November 2014)

I got out to Atigaru. I scouted around there all summer going in and out of hunting [for seal] but the majority of the caribou were on this side [farther west]. (SRB&A Nuiqsut Interview January 2015)

A few years back we went seal hunting at that spot here [Eskimo Islands]. Since I was a kid they always brought me to these islands to look for a caribou. That was June and July. All the way from Eskimo Islands, go straight home. [I] just [went] once last year. We didn't see any caribous. (SRB&A Nuiqsut Interview January 2015)

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 one respondent observed,

After we go to the ocean we just go in there [Fish Creek] a little just to check and see if we see anything, but we never see nothing so we come back. Just to [resident's] cabin and then back. That was end of June, July, something like that when the ice is still out there. (SRB&A Nuiqsut Interview November 2014)

Hunting along Fish Creek was somewhat more common in Year 7 than it had been in the previous few years. One individual described hunting more along Fish Creek than along the East Channel in Year 7 due to the activities in that area:

This past summer I spent most of the time in Fish Creek Bay. And also on the west fork [of Fish Creek], the one that comes in on the bay side. From here I took about 10 to 12 miles in [to Fish Creek].... Caribou are out here [along the coast], but this bay is too shallow [so you can't reach them].... But there were caribous around here, but you don't have access to go to them because the majority of this area is too shallow.... But I focused my camping out here [Fish Creek area]. Teshekpuk herd tastes better. I've seen caribou when I've gone to Oliktok, when I go to pick up my supplies, from Pisiktaġvik coming down. On the east side, we have caribou but it seems like they want to stay away from the shoreline [because] we have so much activities going on. Here I only got a few caribou because in summer we have so many activities going on.... Majority of the caribou were on this side [west] of Fish Creek.... [I went] about maybe four or five times out on Fish Creek. I focus on Fish Creek a lot because I know that caribous on this side are being disturbed by industry. That way you don't have a lot of choppers flying every day. (SRB&A Nuiqsut Interview January 2015)

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 often travel upriver with a specific hunting destination or area in mind (e.g. Ocean Point, Sentinel Hill, Itkillik River, *Puviksuk*, and *Umiraq*) and often mentioned their use of the *Napasulu* channel, which is generally a more navigable channel than *Putu*, once the primary outlet to the main Colville Delta. One individual reported traveling upriver and stopping at several common hunting locations to search for caribou, saying,

Yep, just that one [trip to Itkillik], and then we went again a couple of days later up the Colville, up to Qitik. And there was caribou on top of Ocean Point, but again they were too far inland. [I went] about five or six times upriver, no camping trips, and we didn't catch any. I hardly saw any, except on top of Ocean Point. They were scarce this last summer and fall – hard to find. (SRB&A Nuiqsut Interview November 2014)

A number of respondents specifically reported traveling along Itkillik River in Year 7 to search for caribou; the distance residents' traveled along the river depended on factors such as water levels, transportation types (e.g., jet boat versus propeller boat), and caribou availability:

[We boated in] July and August. I went inside Itkillik River around June, beginning of July, we went up around this area. [Didn't get any caribou]. [We went to Itkillik] a few times, they were all day trips, once we went fishing there. [We went upriver] three to four times, and twice was successful; with boat, yeah. I also went a couple [two, specifically] times on the Honda. I used to like to go inside Itkillik River [more], but nowadays it's too shallow, or I have to wait for high tide to get in. (SRB&A Nuiqsut Interview November 2014)

I go Itkillik. When I go boating I usually go out in June, I go up that river.... I don't go up too far but there is caribou up there. Where's that cabin... We go out to that cabin and look around there. That's a good place to go hunting though. (SRB&A Nuiqsut Interview January 2015)

And after that [trip upriver] I came back after my next R&R and we went out to Itkillik. It was quite a ways [up]. I'd say three or four miles up there. That was my last time off to get out, in September. We went up there once. It was just a day trip. And we barely made it out of there before it was too dark. It's really shallow in there. We caught one, there was a big herd, I'm not sure how much there was, but we caught one. It was out past the [old] airport. (SRB&A Nuiqsut Interview November 2014)

I know we almost passed this valley, but pretty close to around here. Can't be precisely where we caught [the caribou], but it was about an hour past the old airport. Somewhere around here. We were going 25 to 30 [miles per hour]. I used to have a boat that could go 50, but I'm tired of breaking motors. Itkillik – I don't usually go up there, but when you don't see any, I'll go. You can wait 12 hours sometimes [for the caribou to cross]. I went twice – the first trip was maybe just 10 minutes past the airport, and the second was that far [an hour past the airport]. (SRB&A Nuiqsut Interview November 2014)

Several individuals indicated that Ocean Point, *Qitik*, Sentinel Hill (including the spot referred to as *Umiraq*) were “turning around” points for them when hunting. When traveling as far as Sentinel Hill, several individuals reported camping; Sentinel Hill is a traditional camping spot for many in the community, and some own cabins in that area. One individual described using Sentinel Hill as a “base camp” for hunting up and downriver as well as waiting for caribou to cross:

My camp is over here right across from Sentinel Hill; camp is right across from there. We, from here, usually serves as a base camp, really, for day trips or even a couple night trips [up river] [We got our caribou] close by there. Traditionally that spot at Sentinel Hill is where people gathered to wait for caribou to pass through so that's where we know to wait and watch. (SRB&A Nuiqsut Interview January 2015)

In some cases respondents indicated that they limited their upriver travel in Year 7 due to a lack of fuel. Several individuals described hunting upriver from the community toward Ocean Point, *Qitik*, and Sentinel Hill as follows:

Past Ocean Point, we didn't have very much gas, around this area is about as far as we went along the river. They were all day trips. Yeah we actually did [use the shortcut by Ocean Point] it was around July or so, they [other boat] were leading the way, it was pretty deep too so I was able to get through. The second time around it was too shallow. (SRB&A Nuiqsut Interview November 2014)

Around this Ocean Point a little past Ocean Point to Qitik right here. Sentinel Hill is where all the old exploration [took place]... [Umiraq] is just right across it. It's in the same place yeah. From here you can go in... we call Anajuk – you can go in and out. [The map] is not very good detail. June, early June, when it first breaks up. And then in July when you go out to the ocean. [Up until], right before freeze up. The river is changing up there. (SRB&A Nuiqsut Interview January 2015)

We went to Ocean Point. No [success]. [Those trips were at] the beginning of summer--June. [We went] probably 10 times--just day trips. I went to Qitik. Then turned around. (SRB&A Nuiqsut Interview November 2014)

[I hunt] mainly all the way south towards Umiraq. Most of the time we stay on [the Colville] over this way to Ocean Point, then we go to this way [to Qitik]. And then we go down [to Umiraq]. [The] majority of the caribou, they'll be around here. (SRB&A Nuiqsut Interview November 2014)

We go wayyyy over here. That's where all the big herds are. Sometimes we go through there [the "shortcut" near Ocean Point]. We just went halfway [into the shortcut] and then went back because it's so shallow. And then we go back through the main river. Sometimes you can make it all the way through and you make it through and come all the way out there. [I went in] August and September. Yeah, and surprising that there's still water in September too; usually its freezing up [by then]. But things are changing. A few times I camped out and a few times were day trips and I came back home, but sometimes when I take my family out we camp. Right around here where Umiraq, is we hang around here and then we go further. Fishing! Good fishing [there]. Same with caribou; they go through here too, they always come on this side and hang right around here. We just set up tents. Just right around there [but not actually to it]; it's too shallow. [We stayed out there] maybe a week. (SRB&A Nuiqsut Interview January 2015)

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 generally 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. Several individuals described traveling toward Umiat and along Chandler River in Year 7 in search of moose and caribou:

After that I came back [from working] and it was August, so we went further up the river. We went out looking for moose, but we had no luck so instead we took three caribou. This was late August. We were almost to Umiat. We were like two turns from Umiat. That was supposed to be a four-day trip, but it ended up being a week. I was supposed to go back to work for Friday, but on the way back I hit a rock and broke my dad's lower unit. We got it out, but it took a couple days. We were able to see Umiat. One time, for six days. (SRB&A Nuiqsut Interview November 2014)

We went up to Umiat. We went to Chandler about nine [bends in]; no, it was just before that Kutchik River – like right here, maybe. Just around the bend from Kutchik [River]. [Anaktuvuk River] was too shallow. Yeah, I always [use the shortcut near Ocean Point]; it comes out just before Umiraq. That's what Umiraq is: Sentinel Hill. A lot of people don't know how to read maps. Yeah – Sentinel is Umiraq. The short cut comes out by Kogosukruk. That was August and September, like every weekend. Six times, maybe seven. We took one three to four day trip and that was to Umiat and inside here [Chandler] and we slept at Shivugak Bluff. (SRB&A Nuiqsut Interview November 2014)

I've been down Chandler a couple times, Chandler River. All the way down. And then, actually, I went as far as just before Umiat this summer - just past Umiat Mountain. And I went a little ways into Chandler, to a little abandoned cabin. Not very far in. You can't even get in that [Anaktuvuk] River. It's too shallow. Once in a great while [I take the shortcut near Ocean Point], but I haven't gone in a couple of years. I hit bottom too many times, so I haven't gone in there. It wasn't worth it. That would be between June and September; my last trip would be August 29th, to be exact. (SRB&A Nuiqsut Interview November 2014)

Summer travel is not limited to hunting by boat. A number of Nuiqsut caribou harvesters, particularly younger hunters, travel by four-wheeler to the west of the community throughout the summer (July/August) and into the fall (September/October) to hunt caribou. The four-wheeling area generally extends west toward Ublutuooh River and Fish Creek, and south and east toward Ocean Point and Colville River.

Respondents frequently described hunting by four-wheeler when hearing reports of caribou nearby the community from other hunters.

Yeah, I did four-wheeler [hunting]. I went from north of Ocean Point all the way from [?]. I went to Fish Creek with four-wheeler once, and that was at [local resident's] cabin. I would follow lake to lake. That was in September and October. For the whole month of September and October I went practically every day, 15 to 20 times total. This is where I got most of my sick caribou. (SRB&A Nuiqsut Interview November 2014)

And in August we bought a Honda and went out quite a bit. Actually, Fish Creek right here. I was actually able to get out toward Fish Creek, but that was too far of a ride. I crossed two creeks, and man, that was a long ride. We went through the Honda trail through the dumps. Yeah, it's all pretty rough. We're just a few miles out. Furthest I went out was 17.5 miles, and that was the furthest trip I did. And we seen some caribou, but we didn't get close enough to get a good shot. And they got away. (SRB&A Nuiqsut Interview November 2014)

They were all scattered around here when we came back from whaling. They were by this lake [south of Nuiqsut]. We have access with a four-wheeler--we go down [by the Napasulu on the east side of the Colville]. They were coming from the west... Three of them, around here; we were on the west side. There's some access out here. [We took a] four-wheeler; they started migrating southward and I just couldn't get to them. We had a quick season alright, but they just couldn't get to the village. We had plenty of caribou coming from the west side, from the Teshekpuk herd. (SRB&A Nuiqsut Interview November 2014)

One Nuiqsut harvester reported heading north of Nuiqsut on his four-wheeler and hunting caribou near CD5, indicating that the caribou were observed in that area throughout the summer and into the fall. He observed,

...then end of July or August, I went out with the four-wheeler five or six or seven or eight times, around these lakes here. Let's see, all around over here is where we went. This area here all the way to CD5 here.... from CD5 I traveled to here [to the west], around this area right here. Right around this way. I get some caribou at CD5. I tried at CD5 but there was quite a few caribou – like 10 to 15. The people that were working there, they keep seeing a lot. My nephew was telling me they were seeing caribou around that area.... I can't remember, practically every day or every other day. Yeah, late August to September I probably went like every other day [by four-wheeler]. Yeah, June, July, August by Honda... Yeah, they were pretty much in that whole area, they still go to that area even though CD5 is there. They are all over that area, they have still been seeing them in that area. (SRB&A Nuiqsut Interview November 2014)

Several respondents reported traveling by four-wheeler along the new Spur Road, which connects the community to the CD5 road, to hunt caribou in Year 7. One individual reported using the Spur Road in April, after it was no longer safe to travel overland by snowmachine, but not yet boating season. He observed,

I did [hunt along the Spur Road] with my four-wheeler. I was on the bridge; you never been on it yet? There is a bridge there. I sold my four-wheeler. It's this one [road], with the bridges. I only went out maybe four trips [along the road] and it was all in a month period [in] April. Right after the snowmachine [season]. I didn't want to [hurt the snowmachine]. I treat my machines really, really good. I don't want to risk it. (SRB&A Nuiqsut Interview January 2015)

Once the snow falls, certain residents continue to hunt in an area similar to their four-wheeling area, but by snowmachine. Once snow cover allows for more extensive snowmachine travel, some Nuiqsut hunters will hunt caribou to supplement their summertime harvests. Winter hunters can travel greater distances overland than they would with four-wheelers. Year 7 winter caribou hunters described traveling in the same area as described above for four-wheelers but also went farther west to Judy Creek, farther south towards the Kikiakrorak and Kogosukruk rivers on the west side of the Colville, and in an overland area between Itkillik and Colville rivers. A couple individuals reported traveling even farther west toward Teshekpuk Lake and south toward Umiat. These activities are sometimes combined with hunting for wolf and wolverine, and in certain cases, wolf and wolverine are the primary target and caribou are harvested as needed on these trips. Several harvesters described their winter caribou hunting activities as follows:

As soon as the lakes and rivers froze up – I’ve got a wide track, heavy snowmachine. [I hunted in the] same area by Fish Creek, by [local resident’s] cabin. Northwest [from Nuiqsut], out here, these creeks, [we] just go around them. I went to Ocean Point this year, too. Go out to those Pingo Hills and look for them at the Pingo Hills too.... Not too many [times out there]... maybe three trips. Yeah, it’s just day trips. The caribous like to hang out this area [west and southwest] every winter. Yeah, they’ll just go back and forth a ways... I think that would be the first part of December. Sometimes you have to go early because there’s hardly any daylight. I went out December too, November and December. (SRB&A Nuiqsut Interview January 2015)

I got a couple caribou last year November. We weren’t too far back, maybe five miles south of Nuiqsut. Yeah, southwest it was actually, because we were going straight up to Ocean Point. Yeah, we went straight back and got some caribou. I went there a total of three times and came home twice with caribou. They were between Ocean point here and I didn’t go past [local elder]’s Camp. They were hanging out there for quite a while last year. They were just about in the same area, they couldn’t have been more than a mile each time. Yeah, they were spread out. Once you get four to five miles out they’re everywhere. (SRB&A Nuiqsut Interview November 2014)

Winter time we’d go toward the west side, because the caribou are coming in from the west, so over by Fish Creek. We’d be on the west side. All the way back to Fish Creek. The caribou come in from the west. The caribous are coming west from the coast to here and out in the Fish Creek, CD5 area. Caribou hunting in this area is tough, because most of these areas [north and west] are closed. You have to have a permit³ to go on CD4, Alpine area, so we go more on the west side. [We start hunting by snowmachine] winter time, somewhere around November. (SRB&A Nuiqsut Interview November 2014)

That was for wolf hunting. That day I covered at least 250 miles round trip. Well, I was looking for wolf tracks, but if I saw a caribou I would kill it. I believe it’s 15 to 20 miles from [resident’s] cabin [on Judy Creek]. I was pretty much straight from Chandler [River] – we followed Price River down, and then I went down the south side of these rivers. From Chandler I would take a shortcut straight back between Itkillik [River]. That’s at least a 250 mile area. That was in February by snowmachine. I was looking for wolf and wolverine and caribou, and that was a day trip. (SRB&A Nuiqsut Interview November 2014)

³ While CPAI does require that local residents follow safety guidelines, no permits are required for local residents to access CPAI roads or development areas.

Characteristics of Caribou Use Areas and Harvest Sites

Study participants characterized their Year 7 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 seven study years have occurred during every month of the year with the most use areas reported between July and August. For Year 7, respondents reported traveling to 50 percent of their caribou use areas during the month of July, followed closely by August, during which they visited 48 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 7 was similar to previous study years, in that they harvested more caribou in July than in any other month, followed closely by August. Year 7 showed a higher percentage of caribou harvests during the winter months (November through February) compared to previous study years.

Figure 1: Nuiqsut Percentage of Caribou Use Areas by Month, Years 1-7

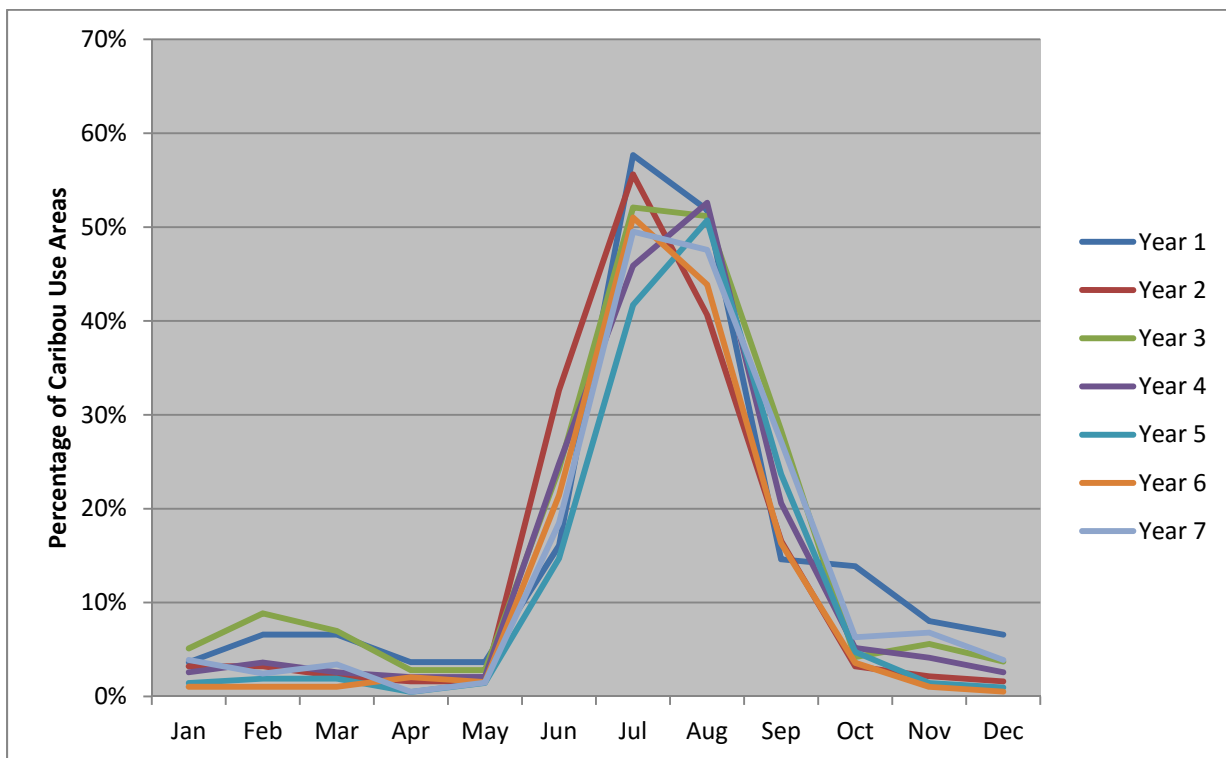
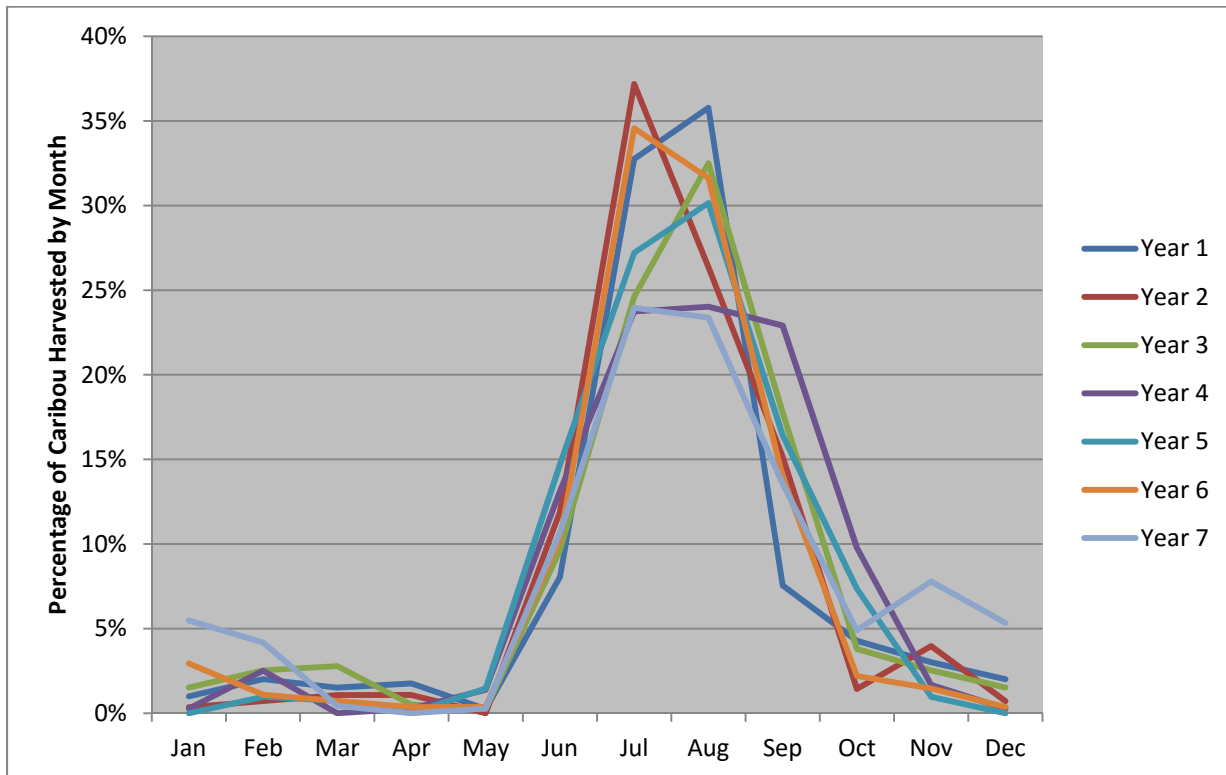


Figure 2: Nuiqsut Percentage of Caribou Harvested by Month, Years 1-7



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. In addition, some residents have expressed a preference for caribou harvested at certain times of the year:

Normally I do summertime, not in the winter. The caribou are fat in the summer and they taste a lot better to me now. (SRB&A Nuiqsut Interview November 2014)

[I went hunting] somewhere in November – this time last year. You have to wait one month. They arrive in October, so a month after that, the fur is better and they’re more tastier. (SRB&A Nuiqsut Interview November 2014)

The caribou are pretty healthy, but you have to go a certain time of year. I try to find the fall migration. If you go too early they’re just getting fat. (SRB&A Nuiqsut Interview November 2014)

Respondents also reported keeping an eye out for caribou during other subsistence pursuits, such as fishing and wolf and wolverine hunting. One individual reported looking for caribou on his way to and from checking fish nets at Fish Creek, while several others described hunting for wolf and wolverine during the winter months and harvesting caribou as needed. Another respondent reported keeping his eye out for caribou during his spring duck hunt. One individual noted that his whaling activities interrupt his fall caribou hunting activities, saying, “[I hunted caribou] from June to August. I’m always busy after then. I was getting ready for whaling, that’s why” (SRB&A Nuiqsut Interview November 2014). A couple also discussed their fall whaling and caribou hunting activities as follows:

Respondent 1: [That was in] July, August, September.

Respondent 2: September you went out whaling, remember?

Respondent 1: It was a short season.

Respondent 2: Oh yeah, after the whaling was over we were trying to stock up for winter.... [We go] as much as we can, yeah, because we are trying to stock up for winter. (SRB&A Nuiqsut Interview November 2014)

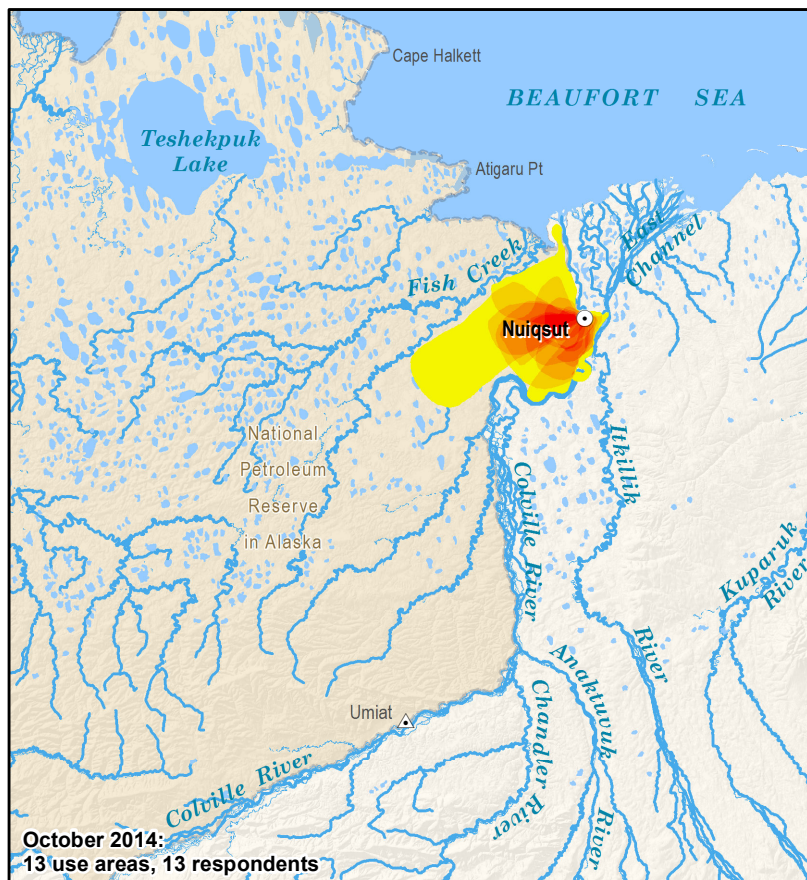
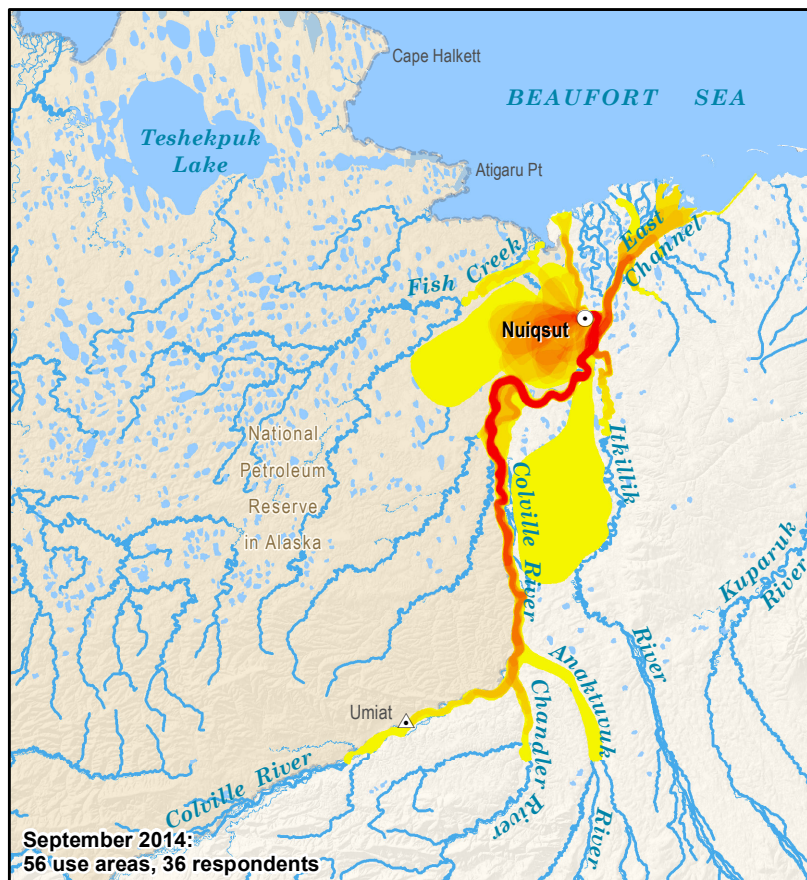
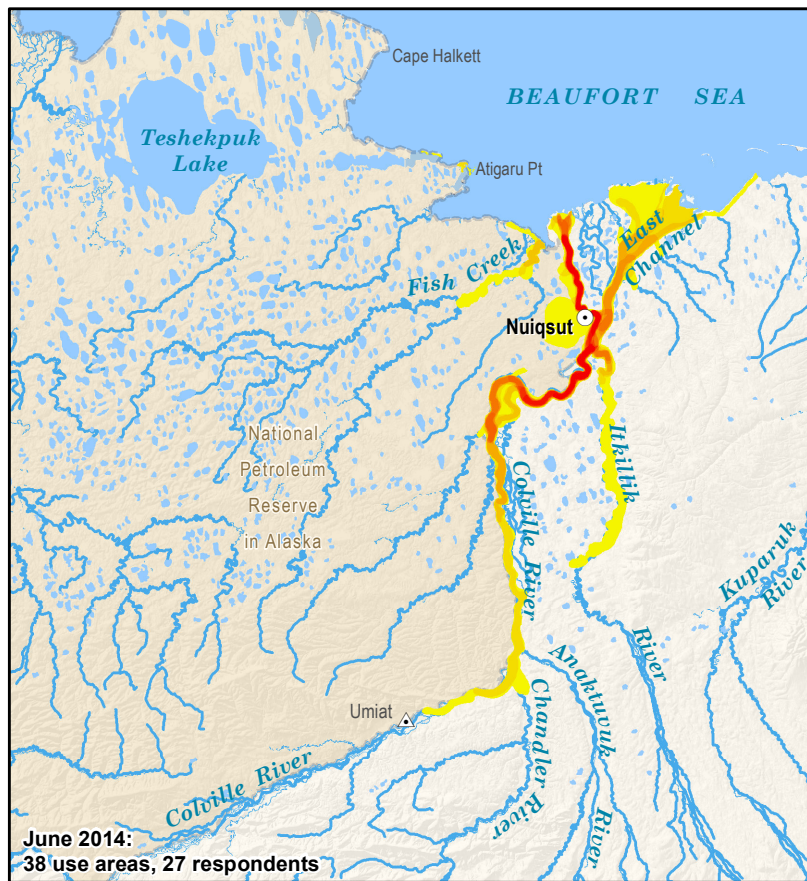
Maps 13 through 16 show Year 7 caribou subsistence use areas and harvest locations by month, and Maps 17 and 18 show the extent of previous study years (Years 1 through 5) as a single polygon, with all harvest locations, by month. According to Year 7 active harvester interviews, during the month of May harvesters reported limited travel along Nigliq channel and the East Channel as well as overland close to the community (Map 13). Respondents only noted a couple of caribou harvest locations adjacent to the community during the month of May (Map 15). Compared to previous years' activities shown (Map 17 and 18), Year 7 use areas in were much less extensive in May than they have been 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.

Map 13 shows that during the months of June through September, Year 7 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 Atigaru Point 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. From July through September, respondents traveled beyond Umiat on the Colville and along the Chandler and Anaktuvuk rivers. As shown on Map 13, Year 7 respondents focused most of their June hunting activities on the Nigliq Channel and along the Colville River as far as Ocean Point. As the months proceeded, harvesters ventured farther from the community by boat, with overlaps increasing along the East Channel in July and upriver toward Sentinel Hill and, to a lesser extent, Chandler River in August and September. Overland travel to the west of the community occurred at lower levels in June, increased in July and August, and peaked in September and October. Harvest locations show a similar pattern, with harvests occurring closer to the community in June, peaking on the East Channel during the month of July, occurring with more frequency upriver from the community (including Itkillik River) during the months of July and August, and concentrating to the west of the community from August to October. Map 17 shows that respondents' June through October travel patterns were similar in previous study years.

Hunting activities were limited primarily to overland travel from October until April (Maps 13 and 14). Residents' overland travel was more limited in October and November, generally occurring within 10 to 15 miles of the community. Starting in December and extending into March, respondents reported use areas extending farther to the west, south, and southeast of the community (Map 14). Winter travel extended west beyond Fish Creek, southwest as far as Judy Creek and Kikiakrorak River, and south to Umiat. Residents also traveled directly south of the community toward Ocean Point and in an area surrounding the Itkillik River. Harvest locations also occurred somewhat close to the community in October and November, and spread outward toward Fish Creek, Judy Creek, Kikiakrorak River, and Ocean Point from December to February (Map 16). In comparison to the previous six study years (Maps 17 and 18), Year 7 respondents traveled in a similar overland area. Harvest locations in Year 7 extended somewhat farther from the community to the west and southwest than in previous years.

Travel Method

Continuing the trend of the previous six study years, Year 7 respondents reported that boats were their principal mode of travel for caribou harvesting activities: 70 percent of caribou use areas in Year 7 were accessed by boat, followed by snowmachine (15 percent), four-wheeler (14 percent) and truck (one percent) (Table 8).



Map 13 Caribou Subsistence Use Areas, May - October, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

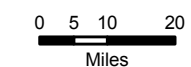
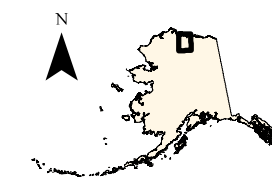
Other areas may have been used for resource harvesting.

LEGEND

Overlapping Polygons

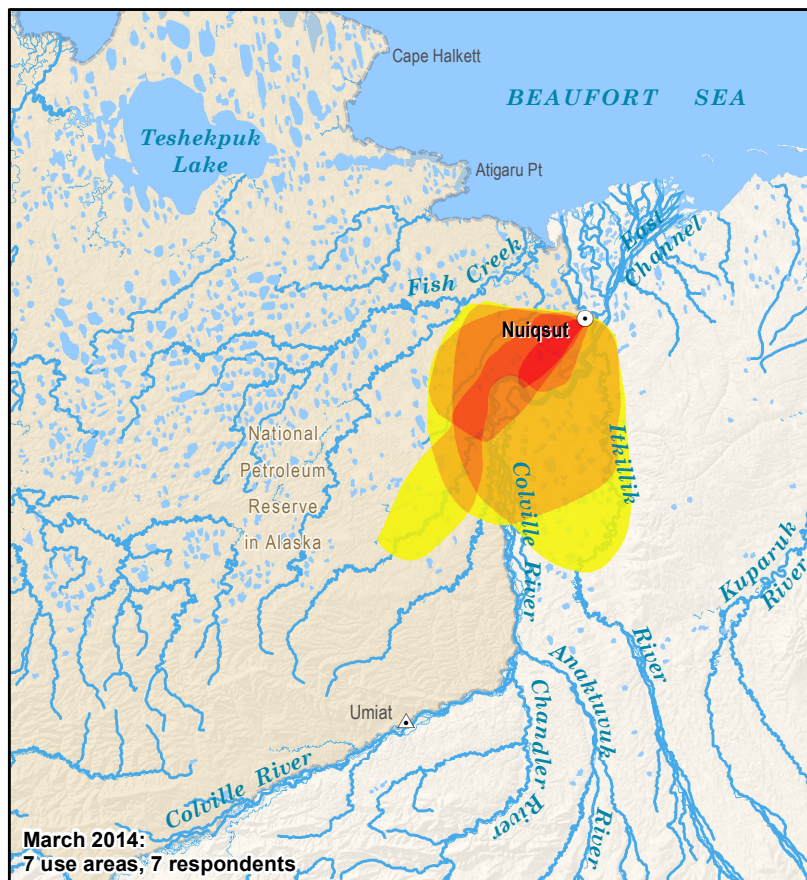
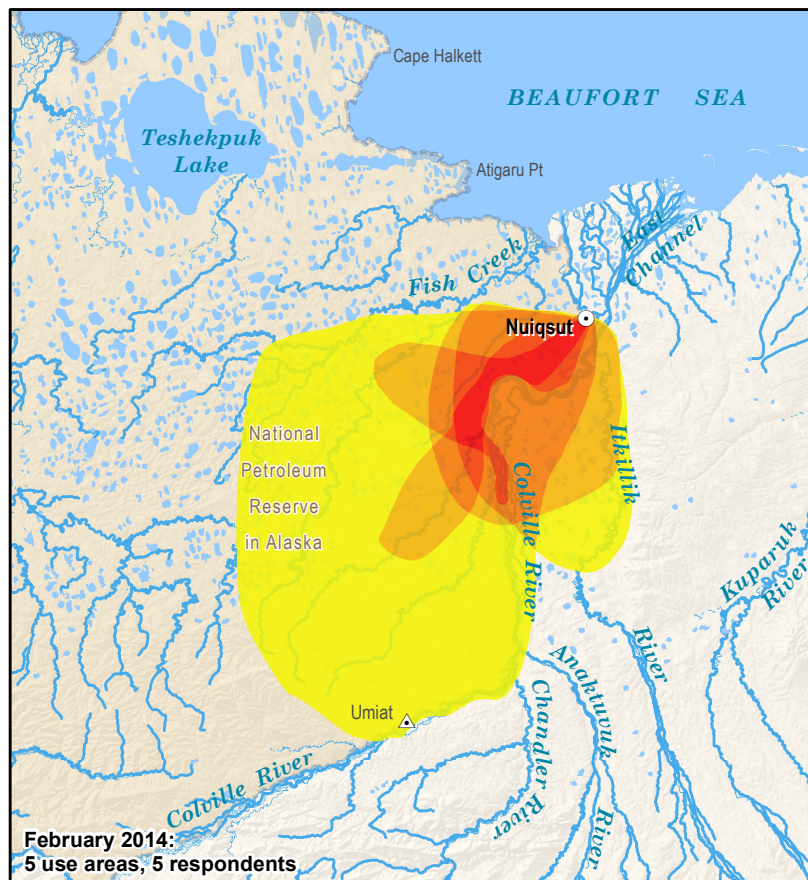
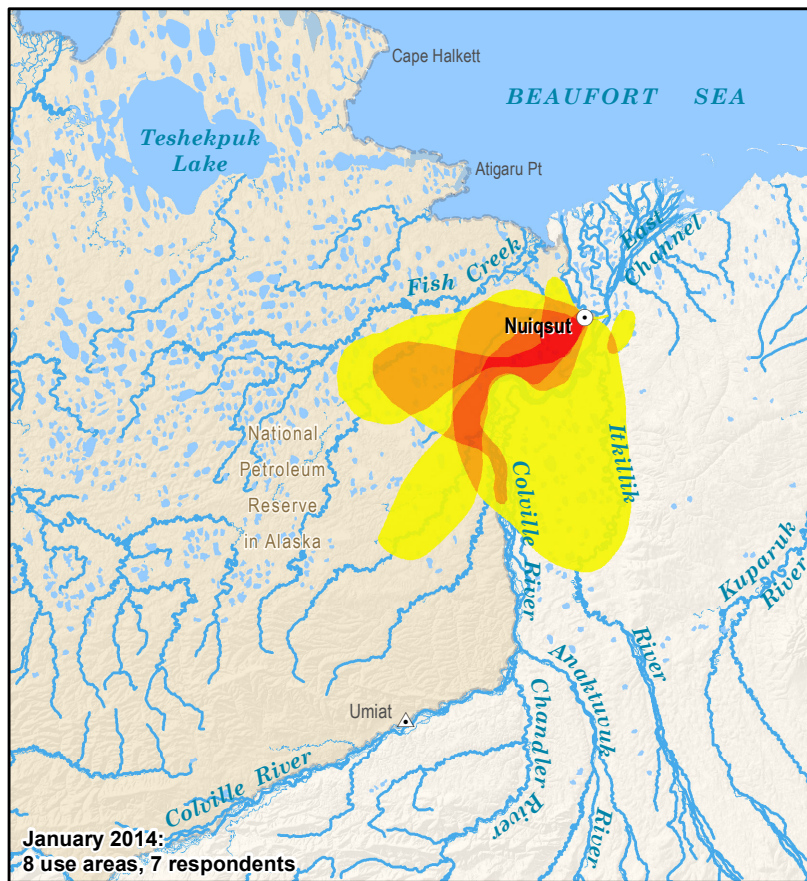
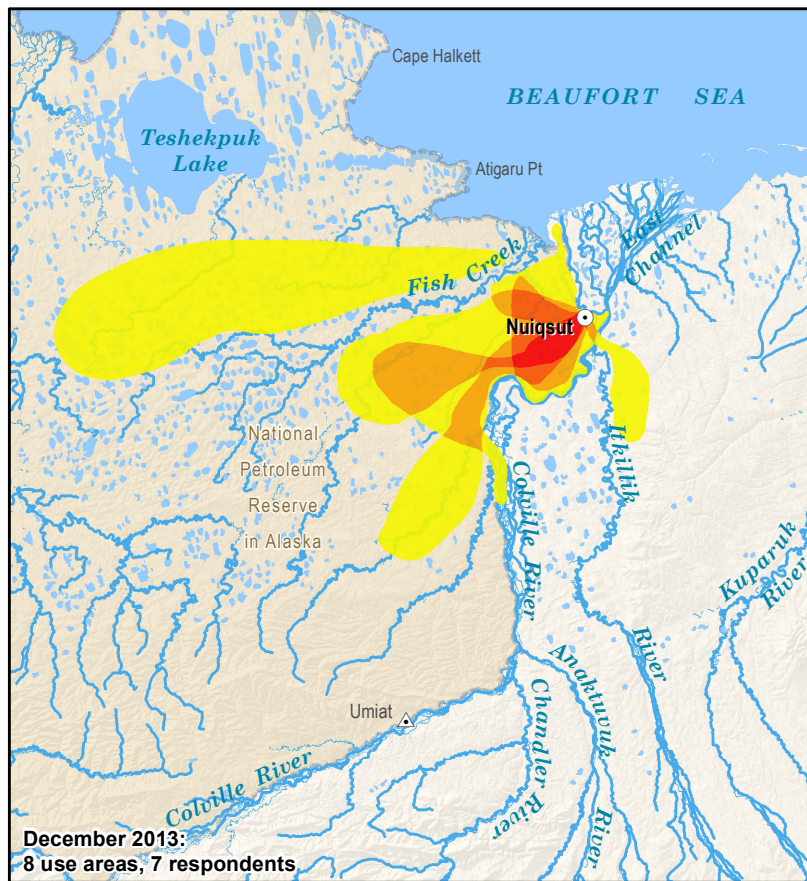
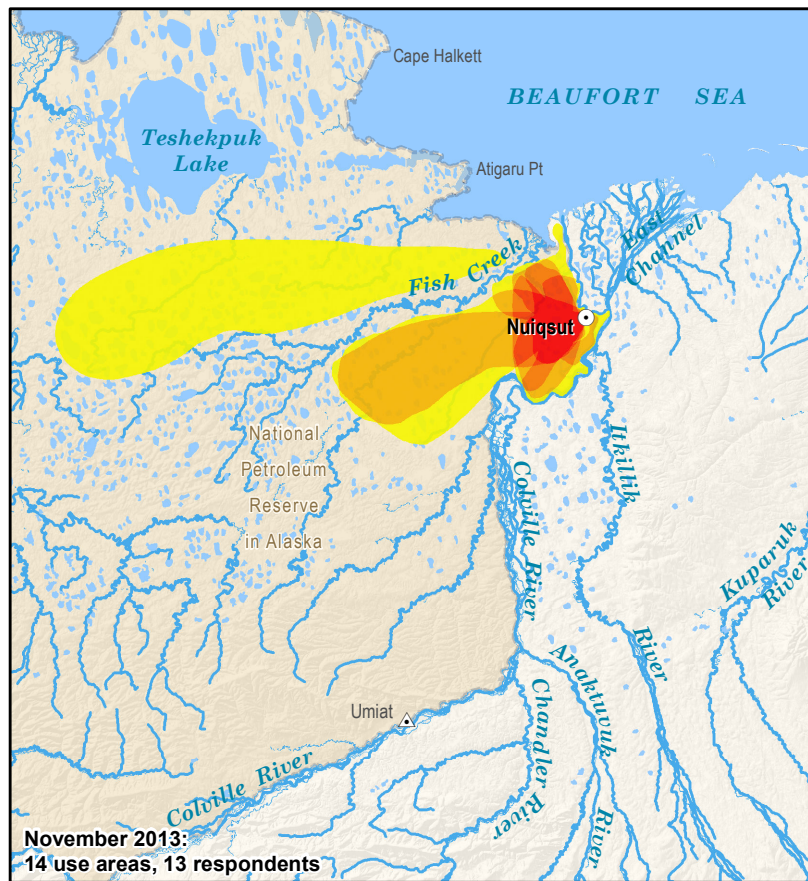


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Map 14 Caribou Subsistence Use Areas, November - April, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

LEGEND

Overlapping Polygons

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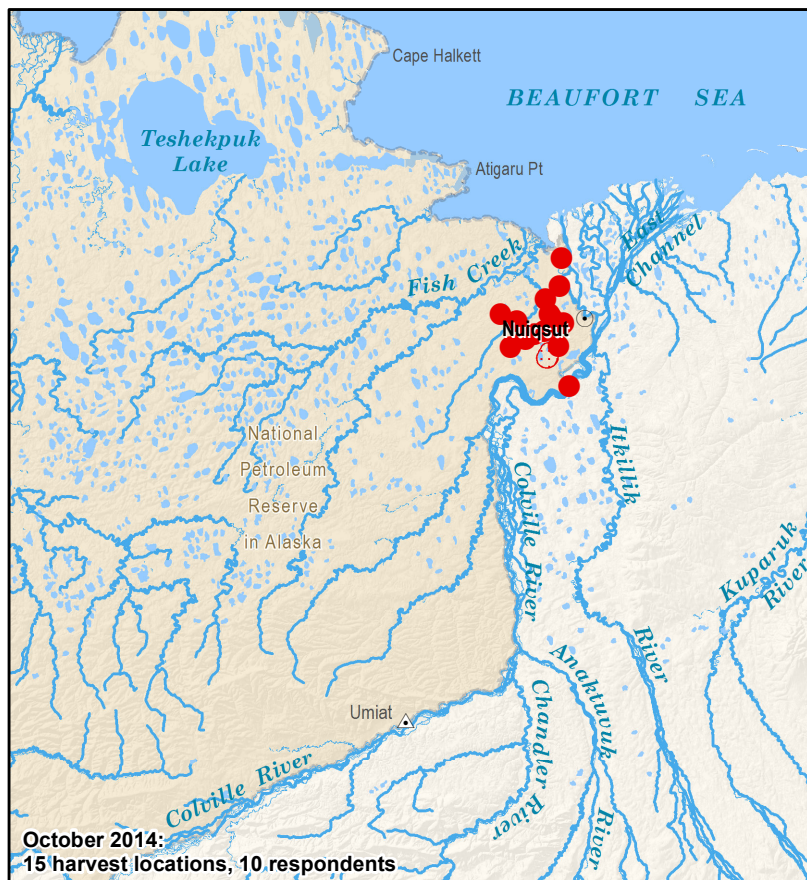
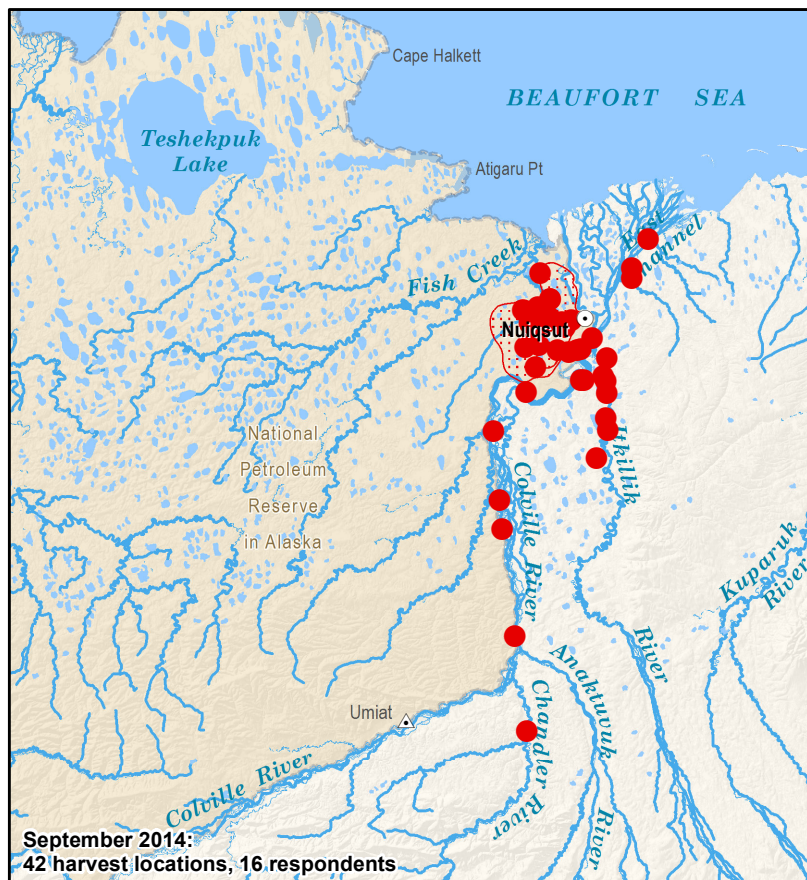
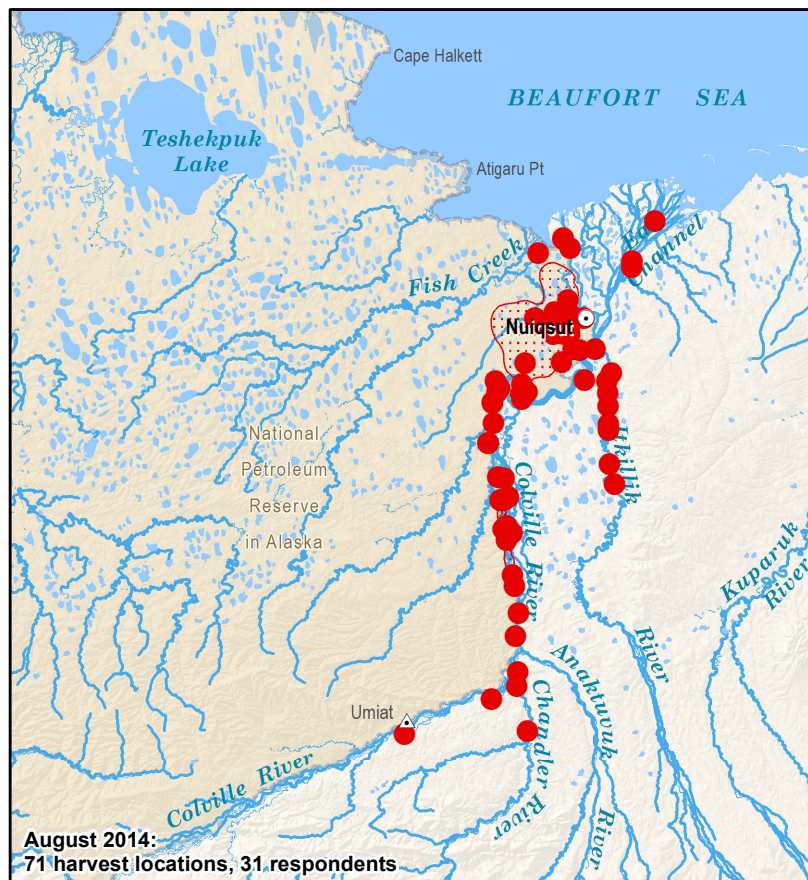
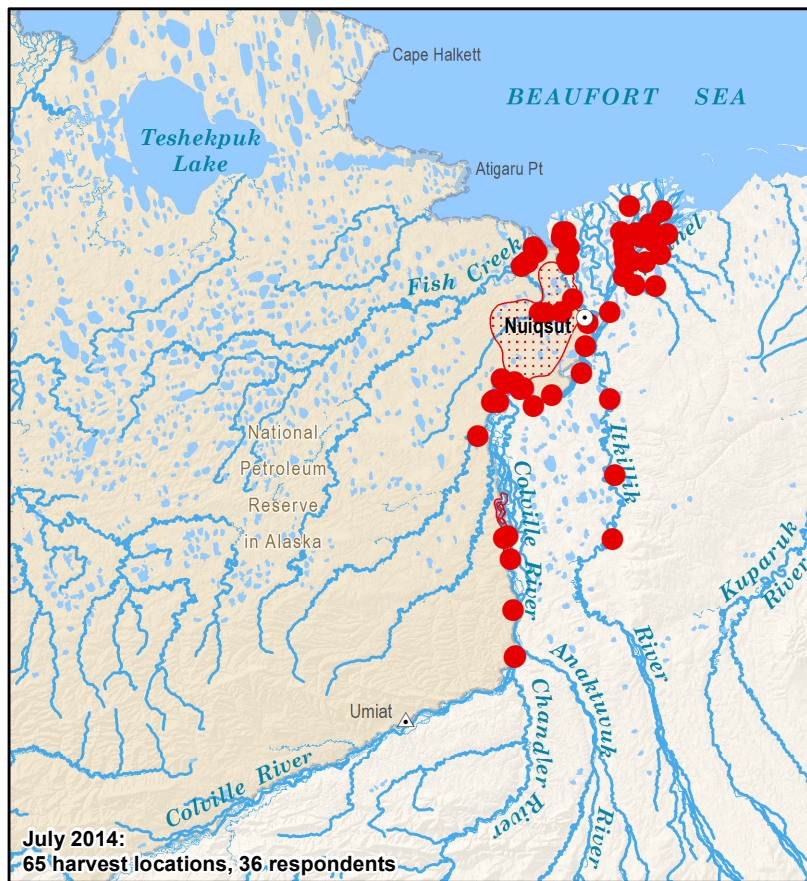
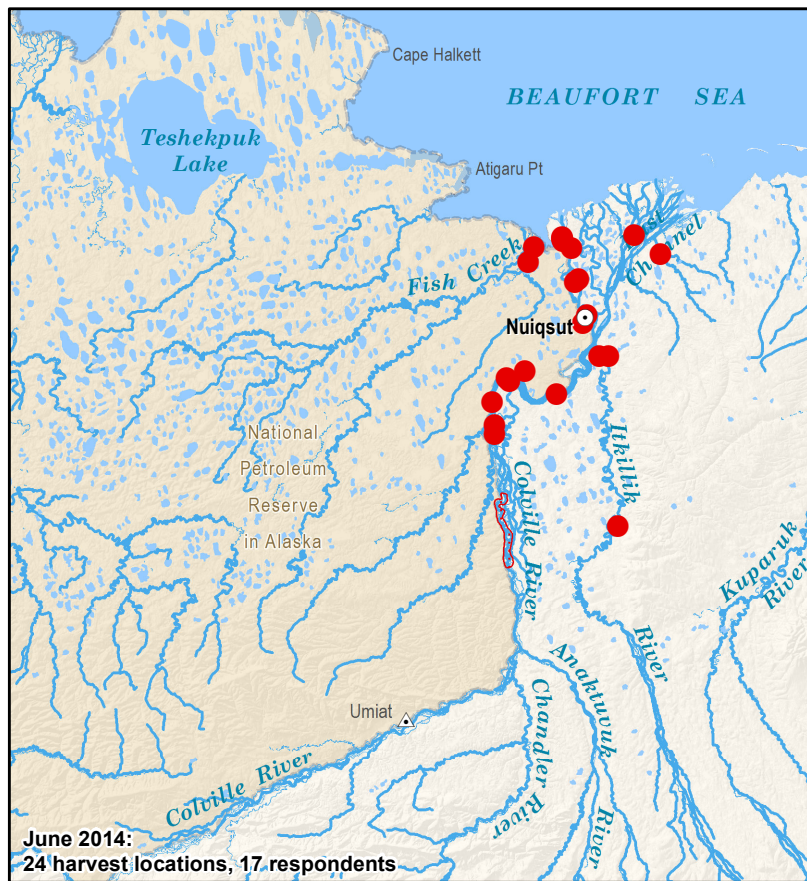
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National Petroleum Reserve Alaska

0 5 10 20
Miles

SCALE: 1:1,800,000

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Map 15 Caribou Harvest Locations May - October, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

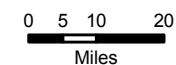
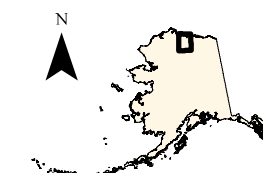
Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations

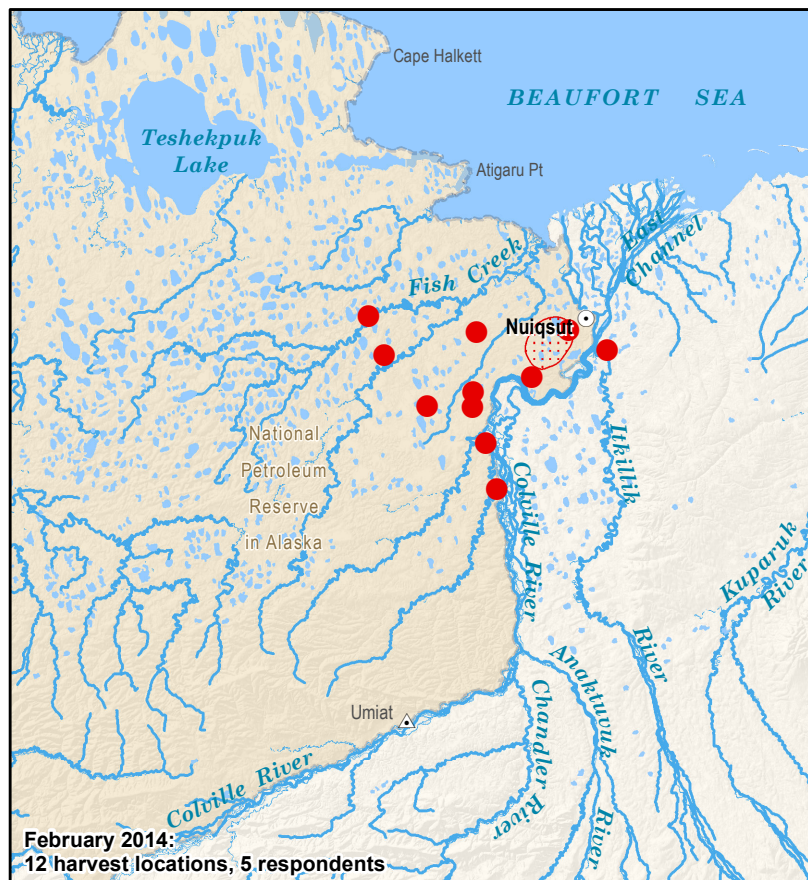
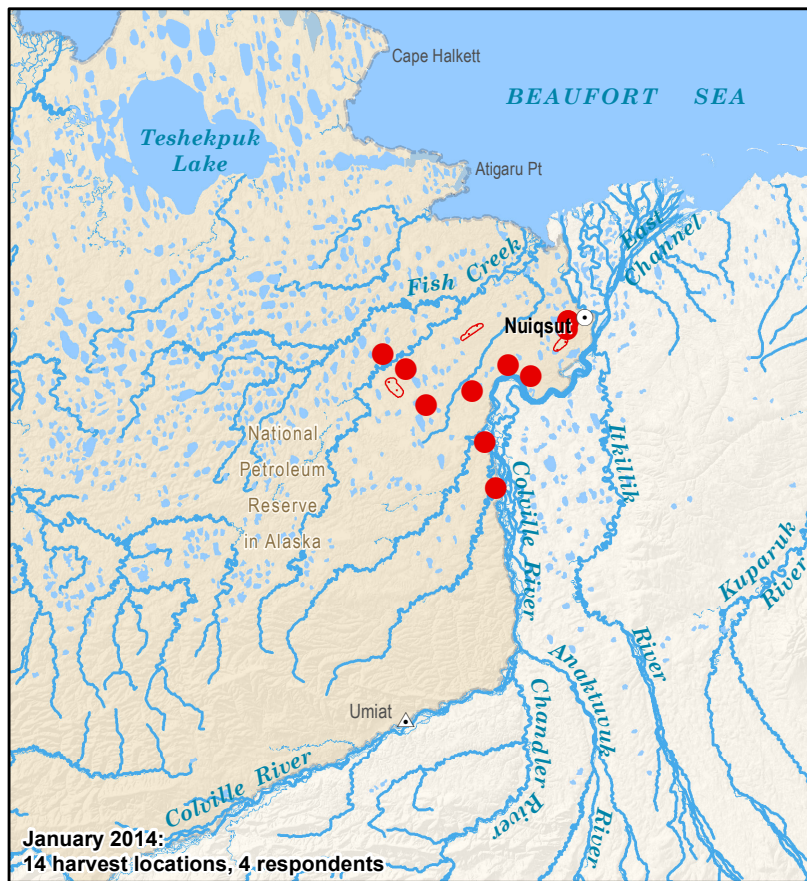
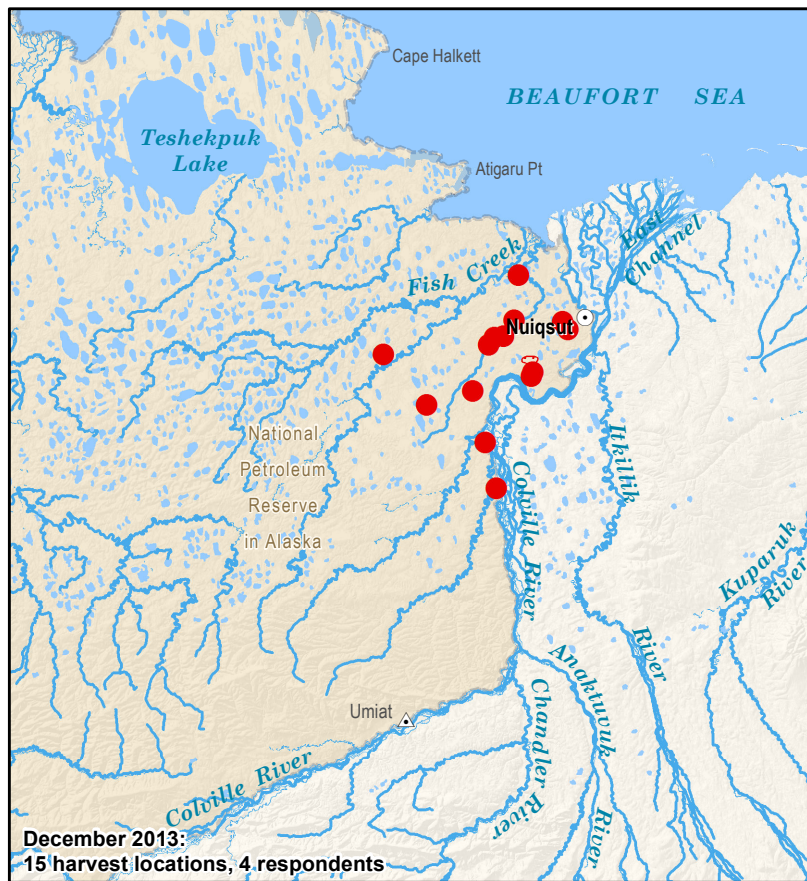


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SCALE: 1:1,800,000

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Map 16 Caribou Harvest Locations November - April, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiq Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

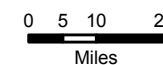
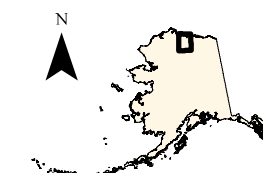
Other areas may have been used for resource harvesting.

LEGEND

Harvest Locations



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SCALE: 1:1,800,000

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Map 17 Caribou Harvest Locations and Use Areas, May-October, 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.

LEGEND

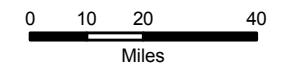
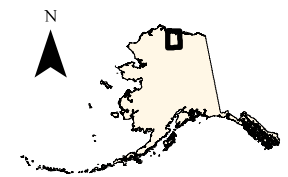
Harvest Locations



Use Areas

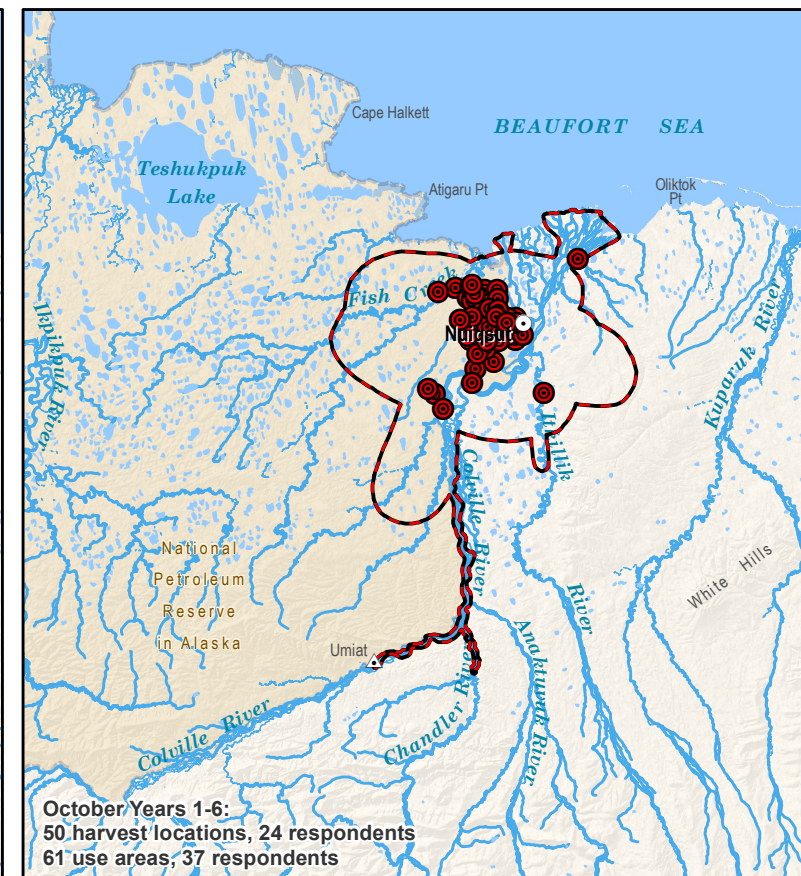
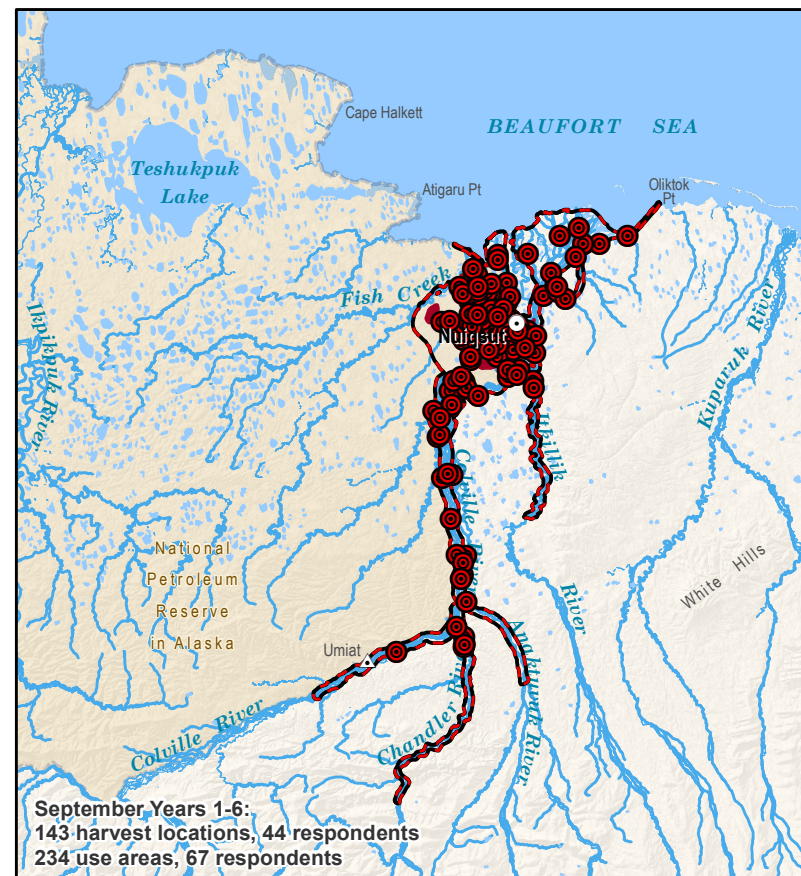
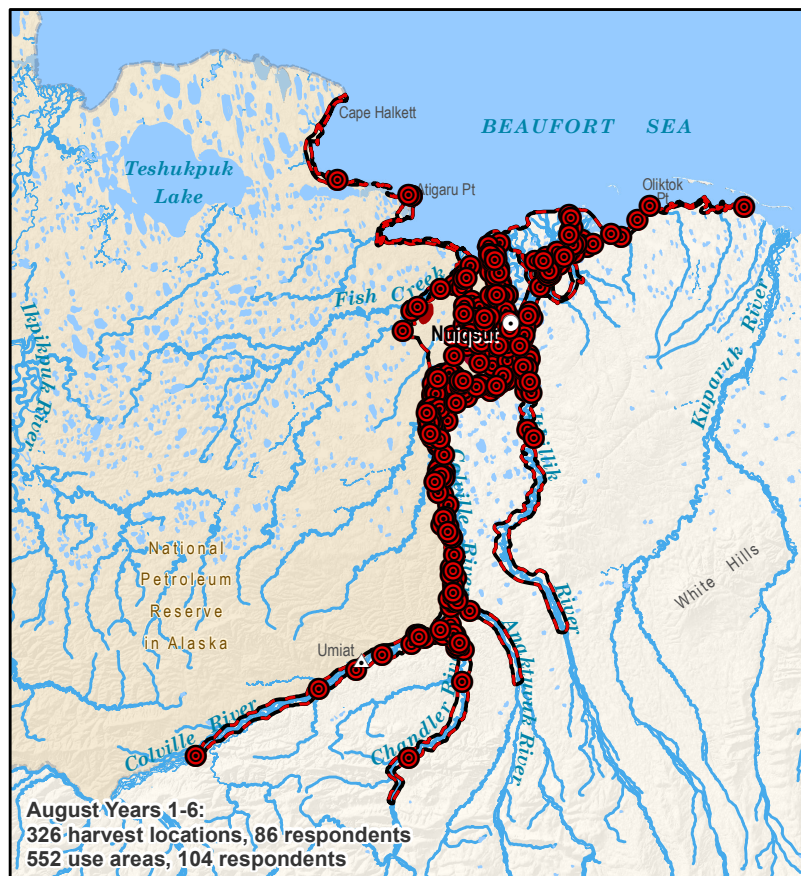
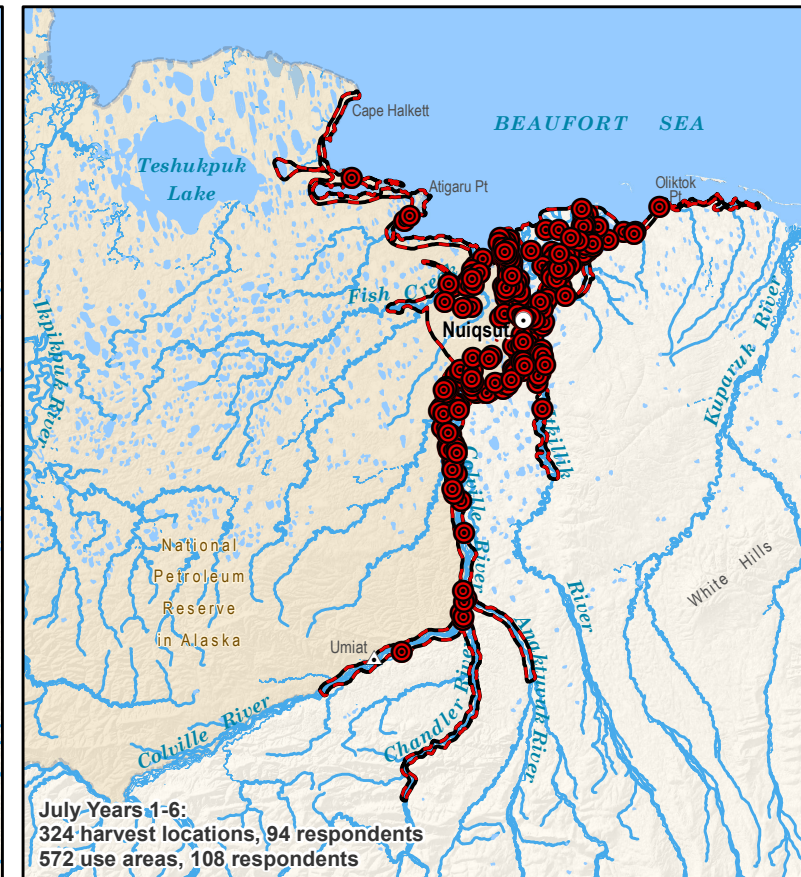
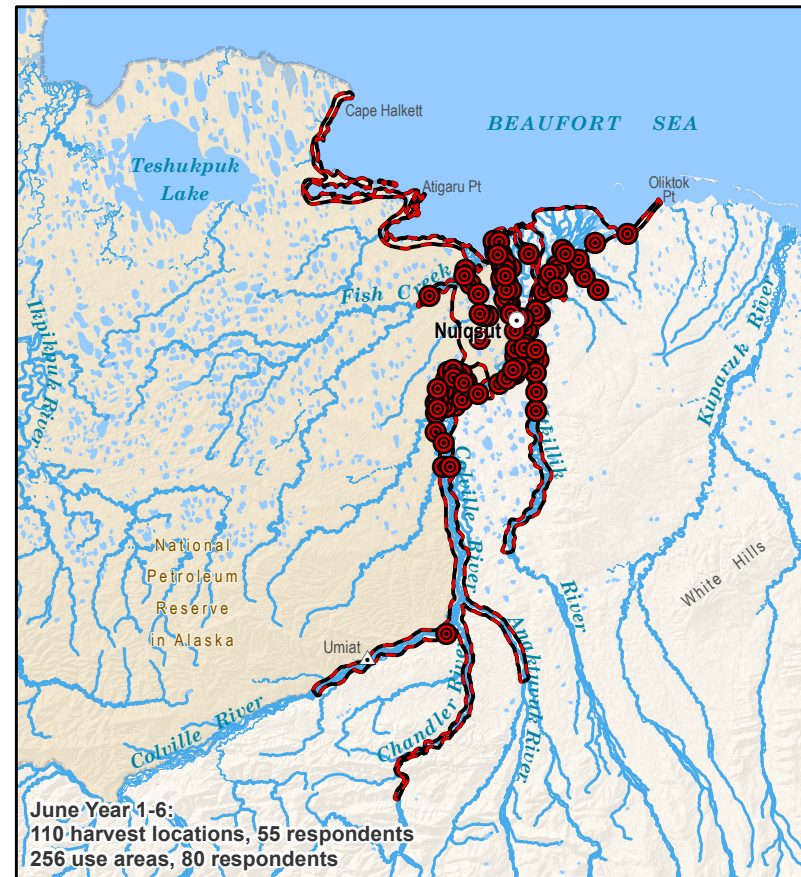
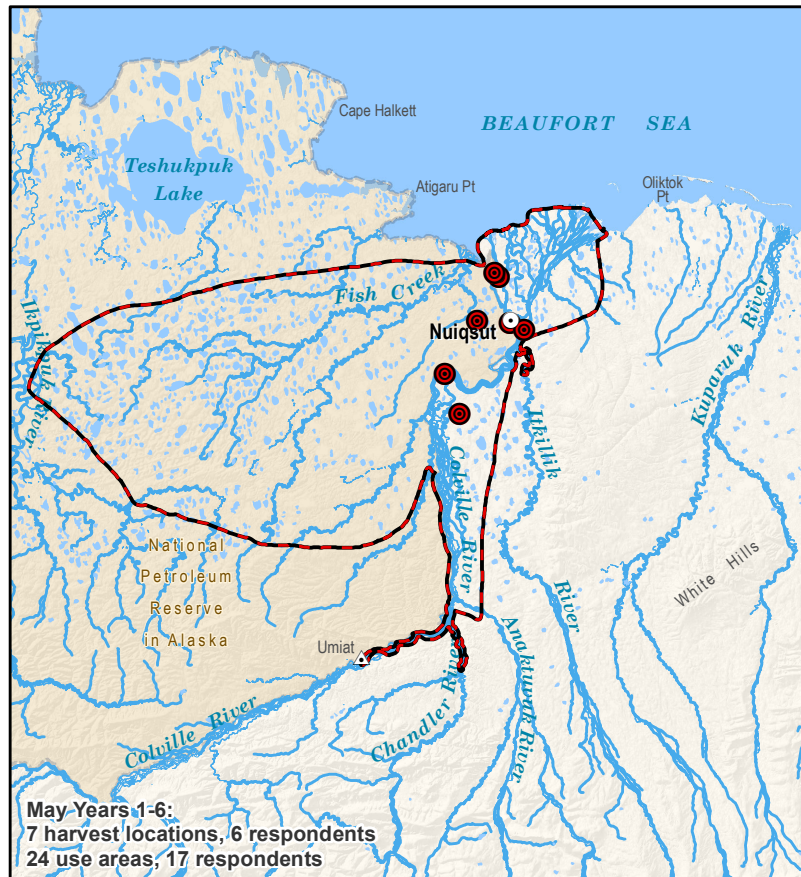


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SCALE: 1:1,500,000

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**Map 18
Caribou Harvest Locations
and Use Areas,
November-April, 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.

LEGEND

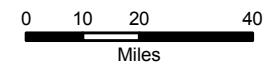
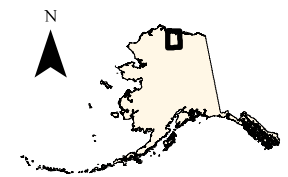
Harvest Locations



Use Areas



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SCALE: 1:1,500,000

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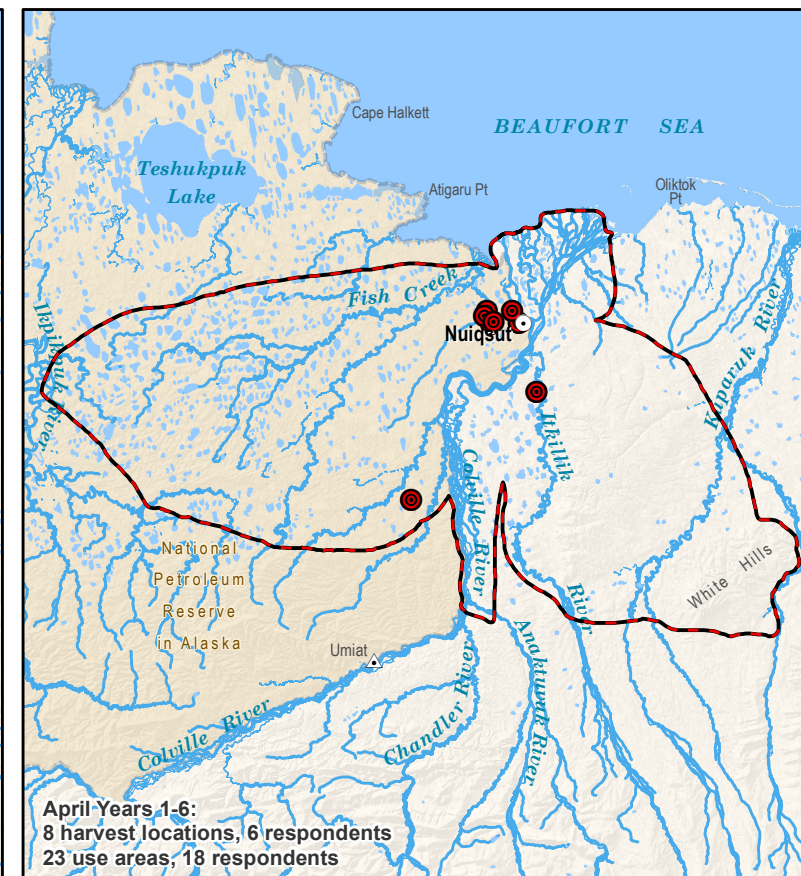
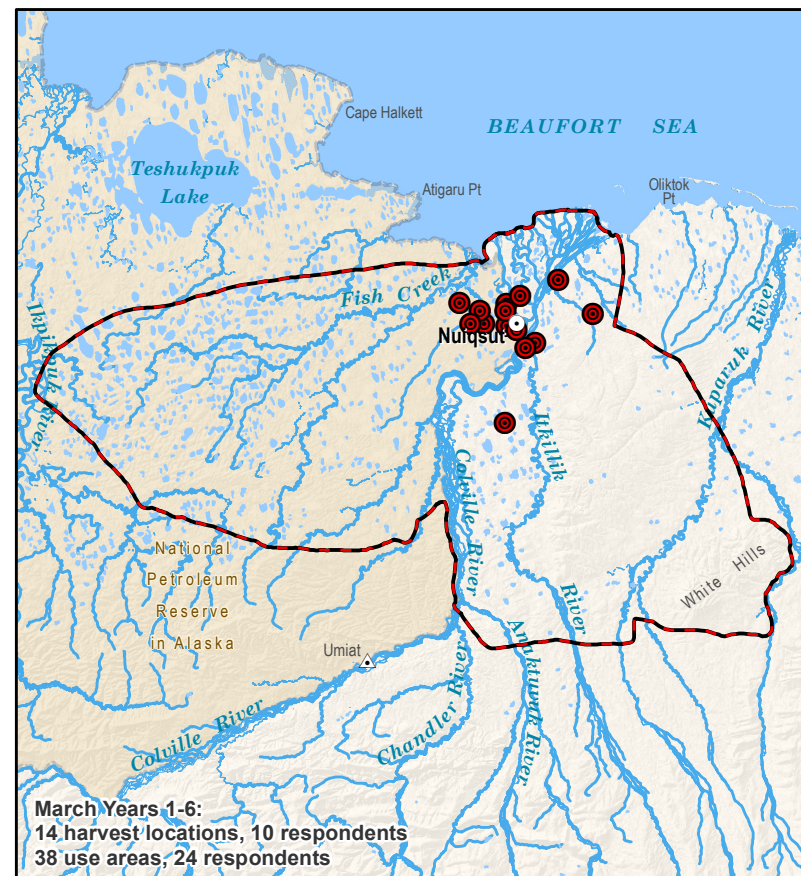
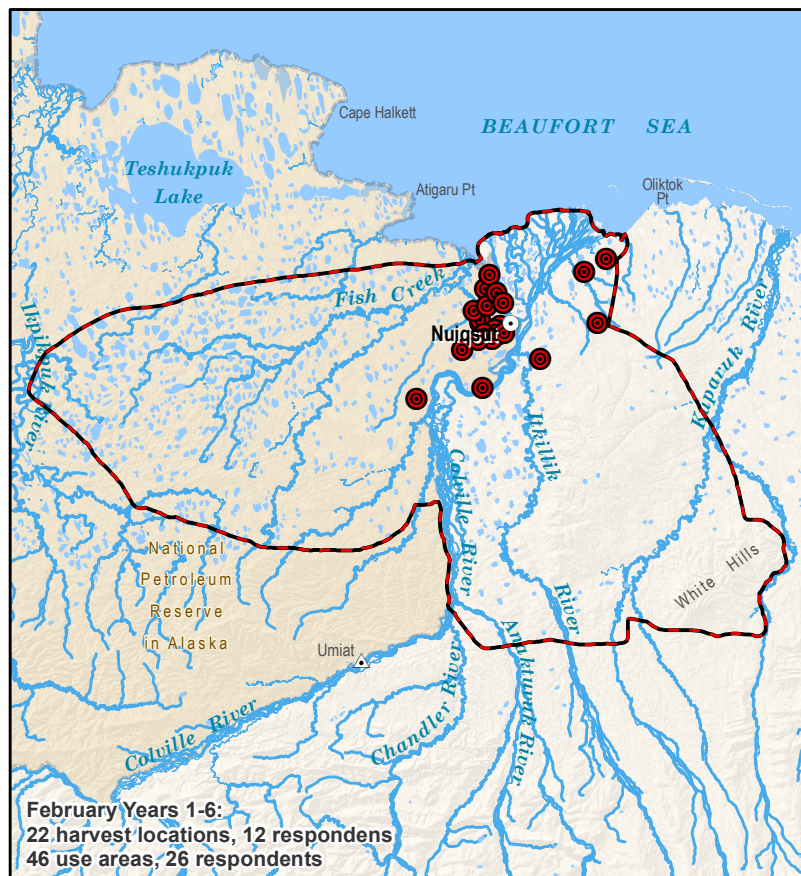
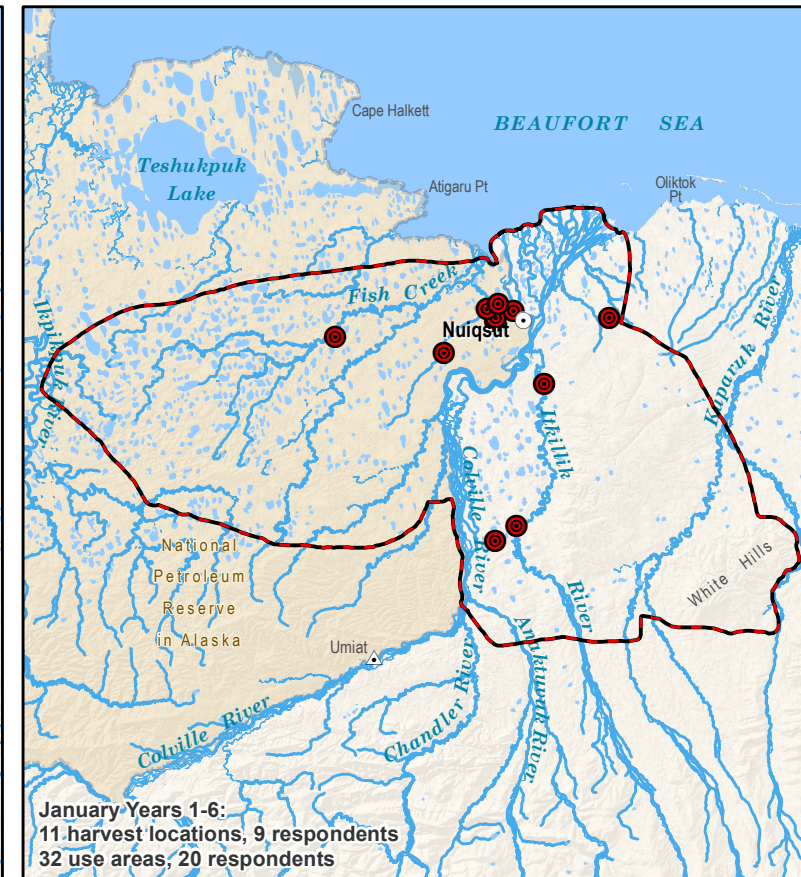
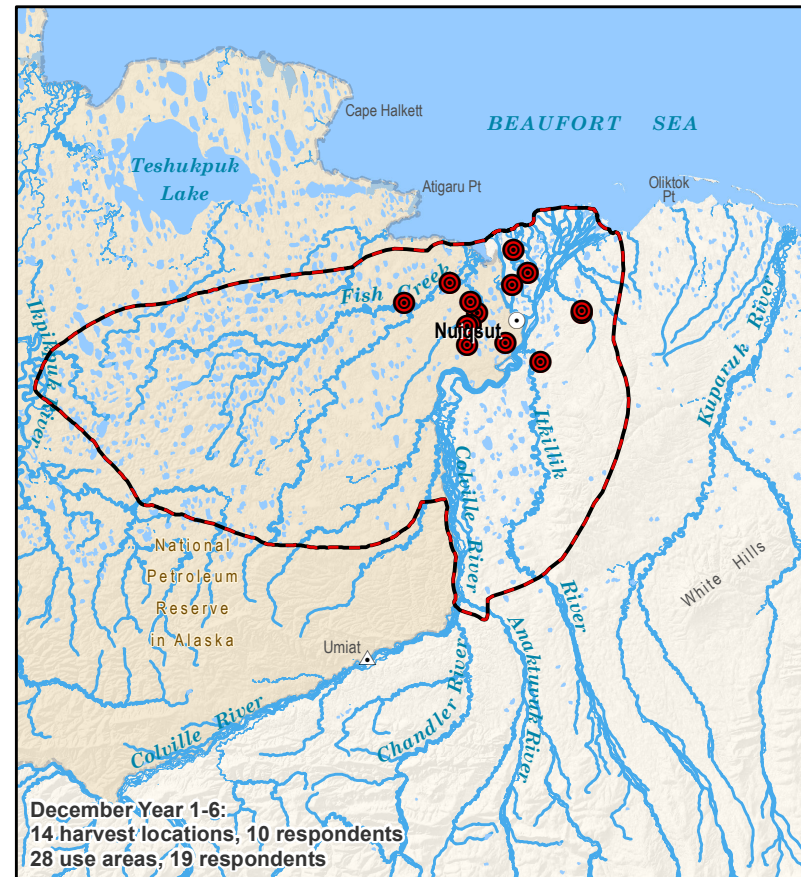
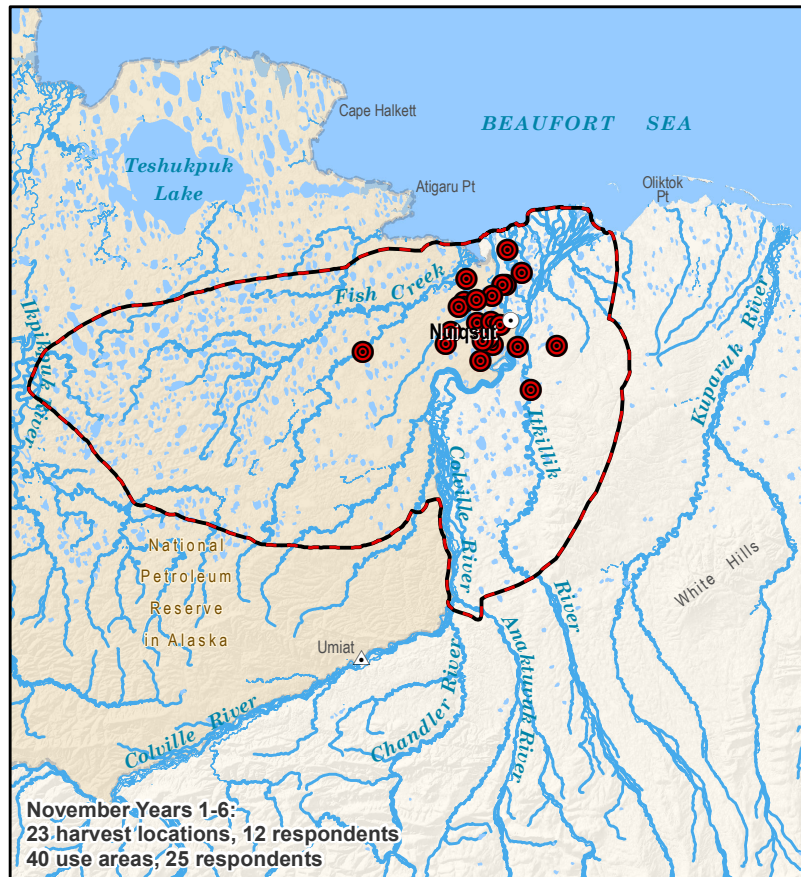


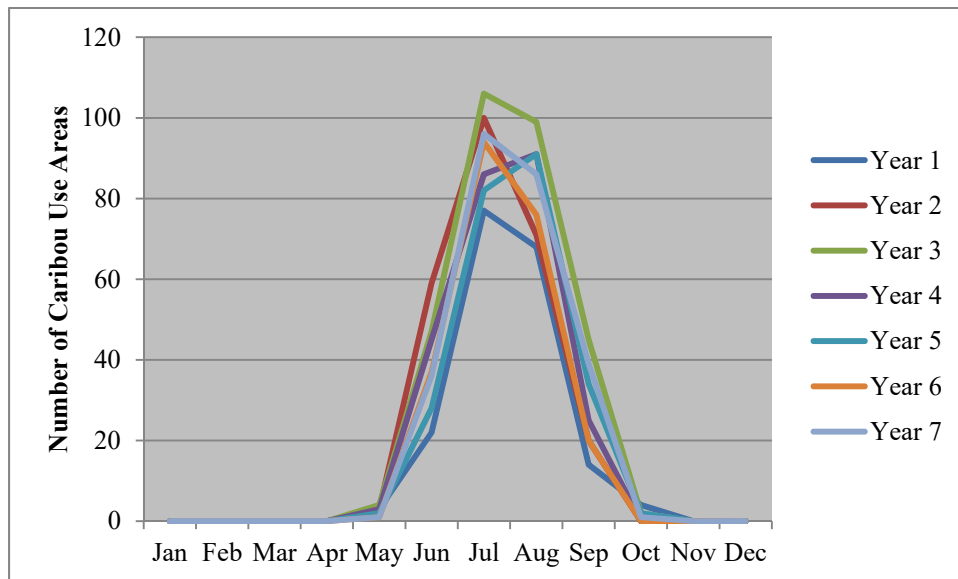
Table 8: Travel Method to Caribou Use Areas

Travel Method	Percentage of Caribou Use Areas						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Boat	74%	80%	74%	80%	74%	77%	70%
Snowmachine	22%	9%	16%	12%	8%	10%	15%
Four-wheeler	4%	9%	9%	9%	17%	11%	14%
Truck	2%	2%	0%	0%	1%	1%	1%
Total	100%	100%	100%	100%	100%	100%	100%

Stephen R. Braund & Associates, 2016.

In general, boat travel begins as soon as the ice breaks up in June and continues until sometime in September when the waterways ice over again; in some years boat travel may extend as late as October. 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 Years 6 and 7 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.

Figure 3: Boat Use by Month, Years 1-7



Stephen R. Braund & Associates, 2016.

Based on respondent observation in Year 7, the rivers broke up in June. One individual recalled the previous spring break-up and noted that they were able to start hunting by boat in early- to mid-June:

June, June 10, roundabout there, like when they first start clearing off the ice.... [Break-up was] around like June 5th, but then we waited five days later because there was a lot of ice packs everywhere. Plus, it was really, really muddy when the ice was still melting. (SRB&A Nuiqsut Interview November 2014)

Residents noted that certain areas are more accessible just after breakup but are too shallow during other times of the year.

Yeah, we actually did [use the shortcut through Putu]. It was around July or so, they were leading the way, it was pretty deep too so I was able to get through. The second time around it was too shallow. (SRB&A Nuiqsut Interview November 2014)

Yeah. Use to come out this way [Putu], but too shallow now, only when the river breaks up can you go through. Yeah, [Itkillik] was too shallow. Only when it was really flooded. Just up to here [on Itkillik]. (SRB&A Nuiqsut Interview November 2014)

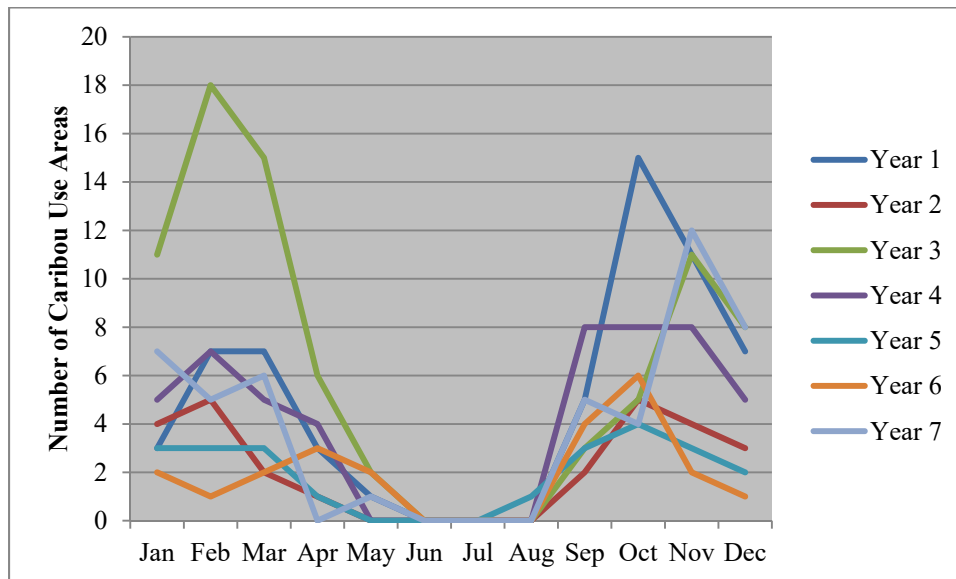
Snowmachine use by active harvesters generally occurs beginning in September through April or May depending on the snow cover. During Year 7, snowmachine use occurred from September through May, with peaks in November, December, and January (Figure 4). In Year 7, 15 percent of use areas were accessed by snowmachine, which is a five percent increase from Year 6. Several respondents noted first using their snowmachine in Year 7 during September:

I just went up to Fish Creek [by snowmachine]. There's cabins up here. Just a straight...Yeah. And that's like in, uh, early September. Yeah I was surprised [that there was snow then] too. There was like six inches then. (SRB&A Nuiqsut Interview January 2015)

In late September, I went to the first lake here around Ublutuoch [by snowmachine]. (SRB&A Nuiqsut Interview November 2014)

No, I was around this area here in the winter [west of the community, following Judy Creek], and then straight back to Nuiqsut. September to October [I went snowmachining]. In October I got one bull and three females. That was my second time [out by snowmachine]. (SRB&A Nuiqsut Interview November 2014)

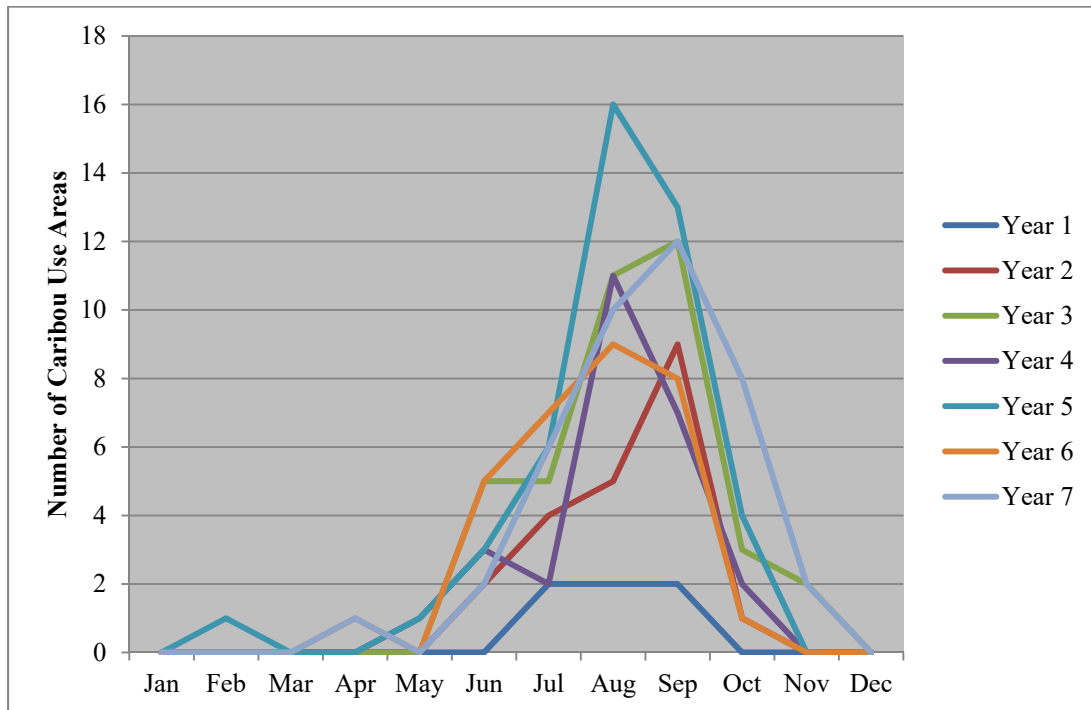
Figure 4: Snowmachine Use by Month, Years 1-7



Stephen R. Braund & Associates, 2016.

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 7 respondents followed this pattern except that one respondent reported using a four-wheeler in the month of April.

Figure 5: Four-wheeler Use by Month, Years 1-7



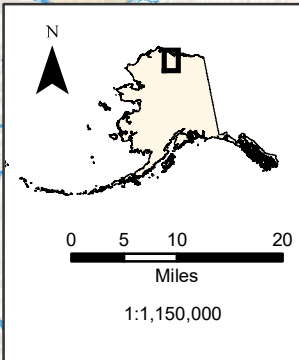
Stephen R. Braund & Associates, 2016.

In addition, a higher number of use areas were accessed by four-wheeler in October than in previous study years. Overall, respondents reported accessing a higher percentage of use areas with four-wheelers during the past three study years (Years 5, 6, and 7; 17 percent, 11 percent, and 14 percent, respectively) than during previous study years, when four-wheelers accounted for less than 10 percent of use areas. In Year 7, respondents' four-wheeler use peaked in November and December. The ability to travel by four-wheeler opens up access to larger overland areas during the summer and fall. One individual noted,

It was around mid-July I went for caribou, with four-wheeler. I just bought a four-wheeler last summer so I went out a lot this last summer.... This [area] is new [to me] because I had a four-wheeler. But the rest [of my areas] are the same. You almost never see caribou by the river, so now I can take my four-wheeler [to access them]. (SRB&A Nuiqsut Interview November 2014)

Development of the Spur Road in Year 7 may be one cause for increased four-wheeler use in Year 7, particularly to the north of the community toward CD5.

Caribou use areas by transportation method are shown on Maps 19 through 24. Map 19 shows that Year 7 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 7 are similar to those for previous years, but do not extend as far along the coast or along the Colville, Chandler, and Itkillik rivers, as some previous years (Map 20).



Map 19 - Method of Transportation to Caribou Use Areas, Boat, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014

High 144 caribou areas used by 55 respondents
Low

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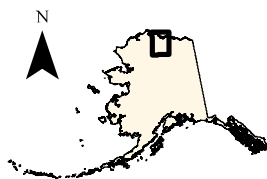
Map 20 - Method of Transportation to Caribou Use Areas, Boat, Years 1-6

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 114 active harvesters from March 2009 through November of 2013.

Other areas may have been used for resource harvesting.

Years 1-6: January 2008 - October 2013

 874 caribou areas used by 112 respondents



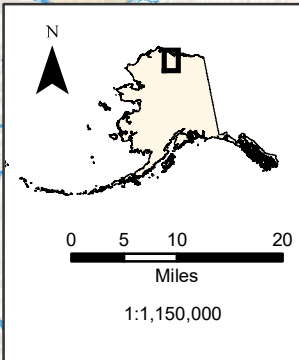
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Miles

SCALE: 1:1,310,000

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Map 21 - Method of Transportation to Caribou Use Areas, Fourwheeler and Truck, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014

High 30 caribou areas used by 25 respondents
Low

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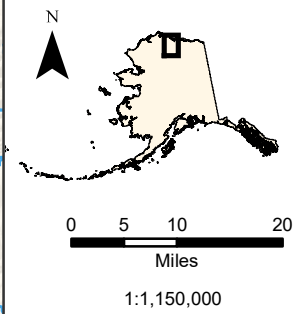
Map 22 - Method of Transportation to Caribou Use Areas, Fourwheeler and Truck, Years 1-6

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

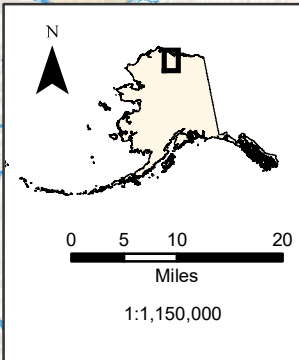
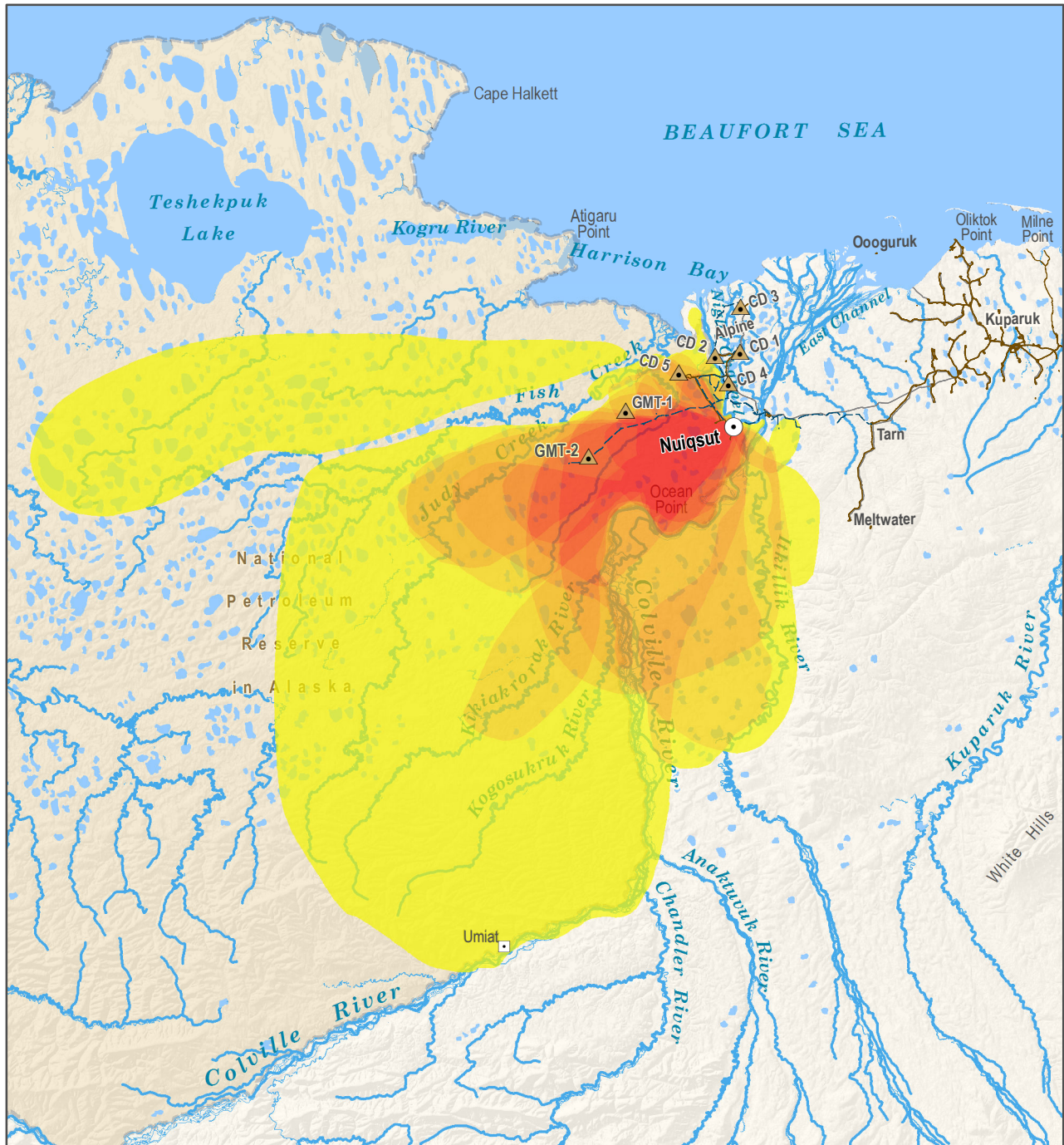
Years 1-6: January 2008 - October 2013

 126 caribou areas used by 56 respondents



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Map 23 - Method of Transportation to Caribou Use Areas, Snowmachine, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

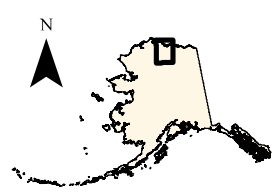
Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014

High 31 caribou areas used by 26 respondents
Low


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0 5 10 20
Miles

SCALE: 1:1,310,000


Map 24 - Method of Transportation to Caribou Use Areas, Snowmachine, 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.

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Years 1-6: January 2008 - October 2013

 138 caribou areas used by 52 respondents

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Respondents note that the type of boat they have affects where they can travel. Jet boats generally allow residents to travel in shallower waters. Several individuals described their experiences navigating areas such as Itkillik River, the shortcut near Ocean Point, and Anaktuvuk River:

[I used a] regular propeller boat, my boat only weighed about 350 pounds. Probably over kill on the motor but gets me where I want to go. Yeah, it was way too shallow I couldn't go anymore. (SRB&A Nuiqsut Interview November 2014)

No I wouldn't take my buddy's boat through [the shortcut]. He has a big boat. He's thinking about getting a better boat. He wants to get maybe a jet boat. Just once [up the channel]; he doesn't like going up that far. He wants to get a boat and take a couple day trips up there. (SRB&A Nuiqsut Interview January 2015)

We went in there, Anaktuvuk [River]; we went right to there and it was shallow, super shallow – we went way in there! We had a jet boat; I wasn't scared to get stuck! We went out there, way out there, and it was a different story in there – it was like I was in the middle of Alaska, beautiful, big branches. (SRB&A Nuiqsut Interview November 2014)

In Year 7, four-wheeler/truck 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 toward Fish Creek. A majority of four-wheeler use areas extended west toward the Ublutuoch River or south toward Ocean Point. Year 7 four-wheeler activity (Map 21) was very similar to Years 1 through 6 (Map 22), but did not extend as far as Fish Creek or to coastal areas in the north. A slight increase in activity to the north of the community along the new Spur Road is evident in Year 7.

Compared to hunting by four-wheeler, snowmachine hunting generally occurs over a larger area and varies the most from year to year. During Year 7, respondents traveled past Fish Creek and Judy Creek in the west, north almost to the Beaufort Sea coast, and south to Ocean Point and around the Kikakrorak, Kogosukruk, and Itkillik rivers (Map 23).

Differences in the maximum extent of hunting areas may reflect overall changes in overland travel or it may be a product of differences in the yearly sample. In Year 7 hunting by snowmachine was somewhat more common than in the previous couple of study years. 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.

Harvest Success

Table 9 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 7, successful harvests occurred in 61 percent of use areas, within the range of the previous five study years. In Year 7, the average number of caribou harvested per use area (2.6) was the second highest of all study years after Year 1 (2.7) (Table 10). In the previous five years, the average number of caribou harvested per use area ranged from 1.4 (Year 6) to 1.7 (Years 3 and 4). The average number of caribou harvested at each individual harvest location was also slightly higher in Year 7, at 2.2 caribou per location compared to between 1.7 and 2.0 caribou during previous study years.

Table 9: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests, Nuiqsut, Years 1-7

Success Response	Percentage of Caribou Use Areas						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Yes (successful)	78%	61%	58%	55%	64%	54%	61%
No (unsuccessful)	22%	39%	42%	45%	36%	46%	39%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Use Areas	137	187	215	194	211	196	206
Chi Square $p = 0.000$							

Stephen R. Braund & Associates, 2016.

Table 10: Mean Number of Caribou Harvested Per Harvest Location and Subsistence Use Area

Mean Number	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Mean Number Caribou Harvested Per Harvest Location	2.0	1.7	1.8	2.0	1.7	1.8	2.2
Mean Number Caribou Harvested by Use Area	2.7	1.5	1.7	1.7	1.6	1.4	2.6
Number of Respondents	36	53	57	58	56	57	57

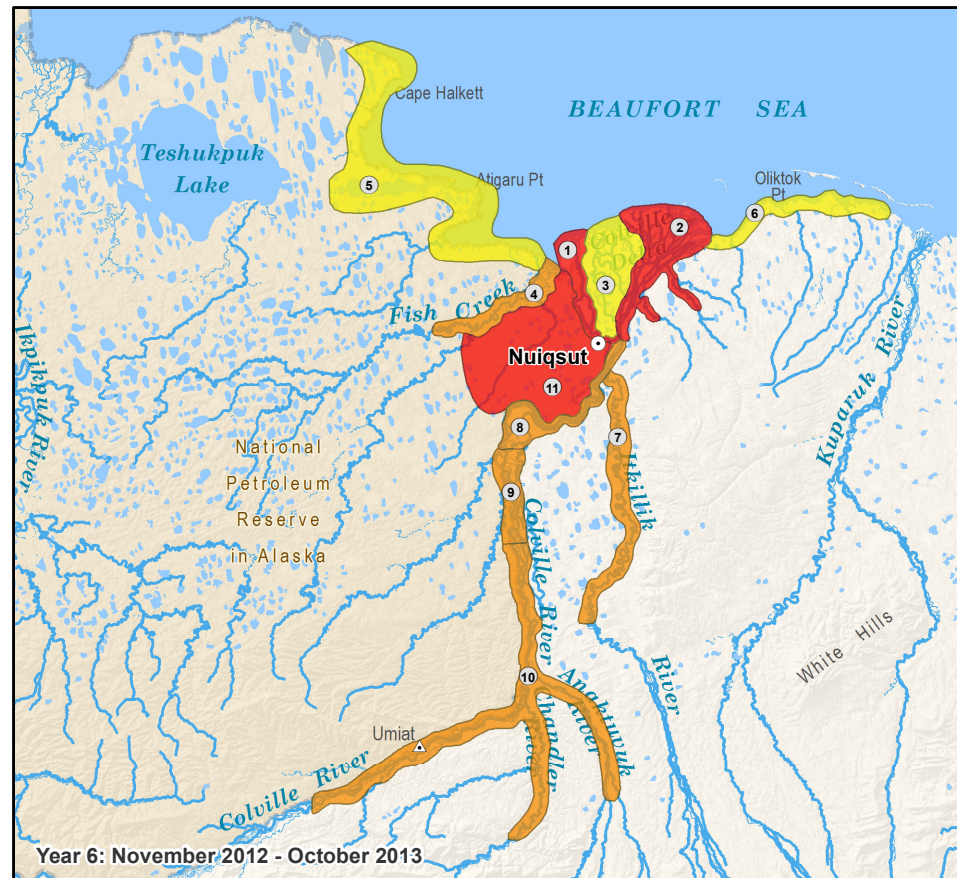
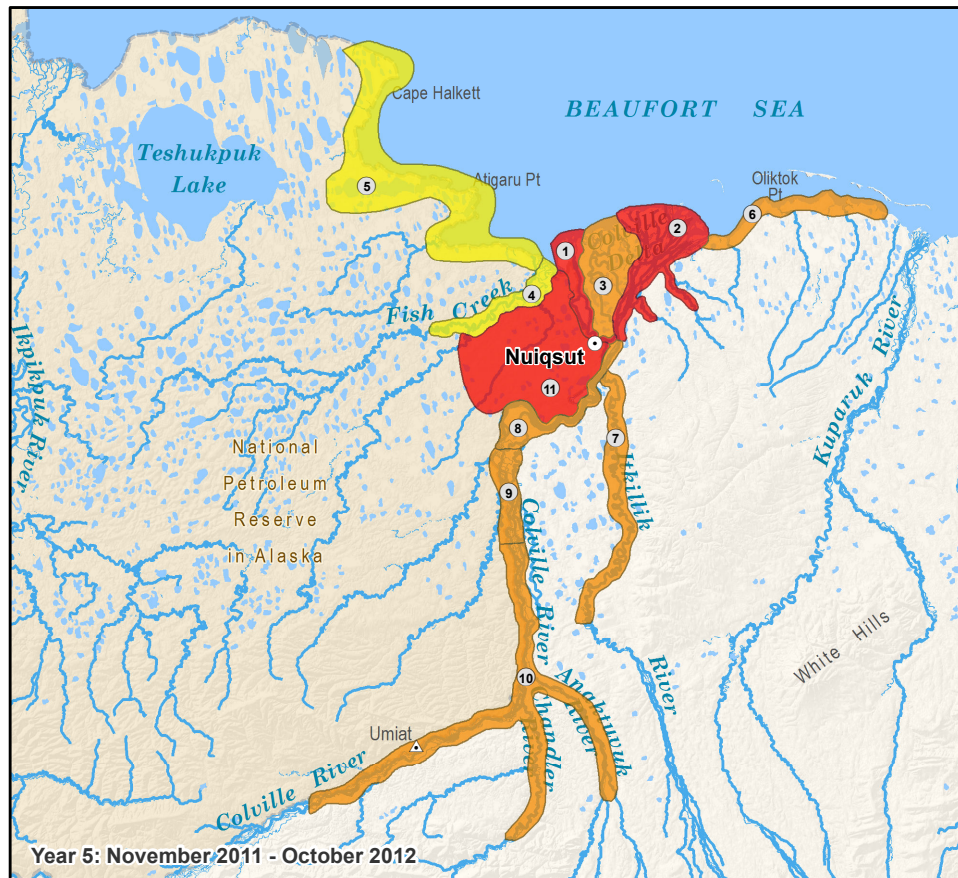
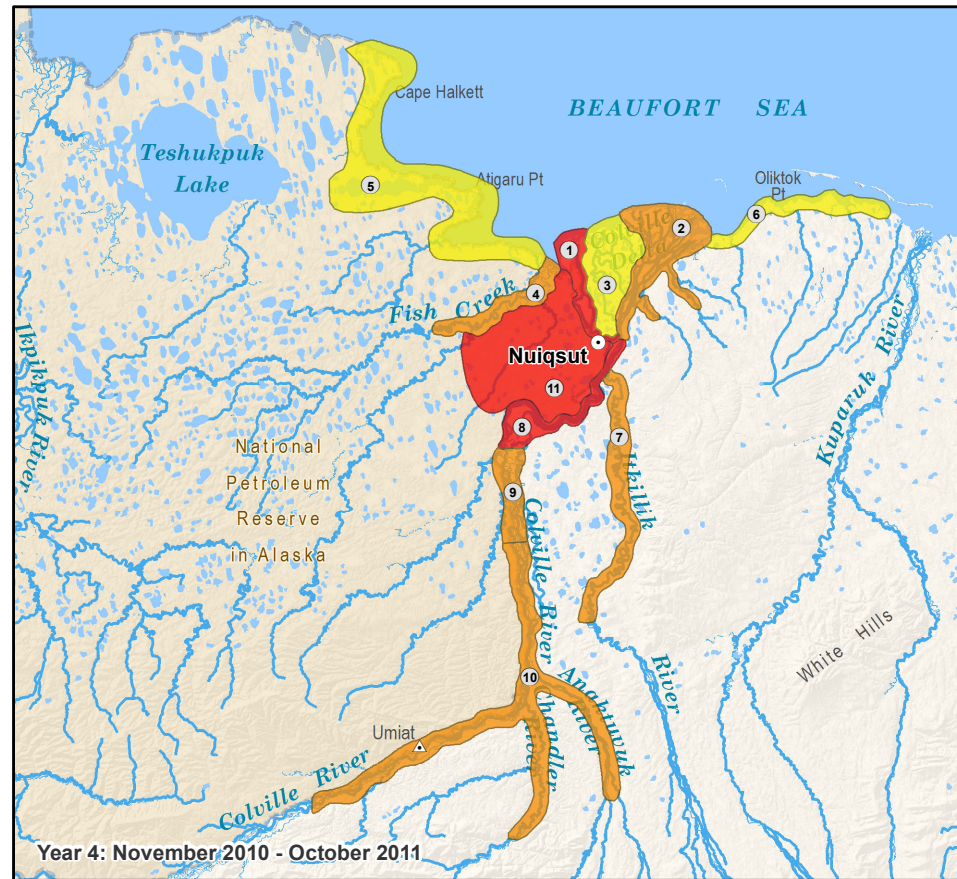
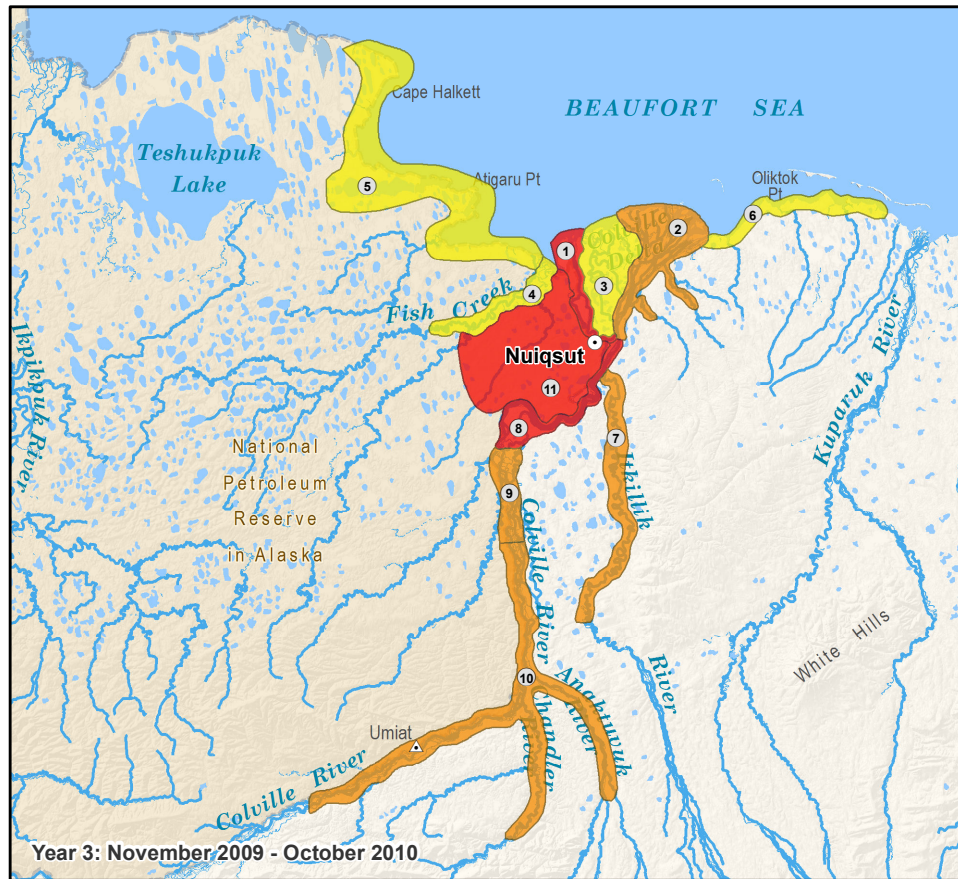
Stephen R. Braund & Associates, 2016.

Table 11 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 7, 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 area that has consistently provided more than 15 percent of the harvest during all seven study years is West of Nuiqsut (Area 11); Nigliq Channel provided more than 15 percent of the harvest during the previous six study years, but not in Year 7, when it provided nine percent of the harvest.

Table 11 shows that during Year 7 the area West of Nuiqsut (Area 11) accounted for the highest portion (39 percent) of caribou harvested, higher than in any previous year. The area West of Nuiqsut was the only area contributing more than 15 percent of the harvest in Year 7; this is the first study with only one "red" area (see Map 25). The East Channel of the Colville (Area 2) was the area that accounted for the second largest percent of caribou harvested (11 percent) by Nuiqsut respondents during Year 7, followed by the Nigliq Channel (Area 1), with nine percent of the total harvest. The area "Other" is not shown on the map, as it is defined as any area falling outside the 11 areas depicted on Map 25. This area accounted for eight percent of the harvest in Year 7, higher than any previous study year. Four areas – Itkillik River, Ocean Point, Sentinel Hill, and Colville River South, all accounted for seven percent of the total harvest in Year

Table 11: Percentage of Caribou Harvest Locations and Caribou Harvests by Caribou Hunting Area

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 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Nigliq Channel	19%	18%	16%	17%	15%	23%	8%	23%	22%	18%	15%	15%	27%	9%
2	East Channel Colville	8%	8%	8%	12%	17%	14%	9%	8%	8%	7%	10%	20%	18%	11%
3	Other Colville Delta	2%	1%	2%	1%	1%	1%	0%	2%	1%	1%	1%	2%	1%	0%
4	Fish Creek	8%	7%	1%	1%	1%	3%	4%	7%	7%	1%	2%	0%	3%	5%
5	Coastal West	1%	0%	1%	0%	2%	1%	0%	1%	0%	1%	0%	1%	1%	0%
6	Coastal East	3%	0%	1%	1%	1%	0%	0%	3%	0%	1%	1%	4%	0%	0%
7	Itkillik River	7%	4%	5%	7%	5%	7%	8%	6%	4%	5%	4%	4%	6%	7%
8	Ocean Point	22%	23%	21%	19%	16%	5%	13%	17%	20%	15%	17%	11%	4%	7%
9	Sentinel Hill	9%	10%	8%	8%	6%	9%	6%	9%	9%	7%	5%	3%	6%	7%
10	Colville River South	4%	11%	10%	4%	6%	11%	8%	3%	11%	7%	4%	3%	9%	7%
11	West of Nuiqsut	14%	17%	23%	30%	30%	21%	37%	18%	17%	30%	40%	34%	20%	39%
12	Other	3%	1%	6%	1%	1%	4%	8%	3%	1%	6%	1%	1%	4%	8%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Map 25 Nuiqsut Caribou Hunting Area Groups: Years 3, 4, 5, 6 and 7

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.

Other areas may have been used for resource harvesting.

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

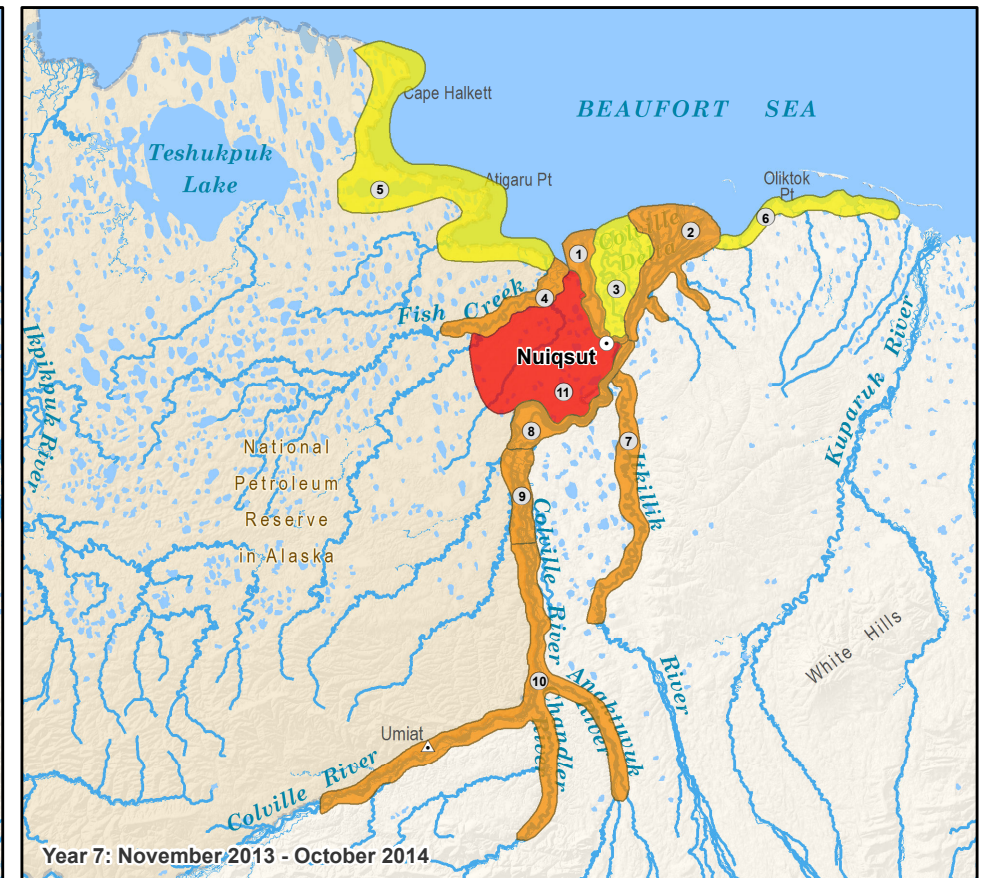
LEGEND

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

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0 5 10 20
Miles

SCALE: 1:1,800,000



7, and Fish Creek accounted for five percent of the total harvest. All other areas – Other Colville Delta, Coastal West, and Coastal East – accounted for zero percent of the Year 7 harvest (one harvest was reported in Other Colville Delta, and zero harvests in the Coastal East and West areas). Table 1 shows that, similar to Year 6, harvests at Ocean Point continued to be lower than during the first five years of the study. Unlike Year 6, which showed Nigliq Channel accounting for a higher percentage of the harvest than any previous year, Nigliq Channel harvests were lower in Year 7 than any other year. Harvests along the East Channel of the Colville River accounted for a higher percentage than the first four years, but a lower percentage compared to the last two years.

It is important to note that while the percentage of harvests in certain areas such as Nigliq Channel and East Channel were lower in Year 7 than in recent previous years, the overall number of caribou harvested in Year 7 was substantially higher. In the case of Nigliq Channel, the number of caribou harvested decreased slightly, with Nuiqsut respondents reporting harvests of 50 caribou compared to 68 in the previous year; harvests along East Channel Colville actually rose in Year 7 from 46 to 58, despite contributing a smaller percentage to the total harvest. The area that showed the greatest increase was the area West of Nuiqsut, which quadrupled from 51 harvests in Year 6 to 216 in Year 7. Other areas that show an increase in harvest numbers from Year 6 to Year 7 included Fish Creek (from seven to 29 caribou); Itkillik River (from 16 to 37 caribou); Ocean Point (from 10 to 41); Sentinel Hill (from 14 to 39); and Colville River South (from 23 to 38). The study team also interviewed several more active harvesters in Year 7 than in previous study years; however, this would likely account for a small portion of the harvests. Table 12 shows the number of harvest locations by the number of caribou harvested for study years 1-7. 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 7, respondents reported harvesting either one or two caribou at 73 percent of harvest locations. Three or four caribou were harvested at 19 percent of harvest locations, and between five and 15 caribou were harvested at the remaining five percent of harvest locations.

Table 12: Number of Caribou Harvested by Number of Harvest Locations, Years 1-7

Number of Caribou Harvested	Number (%) of Harvest Locations						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	95 (52%)	75 (49%)	99 (51%)	58 (36%)	120 (62%)	66 (46%)	105 (42%)
2	44 (24%)	48 (32%)	60 (31%)	47 (29%)	40 (21%)	42 (29%)	77 (31%)
3	19 (10%)	16 (11%)	22 (11%)	19 (12%)	16 (8%)	24 (17%)	23 (9%)
4	7 (4%)	8 (5%)	7 (4%)	17 (10%)	9 (5%)	8 (6%)	26 (10%)
5	13 (7%)	4 (3%)	5 (3%)	10 (6%)	4 (2%)	1 (1%)	6 (2%)
6	1 (1%)	1 (1%)	2 (1%)	6 (4%)	4 (2%)	1 (1%)	4 (2%)
7	2 (1%)	-	-	1 (1%)	-	1 (1%)	1 (<1%)
8	-	-	-	2 (1%)	-	-	2 (1%)
9	-	-	-	1 (1%)	1 (1%)	-	-
10	-	-	-	1 (1%)	-	-	1 (<1%)
11	-	-	-	1 (1%)	1 (1%)	-	-
12	-	-	-	-	-	-	1 (<1%)
13	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-
15	1 (1%)	-	1 (1%)	-	-	-	1 (<1%)

Stephen R. Braund & Associates, 2016.

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 over 80 percent of their caribou hunting areas (Table 13). The percentage of use areas typically visited during same day trips was on the high end during Year 7, at 91 percent, but not substantially higher than previous years. In Year 7, six percent of caribou use areas were visited during trips lasting two to six nights, compared to previous years which ranged from seven to 15 percent. In addition to asking the typical duration of trips to caribou use areas, SRB&A also asked respondents to report the longest trip they took to each area during the study year (Table 14). Table 15 shows that in Year 7, respondents' longest trip lasted one or more weeks at three percent of use areas, and two to six nights at nine percent of use areas. Four percent of use areas fell into the one night category. Following an ongoing trend, respondents took only same day trips to a majority (85 percent) of use areas.

Table 13: Caribou Hunting Typical Trip Duration, Nuiqsut, Years 1-7

Typical Duration	Percentage of Caribou Use Areas						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
More than 2 weeks	0%	1%	0%	0%	0%	2%	1%
1-2 Weeks	1%	1%	1%	1%	1%	1%	0%
2-6 Nights	7%	15%	7%	8%	9%	10%	6%
1 Night	5%	2%	2%	1%	2%	4%	3%
Same Day	87%	81%	90%	90%	88%	84%	91%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Use Areas	135	176	212	193	209	196	190

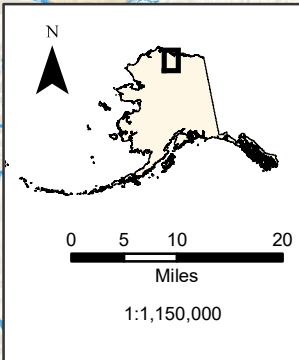
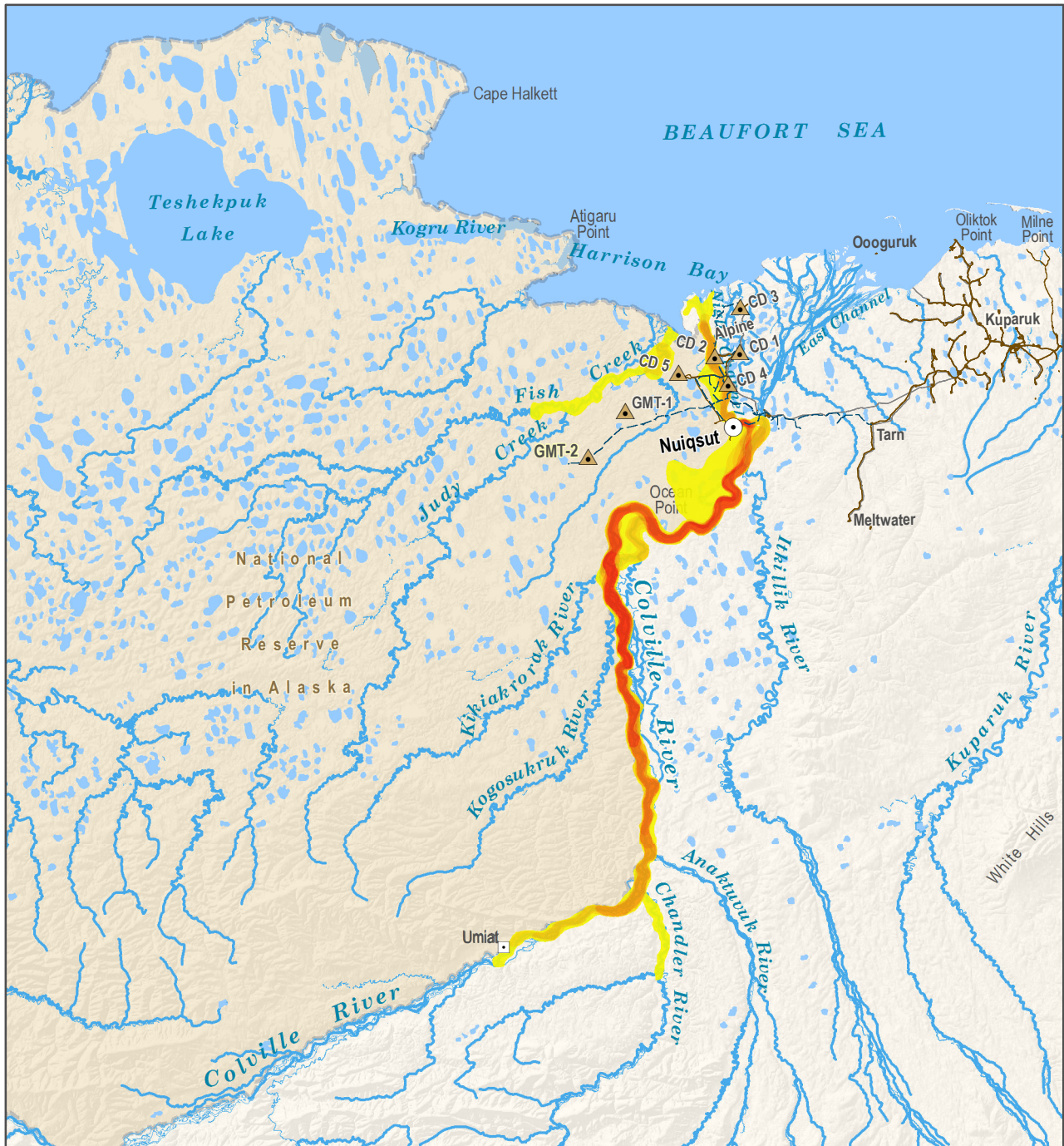
Stephen R. Braund & Associates, 2016.

Table 14: Caribou Hunting Longest Trip Duration, Years 1-7

Longest Duration	Percentage of Caribou Use areas						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
More than 2 weeks	1%	2%	0%	0%	0%	2%	1%
1-2 Weeks	3%	6%	4%	3%	2%	2%	2%
2-6 Nights	20%	24%	12%	12%	11%	14%	9%
1 Night	6%	5%	4%	4%	2%	8%	4%
Same Day	70%	63%	80%	81%	85%	74%	85%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Trips	97	163	211	193	208	196	188

Stephen R. Braund & Associates, 2016.

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 toward Sentinel Hill and beyond; 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. Overnight trips also occurred at a small number of use areas when



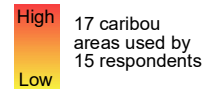
Map 26 - Duration of Trip to Caribou Use Areas, One or More Nights, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014



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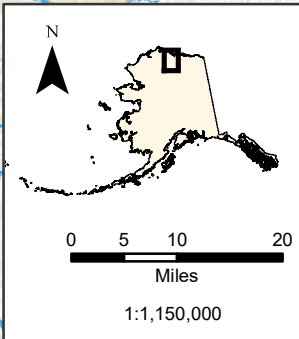
Map 27 - Duration of Trip to Caribou Use Areas, Same Day, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

Year 7: November 2013 - October 2014

High 173 caribou areas used by 53 respondents
Low



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hunting along Fish Creek. 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.

A number of respondents reported camping when traveling farther upriver to hunt for moose and caribou, or when staying at fish camps along Nigliq River where they harvest *aanakliq* while also waiting for the caribou to cross the river:

Maybe right to here [past Umiat]. The first nassik spot. Where you climb up and look around. But when I went up to look, I only saw three caribou total. Almost thought we saw a moose over here alright. [But] no moose [this year]. Some were before [August] too, and after-- July, August, September. The first time I went out we spent 12 days out there. Everybody went to sleep, so me and my buddies would just go walking all over... I only went four times this year. Yeah, I spent three times out there camping. (SRB&A Nuiqsut Interview January 2015)

[I am traveling to the camp on Nigliq] as soon as the river opens until moose season. I would say beginning – late May or beginning of June until I would say August 15th. I would use my brother-in-law's boat. I just didn't have my own, still went looking. I couldn't remember [how many trips I took out there], maybe 100, we went on that river a lot. Going back and forth, back and forth. Sometimes I would stay there for a week and head back. [Longest trip was] two weeks. But a lot of days trips. (SRB&A Nuiqsut Interview November 2014)

We were camping over there.... That was my home for the summer. We'd usually be there for like almost five days; two to three weeks [was the longest]. When their supplies get low they come back to town, go to the store, and then head back out [to camp]. It's usually only my uncle that goes back to town to the store while I stay with my Aaka. (SRB&A Nuiqsut Interview January 2015)

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, saying,

I only went out there [through Nigliq Channel] for seals. Yeah [I looked for caribou] on the way. [We go in] July, because it is super hot and we want to get away to cool off and get away from the bugs. Those are like 30 to 40 hour trips. (SRB&A Nuiqsut Interview November 2014)

In general, resource availability, distance from the community, harvest season, available time, and associated subsistence activities are the primary factors that determine trip duration.

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 15). 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). However, during Year 7 the percent of trips taken to caribou use areas was closer to the first four years at 54 percent. Nuiqsut active harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 7 (between four and nine percent of use areas) compared to Years 1 and 2 (zero percent) (Table 15).

Table 15: Caribou Hunting Number of Trips, Nuiqsut, Years 1-7

Number of Trips	Percentage of Caribou Use Areas						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
20+	0%	0%	9%	7%	4%	7%	7%
6-20 trips	30%	28%	21%	28%	16%	19%	21%
4-5 trips	23%	21%	19%	15%	15%	13%	17%
2-3 trips	27%	26%	27%	29%	34%	28%	26%
1	20%	24%	24%	21%	32%	33%	28%
Total	100%	100%	100%	100%	100%	100%	100%
Number of Trips	121	174	212	193	210	196	204

Stephen R. Braund & Associates, 2016.

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

I did [hunt along Nigliq Channel], maybe twice a week. Always going out seal hunting.... Mostly day trips on Nigliq. Haven't really camped out much the last few years lately. [I went out this way] every day – all summer long, every day. I would say about 35 or 30 [trips]. (SRB&A Nuiqsut Interview January 2015)

Similarly, another respondent described looking for caribou while on his way back and forth between Nuiqsut and his fishing site on Fish Creek. This respondent observed,

Just around Fish Creek area, I'll go around a little bit and then head back. Depends on how much gas I bring. Between October and December, I usually fish until mid-December I will pull my net out. Like every other day I will go out, like every two days, and then I run into something, like a caribou or a wolverine.

One individual reported a higher than average number of trips upriver because he was working on a cabin and frequently traveling back and forth to the community to fetch supplies. He observed,

[I went out this way] September, August--and they're fat. [I went out] 50, 60 [times] because that was the same time I was building my cabin and I had to bring material.... I'd spend a week, come back home for a day, go back for a week. Pretty much for all of August and half of September, because the season closes on the 15th. (SRB&A Nuiqsut Interview November 2014)

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. Several individuals reported that their hunting frequency depends on the availability of transportation and fuel; as one respondent said, “[We went] maybe about five or six times, not very much, [we] didn’t have too much fuel” (SRB&A Nuiqsut Interview November 2014). While some individuals are limited in the frequency of their hunting activities due to family or work commitments, others are not, and some consider their primary role as a provider of subsistence foods to the community. One respondent noted that he hunts every chance he can get, even during the winter months. He said, “[I go] three to four times a week. If it's not below 40, I'll be out there. If it's not a blizzard, I'll be out there” (SRB&A Nuiqsut Interview November 2014).

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 16. In a majority of cases (75 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, 6, and 7. Compared to Year 6, a slightly lower percentage of Year 7 caribou harvests were in herds estimated at 100 or more caribou (17 percent in Year 7 versus 21 percent in Year 6) (Table 16).

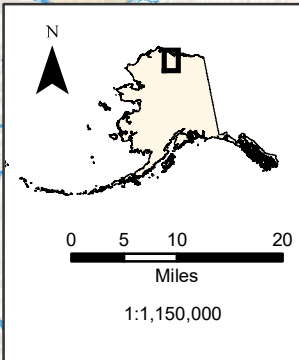
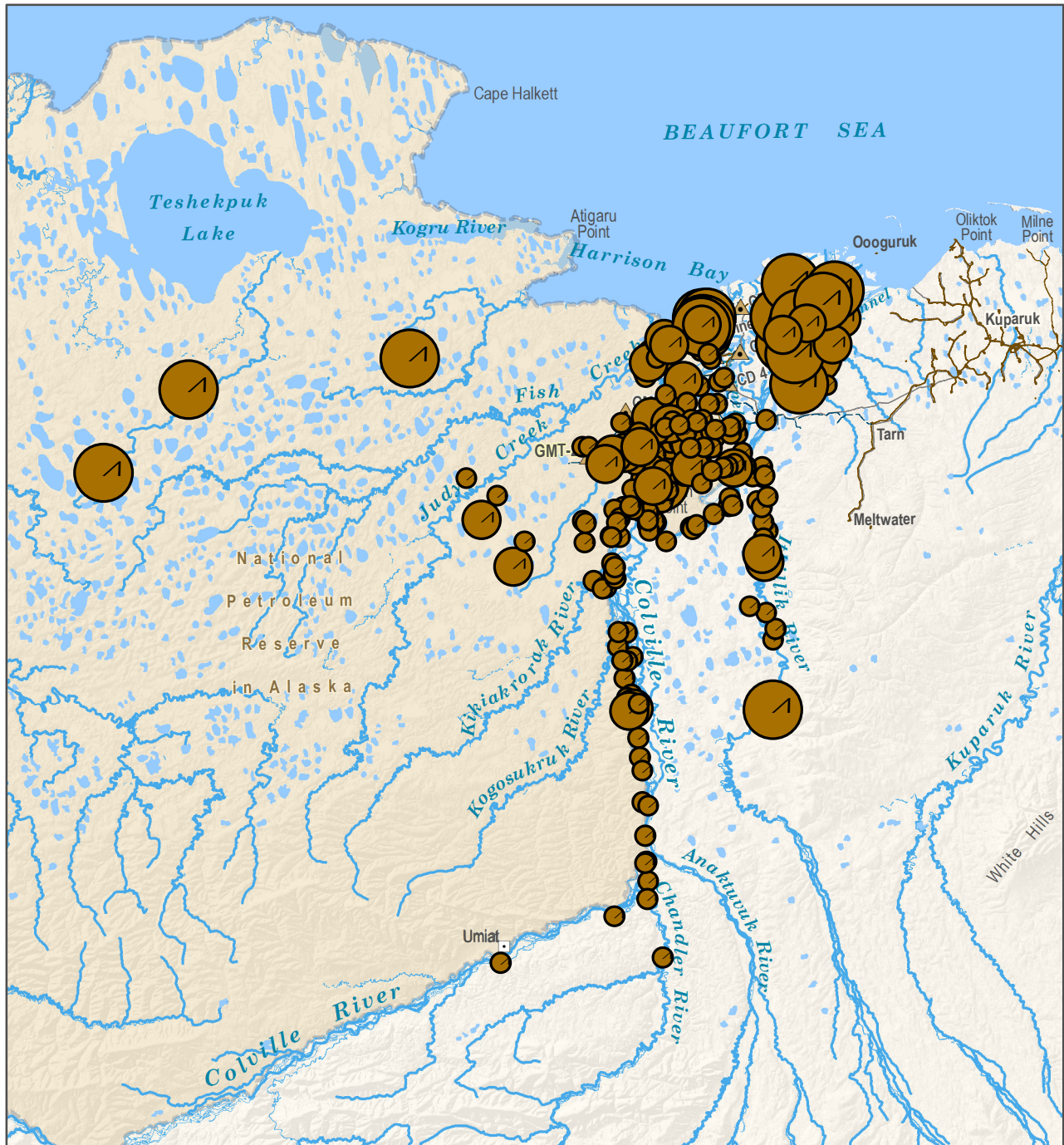
Table 16: Caribou Group Size Noted at Caribou Harvest Locations, Year 5-7

Estimated Herd Size	Percent of Harvest Locations			Percent of Caribou Harvested		
	Year 5	Year 6	Year 7	Year 5	Year 6	Year 7
1000-2000	2%	1%	1%	3%	1%	1%
500-999	1%	3%	1%	0%	5%	1%
100-499	3%	10%	9%	10%	15%	15%
81-99	0%	0%	0%	0%	0%	1%
71-80	1%	0%	1%	1%	0%	1%
61-70	1%	0%	0%	2%	0%	1%
51-60	2%	1%	2%	3%	1%	1%
41-50	2%	2%	3%	4%	3%	4%
31-40	1%	2%	2%	0%	2%	3%
21-30	1%	3%	4%	2%	5%	5%
11-20	13%	11%	13%	14%	14%	16%
2-10	41%	38%	42%	42%	39%	42%
1	34%	29%	20%	19%	16%	9%
Total Number	176	138	230	311	267	490

Stephen R. Braund & Associates, 2016.

Map 28 depicts the herd size noted at reported harvest locations, more than 100 caribou depicted by large symbols, between 21 and 100 caribou depicted by medium symbols, and 1 to 20 caribou depicted by small symbols. As shown on the map, herds of over 100 caribou were most frequently reported to be observed along the East Channel, in addition to the mouth of Nigliq Channel (near Nigliq camp). A number of medium sized herds were observed near the mouth of Fish Creek, and farther to the west and southwest of the community toward Ublutuooh River and Judy Creek. In general, respondents reported observing groups of 1-20 caribou directly to the west and north of the community and upriver from the community to Umiat. One individual described several herds accounting for approximately 1,000 caribou present along Nigliq Channel near Nanuq, saying,

I went there [Nigliq channel] July, late July. I got one at the channel.... On this side (west). There were about 1,000. There were three herds that went through here. Yeah, nearly 1,000. The Porcupine were coming across, there were like three herds. They went through Nanuq. (SRB&A Nuiqsut Interview November 2015)



Map 28 - Caribou Group Size Noted at Harvest Locations, Year 7

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 60 active harvesters in November of 2014 and January of 2015.

Other areas may have been used for resource harvesting.

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National Petroleum Reserve Alaska

Year 7: November 2013 - October 2014

- 1 to 20 caribou
- 21 to 100 caribou
- 101 to 1500 caribou

234 caribou harvest locations
 55 respondents

Several individuals reported the presence of a herd estimated at 200 or 300 along the East Channel near Lonely Island and Kachemach Creek. One respondent described,

We caught two of them there and it was a big herd there, about 200 of them. They were all bulls. No females, no cows. [That was] August, because that's when they had a herd cross by. About a 200 herd. They crossed after a while, after about 6 hours of waiting. We were out there for seals and we just stayed out waiting for them. We were beat. Everyone on the boat slept for about 16 hours the next day. They were all on the island and finding a way to cross, but then they'd get spooked. (SRB&A Nuiqsut Interview November 2015)

Harvest Amounts (Household Harvest Surveys)

This section presents the draft caribou harvest data from ADF&G's 2014 household harvest surveys in Nuiqsut 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 at or above 90 percent during every available study year since 1985 and was 90 percent in 2014. The percentage of households attempting to harvest caribou has varied over time, with the percentage in Year 7 (66 percent) somewhat higher than the previous two years and the percentage harvesting (64 percent) similar to previous years. The difference between the percentage of households attempting to harvest and successfully harvesting caribou was smaller in 2014 compared to the previous few years, indicating higher success rates for those who did go hunting. In addition, the estimated number of caribou harvested in 2014 (773) was higher than in any previous study year. This is consistent with Year 7 active harvester interviews, where a higher number of caribou harvests were reported. The estimated per capita harvest (218 pounds) was also higher than previous study years. For the 2014 study year, ADF&G used a higher conversion rate to estimate pounds than they used in the past (136 versus 117). SRB&A applied a conversion rate of 117 to facilitate comparison with previous study years.

Table 17: Nuiqsut Caribou Harvests 1985-2014

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 2011
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 <i>Unpublished</i> 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%			562	65,754	707	-.**	SRB&A 2012
2011	92%	70%	56%	49%	58%	437	51,129	544	134	SRB&A 2013
2012	99%	68%	62%	65%	79%	501	58,617	598***	147	SRB&A 2014
2013	95%	79%	63%	62%	75%	586	68,534	692	166	SRB&A 2015
2014	90%	66%	64%	67%	59%	773	90,441****	837	218	ADF&G 2016 DRAFT
Mean of observed values	96%	72%	66%	73%	73%	482	57,132	582	146	

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.

** Per capita data are not available for 2010, as household size was not collected during the household surveys that year.

***The estimates for Years 2010, 2011, 2012, and 2013 are based on averages that include one particularly high-harvesting household. In 2013, this household harvested over one third of all the reported harvests for the community. Therefore, the estimated harvests for 2010, 2011, 2012, and 2013 may be skewed upward due to the participation of this high-harvesting household in the harvest survey. Likewise, changes in community harvest estimates in future surveys could be due to this high-harvesting household not being interviewed.

**** This table uses a conversion factor of 117 lbs edible weight per caribou, based on the conversion factor used in an ADF&G caribou harvest study on the North Slope (Braem et al. 2011). ADF&G has since updated their conversion factors and ADF&G's report on the 2014 harvest survey in Nuiqsut uses a conversion factor for caribou of 137 lbs instead of 117 lbs. For the purposes of comparison in this report, the study team retained a conversion factor of 117 lbs for the 2014 study year.

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 18 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 7 were within the range of previous years, with the exception of “Months Changed” which was slightly lower than previous years, and “Hunting Area Changed” which was on the low end of the range of previous years. The percentage of Year 7 respondents reporting a change in trip duration was on the high end of the range of previous years (39 percent), and the percentage reporting a change in hunting area was on the low end (28 percent). As shown in Table 19, respondents also indicated whether they harvested enough caribou. In Year 7, 32 percent of respondents indicated that they did not harvest enough caribou, a decline from the previous two years. In Years 1 through 6, the percentage of respondents not harvesting enough caribou ranged from 16 percent (Year 4) to 54 percent (Year 6).

Table 18: Percentage of Respondents Reporting Changes in Harvest Activities, Years 1-7⁴

Type of Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Hunting Area Changed	31%	28%	39%	33%	36%	40%	28%
Frequency Changed	50%	77%	65%	60%	63%	67%	70%
Duration Changed	39%	32%	21%	21%	23%	26%	39%
Months Changed	19%	15%	12%	21%	21%	18%	11%
Harvest Amount Changed	75%	85%	68%	72%	54%	63%	79%

Stephen R. Braund & Associates, 2016.

Table 19: Percentage of Respondents Reporting Not Harvesting Enough Caribou, Years 1-7

Not Harvesting Enough	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Reported Did Not Harvest Enough	47%	53%	21%	16%	41%	54%	32%

Stephen R. Braund & Associates, 2016.

Changes in Harvest Amount

During Year 7 interviews, 79 percent of Nuiqsut respondents reported a change in harvest amounts, higher than the previous four years, which ranged between 54 percent and 72 percent. Fifty-three percent of respondents reported harvesting less than the previous year, 30 percent reported harvesting more, and 21 percent harvested about the same amount of caribou (Table 20). The percentage of respondents harvesting more is substantially higher than previous years, which ranged from nine percent to 21 percent (Table 20). This is consistent with Year 7 respondents reporting the highest number of harvest locations of any year.

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).

Interestingly, despite the higher overall harvests in Year 7, the percentage of harvesters who reported harvesting less caribou in Year 7 was within the range of previous years, at 53 percent.

Table 20: Type of Change in Harvest Amount, Years 1-7

Type of Harvest Amount Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Harvest more	11%	15%	21%	17%	9%	9%	30%
Harvest less	64%	70%	47%	55%	45%	54%	53%
Harvest the same	25%	15%	32%	28%	46%	37%	21%

Stephen R. Braund & Associates, 2016.

Table 21 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 seven study years, Resource Distribution or Migration factors have been the most frequently cited types of causes for harvesting less caribou (94 observations), followed closely by causes related to Personal Factors (91 observations). Other types of causes cited by respondents have included Development Activities (32 observations), Environmental Factors (nine observations) and Hunting Success (eight observations). In Year 7, factors related to resource abundance (i.e., overall population levels) were cited for the first time, consistent with recent surveys of caribou herds. Despite the gradual increase in both the Teshekpuk and Central Arctic herds from the mid-1990s through the 2000s, recent estimates have shown declines in both herds due to decreased adult and calf survival. A photocensus conducted by ADFG in July 2011 yielded an estimate of approximately 55,000 animals in the CAH 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).

Table 21: Reasons for Decrease in Harvest Amount, Nuiqsut, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Resource Distribution or Migration Total	12	18	10	8	15	15	16	94
	35%	46%	29%	19%	43%	41%	41%	36%
Resource availability	8	9	2	4	9	10	7	49
Migration changed or diverted	3	5	0	0	1	2	4	15
Farther from riversides/farther inland	0	2	4	0	2	2	3	13
Change in distribution/migration	0	1	0	3	1	0	0	5
Moved out of area	0	0	3	1	0	0	0	4
Farther from community	0	1	0	0	0	0	2	3
Resource in smaller groups	1	0	0	0	0	0	0	1
Earlier migration/arrival	0	0	1	0	0	0	0	1
Later migration/arrival	0	0	0	0	1	0	0	1
Move to different areas	0	0	0	0	1	0	0	1
Timing of migration	0	0	0	0	0	1	0	1
Personal Factors Total	9	10	16	22	6	14	14	91
	26%	26%	47%	52%	17%	38%	36%	35%
Personal reasons	0	3	3	7	1	6	2	22
Lack of transportation/equipment	2	1	3	4	0	3	3	16
Take fewer trips	0	1	6	1	2	0	4	14

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Change in subsistence providers	1	1	2	4	2	1	1	12
Employment/lack of time	1	2	2	4	0	2	0	11
Change in subsistence dependents	3	2	0	2	0	0	0	7
Need less	2	0	0	0	0	0	2	4
Use area changed	0	0	0	0	0	2	0	2
Increased cost of living/expenses	0	0	0	0	0	0	1	1
Change in transportation method	0	0	0	0	0	0	1	1
Smaller hunting area	0	0	0	0	1	0	0	1
Development Activities Total	9	3	2	3	9	3	3	32
	26%	8%	6%	7%	26%	8%	8%	12%
Helicopter traffic disturbance	4	0	0	2	5	2	2	15
Development	2	1	2	0	0	0	1	6
Airplane traffic disturbance	2	1	0	1	1	0	0	5
Air traffic	1	0	0	0	2	0	0	3
Traffic disturbance	0	0	0	0	0	1	0	1
Offroad vehicles disturbance	0	0	0	0	1	0	0	1
Oil drilling	0	1	0	0	0	0	0	1
Don't Know Total	0	2	1	5	1	0	0	9
	0%	5%	3%	12%	3%	0%	0%	3%
I do not know	0	2	1	5	1	0	0	9
Environmental Factors Total	0	3	2	1	1	1	0	8
	0%	8%	6%	2%	3%	3%	0%	3%
Change in food availability	0	2	0	0	0	0	0	2
Climate affecting travel	0	0	0	1	0	0	0	1
Wind	0	0	1	0	0	0	0	1
More rain	0	0	0	0	1	0	0	1
Predators	0	0	1	0	0	0	0	1
Increase in predators	0	1	0	0	0	0	0	1
New species in region	0	0	0	0	0	1	0	1
Hunting Success - General Total	3	0	2	0	0	1	2	8
	9%	0%	6%	0%	0%	3%	5%	3%
Worse success	0	0	1	0	0	1	2	4
More difficult	2	0	0	0	0	0	0	2
Reduced harvest opportunities	0	0	1	0	0	0	0	1
Travel farther to harvest resource	1	0	0	0	0	0	0	1
Competition or Hunting Pressure Total	0	1	0	1	0	3	0	5
	0%	3%	0%	2%	0%	8%	0%	2%
Competition with sport hunters	0	0	0	0	0	2	0	2
Sport hunting and fishing	0	0	0	1	0	0	0	1
Sport hunting methods disturbing migration routes	0	1	0	0	0	0	0	1
Hunting pressure	0	0	0	0	0	1	0	1
Resource Behavior Total	0	0	1	0	2	0	0	3
	0%	0%	3%	0%	6%	0%	0%	1%
Skittish behavior in species	0	0	1	0	2	0	0	3
Development Infrastructure Total	1	1	0	0	1	0	0	3

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
	3%	3%	0%	0%	3%	0%	0%	1%
Pipeline	1	1	0	0	0	0	0	2
Oil field infrastructure	0	0	0	0	1	0	0	1
Contamination Concerns Total	0	1	0	0	0	0	1	2
	0%	3%	0%	0%	0%	0%	3%	1%
Contamination from air pollution	0	1	0	0	0	0	1	2
Resource Health Total	0	0	0	1	0	0	1	2
	0%	0%	0%	2%	0%	0%	3%	1%
Disease/infection	0	0	0	0	0	0	1	1
Concern of disease/infection	0	0	0	1	0	0	0	1
Resource Abundance Total	0	0	0	0	0	0	2	2
	0%	0%	0%	0%	0%	0%	5%	1%
Decrease in species number	0	0	0	0	0	0	2	2
Other Total	0	0	0	1	0	0	0	1
	0%	0%	0%	2%	0%	0%	0%	0%
Miscellaneous	0	0	0	1	0	0	0	1
Grand Total	34	39	34	42	35	37	39	260

Stephen R. Braund & Associates, 2016.

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 7, "resource availability" was the most commonly reported reason for harvesting less caribou, followed by "migration changed or diverted," and "take fewer trips."

Distribution/migration factors cited by respondents for harvesting less caribou in Year 7 included general resource availability, a change or diversion in caribou migration, the caribou being farther inland, and the caribou being farther from the community. Some individuals provided more general observations regarding the availability of caribou in Year 7, such as "I just haven't seen very many" and "Barely seen them around." Others cited environmental factors for the change in caribou distribution or migration. One hunter noted particularly windy and stormy conditions in Year 7 and wondered if this affected caribou movement, saying, "Yeah, [I got] a lot less [than usual]. More wind. I'm thinking that the caribous were following the wind in a different direction. That's my guess. Yeah, too far" (SRB&A Nuiqsut Interview November 2015). Another individual made a similar comment, indicating that the cold, wet summer affected caribou availability in their hunting areas:

No, I think I got less than previous years I've been getting. It's just a matter of waiting for them to come near shore. Weather warms up... when it starts warming up, they start going down to the near shore. It was a cold and wet summer it was a lot more colder than it has been in previous years. (SRB&A Nuiqsut Interview January 2015)

One respondent noted that he harvested fewer caribou overall because of the large number of sick caribou he encountered, saying, "All the sick caribou I had to leave out there that's why, at least one of the reasons. If those caribou had been healthy it would have been the same" (SRB&A Nuiqsut Interview November 2014). In addition to environmental factors, several individuals attributed the change in caribou distribution/migration to disturbance from development activities, development infrastructure, or local

hunters. Several respondents provided the following discussions regarding the perceived impacts of helicopter traffic, emissions, and infrastructure on caribou migration and distribution:

Uh, last year, I get three last year. I got less, but there were more caribou this year. I see a lot of caribou, but I just barely get one this year, inland. I just don't feel like – I feel like hunting caribou near Nuiqsut instead of going out [farther] to get caribou. And they're not here. There's traffic, in the right season – in May, June, July, there's always helicopters or something, and we end up having to go out farther caribou hunting by boat [rather than closer to the community]. (SRB&A Nuiqsut Interview November 2014)

[I usually] harvest more - way more than [this year]. The oil companies all their smoke coming out of their... that smoke will distract them and go out there and it diverts them. They color it. The smell of that is bad, the natural gas. (SRB&A Nuiqsut Interview November 2014)

I think the oil fields are blocking off their usual [route]. They're starting to pop up more on this side, and they used to pop up lots on this side. (SRB&A Nuiqsut Interview January 2015)

Personal factors were also cited by a number of individuals as causing their decreased harvests in Year 7. These factors included fewer hunting trips, a lack of or change in transportation or equipment (e.g., rifles), decreased need for caribou, personal reasons such as age or health factors, and increased costs. One individual noted the advantage that people with four-wheelers and snowmachines have when hunting caribou. This respondent observed that the caribou are often too far inland to access when traveling by boat, and due to snowmachine problems, he was unable to travel overland to access them:

I got less this year than last year.... A lot of people, when, they come home with caribou, it's mostly with four-wheelers from the land. They do come in that area west of Nuiqsut, you get a better chance when you have a four-wheeler than a boat. For my fall time, my wintertime, I was having snowmachine problems and summertime I just hadn't really hardly seen them except that herd we ran into. We see them one or two here or there and they're too far inland or something like that. Or a cow with a calf, we leave those alone. (SRB&A Nuiqsut Interview November 2014)

Several hunters reported reduced opportunities to hunt during Year 7, either because they were out of town, had a busy work schedule, or did not have access to transportation. Several individuals made comments such as “I probably just didn't go out as much as I did the other year” (SRB&A Nuiqsut Interview January 2015), and “...when everyone was going I was stuck at home” (SRB&A Nuiqsut Interview November 2014).

In addition, several individuals pointed to a desire to reduce wastefulness by harvesting only what they needed. As one said, “I don't like to overharvest them, there's no point to waste the meat” (SRB&A Nuiqsut Interview November 2014). Two others observed that they always self-manage their hunting activities by gauging each year how much they will need based on how many people they are providing for, how many are providing for them, and how well the caribou herd is doing:

Well, some go to waste if we don't eat them in time, and so we just try to get what we need. That's what we're doing with fishing. We're trying to figure out what we need, but if we don't get enough then we'll short ourselves, but there's always places where we can find them. Yeah. He [my brother] pretty much took over [hunting]. There are a few times that we went out together. (SRB&A Nuiqsut Interview November 2014)

Yeah, there seem to be less. It depends on how much meat I got - do I need more? I might see one on my boat and think, 'Go ahead, get it – we need it.' Just what's needed. I might dry meat, which I do anyway, because I like dry meat... In July we might catch one or two and

dry the meat. I don't know [what's causing the decline]. It's natural though. Bad winters or predators or over hunting. Sometimes it rains earlier in the fall and it freezes up and the caribou don't get to eat that much and it's hard for them to dig into what they eat so what they eat is ice so they starve. I know there's lot of wolves sometimes you come upon a kill... I know they dropped in numbers since last year, you know, that's what I read. (SRB&A Nuiqsut Interview January 2015)

Several individuals directly attributed their decreased harvests to industry activity rather than discussing changes to resource distribution or migration. One individual said, "I don't know, there is a lot of chopper activity so it is hard to spot them with all that chopper activity" (SRB&A Nuiqsut Interview November 2014) and another, "Just [because] all the activities going on out there. You see it right out there, just out our back door" (SRB&A Nuiqsut Interview November 2014).

One individual believed that poor hunting practices by the younger generation are diverting the caribou away from the community. He noted that many young hunters do not adhere to the traditional method of letting the first herd pass before harvesting any caribou:

Maybe [I got] a little more the year before. I think by the way the caribou migration starts from June. We have some young people here that get down there by boat and intercept that herd. Traditionally, we don't do that. We tell our young people to leave that first herd alone. But last year they went and intercepted to the south of us. And [there were less] later... The pipeline had to do something with that too.... But when young people go down there they divert [the herd] and they head west. The stories my father told of the 1930's right over there at Putu and he got to know the migration of the caribou. But there were some young people out there anxious to get out there and get that caribou. We learned from that also. (SRB&A Nuiqsut Interview January 2015)

Table 22 shows the reasons given for harvesting more caribou in Year 7. Over the seven study years, personal factors are the most common reason for harvesting more caribou, followed by resource distribution/migration factors. Under personal factors, residents cited an increase in trip frequency, an increase in sharing, better transportation/equipment, and personal reasons (e.g., age or health). One individual simply stated, "I went out more, so I got more" (SRB&A Nuiqsut Interview November 2014). Others had better access to transportation in Year 7 and therefore had more opportunities to hunt. One couple described,

Respondent 1: We got our own transportation.

Respondent 2: Yeah he got the boat this year so we went out a lot. And now [we have] the Honda so we go out that way [west].

Respondent 1: We just had the ability to get out without having to spend more money. And we didn't have to wait and hitch a ride to the landfill. (SRB&A Nuiqsut Interview November 2014)

Others indicated a greater need for caribou in Year 7 due to more individuals depending on them for food. One individual reported sharing caribou with extended family outside of Nuiqsut. Another reported that, because he had a snowmachine in Year 7, he took the opportunity to harvest and share more caribou. These respondents observed,

I had more access [because I had a snowmachine]. I'm harvesting a lot more extra caribou than I need [for myself] to give to people. (SRB&A Nuiqsut Interview January 2015)

I needed more. My family is just getting bigger and bigger and I am the only one that hunts in my family. I was sending them to family in Barrow and Sitka and Anchorage. (SRB&A Nuiqsut Interview November 2014)

One individual reported having an advantage in Year 7 because he was hunting overland while a majority of the community’s hunters were traveling by boat. He said,

Just hunting. Every time I went out there was no one out but me. Everyone would be out boating. They said they’d see them but didn’t get them. I tell them they need to be with me! (SRB&A Nuiqsut Interview November 2014)

Another respondent observed that while he did not harvest a higher number of caribou, he did harvest more “meat” due to the large size of the caribou he harvested in Year 7. He described,

That was more for me – more bigger ones. My [increased harvest] was bigger [caribou], more meat - they were fatter this year. Not more in numbers. There was actually a couple that the fat went all the way up to the neck! (SRB&A Nuiqsut Interview November 2014)

One individual commented that while the amount harvested always varies somewhat from year to year, there have not been any long-term changes in his harvest amounts, saying, “About the same I’d have to say; our freezer is always full, sometimes a little more, it’s never any less. Always the same or more” (SRB&A Nuiqsut Interview November 2014).

Table 22: Reasons Given for Increase in Harvest Amount, Nuiqsut, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	4	6	6	7	2	1	10	36
	80%	75%	50%	58%	50%	33%	59%	59%
Personal reasons	2	2	1	5	0	0	2	12
Take more trips	1	3	2	0	0	0	4	10
Better transportation/equipment	0	0	1	0	0	1	2	4
Change in subsistence dependents	1	0	1	1	1	0	0	4
Change in subsistence providers	0	0	1	1	1	0	0	3
Sharing more	0	0	0	0	0	0	2	2
Need more	0	1	0	0	0	0	0	1
Resource Distribution or Migration Total	1	2	5	4	2	2	3	19
	20%	25%	42%	33%	50%	67%	18%	31%
Resource availability	0	2	2	4	2	1	2	13
Moved into area	0	0	2	0	0	0	1	3
Travel farther to harvest resource	0	0	0	0	0	1	0	1
Migration changed or diverted	0	0	1	0	0	0	0	1
Closer to community	1	0	0	0	0	0	0	1
Don't Know Total	0	0	0	1	0	0	2	3
	0%	0%	0%	8%	0%	0%	12%	5%
I do not know	0	0	0	1	0	0	2	3
Hunting Success - General Total	0	0	1	0	0	0	1	2
	0%	0%	8%	0%	0%	0%	6%	3%
Better success	0	0	1	0	0	0	1	2
Resource Health Total	0	0	0	0	0	0	1	1
	0%	0%	0%	0%	0%	0%	6%	2%
Increase in resource size	0	0	0	0	0	0	1	1
Grand Total	5	8	12	12	4	3	17	61

Stephen R. Braund & Associates, 2016.

Changes in Trip Frequency

As shown in Table 18, the percentage of harvester respondents reporting a change in trip frequencies has varied over the seven study years, from 50 percent (Year 1) to 77 percent (Year 2). In Year 7, 70 percent of respondents reported a change in the frequency of their hunting trips, within the range of previous years; 40 percent of respondents reported taking fewer trips (within the range of previous years), and 30 percent reported taking more trips (within the range of previous years) (Table 23).

Table 23: Type of Change in Trip Frequency, Nuiqsut, Years 1-7

Type of Trip Frequency Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Take more trips	25%	36%	32%	26%	27%	25%	30%
Take fewer trips	25%	42%	33%	34%	36%	42%	40%

Stephen R. Braund & Associates, 2016.

Over the seven 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 24). In Year 7, one respondent also cited resource behavior for the increase in trip frequency.

Under personal factors, general personal reasons were the most frequently cited reasons for an increase in the frequency of hunting trips in Year 7 (six observations), followed by better transportation/equipment (five observations), increased need, and a change in transportation method (one observation each) (Table 25). A few individuals indicated that they simply had a desire to go hunting more in Year 7 or, as one hunter put it, “had more opportunities” (SRB&A Nuiqsut Interview November 2014). One indicated that because he was teaching his nephews to hunt, he made more trips:

Because my nephews were out there. Go out there check on them and make sure... [just to be] accompanying them... Yeah, whenever they have trouble they call me up and I go out there and show them [what to do]. (SRB&A Nuiqsut Interview January 2015)

Access to equipment such as four-wheelers and boats also facilitated a number of hunters’ trip frequency in Year 7. As one individual observed, “The added four-wheeler made more trips possible” (SRB&A Nuiqsut Interview November 2014). One respondent noted that a new boat, in addition to skittish behavior in the caribou, resulted in him taking more trips in Year 7, saying,

More because I got my own boat here. I actually had to go out quite a few times, sometimes I wouldn’t see any. Sometimes they would be spooked. Every time they heard a boat they would be spooked. (SRB&A Nuiqsut Interview November 2014)

Similar to the individual above, several Nuiqsut harvesters explained that they took more trips because the caribou were less available. One respondent stated, “no luck on caribou,” while another suggested that helicopter traffic may have kept the caribou away from the riversides:

It was hard to find the caribous [so I went out more]. I don’t know why. There was lots of helicopters flying up the river. Maybe keeping them away. (SRB&A Nuiqsut Interview November 2014)

In Year 7, reasons for a decrease in trip frequency were primarily Personal Factors (14 observations), followed by Resource Distribution/Migration (four observations) and Economic Factors (two observations) (Table 25).

Table 24: Reasons for Increase in Trip Frequency, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	1	6	16	9	10	8	13	63
	8%	35%	80%	60%	63%	47%	76%	55%
Personal reasons	0	6	7	7	5	3	6	34
Better transportation/equipment	0	0	7	2	1	2	5	17
Need more	0	0	2	0	1	0	1	4
Sharing more	1	0	0	0	0	2	0	3
Change in subsistence providers	0	0	0	0	2	0	0	2
Change in transportation method	0	0	0	0	0	0	1	1
Change in subsistence dependents	0	0	0	0	0	1	0	1
Use area changed	0	0	0	0	1	0	0	1
Resource Distribution or Migration Total	6	7	4	4	4	7	2	34
	50%	41%	20%	27%	25%	41%	12%	30%
Resource availability	4	7	2	4	3	6	2	28
Migration changed or diverted	2	0	0	0	0	0	0	2
Moved out of area	0	0	1	0	1	0	0	2
Moved into area	0	0	1	0	0	0	0	1
Farther from riversides/farther inland	0	0	0	0	0	1	0	1
Development Activities Total	3	2	0	0	2	1	1	9
	25%	12%	0%	0%	13%	6%	6%	8%
Traffic disturbance	1	1	0	0	0	1	0	3
Development	2	1	0	0	0	0	0	3
Helicopter traffic disturbance	0	0	0	0	1	0	1	2
Airplane traffic disturbance	0	0	0	0	1	0	0	1
Don't Know Total	0	1	0	1	0	0	0	2
	0%	6%	0%	7%	0%	0%	0%	2%
I do not know	0	1	0	1	0	0	0	2
Environmental Factors Total	0	0	0	1	0	1	0	2
	0%	0%	0%	7%	0%	6%	0%	2%
Weather	0	0	0	1	0	0	0	1
Increase in predators	0	0	0	0	0	1	0	1
Competition or Hunting Pressure Total	0	1	0	0	0	0	0	1
	0%	6%	0%	0%	0%	0%	0%	1%
Competition with sport hunters	0	1	0	0	0	0	0	1
Development Infrastructure Total	1	0	0	0	0	0	0	1
	8%	0%	0%	0%	0%	0%	0%	1%
Pipeline	1	0	0	0	0	0	0	1
Economic Factors Total	1	0	0	0	0	0	0	1
	8%	0%	0%	0%	0%	0%	0%	1%
Mitigation funds	1	0	0	0	0	0	0	1
Resource Behavior Total	0	0	0	0	0	0	1	1
	0%	0%	0%	0%	0%	0%	6%	1%
Skittish behavior in species	0	0	0	0	0	0	1	1
Grand Total	12	17	20	15	16	17	17	114

Table 25: Reasons for Decrease in Trip Frequency, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	7 88%	14 78%	11 92%	12 80%	9 56%	11 61%	14 67%	78 72%
Personal reasons	2	2	8	10	8	10	4	44
Employment/lack of time	3	3	5	7	4	6	9	37
Lack of transportation/equipment	4	10	6	5	4	2	2	33
Change in subsistence providers	0	0	0	0	1	1	1	3
Better transportation/equipment	0	0	0	0	0	1	1	2
Change in transportation method	0	0	0	0	0	0	1	1
Need less	0	1	0	0	0	0	0	1
Change in subsistence dependents	0	0	0	0	0	1	0	1
Resource Distribution or Migration Total	0 0%	4 22%	1 8%	1 7%	3 19%	3 17%	4 19%	16 15%
Resource availability	0	4	0	0	2	3	2	11
Further from community	0	0	0	0	0	0	1	1
Closer to community	0	0	0	0	0	0	1	1
Change in distribution/migration	0	0	0	0	1	0	0	1
Moved into area	0	0	0	1	0	0	0	1
Moved out of area	0	0	1	0	0	0	0	1
Economic Factors Total	0 0%	0 0%	0 0%	0 0%	1 6%	4 22%	2 10%	7 6%
Increased cost of living/expenses	0	0	0	0	1	4	2	7
Don't Know Total	0 0%	0 0%	0 0%	2 13%	1 6%	0 0%	1 5%	4 4%
I do not know	0	0	0	2	1	0	1	4
Development Activities Total	0 0%	0 0%	0 0%	0 0%	1 6%	0 0%	0 0%	1 1%
Development	0	0	0	0	1	0	0	1
Development Infrastructure Total	0 0%	0 0%	0 0%	0 0%	1 6%	0 0%	0 0%	1 1%
Oil field infrastructure	0	0	0	0	1	0	0	1
Environmental Factors Total	1 13%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 1%
Shallower rivers/lakes	0	0	0	0	0	0	1	1
Wind	0	0	0	0	0	0	1	1
Less snow	1	0	0	0	0	0	0	1
Grand Total	8	18	12	15	16	18	21	108

Stephen R. Braund & Associates, 2016.

Personal factors causing respondents to hunt less frequently included employment/lack of time, general personal reasons, and lack of transportation/equipment. The number of observations related to employment/lack of time were higher in Year 7 than in previous study years. Several individuals indicated that they hunted less because they were too busy with work and family commitments. One individual observed, “We’re taking care of our grandkids more than ever” (SRB&A Nuiqsut Interview January 2015), while another said, “I was working more” (SRB&A Nuiqsut Interview January 2015). Others indicated that they had been out of town for portions of the hunting season.

One respondent noted that a combination of high costs and low water made hunting more difficult for him in Year 7, saying, “Lack of cash and whatnot – too expensive, no water” (SRB&A Nuiqsut Interview January 2015). The high cost of fuel is often a major factor in Nuiqsut hunters’ trip frequency and duration. Several individuals indicated that they hunted less due to increased expenses, saying,

Less, because I got a bigger boat, and it takes more gas. I gotta make sure I get something. (SRB&A Nuiqsut Interview November 2014)

You know, gas is so expensive around here and you have to wait for vouchers to come up. The gas is so expensive and the oil for heat is so expensive. (SRB&A Nuiqsut Interview November 2014)

We’ve gotten a brand new boat and it guzzled a lot more gas. Uses like three times as much gas as our previous boat we had with a motor. (SRB&A Nuiqsut Interview November 2014)

A few individuals indicated decreased need for caribou. One respondent observed that he hunts less frequently since his son took over the majority of hunting duties for his household and said,

Because my son did the rest of it after I got started. He said, ‘It’s my turn, I’ve got my four-wheeler.’ I didn’t have an issue with it; he’s younger than me and he can handle the rough trails better than I can. (SRB&A Nuiqsut Interview November 2014)

In addition to personal factors, several individuals indicated that they took fewer trips due to resource availability. Two respondents indicated higher success rates due to increased resource availability, with one saying, “Because they were easier to find,” and another, “There were more caribous nearby, even just outside of Nuiqsut” (SRB&A Nuiqsut Interview November 2014). Others reported more difficulty finding caribou in their hunting areas and one indicated that he did not want to “waste gas” when the caribou are not around. He observed,

Because I’m tired of going out and catching nothing. It’s a waste of gas, I think. Because you barely see something on the Colville River until October, September. Who knows where all these tuttus are over here, they go over to the coast. Once in a great while a herd runs through town – but I don’t know where they go. The only times my father went this way [East Channel] and tried to look over here, he saw nothing. I ask [other hunters] where the caribou are, where they’ve seen them and then go after them [based on that information]. (SRB&A Nuiqsut Interview November 2014)

In addition to the above factors, one Nuiqsut harvester cited his advanced age for a decrease in caribou hunting in Year 7. He said, “That was because of my health. Every time I want to go out, they won’t let me go alone. I have to have someone go with me. (SRB&A Nuiqsut Interview November 2014).

Changes in Trip Duration

The percentage of active harvesters reporting a change in their trip duration in Year 7 was on the high end of the range reported in previous years, with 39 percent of harvester respondents reporting a change in Year 7 (Table 18). Nineteen percent of Year 7 respondents reported taking longer trips compared to the previous

year, and the same percent reported taking shorter trips (Table 26). The percentage of respondents taking longer trips is higher than the previous four years but lower than in Years 1 and 2; the percentage of respondents taking shorter trips in Year 7 was higher than any previous years.

Table 26: Type of Change in Trip Duration, Nuiqsut, Years 1-7

Type of Trip Duration Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Take longer trips	33%	25%	9%	12%	13%	16%	19%
Take shorter trips	6%	8%	12%	9%	11%	11%	19%

Stephen R. Braund & Associates, 2016

Table 27 shows the reasons given for taking longer hunting trips in Years 1 through 7. During all study years and in Year 7, “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 as reasons for taking longer trips. In previous years, respondents also cited causes related to general hunting success, development activities, and economic factors.

Table 27: Reasons for Taking Longer Trips, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Resource Distribution or Migration Total	10 63%	5 56%	1 20%	4 57%	4 57%	8 73%	8 73%	40 61%
Resource availability	4	3	0	3	2	6	4	22
Farther from riversides/farther inland	0	1	0	0	1	2	4	8
Travel farther to harvest resource	1	1	1	1	1	0	0	5
Migration changed or diverted	5	0	0	0	0	0	0	5
Personal Factors Total	0 0%	3 33%	3 60%	3 43%	3 43%	3 27%	3 27%	18 27%
Personal reasons	0	3	3	3	1	1	3	14
Better transportation/equipment	0	0	0	0	1	1	0	2
Sharing more	0	0	0	0	0	1	0	1
Change in transportation method	0	0	0	0	1	0	0	1
Hunting Success - General Total	1 6%	0 0%	1 20%	0 0%	0 0%	0 0%	0 0%	2 3%
More difficult	1	0	0	0	0	0	0	1
Worse success	0	0	1	0	0	0	0	1
Development Activities Total	5 31%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	5 8%
Helicopter traffic disturbance	2	0	0	0	0	0	0	2
Airplane traffic disturbance	2	0	0	0	0	0	0	2
Development	1	0	0	0	0	0	0	1
Economic Factors Total	0 0%	1 11%	0 0%	0 0%	0 0%	0 0%	0 0%	1 2%
Increased cost of living/expenses	0	1	0	0	0	0	0	1
Grand Total	16	9	5	7	7	11	11	66

Stephen R. Braund & Associates, 2016

Under the category of “Resource Distribution or Migration,” respondents cited general “resource availability” (four observations), in addition to “farther from riversides/farther inland” (four observations). All in all, eight respondents reported taking longer trips due to a general lack of caribou availability or, more specifically, because the caribou were too far inland from the riversides for hunters to access them. One individual stated,

Because we were not catching anything, [it] takes that much more time to look for them. Fall time we are out there by dark and go by GPS. I had to go out more because of lack of caribou, that’s pretty much it. (SRB&A Nuiqsut Interview January 2015)

Hunters in boats generally wait patiently until the caribou reach the river where they can harvest them easily without packing them too far. As two individuals described,

I have to stay out there longer this past summer, because I didn’t want to go home empty handed. It takes longer for them to come – you know, here they are, you can see ‘em but it takes longer for them to get to the river. So I had to wait down [at] my fish camp down here.... (SRB&A Nuiqsut Interview January 2015)

This year they [hunting trips] were longer than last year because we didn’t have – I didn’t see that many caribous this year. The ones that I do see were quite a ways off, they were coming toward us so I stayed there and waited for them. One of them was a camping trip and we didn’t have our camping stuff so we just waited in our boat. (SRB&A Nuiqsut Interview January 2015)

Others cited personal reasons for taking longer trips (three observations). One respondent called it “sight-seeing,” while another indicated that they took longer trips because they were hoping to catch a moose while on their hunt. This individual observed,

That was my first ever 12 day trip. For moose! Because we wanted to catch a moose...but we didn’t see them. There was only like one, two, three moose that have been caught this year. (SRB&A Nuiqsut Interview January 2015)

The primary reasons for taking shorter trips over all study years were related to Personal Factors (Table 28). However, in Year 7, Resource Distribution or Migration had a slightly higher number of observations. Respondents also cited Economic Factors, Environmental Factors, and General Hunting Success for their shorter trip duration in Year 7. More specifically, Year 7 harvesters reported taking shorter trips due to resource availability, increased expenses, better success, employment/lack of time, change in transportation method, and the caribou being farther inland. While some respondents respond to a lack of caribou in the area by taking longer trips to search for the caribou, others respond by taking fewer or shorter trips to avoid wasting time and gas. One respondent observed, “You know, I tried to go out as much as I could but we always see some way far, but it’s too far for us to go for ‘em, so it’s probably less [in terms of duration]” (SRB&A Nuiqsut Interview January 2015). Several others indicated increased success hunting caribou and therefore noted that they did not have to stay out as long:

Shorter trips this year. Hardly any caribou the summer before; this year [referring to 2014] was different. Yeah, there was more caribou than last year. (SRB&A Nuiqsut Interview November 2014)

They [hunting trips] seemed shorter, less time out there. I didn’t have to go that far out. That and the caribou they weren’t spooked, they wouldn’t run when they heard the snowmachine. (SRB&A Nuiqsut Interview November 2014)

Others indicated personal reasons for their decreased trip length. One respondent noted the rainy weather conditions during the previous summer and indicated that they generally returned home when the weather turned for the worse. Others were too busy to spend the time hunting or did not have the money to spend on fuel:

They were short. Yeah, basically, I just wait until somebody tells me there is caribou and then I go out there and get one. Busy this year, I was working at the time. (SRB&A Nuiqsut Interview January 2015)

Last year they were short, maybe only two days, we don't catch no moose, we try to catch caribous.... Yeah, last year I didn't go to work, so I didn't have much money to buy gas, so I was following my cousins. (SRB&A Nuiqsut Interview January 2015)

Table 28: Reasons for Taking Shorter Trips, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	2	2	6	3	5	3	2	23
	100%	100%	86%	60%	56%	50%	22%	58%
Employment/lack of time	1	1	0	0	1	1	1	5
Change in transportation method	0	0	0	0	0	0	1	1
Personal reasons	1	0	5	2	4	1	0	13
Lack of transportation/equipment	0	1	1	1	0	1	0	4
Resource Distribution or Migration Total	0	0	1	1	2	1	3	8
	0%	0%	14%	20%	22%	17%	33%	20%
Resource availability	0	0	1	1	2	1	2	7
Farther from riversides/farther inland	0	0	0	0	0	0	1	1
Economic Factors Total	0	0	0	0	1	2	2	5
	0%	0%	0%	0%	11%	33%	22%	13%
Increased cost of living/expenses	0	0	0	0	1	2	2	5
Environmental Factors Total	0	0	0	0	1	0	1	2
	0%	0%	0%	0%	11%	0%	11%	5%
Weather	0	0	0	0	0	0	1	1
More rain	0	0	0	0	1	0	0	1
Don't Know Total	0	0	0	1	0	0	0	1
	0%	0%	0%	20%	0%	0%	0%	3%
I do not know	0	0	0	1	0	0	0	1
Hunting Success - General	0	0	0	0	0	0	1	1
	0%	0%	0%	0%	0%	0%	11%	3%
Better success	0	0	0	0	0	0	1	1
Grand Total	2	2	7	5	9	6	9	40

Changes in Use Area

As shown in Table 18, 28 percent of harvester respondents reported that their hunting area was different in Year 7 compared to the previous year. This was slightly lower than in the previous four years, which ranged from 33 percent of respondents in Year 4 to 40 percent in Year 6. Sixteen percent of Year 7 Nuiqsut caribou harvester respondents (compared to 28 percent in Year 6) reported a general change in the location of their use area in Year 7, seven percent reported an expanded use area, four percent reported a smaller hunting area, and two percent reported utilizing new or different areas (Table 29).

Table 29: Type of Change in Use Area, Nuiqsut, Years 1-7

Type of Use Area Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Use area changed	6%	19%	14%	29%	29%	28%	16%
Expanded use area	0%	0%	7%	0%	4%	11%	7%
Smaller hunting area	11%	0%	11%	0%	4%	0%	4%
Utilizing new or different areas	0%	0%	2%	0%	0%	0%	2%
Personal reasons	0%	2%	0%	0%	0%	0%	0%
Take fewer trips	0%	2%	0%	0%	0%	0%	0%
Travel farther to harvest resource	14%	4%	5%	2%	0%	0%	0%
Changing of timing of hunt	0%	2%	0%	0%	0%	2%	0%
Change in harvest methods	0%	0%	0%	2%	0%	0%	0%
Move to different areas	0%	2%	0%	0%	0%	0%	0%
Number of Respondents	36	53	57	58	56	57	57

Stephen R. Braund & Associates, 2016.

Table 30 shows the reasons given for the more general observation of “Use Area Changed.” Over all seven 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 7, resource availability and change in transportation method were the most commonly cited single reasons for a change in use area (three observations each), followed by personal reasons, lack of transportation/equipment, and development, (two observations each).

Table 30: Reasons Given for a Change in Use Area, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	4 24%	4 25%	19 83%	15 68%	13 46%	12 44%	8 40%	75 49%
Personal reasons	1	1	10	11	6	3	2	34
Lack of transportation/equipment	2	2	5	4	3	4	2	22
Better transportation/equipment	0	0	4	0	1	3	1	9
Change in transportation method	0	0	0	0	1	0	3	4
Employment/lack of time	1	1	0	0	0	2	0	4
Change in subsistence providers	0	0	0	0	1	0	0	1
Smaller hunting area	0	0	0	0	1	0	0	1
Resource Distribution or Migration Total	6 35%	7 44%	2 9%	2 9%	12 43%	8 30%	4 20%	41 27%
Resource availability	1	2	0	1	4	8	3	19
Migration changed or diverted	4	2	0	0	1	0	0	7
Change in distribution/migration	0	1	0	1	3	0	0	5
Farther from community	0	1	0	0	1	0	0	2
Moved out of area	0	0	2	0	0	0	0	2
Closer to community	0	0	0	0	0	0	1	1
Harvest resource closer to community	0	0	0	0	1	0	0	1
Move to different areas	0	1	0	0	0	0	0	1

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Farther from shore	0	0	0	0	1	0	0	1
Moved into area	0	0	0	0	1	0	0	1
Farther from riversides/farther inland	1	0	0	0	0	0	0	1
Environmental Factors Total	1 6%	3 19%	2 9%	4 18%	2 7%	2 7%	3 15%	17 11%
Shallower rivers/lakes	0	0	1	3	0	1	2	7
Wind	0	1	0	0	0	0	1	2
Climate affecting travel	0	2	0	0	0	0	0	2
Climate	0	0	0	0	1	0	0	1
Less snow	1	0	0	0	0	0	0	1
Warmer temperatures	0	0	0	0	1	0	0	1
Water quality	0	0	0	1	0	0	0	1
Weather	0	0	1	0	0	0	0	1
River channel changed	0	0	0	0	0	1	0	1
Development Activities Total	4 24%	1 6%	0 0%	1 5%	1 4%	5 19%	3 15%	15 10%
Development	1	1	0	1	1	1	2	7
Helicopter traffic disturbance	1	0	0	0	0	1	1	3
Traffic disturbance	1	0	0	0	0	2	0	3
Airplane traffic disturbance	1	0	0	0	0	0	0	1
Air traffic	0	0	0	0	0	1	0	1
Development Infrastructure Total	2 12%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	2 1%
Pipeline	1	0	0	0	0	0	0	1
Ice roads	1	0	0	0	0	0	0	1
Economic Factors Total	0 0%	1 6%	0 0%	0 0%	0 0%	0 0%	1 5%	2 1%
Increased cost of living/expenses	0	1	0	0	0	0	1	2
Don't Know	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 5%	1 1%
I do not know	0	0	0	0	0	0	1	1
Grand Total	17	16	23	22	28	27	20	153

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 7, a few respondents indicated that they hunted in different areas in search of caribou. One respondent observed, “Yeah [it was different], because I was on this side [west side]; I don’t usually hunt that side. That’s where the caribou were heading” (SRB&A Nuiqsut Interview November 2014).

Another individual reported traveling to Fish Creek in search of caribou because they were less available near the community; she blamed increased traffic from development activities and local hunters for the change in caribou distribution:

[We went to] different areas, because we couldn't really see the caribou. Yeah [went to Fish Creek]. We weren't having any luck for the winter, and we like to make dry meat and it was kinda hard. Caribous, we had to wait – they were, you know, like I said, maybe the helicopter, they were doing a lot of seismic and stuff. It was kinda hard, you had to wait a little bit, and sometimes people will announce there's caribou over there, and sometimes people will run over with a four-wheeler or three-wheeler [and scare them off]. (SRB&A Nuiqsut Interview November 2014)

In contrast, one respondent reported that the caribou were closer to town during his hunting activities and therefore he did not have to go as far. He said, “[I hunted] a little bit closer to town [than last year]. The caribou was just closer to town, not so spread like it was last year” (SRB&A Nuiqsut Interview November 2014).

Others reported not hunting in some of their usual areas due to a lack of transportation or environmental causes such as low water. One Nuiqsut hunter reported that he did not hunt along Itkillik River as much as usual or to the west of the community in Year 7; the latter due to shallow water prohibiting travel, and the former due to his four-wheeler breaking down. This individual described,

I went to Itkillik but I didn't see anything. Just to that first bluff. I didn't even reach the airport. It was too shallow [along Itkillik]. Nope [no overland hunting], as much as I wanted to. I lent my four-wheeler out and it broke down. (SRB&A Nuiqsut Interview November 2014)

Another individual reported less overland hunting to the west of community and expressed frustration with the high use of four-wheelers during the hunting season and the impact it has on the distribution of caribou near the village. He explained,

I tend to stay away from that [overland hunting] now, 'cause it seems like a lot of people have four-wheelers and they're scaring them [caribou] away. And it makes me a little mad, because when summer hits, it's four-wheeler, four-wheeler, four-wheeler. And I mean, they keep saying they're just over the bluff, but if they just wait they'll come, so they don't come close [because of all the four-wheeler traffic]. There are people with steady income [and so they can afford to get out there], but they could just wait so those who don't have that ability can get them. (SRB&A Nuiqsut Interview November 2014)

One respondent indicated that while he usually hunts for caribou along Fish Creek and in coastal areas, he was unable to access these areas in Year 7 because of dangerous boating conditions. He said,

Fish Creek - it was too windy to go across the bay, just this year. And then these whole [coastal] areas, we just didn't go that far this year, just around here [because of the wind]. (SRB&A Nuiqsut Interview November 2014)

One respondent reported hunting less along Nigliq Channel due to traffic associated with development activities, noting that he now prefers to hunt farther to the west near Fish Creek where there is less activity. He said, “There's too much activity, too much choppers. This is where it's happening [west] where there's no activity, nice and quiet” (SRB&A Nuiqsut Interview January 2015). Another individual made a similar comment, saying, “I'm starting to look at different areas now, especially over in the west. We are going farther away to avoid the activity” (SRB&A Nuiqsut Interview November 2014).

Several respondents reported hunting in a larger overland area in Year 7. One individual noted that he hunted for caribou while out hunting for wolves and wolverine by snowmachine. He went on to note that he usually does not harvest caribou during this time but that he chose to during the previous winter.

That was just this year I did that [snowmachining]. Well, I did [hunt in that area] in the past but it was never for caribou. That's a hard question [why]. I do usually get caribou for bait,

but I would say it's for personal reasons that I went out on the snowmachine [for caribou] this year. (SRB&A Nuiqsut Interview November 2014)

Two others indicated that they hunted in a larger area because of access to new transportation equipment. One said, “This [area] is new because I had a four-wheeler” (SRB&A Nuiqsut Interview November 2014). Another observed, “I could say that in 2013 I went pretty far out too, it was the first of April I got a new snowmachine – but I did put a lot of miles on it that month” (SRB&A Nuiqsut Interview January 2015).

A majority of respondents indicated that their hunting areas in Year 7 were similar to the previous year, and made comments such as, “I didn’t notice any changes. All pretty much the same hunting areas” (SRB&A Nuiqsut Interview November 2014).

Changes in Hunting Months

Eleven percent of Nuiqsut caribou harvester respondents reported a change in their hunting months in Year 7, somewhat lower than in previous years (between 12 percent and 21 percent) (Table 18). In most cases these respondents (seven percent) reported a general change within their normal harvest season, rather than an overall shift in the timing of their hunting season (Table 31).

Table 31: Type of Change in Months of Harvest by Type of Change, Nuiqsut, Years 1-7

Type of Hunting Month Change	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Later hunting season	11%	0%	5%	0%	0%	0%	2%
Earlier hunting season	0%	0%	0%	0%	2%	2%	2%
Harvest season changed	8%	15%	7%	21%	20%	16%	7%

Stephen R. Braund & Associates, 2016.

Over the seven study years, Personal Factors were the most commonly cited reasons for a change in harvest seasons, followed by Resource Distribution or Migration factors (Table 32). In Year 7, nearly all observations related to a change in harvest season were under the category of Personal Factors (four observations). In addition, resource availability was mentioned once as a reason for a change in harvest season. Several individuals reported that their hunting season was different because of a lack of transportation or because they were not in the village during the usual time. Two respondents said,

I wanted to hunt in September, October, but I had no means of getting out there. (SRB&A Nuiqsut Interview November 2014)

Umm... just different times of the year I guess. Previous times we usually go around June or July. I wasn't here during that time. (SRB&A Nuiqsut Interview January 2015)

Another respondent indicated that he was eager to stock his freezer with caribou and therefore went hunting earlier in the season, rather than waiting for the caribou to “fatten up.” He explained,

No...or around here [the months were different] yeah, yeah. Usually I wait longer until August, but this year I went earlier. I usually wait for them to fatten up. I just wanted to get the caribou in the freezer. (SRB&A Nuiqsut Interview November 2014)

One individual noted that the caribou were not in his winter hunting area until later than usual, saying,

For some reason it's starting to get later and later now. In the winter later. I don't know why; I don't know where the caribou come up from the south, whether it's up from Anaktuvuk Pass or by the Dalton Highway? (SRB&A Nuiqsut Interview January 2015)

Table 32: Reasons Given for a Change in Harvest Season, Years 1-7

Causes	Number and Percent of Observations							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	All Years
Personal Factors Total	4 57%	5 63%	5 71%	12 86%	8 67%	7 70%	4 67%	45 70%
Lack of transportation/equipment	2	2	2	3	6	3	1	19
Personal Reasons	0	2	0	7	1	1	2	13
Employment/Lack of time	2	0	1	2	0	1	0	6
Better transportation/equipment	0	0	2	0	1	0	0	3
Need more	0	0	0	0	0	1	1	2
Change in subsistence dependents	0	1	0	0	0	0	0	1
Change in subsistence providers	0	0	0	0	0	1	0	1
Resource Distribution or Migration Total	3 43%	2 25%	2 29%	1 7%	2 17%	1 10%	1 17%	12 19%
Resource Availability	0	2	1	0	2	1	1	7
Later Migration/Arrival	3	0	0	0	0	0	0	3
Change in distribution/migration	0	0	0	1	0	0	0	1
Moved out of area	0	0	1	0	0	0	0	1
Environmental Factors Total	0 0%	0 0%	0 0%	0 0%	2 17%	1 10%	0 0%	3 5%
Climate	0	0	0	0	1	0	0	1
Harsh winter	0	0	0	0	1	0	0	1
Weather	0	0	0	0	0	1	0	1
Development Activities Total	0 0%	1 13%	0 0%	0 0%	0 0%	0 0%	0 0%	1 2%
Airplane Traffic Disturbance	0	1	0	0	0	0	0	1
Don't Know Total	0 0%	0 0%	0 0%	1 7%	0 0%	0 0%	1 17%	2 3%
I Do not Know	0	0	0	1	0	0	1	2
Hunting Success - General Total	0 0%	0 0%	0 0%	0 0%	0 0%	1 10%	0 0%	1 2%
Better success	0	0	0	0	0	1	0	1
Grand Total	7	8	7	14	12	10	6	64

Harvested Enough Caribou

In Year 7, 32 percent of Nuiqsut respondents indicated that they did not harvest enough caribou, within the range of previous years, which ranged from 16 percent (Year 4) to 54 percent (Year 6) (Table 19). Compared to the previous two study years, a higher percentage of respondents reported harvesting enough caribou in Year 7. This corresponds with higher reported harvests by active harvester respondents during Year 7.

Respondents discussed a variety of reasons for not harvesting enough caribou during the Year 7 study period, often referring back to their reasons for harvesting fewer caribou in Year 7 (see Table 21). Others indicated that while they harvested their usual amount of caribou, it was not enough to supply their family, extended family, and others in need. 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 respondents reported

sending shares of their caribou to relatives in other villages and towns. The following individuals discussed not having enough caribou in the context of sharing:

Not [enough] for our family, but for the out of town family, yeah. My family here didn't have enough. I thought I had more in the freezer, but I don't know where it went. I think it's because my uncle's kids are getting bigger and eating more. I just send [my relatives] as much as I can. I tell them I can send 150 or 200 pounds and they are like, 'Yeah that's great!' (SRB&A Nuiqsut Interview November 2014)

Because I have a big family and four caribou is not enough for that. Plus you gotta divide your shares. (SRB&A Nuiqsut Interview November 2014)

We need to get more. We have a lot of family, family in Barrow, aunt in Wasilla and Kasilof, Fairbanks. (SRB&A Nuiqsut Interview November 2014)

No, we're already out. We're already out, and this was in August that we did this hunting and we like to share to, we don't just straight keep it for ourselves, and if there's a charter to AKP or something, and they don't have any, we send down there. We like to share. (SRB&A Nuiqsut Interview November 2014)

We got some that has been given to us shared by some of our relatives, so it was about average, and we still have some, so we never know until, and then I share some to other elders to, and my other people who share to us. You just never know. (SRB&A Nuiqsut Interview November 2014)

A number of respondents indicated that they ran out of caribou before the year's end, and some indicated during fieldwork in November 2014 and January 2015 that they had no caribou in their freezers and were depending on others to share with them. Several individuals made comments such as "it's already gone" or "I ran short." A number of individuals reported not harvesting enough due to the lack of caribou in their hunting areas, with two respondents saying,

This year, not really, I haven't got that many, been having family help us out and get...For my fall time, my wintertime, I was having snowmachine problems and summertime I just hadn't really hardly seen them except that herd we ran into. We see them one or two here or there and they're too far inland or something like that. Or a cow with a calf, we leave those alone. (SRB&A Nuiqsut Interview January 2015)

Not this year--[the caribou were] Too far out. It was hard to find them. (SRB&A Nuiqsut Interview November 2014)

In contrast, other Nuiqsut hunters indicated that they harvested more than enough caribou in Year 7, with one saying, "Yeah, I was giving it away" (SRB&A Nuiqsut Interview November 2014). Another said,

More than enough. Enough for the community. We always announce it on the radio because my son always get caribou so we announce on the VHF if you need caribou we'd be more than happy to share it with you. (SRB&A Nuiqsut Interview November 2014)

One respondent observed that he had enough caribou when taking into consideration the other resources his household harvested in Year 7, saying, "We got enough. We had lots of *muktuk* too, seal meat, and stuff like that. Sometimes I get tired of always eating caribou" (SRB&A Nuiqsut Interview January 2015).

Observations of Harvested Caribou Health and Condition

The percent of respondents reporting one or more “abnormalities” in caribou has ranged from 23 percent to 64 percent over the study years (Table 33). The percentage of respondents observing caribou abnormalities in Year 7, at 23 percent, was lower than in previous years (Table 33). The total number of caribou with abnormalities in Year 7 (23) was also on the low end of the range of previous years, but still higher than in Year 6 (14 caribou) (Table 34).

Table 33: Respondent Observations of Abnormalities in Harvested Caribou, Nuiqsut, Years 1-7

Type of Abnormality	Percentage of Respondents						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Health	47%	26%	18%	26%	34%	16%	16%
Other	3%	4%	0%	0%	4%	4%	5%
Parasites	22%	2%	5%	3%	4%	0%	2%
Quality	8%	4%	4%	10%	14%	4%	0%
Size	28%	11%	18%	14%	27%	12%	9%
One or More Abnormalities	64%	38%	40%	29%	45%	25%	23%
Number of Active Harvester Respondents	36	53	57	58	57	57	57

Stephen R. Braund & Associates, 2016.

Health problems were the primary type of observation in caribou in Year 7, followed by abnormal size. In Year 7, health-related abnormalities were reported in 83 percent of abnormal caribou (19 caribou), and size-related abnormalities were reported in 43 percent of abnormal caribou (10 caribou). In Year 7, respondents reported using only a small portion (11 percent) of caribou with health-related abnormalities (two of 19); this was a lower percentage than in previous years, when respondents used between 15 percent and 67 percent of caribou with health-related abnormalities (Table 34). Year 7 respondents used 20 percent of abnormal caribou with size-related abnormalities, also lower than in previous years. For all types of abnormalities, respondents reported using six of the 23 caribou with reported abnormalities in Year 7, or 26 percent, quite a bit lower than in previous years, which ranged from 41 percent to 70 percent (Table 34).

As shown in Table 35, in Year 7 “disease/infection” (17 observations) was the most commonly reported type of abnormality by active harvesters, followed by “decrease in resource size” (10 observations) and “resource injury” (two observations). In addition, one respondent reported harvesting a caribou with “fur less thick” (Table 35).

Respondents’ reports of disease/infection in harvested caribou included diseased, infected, or discolored flesh and organs. Residents specifically reported instances of disease in the stomach, ribs, hind quarter, chest, liver, intestines, and leg joint of the caribou they harvested. A number of individuals reported encountering greenish “slime” or pus when butchering these animals.

There’s some kind of saliva – some kind of mold, you can see on the back, like a green, yellow stuff. They’ve never been like that. On the back. And when I cut that up. And I cut open the chest and you can see all that there. What is that? ... They look healthy, but when you butcher them, they’re unusual.... They’re sick in the chest. Can’t tell until you start butchering.... You open up the chest and it’s like saliva. It’s gross. It never used to be like that. You can’t tell until you shoot them down. It’s like wasting caribou, because they’re sick. (SRB&A Nuiqsut Interview November 2014)

Table 34: Number and Percent of Abnormal Caribou by Type of Abnormality, Nuiqsut, Years 1-7

Type of Abnormality	Number (%) of Abnormal Caribou							Number (%) of Abnormal Caribou Used						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Health	24 (32%)	16 (47%)	13 (35%)	23 (85%)	30 (60%)	9 (64%)	19 (83%)	4 (17%)	4 (25%)	2 (15%)	10 (43%)	7 (23%)	6 (67%)	2 (11%)
Other	1 (1%)	2 (6%)	0 (0%)	0 (0%)	2 (4%)	2 (14%)	3 (13%)	0 (0%)	2 (100%)	--	--	0 (0%)	1 (50%)	2 (67%)
Parasites	13 (18%)	5 (15%)	8 (22%)	3 (11%)	2 (4%)	0 (0%)	1 (4%)	11 (85%)	5 (100%)	7 (88%)	0 (0%)	0 (0%)	--	0 (0%)
Quality	3 (4%)	2 (6%)	2 (5%)	6 (22%)	11 (22%)	2 (14%)	0 (0%)	2 (67%)	1 (50%)	2 (100%)	1 (17%)	1 (9%)	1 (50%)	--
Size	43 (58%)	9 (26%)	16 (43%)	12 (44%)	33 (66%)	7 (50%)	10 (43%)	38 (88%)	8 (89%)	20 (88%)	1 (8%)	20 (61%)	3 (43%)	2 (20%)
One or More Abnormalities	74	34	37	27	50	14	23	52 (70%)	20 (59%)	25 (68%)	11 (41%)	25 (50%)	9 (64%)	6 (26%)

Stephen R. Braund & Associates, 2016.

Respondent 1: It was in the hind quarters and all over in the ribs [the green slime]. Just the one caribou the one that they were hunting, that one had green. It was like slimy looking on the hind quarter or on the ribs.

Respondent 2: We took it, we gave it to fish and game [didn't eat it] He tested it, and it was good, but I ain't going to eat that. It was like inside the ribs and the hindquarters.

Respondent 1: It was pretty slimy, that was gross, like the color of your sweater. They started cutting it and then it was like, 'Eww, what is that?!' and I was telling them, 'Don't eat that.' It looked healthy from the outside and then when they started cutting that it was green. It was fat on the outside. (SRB&A Nuiqsut Interview November 2014)

One of them had like a greenish thing on the leg. I don't know; green slime right at the knee part and I'm thinking that's probably just an infection or something. Something, because it was right at the knee part, but I just cut that off and there was nothing wrong with [the rest of it]. (SRB&A Nuiqsut Interview January 2015)

Table 35: Types of Observed Abnormalities, Nuiqsut, Years 1-7

Observed Abnormality	Number of Observations						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Disease/Infection	24	12	13	20	29	7	17
Decrease in Resource Size	36	9	12	12	33	6	10
Resource Injury	0	0	0	0	0	0	2
Fur Less Thick	0	0	0	0	0	0	1
Increase in Resource Size	5	0	4	0	0	0	0
New Species in Region	0	1	0	0	0	0	0
Abnormal Resource Death	1	0	0	0	0	0	0
Physical Abnormalities	0	3	0	0	1	0	0
Change in Texture of Meat	0	3	0	4	8	1	0
Parasites	0	5	0	0	0	0	0
Less Fat	1	0	0	0	0	0	0
Change in Smell of Meat	2	1	0	5	6	1	0
Change in Resource Quality	0	0	2	0	0	0	0
Resource Appears Unhealthy	0	0	0	0	1	1	0
More Parasites	3	0	1	3	1	0	0
Fewer Parasites	10	0	7	0	0	0	0
Injured Resource	0	0	0	0	0	4	0
Taste	1	0	0	0	1	1	0

Stephen R. Braund & Associates, 2016.

When asked by researchers what they thought caused the sicknesses observed in the caribou, most respondents made statements such as “It’s hard to say for the cause” (SRB&A Nuiqsut Interview November 2014). However, one individual believed that contamination from nearby oil and gas activity is causing an increase in the frequency of diseased caribou. This harvester recalled an experience from the late 1990s, saying,

One time I was out there when Alpine first started. I was way out there. I felt something land on my face. It was east wind, I happened to look down, and it was particles of black, and it

hit. It was 40 some miles [from the development]. It probably spread all over. I felt in the snow, particles of black. And I felt it, and this was soot. And I called them when I got home, and they didn't believe me. This was around 1998, 1999. And they didn't believe me. Now that's why I have this (camera), because they don't believe me. And I could smell it. Yeah that pollution goes out and settles on the tundra. Because that's the smoke out there. I think that's what they're getting sick from – the industry. It never used to be like this in the 30 years that I've been trapping and hunting caribou. We're getting more [sick caribou] since about 1998. (SRB&A Nuiqsut Interview November 2014)

In many cases, harvesters' reports of skinny caribou accompanied reports of illness or disease. Several individuals described harvesting sick caribou who were also abnormally skinny. As two individuals described,

I brought home two; we [my hunting partner and I] brought home two each, there was four sick [caribou]. On the body they would have bruises and purplish spots on the meat and a lot of blood clots on the hind quarters. They all had the same thing going on. Most of them were skinny.... One had green pus coming out of the bones. I have pictures on my other phone but it broke. It looked healthy, but you could see the ribs, so you could tell it was skinny. The skin looked good but the meat was pretty bad. (SRB&A Nuiqsut Interview November 2014)

There was a couple of them that we got and we had to leave because they had big lumps on their legs or something and some of them are really skinny so we just had to cut their heads off and leave 'em. More on this side [east]. They were sick. One right here [east] one right here [up river]. We can't take them we already know that our food should be healthy food so we see something like that one caribou, we don't take them. (SRB&A Nuiqsut Interview January 2015)

Other individuals harvested skinny caribou that otherwise seemed healthy. One respondent believed that icy weather conditions (resulting from a mixture of rain and snow) had reduced the caribou herd's access to food saying,

There was one that was skinny over here. Because of ah, the rain and snow that we have had, the caribou are not getting enough to eat. It's making the caribou herd...I noticed there was hardly anything in the stomach when I was cutting the caribou. (SRB&A Nuiqsut Interview November 2014)

Another individual reported harvesting a skinny caribou and posited that the caribou had lost fat when running from predators. He observed,

[They didn't have] very much fat; maybe one by Nigliq [was fat], but the ones I got, they had like that much fat [quarter inch]. Too much muscle [and] not enough fat. Maybe they ran into wolverines or whatnot. (SRB&A Nuiqsut Interview January 2015)

A few individuals reported infections from wounds inflicted by either hunters (bullets) or predators. One respondent reported harvesting a caribou that had a recent injury, saying,

There was only one that was just slashed from a bear or a wolverine. A part of the tail area had a big scratch. It was fresh like. It probably happened four to five days before we saw it. All the rest of the caribou were normal. Yeah, my family was all there and we all agreed it was just a little scratch; if there was pus we would have left it there, but it wasn't very bad so we took it home [and used it]. (SRB&A Nuiqsut Interview November 2014)

While 23 percent of Year 7 respondents reported harvesting caribou with abnormalities, others reported that the caribou they harvested were healthy and of good quality. One individual indicated that the caribou he harvested were in fact fatter than in previous years. Several respondents described the quality of caribou during the previous hunting season as follows:

They were a lot fatter than the caribous I caught in previous years for some reason. Maybe we have less snow or wet snow... (SRB&A Nuiqsut Interview January 2015)

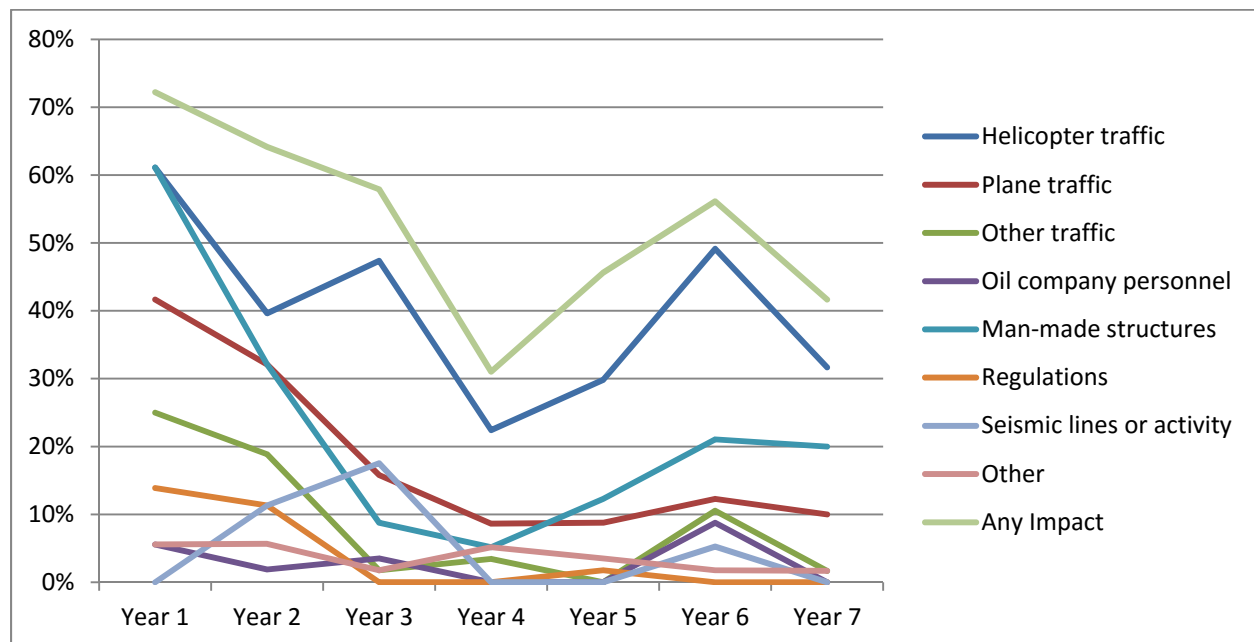
Yeah, they were all good. It's been a while since I got a sick caribou. My son got a few of them this last season, but I didn't. Not much fat, but they were good eating. The meat was really soft and tender, good and clean. (SRB&A Nuiqsut Interview November 2014)

The locations where Year 7 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 7 time period, respondents reported harvesting “abnormal” caribou primarily to the overland area west of the community and upriver along the Colville River. In addition, a couple of abnormal caribou locations were reported on Nigliq Channel, on the East Channel, along Itkillik River, and south of Teshekpuk Lake. As shown on Map 30, over all study years, the locations where respondents have harvested abnormal caribou are similar to the locations where they have harvested healthy caribou.

Impacts on Harvesting Activities

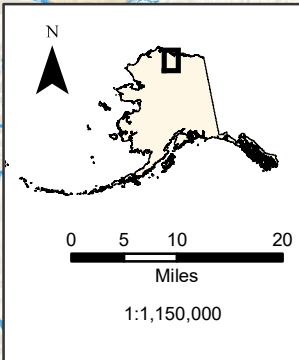
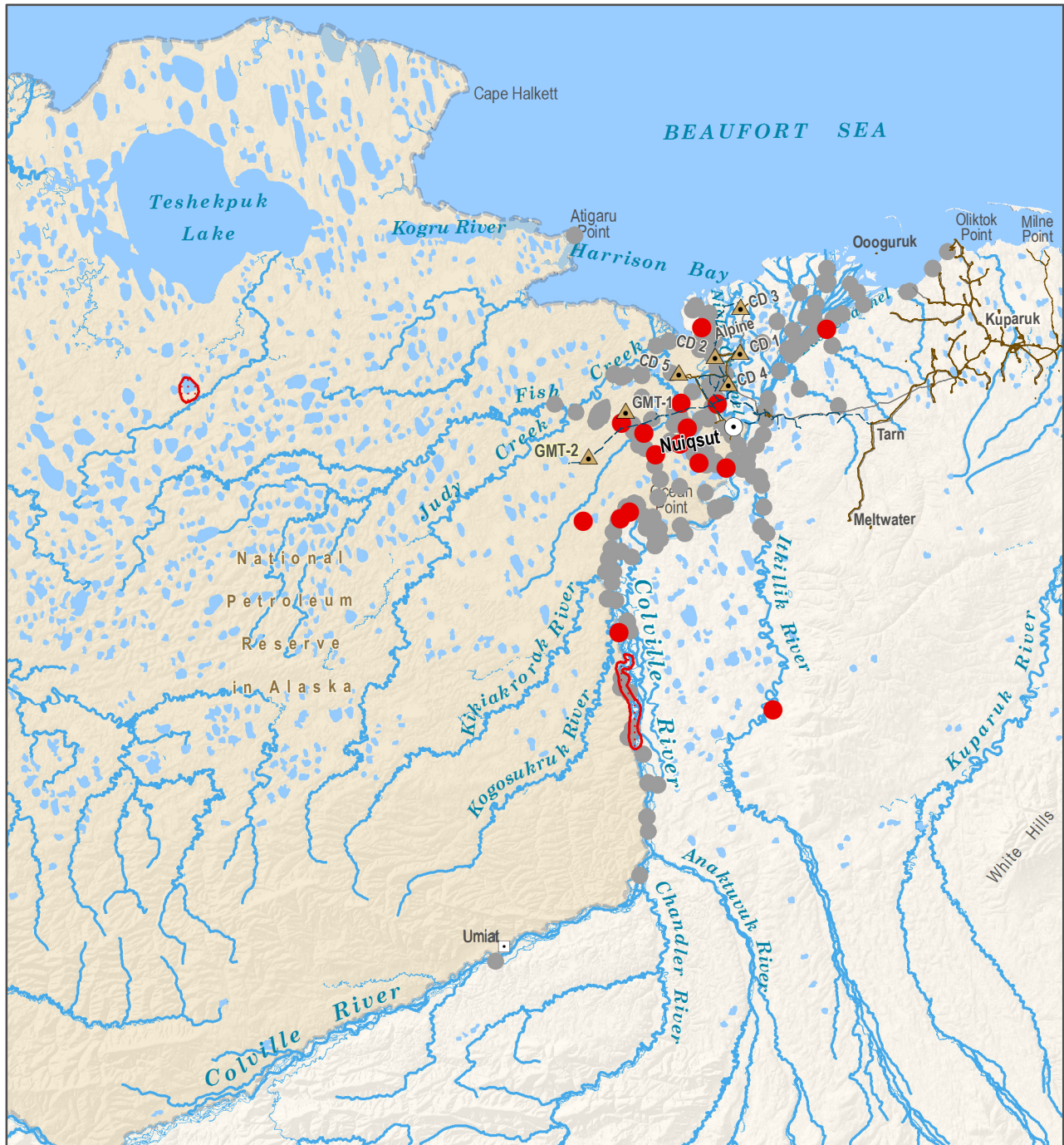
In Year 7, 42 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting⁵, lower than all other years except Year 4 (Figure 6, Table 36). The higher percentage of study participants (72 percent) reporting impacts in 2008 (Year 1) is due in part to Year 1 respondents including impacts that had occurred since the Alpine development had begun.

Figure 6: Percentage of Respondents Reporting Impacts by Study Year



Stephen R. Braund & Associates, 2016.

⁵ 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 Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 124 active harvesters from March 2009 through January 2015.

Other areas may have been used for resource harvesting.

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Year 7: November 2013 - October 2014

● 18 caribou harvest locations
 13 respondents

Years 1-6: January 2008-October 2013

● 192 caribou harvest locations
 64 respondents

National Petroleum Reserve Alaska



Map 30 - Harvest Locations where Respondents Harvested Abnormal Caribou and Healthy 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 124 active harvesters from March 2009 through January 2015.


Other areas may have been used for resource harvesting.

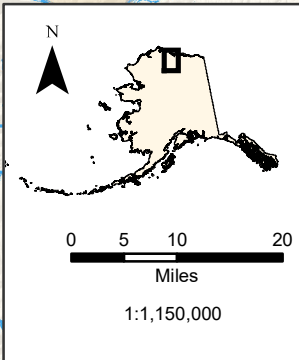
Years 1-7: January 2008 - October 2014

- 210 abnormal caribou harvest locations
- 66 respondents

Years 1-7: January 2008 - October 2014

- 1278 healthy caribou harvest locations
- 119 respondents

 National Petroleum Reserve Alaska



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Table 36: Respondent Reported Alpine-Related Impacts on Caribou Hunting, Nuiqsut, Years 1-7

Type of Alpine-Related Impact	Percent of Respondents							Percent of Observations						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Helicopter traffic	61%	40%	47%	22%	30%	51%	32%	28%	26%	49%	54%	55%	46%	48%
Plane traffic	42%	32%	16%	9%	9%	13%	10%	22%	21%	16%	18%	18%	12%	14%
Other traffic	25%	19%	2%	3%	0%	11%	2%	10%	12%	2%	7%	0%	9%	2%
Oil company personnel	6%	2%	4%	0%	0%	9%	0%	2%	1%	4%	0%	0%	7%	0%
Man-made structures	61%	32%	9%	5%	12%	22%	20%	30%	22%	9%	11%	18%	19%	33%
Regulations	14%	11%	0%	0%	2%	0%	0%	6%	7%	0%	0%	3%	0%	0%
Seismic lines or activity	0%	11%	18%	0%	0%	5%	0%	0%	7%	18%	0%	0%	4%	0%
Other	6%	6%	2%	5%	4%	2%	2%	2%	4%	2%	11%	5%	1%	2%
Any Impact	72%	64%	58%	31%	46%	56%	42%							
Number of Respondents/ Observations	36	53	57	58	57	55	60	87	82	55	28	38	67	42

Stephen R. Braund & Associates, 2016.

During Years 2 through 7, 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 seven 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 "non-Alpine" impacts are summarized separately below. The study team recorded all impacts reported by respondents and did not make determinations regarding what 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 36, 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 36.

It is interesting to note that the percentage of respondents reporting impacts in Year 7 was lower than in most other study years despite the fact that, according to CPAI, Year 7 (2014) was one of the highest years of development activity due to construction of CD5, the Kuukpik Spur Road, and the roads and bridges connecting CD5 to the east side of the Nigliq Channel. The majority of this work occurred during the winter months, thus reducing potential conflicts with subsistence activities which are highest during the summer and fall months. In addition, CPAI noted that helicopter traffic, a primary source of reported impacts in previous years, was limited during the summer of 2014.

As in the case of Years 1 through 6, the most commonly reported Alpine-related impact in Year 7 was associated with helicopter traffic, with 32 percent of harvester respondents reporting helicopter traffic impacts. These observations accounted for 48 percent of all impact observations in Year 7 (Table 36). The percentage of respondents reporting helicopter-related Alpine impacts is higher than it was in Years 4 and 5 and lower than it was in all other years. The percentage of respondents reporting impacts related to plane traffic (10 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 7 (two percent) was similar to Years 3 through 5 which ranged from zero percent to three percent. Reported impacts from other traffic were higher in Years 1, 2, and 6 (25 percent, 19 percent, and 11 percent, respectively); in those years, airboat traffic was more frequently mentioned. 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, 6, and 7 (12 percent, 22 percent, and 20 percent respectively). Man-made structures were the second most commonly reported impact observations in Year 7, accounting for 33 percent of all observations. 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, impacts related to regulations, and impacts related to seismic lines or activity were not reported by Year 7 respondents (each at zero percent). Impacts related to “other” were reported by just two percent of respondents. While reports of these impacts related to oil company personnel and seismic lines or activity were higher in Year 6 (nine percent and five percent, respectively) percentages from Year 7 were similar to those of Years 4 and 5.

Figure 7 shows the number of reported impacts on caribou hunting of all types by month for the seven study years, and Figures 8 through 13 show individual impact reports by month for the seven study years. The peak months for reported impacts in all seven years are June, July, and August, the same months as peak caribou hunting activity (Figure 7, Figure 1). While most other study years show a peak in reported impacts in July, in Year 7 impacts were most commonly reported to occur during the month of August. Helicopter impacts peaked in August with 10 observations of impacts, but were also reported in similar numbers during July (Figure 8). Airplane impacts also peaked in August with five observations of impacts, but were reported in similar numbers from June through September (Figure 9). Man-made structure impacts were reported year round at low levels but peaked in June at five observations of impacts (Figure 11).

Figure 7: Reported Impacts by Month, Years 1-7

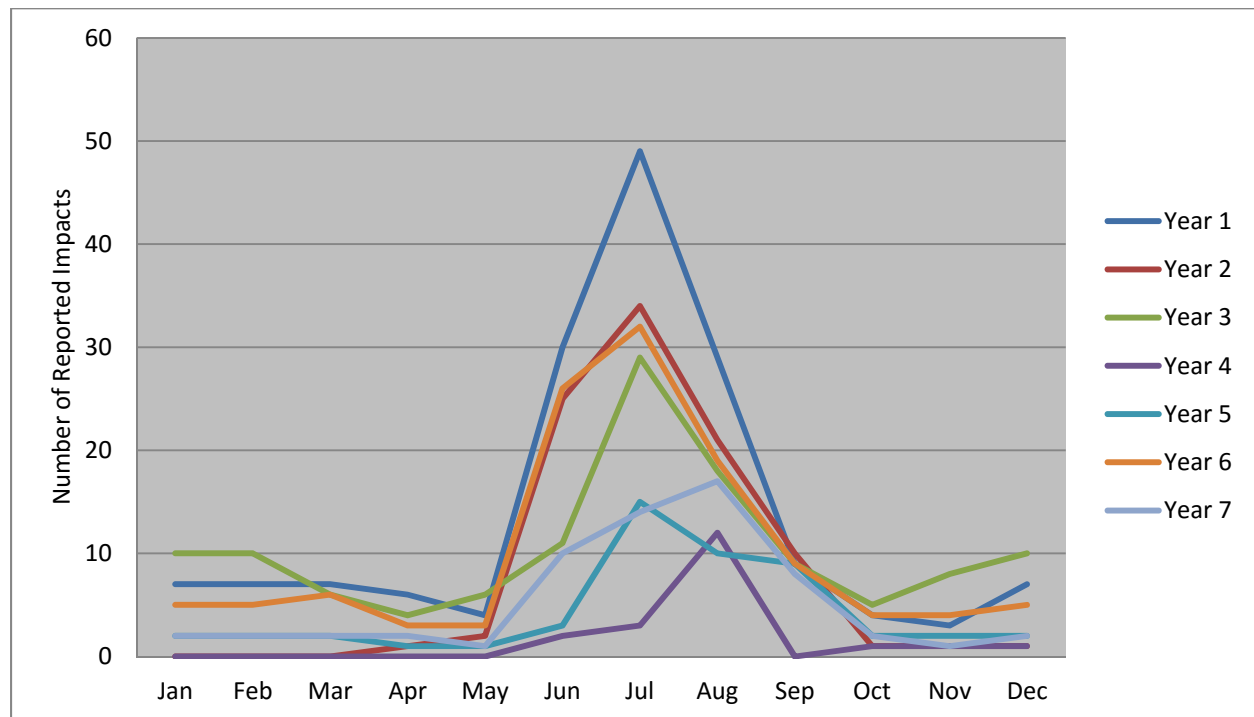


Figure 8: Reported Helicopter Impacts on Caribou Harvest Activities by Month: Years 1-7

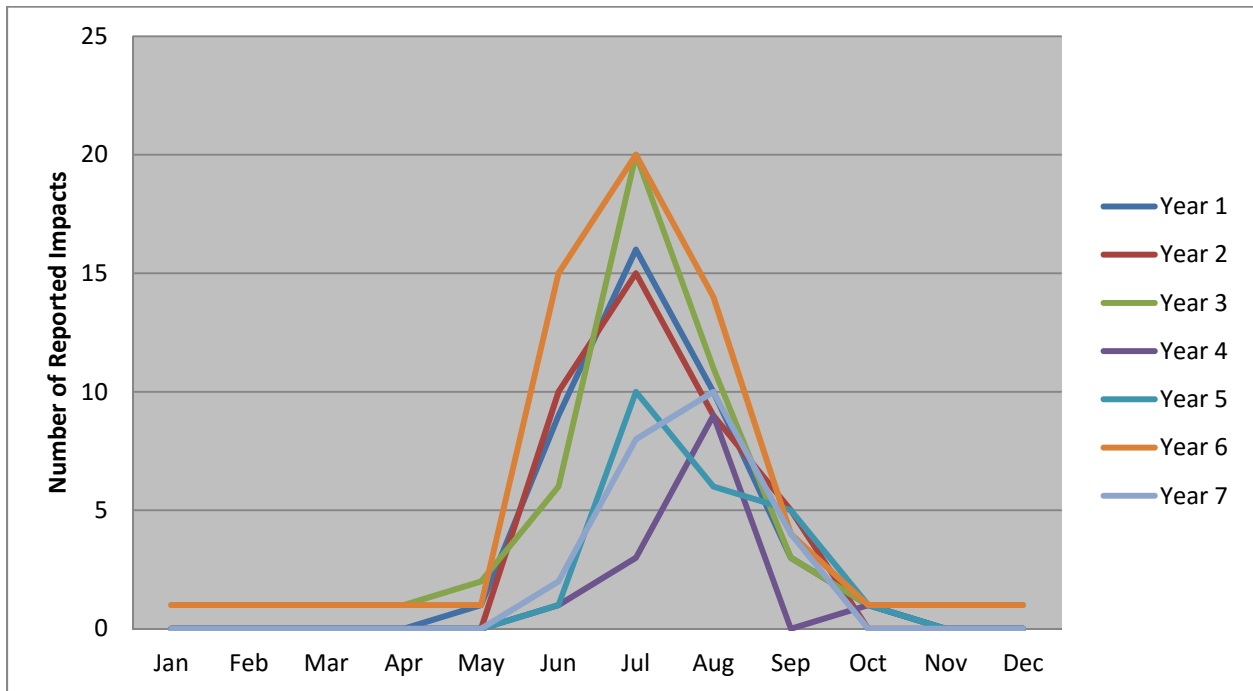


Figure 9: Reported Airplane Impacts on Caribou Harvest Activities by Month: Years 1-7

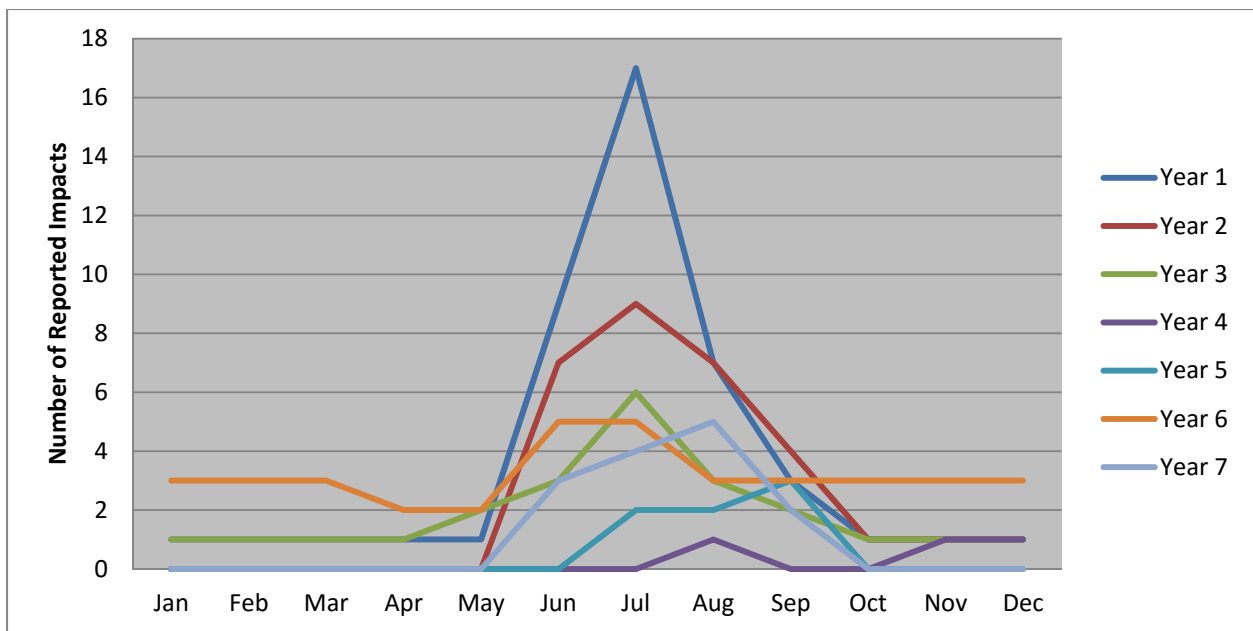


Figure 10: Reported Oil Company Personnel Impacts on Caribou Harvest Activities by Month: Years 1-7

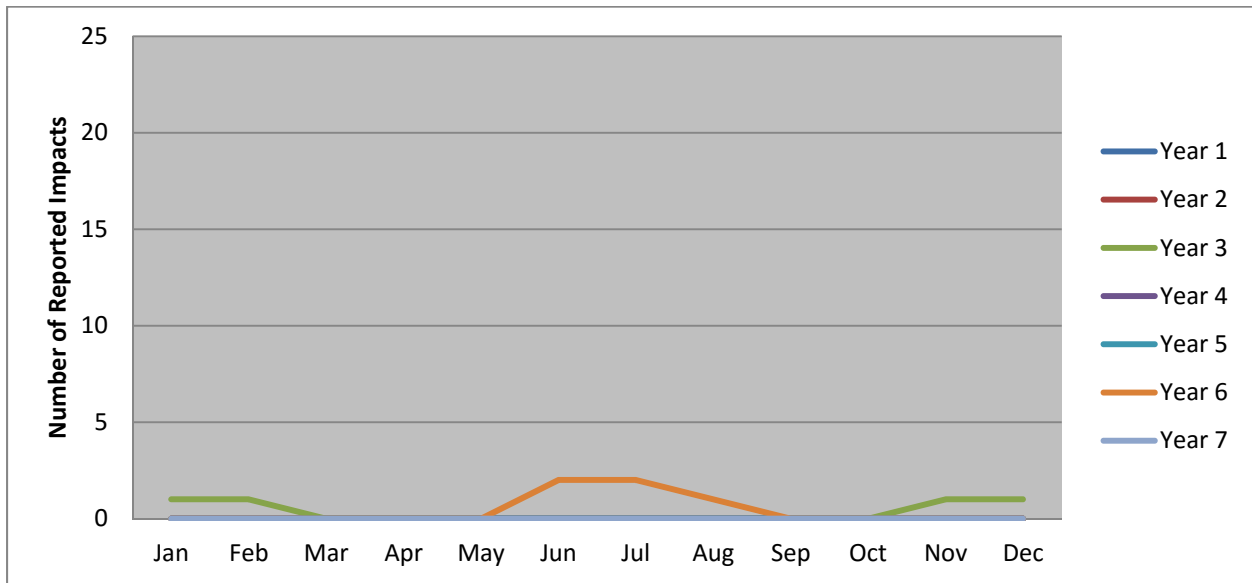


Figure 11: Reported Man-Made Structure Impacts on Caribou Harvest Activities by Month: Years 1-7

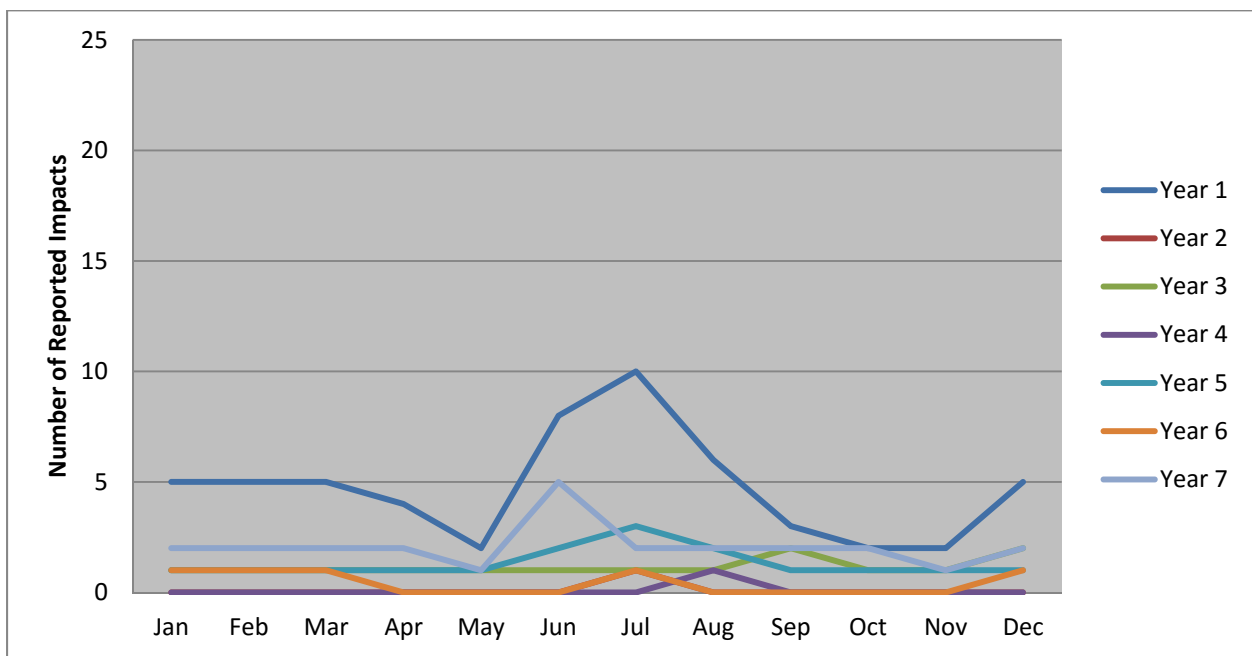


Figure 12: Reported Regulation Impacts on Caribou Harvest Activities by Month: Years 1-7

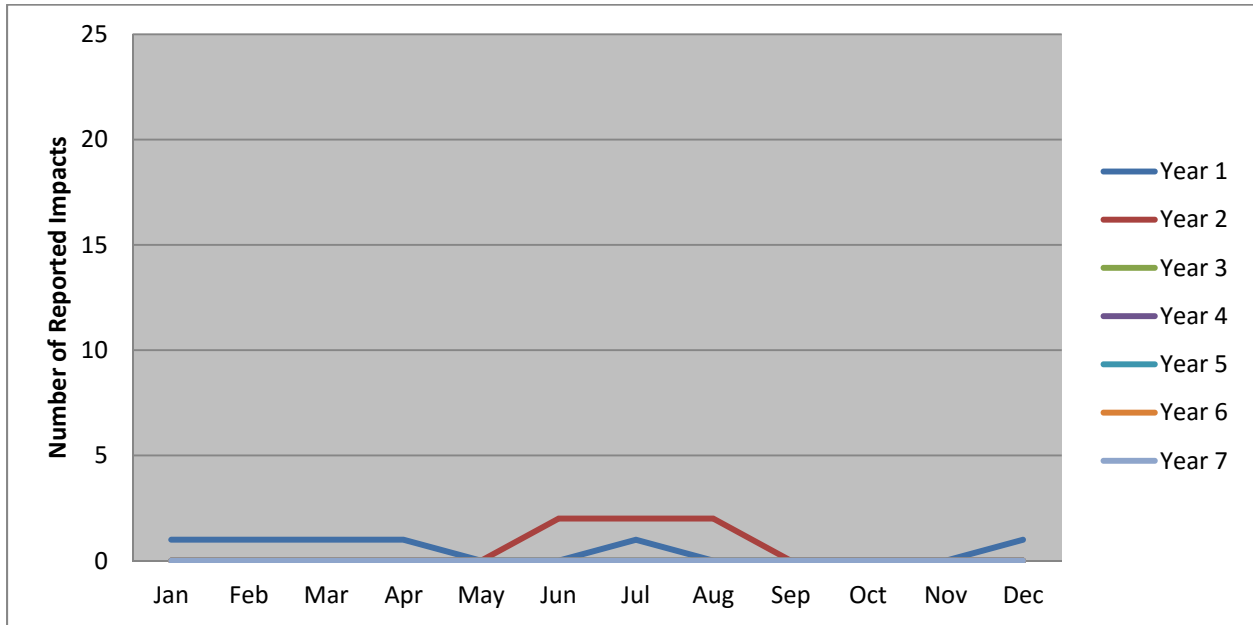
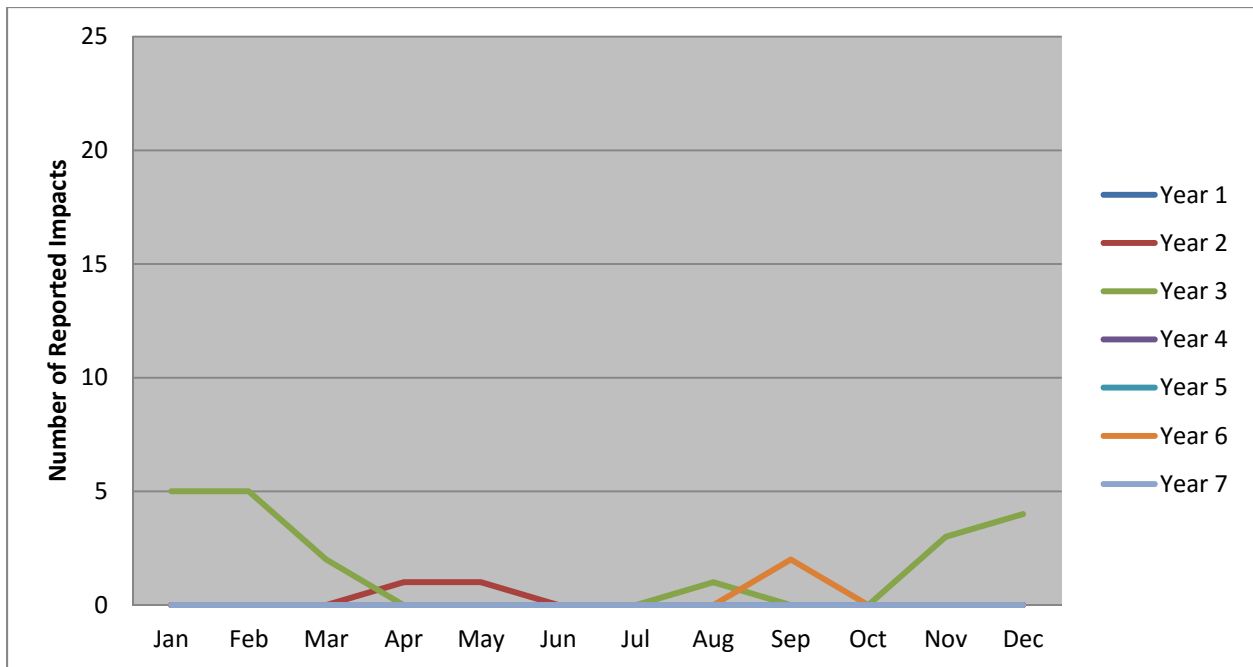


Figure 13: Reported Seismic Line and Activity Impacts on Caribou Harvest Activities by Month: Years 1-7



Map 31 shows the locations of Alpine-related impacts reported by Year 7 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 31, 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 CD2 and CD4. Impacts were also reported to the north and west of the community, along the new Spur Road and near the bridge to CD5. While a majority of these were helicopter traffic impacts, respondents also reported other traffic, plane, and man-made structure 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 near Kachemak River and near Fish Creek, Ublutuoch River, and Ocean Point.

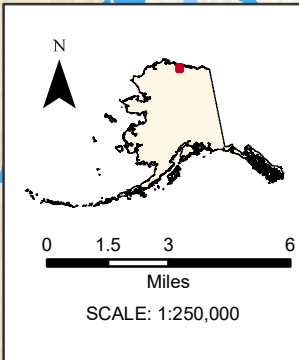
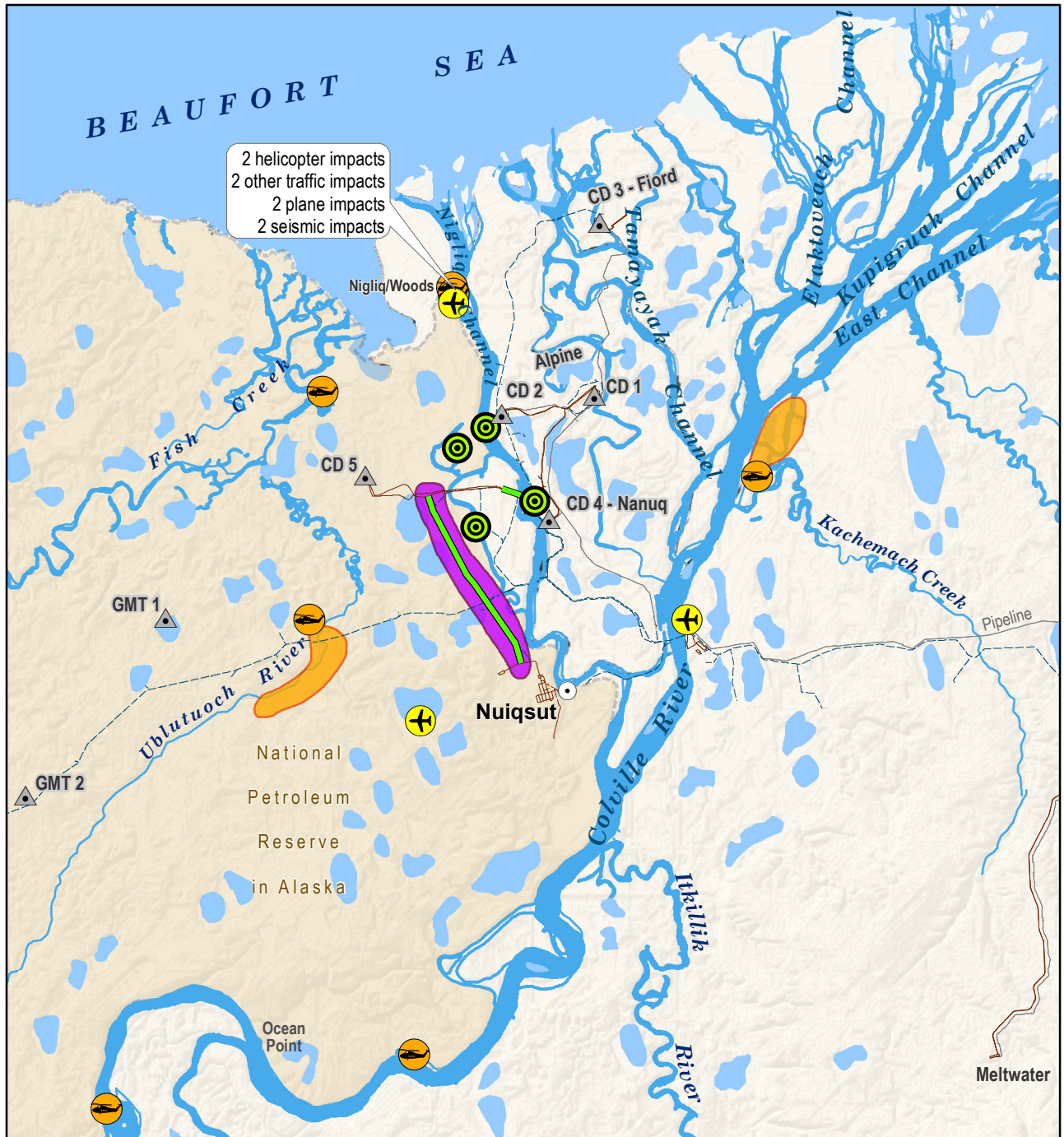
Impacts of Helicopter Traffic

As shown in Table 36, 32 percent of respondents reported helicopter impacts in Year 7, a smaller percentage than in Years 1, 3, and 6, but similar to those of Years 2, 4, and 5. Helicopter impacts accounted for 38 percent of the reported impacts during the Year 7 study period (Table 36). As shown on Map 3031, helicopter impacts were reported along the Nigliq Channel near Nigliq camp (in the lower portion of the channel), along Ublutuoch River and Fish Creek, and along the East Channel of the Colville Delta. In addition, several helicopter impacts were reported to the south along the Colville River near Ocean Point. When asked to describe the helicopters causing impacts, respondents most frequently indicated that they did not know or remember the helicopter owner/operator or physical description. However, those who could recall the helicopters they observed described “Alpine” helicopters (five observations) followed by “blue and white” helicopters. Residents also described green and white helicopters, ConocoPhillips helicopters, blue helicopters, and yellow helicopters (Table 37). According to a poster distributed by CPAI, Repsol, and Linc Energy prior to Summer 2014, helicopters leased to CPAI in 2014 were green and yellow with a white underbelly; helicopters leased to Repsol were white with blue and green stripes and a white underbelly.

Table 37: Respondent Descriptions of Helicopters Associated with Impacts, Nuiqsut, Years 3-7

Helicopter Descriptions	Number of Observations				
	Year 3	Year 4	Year 5	Year 6	Year 7
Blue and White Helicopter	8	6	10	9	4
Alpine Helicopter	4	0	5	6	5
Air Logistics Helicopter	4	0	2	3	0
Conoco Phillips Helicopter	1	0	0	0	1
Red Helicopter	1	0	0	0	0
Helicopters - Unknown Owner	9	7	4	9	6
Helicopter, Blue	0	1	0	0	1
Helicopter, Blue and Orange	0	1	0	1	0
Red and Black Helicopter	0	0	0	1	0
Yellow Helicopter	0	0	0	0	1
Other oil company helicopter	0	0	0	1	0
Airplane - Unknown Owner	0	0	0	1	0
Green and White Helicopter	0	0	0	0	1
Total	27	15	21	31	20

Stephen R. Braund & Associates, 2016.







Map 31 - Perceived Alpine Related Impacts, Year 7

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 60 active harvesters in November of 2014 and January 2015.

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National Petroleum Reserve Alaska

LEGEND

-  3 other traffic
3 respondents
-  9 structure impacts
8 respondents
-  3 plane impacts
3 respondents
-  9 helicopter impacts
9 respondents

Respondents indicated that the heavy helicopter traffic in the Nuiqsut area resulted in the caribou being disturbed or diverted from their migratory path towards other areas. They noted that these disruptions affected harvest success rates and negatively impacted the experience of caribou hunting. Caribou harvesters observed that helicopter traffic is more disruptive to caribou behavior and movement than other types of traffic. As one respondent noted, “you have less noise [from traveling] on gravel than you have up in the air” (SRB&A Nuiqsut Interview January 2015). Several respondents commented on specific instances in which helicopters had interrupted their harvesting activities. Others commented on the general nature of caribou reactions to helicopters. However, most participants agreed that there was a high frequency of helicopter traffic in the area:

Oh man, helicopters are a big issue. I am sick and tired of them. They fly too much. It happens every year. They come here and we have meetings and we tell them about it, but it's the same issue every year. [We meet about it] at least once a year. Yeah, it's happened ever since they started Alpine. For the last five years the flying has gone beyond – way more [than] what they said they were going to do. (SRB&A Nuiqsut Interview January 2015)

You used to see a lot of air traffic. I think they were surveying or something. But I think it's the helicopters that are always in the air from early in the morning until later. (SRB&A Nuiqsut Interview November 2014)

There's too much helicopters and planes on Fish Creek. When I was trying to catch caribou, a helicopter came and scared them away. That was last year. They [helicopters] were blue and white. (SRB&A Nuiqsut Interview January 2015)

Several individuals said that they had tried to be more aware of which helicopters they spotted, because the tribal council had stressed that the information was useful when reporting impacts, saying, “They told us [the helicopters had] different colors and numbers and to write down the number and bring it to the city,” (SRB&A Nuiqsut Interview November 2014). A majority of the helicopters described by Year 7 participants were characterized as Alpine helicopters or blue and white helicopters, though other types of helicopters were also seen. As noted above, in 2014 CPAI leased helicopters that were green and yellow with a white underbelly. Reports of blue and white helicopters could either be helicopters leased by other companies or agencies, or they could reflect the difficulties in identifying and/or remembering helicopter details from such a distance and after several months. The following respondents discussed their observations of helicopters spotted in the area:

Between here and Nigliq there was too much chopper activity, and then Repsol activity, too. They were blue and white and this one I think was green and white. They are doing a lot of studies over on the east side. During prime time—around August. [It was] just mostly chopper [activity]—too much chopper activity. (SRB&A Nuiqsut Interview November 2014)

They had to come here and clean up after their winter exploration. [They were] blue. One of them's got a yellow top one of them's got a white top. They've got a different bottom but the top... Yellow belongs to Conoco, and white belongs to Repsol. (SRB&A Nuiqsut Interview January 2015)

Several participants went on to comment on the projects with which they believed the helicopters were associated. The following respondents listed garbage clean-up and unspecified studies along river channels, as contributing to helicopter traffic in the region:

[There was] a lot of activity around the ice road route, because they're hovering and about every 50 feet they were picking up trash. In June, July, [and] August... I wish they would quit studying... (SRB&A Nuiqsut Interview November 2014)

Out here, mainly they're down on this side. And during the spring time they were following the rivers, like they had never experienced it before, they were watching it. (SRB&A Nuiqsut Interview November 2014)

Participants noted that helicopter activity impacted caribou in a multitude of ways, such as scaring and scattering herds, and disrupting the timing and trajectory of their migration. Respondents pointed out that in addition to causing temporary scattering of herds, helicopter traffic also tends to divert the caribou from their typical migration routes. Respondents explained that the noise and presence of helicopters disrupt caribou, causing them to become skittish:

Helicopters and planes are common. They come in and out every day. We're used to it now. It's just [that] the choppers [make] so much noise in those props and the caribou get spooked from them. (SRB&A Nuiqsut Interview November 2014)

They used to travel in good sized numbers but not anymore. There's too much activity, too much choppers. This is where it's happening [west] where there's no activity, nice and quiet. (SRB&A Nuiqsut Interview January 2015)

The [caribou] were scattered [by a blue helicopter], they were driven away from the river, away from us. And that's the reason why we try to make contact with KSOP here so we can inform them to minimize the flights down here. I was somewhere down here near that lake near my fish camp. They come here from Alpine straight to CD5... That [CD5] there with equipment out there [will] just kind of temporarily disrupt, but not permanently disrupt [the caribou]. But the chopper is a concern to us. (SRB&A Nuiqsut Interview January 2015)

Harvesters also observed that the caribou begin to avoid areas where there is regular helicopter traffic, such as along river corridors and near heavily populated areas:

The helicopter that was going from Alpine diverted the caribou inland. It was on the east side of the Colville and then they went in further. I had to go in further [inland] to get that caribou right there. (SRB&A Nuiqsut Interview November 2014)

They [caribou] were a long ways [away]. And like I said, I think the helicopter divert the caribou when they fly around here. Maybe they could slow it down during the fall times, but when they do the seismic they're here, so they told the community about it. We have to go further. I got them around Nigliq [in the past], but now we have to go further. (SRB&A Nuiqsut Interview November 2014)

I think that [where they've moved] is the place where there's no activity going on. There used to be a whole bunch around this area, but now they're moving south. I think they're finding a food source down here [near the Nigliq Channel], and now they're down here. You know, we were so fortunate they were going from the east to the west. (SRB&A Nuiqsut Interview November 2014)

One respondent observed that the caribou may anticipate high traffic months and wait to pass through the area until the traffic has subsided:

[The caribou] are starting to realize that [helicopters] fly around the area during the migration months. I think they're trying to come when the helicopters are over. Yeah, [the helicopters] divert [the caribou]. (SRB&A Nuiqsut Interview November 2014)

In addition to impacting the caribou directly, several harvesters indicated that helicopter traffic affects their hunting experiences more generally. As one individual observed, "A lot of people get annoyed

by the helicopters. Every time we see them they are always pretty low,” (SRB&A Nuiqsut Interview January 2015). Several respondents recalled instances when helicopters had interrupted a hunt just as hunters were trying to harvest caribou:

I tried to shoot a caribou and a chopper came and it didn't see me but it saw the caribou and it tried to turn but the caribou [took off]. It was right at Kayuktisiluk. I was just waiting for him and the chopper came around and spooked it and she really turned around. I don't know [what color the chopper was], gee whiz. I'd say blue and white, I think. (SRB&A Nuiqsut Interview January 2015)

I tried to shoot a caribou and the helicopter was right there, and it scared them away and then I had to start all over. I wasn't that far from Ublutuoch Creek. (SRB&A Nuiqsut Interview November 2014)

They always scare my caribous away while we're waiting for them to get closer and then they don't let them go back in. It doesn't let us get anything. (SRB&A Nuiqsut Interview January 2015)

A few respondents described altering their hunting areas or methods in an attempt to avoid areas of heavy traffic. Two individuals described the impact of helicopter traffic on their Year 7 hunting activities as follows:

I don't go very far because there's helicopters flying from Alpine to southwest disturbing our hunting. When a good season comes along, like the fall time, spring time, mostly spring time, the Alpine fly their helicopters on the right season. I think he's going to chase them away and disturb my hunting. And they do that! They chase the caribou further inland. Like they're chasing! (SRB&A Nuiqsut Interview November 2014)

We didn't get to go camping this year. [There was] too much traffic—too many helicopters over this way... We used to hunt caribou, but we don't go there anymore because there's too much helicopters. That's the main thing. The helicopter [activity] is my problem, because they're out there in the mornings and the day and sometimes we wait until 5 o'clock to go out, but that makes for a short evening. So my thing is the helicopter. I could even hear it from my house... it goes back and forth, back and forth. And we'll never see the caribou, just the helicopters. That was my number one [impact]—the helicopter. (SRB&A Nuiqsut Interview November 2014)

Impacts of Airplane Traffic

Airplane traffic was the third most commonly reported impact during the Year 7 respondent interviews. Ten percent of respondents reported impacts from airplanes during the Year 7 study period, accounting for 14 percent of all reported impacts (Table 36). When asked to describe airplanes causing impacts, in two cases respondents did not know the source or owner of the airplane and in four cases, respondents believed the airplane was Alpine-related (Table 38).

Airplane traffic is generally less of a concern to hunters as residents indicate that the noise levels are 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.

Table 38: Descriptions of Airplanes Associated with Airplane Traffic Impacts, Nuiqsut, Years 3-7

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

Stephen R. Braund & Associates, 2016.

The following respondents discussed their observations regarding the impact of airplane traffic on their caribou hunting activities:

I keep track of the flights that come out of Alpine, and that's every day, four to five times a day, and for the local hunters that really bothers them. And it was going to happen that they try to put a limitation on them, but it's just bound to happen that they fly more [than they initially thought they would]. And there are people doing the environmental studies on the birds and the fish, and there are about four different outfits [flying]. (SRB&A Nuiqsut Interview November 2014)

In June, July, August... [there are] helicopters [and] C-130. They go there every day. Every day in the season. That's too many [times]. It's never changed after how many years we've been complaining about air traffic around here. (SRB&A Nuiqsut Interview November 2014)

Participants additionally discussed specific instances in which they had observed caribou being disturbed by airplane traffic. They noted that planes had caused caribou to startle or move in circles, and that the animals would often remain agitated after airplanes had moved away. Respondents pointed out that these disruptions also affect hunting success rates:

Pretty much all of it is the planes; the planes are flying and it disturbs them. Yeah, pretty much every day, they fly in and out of Alpine every day. I rarely saw [helicopters]. [The caribou] just get startled and start moving. (SRB&A Nuiqsut Interview January 2015)

We were watching the caribou for a while and the animals were going in circles from the planes going overhead. There was about six caribou there, and then the plane came from Prudhoe side and it went straight for us we thought. It did about four circles then took off. That was September, right before freeze up—late September. (SRB&A Nuiqsut Interview November 2014)

[Float planes do] not [bother] me, but they do scare the caribou off. They'd be frightened [already] and then they'd take off when they hear the four-wheelers. [That was in] August. I don't know if they disturbed anyone else, but they did us. (SRB&A Nuiqsut Interview November 2014)

They're Alpine planes and Conoco planes. They always scare my caribous away while we're waiting for them to get closer and then they don't let them go back in. It doesn't let us get anything. (SRB&A Nuiqsut Interview January 2015)

Impacts of Other Traffic

One respondent reported impacts related to other traffic (i.e., not helicopters or airplanes) in Year 7. This observation accounted for two percent of Alpine impact observations. The participant noted that road traffic on the new road to CD5 had disrupted caribou migration paths. They observed that caribou had begun to turn around at that road due to increased vehicle traffic:

Just that new road up by CD5 [is making the caribou] go the other way or something because I believe people here are starting to go on that road and the caribou just run away, I guess.
(SRB&A Nuiqsut Interview November 2014)

Impacts of Man-made Structures

Impacts related to man-made structures were reported by 20 percent of Year 7 respondents, which was similar to Year 6 (at 21 percent) but higher than Years 3 through 5, which ranged from five to 12 percent (Table 36). During Years 1 and 2, respondents reported much higher numbers, which is likely due to the fact that researchers in Year 1 collected 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. These more general observations are discussed in further detail below under “General Observations Regarding Status of Caribou Herds in Year 7.” 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 7 continued to make general comments regarding the impacts of pipelines and other infrastructure. As shown in Table 39, ice roads and permanent roads and bridges accounted for eight of 14 man-made structure observations. In addition, three individuals cited pipelines, one respondent reported seismic lines, and one cited infrastructure in general.

Table 39: Descriptions of Sources of Man-Made Structures Associated with Impacts, Nuiqsut, Years 3-7

Man-Made Structure Descriptions	Number of Observations				
	Year 3	Year 4	Year 5	Year 6	Year 7
Trucks	0	0	0	0	1
Pipeline	2	1	6	7	3
Ice Roads and Bridges	2	0	0	0	5
Infrastructure	1	1	1	6	1
Seismic Lines	0	0	0	0	1
Permanent Roads and Bridges	0	0	0	0	3
Waste	0	1	0	0	0
Total	5	3	7	13	14

Stephen R. Braund & Associates, 2016.

Impacts associated with man-made structures as reported by Year 7 respondents were generally focused around three main topics: difficulty hunting near man-made structures due to access/security restraints and fear of damaging property; effects on caribou migration and well-being; and visual interruptions to landscapes and views. Man-made structures that were reported as having caused disruptions were the Alpine development in general, pipelines, conexes and other equipment, bridge to CD5, and roads such as the Spur Road and CD5 road and associated traffic.

Respondents noted that man-made structures blocked access to hunters in Year 7 when traveling overland, and made hunting more difficult. They expressed concern that both the physical presence of the road and the traffic associated with the road has an impact on hunters. Several respondents pointed out that the CD5 road itself – due to its height – is too difficult to cross in parts, whereas the Spur Road is much lower. Another respondent discussed the increased traffic associated with the new road:

That road, CD5 road, it's kind of too high so you have to go all the way around. I couldn't get to Fish Creek I would have to go all the way around. I was going to try to go fishing, but I had to go around. I would basically have to go around CD5. (SRB&A Nuiqsut Interview November 2014)

Yeah and there's that road, they made that road, there's a lot of trucks and heavy equipment going out to that CD5. Yeah, a lot of traffic. Big impact. (SRB&A Nuiqsut Interview November 2014)

According to respondents, the new road and associated bridge have also interrupted the visual landscape in such a way that it disrupts hunting. Respondents noted that the area where the bridge crosses Nigliq Channel is a common lookout point for caribou hunters but that the bridge and road are so elevated that one cannot see beyond them to spot caribou⁶:

This is where our view is blocked from the road [along Kuupaquallurak]. Even if you get out of the river you still can't see over the road. I always know there's fat caribou there in September. (SRB&A Nuiqsut Interview November 2014)

The bridge, that was up by Kuupaquallurakis where the bridge is and makes it difficult to glass out for animals. (SRB&A Nuiqsut Interview November 2014)

Respondents also indicated that the presence of man-made structures made them wary of hunting in certain areas, even when caribou were present, due to fear of damaging infrastructure or company property. They noted that this issue minimizes the areas where they feel comfortable hunting and interrupts potentially successful hunts. As one respondent recalled, "We could've caught those caribou, but we just decided not to [because of the nearby buildings and pipeline]," (SRB&A Nuiqsut Interview January 2015). The following respondents described their experiences with infrastructure interrupting caribou hunts:

I caught two [caribou] on the other side of that there. I had to walk at least maybe a mile until I could find a shot [away from the conexas]. (SRB&A Nuiqsut Interview November 2014)

You have to control where you go, so it minimizes where you can get [caribou] pretty much... and it's going to be a year-round impact now [with increased development]. I don't know who's going to shoot them from the road, but if you're on a snowmachine you can do that. They say you can use the road to harvest... Yeah it impacts me, I can't say for her [partner]. It's like [when you're] hunting caribou and you're coming back home and you see caribou between you and town [and you're worried about shooting toward town]. It's like the same situation with people on the road. (SRB&A Nuiqsut Interview November 2014)

Several Nuiqsut harvesters also believed that the presence of man-made structures affects caribou behavior and movement. Several respondents believed that the same structures that blocked access for hunters in Year 7, such as the road to CD5, also blocked access for the caribou and disrupted their migration path:

⁶ CPAI acknowledged the issue surrounding road height for local hunters and noted that the elevated height, particularly near the Nigliq Bridge, was in part due to efforts to make the Nigliq Channel Bridge high enough for boat travel. Requirements regarding the slope of the road led to higher-than-desired elevations. To address the issue, in August 2015 CPAI installed permanent gravel ramps to facilitate hunter access by snowmachine or ATV. These features had not been installed at the time of the Year 7 interviews.

Just the river bridge [is an impact]. They're on the second structure. They're coming this way and they're pretty much on the second pole [of the bridge]. No [it didn't impact me]. But that road is [impacting the caribou]. I was out at my cabin in September, and I've seen a couple hundred just off the road, and they don't know where to go. They go around CD5. (SRB&A Nuiqsut Interview November 2014)

In addition to pointing to specific infrastructure, respondents discussed the general impacts of infrastructure, including pipelines, on caribou migration. These more general observations are discussed below under “General Observations Regarding Status of Caribou Herds in Year 7.”

While this section focuses on the impacts of man-made structures on caribou hunting activities, it is important to note that several hunters reported using the newly built Spur Road for caribou hunting in Year 7 and saw the addition of the road as a benefit to local harvesters.

Impacts of Regulations

No respondents reported experiencing impacts related to regulations in Year 7 (Table 36).

Impacts of Seismic Lines

No respondents reported experiencing impacts under the impact category of seismic lines in Year 7 (Table 36), although one individual did reported seismic impacts under “Man-made Structures” (Table 39).

Impacts of Other

One respondent reported an impact that did not readily fit into the other impact categories. This respondent noted the effects of the smoke or emissions from oil facilities. They observed that caribou tended to avoid the smoke and divert around it:

The oil companies – all their smoke coming out of their [facilities] ... that smoke will distract them and go out there and it diverts them. They color it [the smoke]. The smell of that is bad, the natural gas. Well, they were talking about choppers and stick pickers and what not and the form of the gas, the way they burn it, it drives them away, you can see that yellow smoke and it distracts the caribou coming in. (SRB&A Nuiqsut Interview November 2014)

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 40, 30 percent of Nuiqsut respondents reported at least one type of non-Alpine impact in Year 7. A majority of these reported impacts were related to helicopter traffic (50 percent of observations) or airplane traffic (36 percent of observations). The percentage of respondents reporting non-Alpine impacts in Year 7 was within the range of all previous years, which ranged from five percent of respondents (Year 3) to 54 percent (Year 1).

“Non-Alpine” impacts in Year 7 frequently occurred upriver from the community, with several respondents reporting that helicopter traffic disturbed the caribou while they were hunting:

When we went there [upriver], there were choppers flying around. Every time you go there there's choppers. They say that they're hunting caribou out there [farther south] by choppers because one of the villages haven't had any caribou for a long time. That's what they say, but it kind of makes it harder. [The choppers had] red stripes, white – yeah I don't know what number though.... When I had my family out there camping around waiting for the caribou to come by, and they scare them away. (SRB&A Nuiqsut Interview January 2015)

Table 40: Non-Alpine Impacts on Caribou Hunting, Nuiqsut, Years 1-7

Type of Non-Alpine Impact	Percent of Respondents							Percent of Observations						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Helicopter traffic	11%	9%	2%	7%	32%	13%	17%	22%	45%	33%	40%	43%	32%	50%
Plane traffic	17%	6%	4%	5%	28%	15%	13%	39%	27%	67%	40%	34%	36%	36%
Other traffic	3%	0%	0%	0%	4%	4%	2%	6%	0%	0%	0%	4%	9%	5%
Oil company personnel	0%	0%	0%	0%	5%	0%	2%	0%	0%	0%	0%	6%	0%	5%
Man-made structures	6%	4%	0%	0%	2%	2%	0%	11%	18%	0%	0%	2%	5%	0%
Regulations	3%	0%	0%	0%	4%	2%	0%	6%	0%	0%	0%	4%	5%	0%
Seismic lines or activity	0%	2%	0%	0%	0%	0%	0%	0%	9%	0%	10%	0%	0%	0%
Other	8%	0%	0%	2%	5%	5%	2%	17%	0%	0%	10%	6%	14%	5%
Any impact	31%	15%	5%	16%	54%	29%	30%							

Stephen R. Braund & Associates, 2016.

We did see a chopper. It was flying really low. Where were we? We were just above Umiraq I think. We were just passing by Umiraq and it was flying this way [west]. Late August. It was flying just above the bluff, which is 300 to 400 feet and it flew just above the bluff. I told my brother to take a picture and we could get the numbers off it, but.... It might have been sport [hunters], I don't know. (SRB&A Nuiqsut Interview November 2014)

Yeah [we hunt in the same area] but [the area is] more motorized. We see caribou and we're after them and we were stalking them so we could get near and this plane flies over and this same situation happens all the time. Right by the camp [upriver], [there are] flights going back and forth and sometimes along that river. You're stalking the caribou and all of the sudden a chopper flies over it. It gets real frustrating. My boys tell us about this all the time. [One was] blue colored and another one that we couldn't recognize. I know for a fact that the state had a bunch of people up here tagging grizzlies. We didn't know what they were doing we were looking through binoculars and saw them tagging the grizzly. (SRB&A Nuiqsut Interview January 2015)

One individual reported seeing a helicopter land near *Kayuktisiluk* and indicated that while he has become accustomed to helicopter traffic, this particular instance was somewhat unnerving. He said,

Yeah, [we] ran into the first [spot], Kayuktisiluk, smoked a cigarette. That white and blue helicopter was out there, I don't know what it was doing there. That's the first time. Yeah, it was kinda surprising to see that. We tried to get numbers but couldn't. Usually it doesn't affect me, I see them all the time, but seeing it landing is kind of weird – like, is there a reason? [It bothered me] a little. I kinda sorta want to know why they landed there. It was on the opposite side. There's kind of a high bank, we pulled off, and we stopped here, yeah, you got the right spot. Yeah, I don't know; it's that one [helicopter] that usually everybody sees, the blue and white [one]. And it was kind of shocking. I don't know what it's doing or why it's there but it's there. That was September. We tried to spot the tail number but couldn't, but what was it doing there? (SRB&A Nuiqsut Interview November 2014)

Several individuals also discussed impacts related to other oil companies conducting exploratory activities near the East Channel.

Just choppers that were flying around. Between here on Nigliq there was too much chopper activity and then Repsol activity too. They were blue and white and this one I think was green and white. They are doing a lot of studies over on the east side. (SRB&A Nuiqsut Interview November 2014)

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 to the protocol 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 41, 58 percent of Year 7 respondents reported no longer using or avoiding certain areas, similar to the previous year (61 percent). The remaining 42 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 (11 observations), followed by Fish Creek, Itkillik River, *Kuupaqullurak*, and Tamayayak River (three observations each), and the Anaktuvuk river, Colville Delta, Upper Colville River, Various Areas, and area West of Nuiqsut (two observations each) (see Maps 1 and 2 for placename locations) (Table 42). Other places that harvesters reported avoiding are the Chandler River, area east of the Colville Delta, Nigliq Channel, and Spur Road (all one observation each).

Table 41: Respondents Reporting Avoidance of Previously Used Hunting Areas

Avoid Areas?	Year 6	Year 7
No	39%	42%
Yes	61%	58%
Total	100%	100%

Stephen R. Braund & Associates, 2016.

Table 42: Places of Avoidance

Place	Number (%) of Observations	
	Year 6	Year 7
Alpine/Alpine Satellites	13 (29%)	11 (30%)
Fish Creek	4 (9%)	3 (8%)
Itkillik river	1 (2%)	3 (8%)
<i>Kuupaqullurak</i>	0 (0%)	3 (8%)
Tamayayak River	0 (0%)	3 (8%)
Anaktuvuk River	0 (0%)	2 (5%)
Colville Delta	2 (4%)	2 (5%)
Upper Colville River	1 (2%)	2 (5%)
Various Areas	0 (0%)	2 (5%)

Place	Number (%) of Observations	
	Year 6	Year 7
West of Nuiqsut	2 (4%)	2 (5%)
Chandler River	0 (0%)	1 (3%)
East of Colville Delta	0 (0%)	1 (3%)
Nigliq channel	4 (9%)	1 (3%)
Spur Road	0 (0%)	1 (3%)
Atigaru Point	1 (2%)	0 (0%)
East channel	3 (7%)	0 (0%)
East of Colville River	1 (2%)	0 (0%)
East of Nigliq channel	1 (2%)	0 (0%)
Kachemach River	1 (2%)	0 (0%)
Kuparuk River	1 (2%)	0 (0%)
Lake near Kachemak	1 (2%)	0 (0%)
<i>Puviksuk</i>	2 (4%)	0 (0%)
Shallow areas	3 (7%)	0 (0%)
Tamayayak channel	3 (7%)	0 (0%)
Teshkepuk Lake	1 (2%)	0 (0%)
Total Observations/Respondents	45	37

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 47 cause observations, compared to 37 location observations. As shown in Table 43, development-related causes were most commonly cited (28 observations), followed by personal reasons (10 observations), and environmental causes (nine observations). A higher percentage of observations were related to personal reasons in Year 7, compared to Year 6, and a lower percentage were related to environmental causes. Development-related causes included development infrastructure, activities associated with development (e.g., air traffic), concerns about contamination, safety concerns, and security restrictions (See Table 43). 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 43).

As shown in Table 44, the causes cited for avoiding the area near Alpine/Alpine Satellites included infrastructure (e.g., the presence of pipelines/buildings/roads), development activities (e.g., traffic), safety concerns (e.g., shooting near areas with pipelines or oil company workers), concerns about contamination, and security restrictions (e.g., concerns about being confronted by oil company personnel or not understanding hunting policies in developed areas). In addition to mentioning Alpine/Alpine Satellites directly, respondents also reported avoiding areas such as *Kuupaqullurak* (a slough off of Nigliq Channel which is crossed by the CD5 bridge), Tamayayak River, Nigliq Channel, and the Colville Delta due to Alpine-related activities or infrastructure.

Several respondents discussed a general tendency to avoid development areas, including Alpine, Alpine Satellites, and Tamayayak River, despite the presence of caribou near those areas. The presence of infrastructure alone was a reason to not hunt near development. These individuals described,

Alpine – CD 1, 2, 3, 4, 5. We used to catch caribou in the middle delta there, Tamayayak. [I am] just thinking there would be no caribou, but I guess there is still caribou there. I guess I don't feel like hunting right by Alpine, even though I guess we have that right. (SRB&A Nuiqsut Interview January 2015)

Table 43: Causes of Avoidance

Causes	Number of Observations	
	Year 6	Year 7
Development Causes	32 (60%)	28 (60%)
Development Infrastructure	7	12
Development Activities	8	5
Contamination Concerns	6	4
Safety Concerns	3	4
Security Restrictions	4	3
Development-General	4	0
Environmental Causes	18 (34%)	9 (19%)
Environmental Factors	12	3
Resource Availability	6	6
Personal Reasons	2 (4%)	10 (21%)
Don't Know	1 (2%)	0 (0%)
Total Observations	53	47

Table 44: Causes Cited for Avoidance by Place

Place	Environmental Factors	Development Factors					Personal Reasons	Total
		Development Activities	Development Infrastructure	Contamination Concerns	Security Restrictions	Safety Concerns		
Alpine/Alpine Satellites	0	3	7	2	2	3	1	18
Fish Creek	0	0	0	0	0	0	3	3
Itkillik River	2	0	0	1	0	0	0	3
<i>Kuupaqullurak</i>	0	0	2	0	0	1	0	3
Spur Road	0	1	0	0	0	2	0	3
Tamayyak River	0	0	3	0	0	0	0	3
West of Nuiqsut	0	0	0	0	0	1	2	3
Anaktuvuk River	1	0	0	0	0	0	1	2
Colville Delta	0	1	0	0	1	0	0	2
Upper Colville River	0	0	0	1	0	0	1	2
Various Areas	0	0	0	0	0	1	1	2
Chandler River	0	0	0	0	0	0	1	1
East of Colville Delta	0	0	0	0	0	1	0	1
Niqliq Channel	0	0	0	0	0	1	0	1
Total	3	5	12	4	3	10	10	47

Stephen R. Braund & Associates, 2016.

I used to go hunting down there at Tamayayak, down there, I used to go down there with a point and go in there through the ocean and go out hunt there. I hardly hunt over there because there's too much stuff now. I just don't like to hunt there. Once in a while I try to go in a little ways – where's Tamayayak River? Yeah, that one. Yeah, I use to go hunting around here, by Alpine, because further out is too shallow. (SRB&A Nuiqsut Interview January 2015)

Well, I don't hunt around Nanuq anymore, because of the pads out there. We used to camp out there. (SRB&A Nuiqsut Interview November 2014)

Other respondents discussed more specific reasons for avoiding the Alpine areas. A few individuals cited concerns about shooting toward infrastructure or being confronted by security, or believed that they would need to obtain a permit to hunt near Alpine facilities. Two respondents described,

We used to go hunting out over here, but now you need a permit over here, because you know there's a lot of pipelines and whatnot. There's a lot of caribou around here between July and August, mosquito season, but you have to get permission from Conoco. This area (Colville Delta), we used to hunt caribou before, you know, CD 1, 2, 3, 4, this is where the general area was for hunting caribou back then, but now we're not allowed to use this area because of all the oil going on. Back then you know, in these channels, we used to go out here in this area [middle Colville Delta], but today we're not allowed to use this area. And now if you're going hunting in this area you have to get a permit⁷ or get permission from Conoco Philips. (SRB&A Nuiqsut Interview November 2014)

Just right at Alpine. There's caribou by Alpine but we didn't want to get any by Alpine. We just avoid by Alpine. Every time we see caribou they're always near the facility and we can't [shoot them]. We're [concerned] about THEM [facilities].... But the caribou, though, around Alpine is my biggest [concern]. (SRB&A Nuiqsut Interview January 2015)

A number of respondents indicated that they avoided certain Alpine areas due to the presence of infrastructure either making travel through the area difficult or obstructing their hunting activities. One individual reported that he no longer hunts along Tamayayak River because the location where the pipeline crosses the channel makes it difficult to traverse by boat. Several other individuals pointed to the new road to CD5, indicating that the road is difficult to cross on snowmachine and that the bridge and road obstruct views when hunting for caribou. Respondents described their reasons for avoiding areas due to infrastructure as follows:

I know that I stopped using the whole Alpine area that I used to hunt on, [with] the trucks and pipelines and whatnot. [The pipeline] made it harder to travel through that [Tamayayak] area, it's crossing right at the deep spot. (SRB&A Nuiqsut Interview November 2014)

Ever since they put up the pipeline, it's difficult to hunt near CD2 and CD4, especially that road they just got in at CD5 and its going to go to CD6. There's been a lot of people talking about the road being so high. And you can't get over it on snowmachine. And we can't get to these coastal areas. We've been saying that for so many years, ever since they put up that pipeline. (SRB&A Nuiqsut Interview November 2014)

⁷ As noted earlier, CPAI does not require permits for access by local residents to their development areas, but does require that residents abide by safety policies and guidelines when traveling in these areas.

I don't go inside the Kuupaquullurak. That is where we used to go out, but the bridge is right there. And you can't see on the other side of the road because the road is so high. Can't spot [caribou] across [from the road]. (SRB&A Nuiqsut Interview November 2014)

Others reported avoiding Alpine areas due to the activities and noise associated with development. As one respondent explained, "...it's kind of something that you look for when you are hunting - other than [looking for] caribous, [you are looking for] peace and quiet, too" (SRB&A Nuiqsut Interview November 2014). Another respondent described the frequent noise from helicopter traffic throughout his hunting season, saying,

We used to hunt caribou [near Alpine], but we don't go there anymore because there's too much helicopters, and that's the main thing, the helicopter is my problem, 'cause they're out there in the mornings and the day and sometimes we wait 'til 5 o'clock to go out, but that makes for a short evening. So my thing [concern] is the helicopter. (SRB&A Nuiqsut Interview November 2014)

Others reported hunting less near Alpine and Alpine Satellites due to the perception that the caribou are less available in those areas. One individual reported that the caribou no longer cross near CD4 like they once did, and another reported changing his winter hunting route due to changes in resource availability related to development activities:

CD4, when I first came here in 1994 that's where I used to get all my caribou. Pretty much exactly where the CD 4 pad is, that's where I got the caribou. And then when the pipeline came through no more caribou went through there. Plus, you can't shoot near the pipeline. (SRB&A Nuiqsut Interview November 2014)

Each of my winter hunts I go from the southeast and come around, I try not to go too far out, last few years, because of all the activities and all the seismic they are doing, they are just driving them out, ever since, fall time and this winter everybody has been coming down south to get caribou, they haven't been seeing them on the west side. (SRB&A Nuiqsut Interview January 2015)

One individual reported that he avoided harvesting caribou found in the Alpine area due to concerns about unhealthy or sick caribou, saying,

Around Alpine area, they're a lot skinner. I don't know if it's the vegetation or what – I don't know if there's more nutrients around there. Just mainly avoiding the caribou was the main thing. I mean, we could've caught those caribou but we just decided not to. (SRB&A Nuiqsut Interview January 2015)

One Nuiqsut harvester discussed the various reasons he no longer hunts in certain areas associated with Alpine and Alpine Satellites. He discussed how development of the area has impacted his use of traditional family camps and fishing sites. Reasons for decreased use of these areas include changes in resource availability, decreased access due to the CD5 road obstructing overland travel, disruptions from development noise and activities, concerns about contamination, and safety concerns (i.e., hunting near infrastructure).

Right where Alpine is at – my mom's side of the family, we had a camp out there; [now] there's a road not even 500 yards from our camp. Now they built a bridge right where our camp is at. Ever since they built Alpine, our family hasn't camped there since. Every year I set my net, every year I set my net. CD4 is where the bridge comes now; my grandpa taught me how to fish right here [where the bridge is] before he passed – 'never ever move, that's a hot spot right there,' even for winter time fishing and summer time fishing. I used to be able to get 45

to 50 every day on that [area]. Ever since they built that [bridge] a couple years ago – that summer after they put the post in – I set my net in like I did every year and I started to get only one or two [fish]. I didn't know where they went. Same thing in the winter – I'm not getting the same I used to. The way these roads are built, they are so far high up [and] we don't have any crossings. They say they are going to make ramps, [but] there's no ramps. Our family hasn't hunted there [near the bridge and road CD5] ever since. Right at our camp, that's where our migration was. Right there was one of their main crossing areas. A little further north from our camp was where their other crossing was. Now they don't cross there anymore because of the road and the Alpine and the pipeline. Now if they go it's all the way around toward the south. I think that's been since '98. But I remember the last time we camped there was '97. Plus, they were blasting as well, getting ready for building the pad; that was really noisy. All these pipelines and oil field productions – we don't hunt there anymore. I don't want to get in trouble if anything misses. Plus, I don't know about the chemicals or anything – even if I see caribou on that [east] side of the river, I just leave them alone. I'll just let them go. (SRB&A Nuiqsut Interview January 2015)

One respondent reported that he no longer uses the area where the new Spur Road to Nuiqsut was built. He believed that the caribou avoided the road due to traffic and was also concerned about shooting near so much human activity. He and his partner discussed these concerns as follows:

Respondent 1: Kinda on the Spur Road; you used to be able to get all the way back here. It's off the landfill down here, it's a dirt road now. We could [use it]; it's an option, but it's a dirt road and they were working on it all summer, so there's a lot of traffic.

Respondent 2: So the caribou avoid it.

Respondent 1: And yeah, I don't want to be shooting at them. There were a couple of times that I saw them [caribou] there. Pretty much the same as Alpine had, you have to control where you go [to avoid shooting toward infrastructure], so it minimizes where you can get them pretty much. The four-wheeler trips I took back there, and it's going to be a year-round impact now [with increased development]. I don't know who's going to shoot them from the road, but if you're on a snowmachine you can do that. They say you can use the road to harvest.

Respondent 2: But it's best to go somewhere else.

Respondent 1: On the [ammunition] box, it says there's a 2.5 mile range. So that's what I go off of. This is the dump road, and [the spur road] comes off the dump road. That's the spur road I was talking about. It goes to the southwest. I went up and down it all summer. And I don't know what state and federal laws are [regarding] shooting from roads like that. Yeah it impacts me, I can't say for her [partner]. It's like [when you're] hunting caribou and you're coming back home and you see caribou between you and town [and you're worried about shooting toward town]. It's like the same situation with people on the road. (SRB&A Nuiqsut Interview November 2014)

One respondent also pointed to the developed areas east of the Colville River, noting that residents once used the areas, such as the area near Kuparuk, but they stopped many years ago due to safety concerns:

In the east, all in the east, all the way to Kuparuk. We used to go there, but then the bullets, like if we didn't hit the caribou we might hit the pipeline, or a person, so we just don't do that anymore, like all up in here where all the facilities are. (SRB&A Nuiqsut Interview November 2014)

The converse to the above comments is that several hunters in Year 7 used the newly built Spur Road to hunt caribou. The introduction of roads to a rural area has the potential to substantially alter use of the land by local residents by facilitating access year-round. This has been seen in other communities in Alaska,

such as the community of Tyonek on the western shore of Cook Inlet, where use of old logging roads is common and overland travel is otherwise hindered by thick vegetation. On the North Slope where communities are surrounded by wide open tundra, roads are more likely to facilitate access during specific times of the year, such as during the spring when rivers are not yet accessible and overland travel by snowmachine no longer possible. The presence of roads could be particularly helpful to residents who do not possess a snowmachine or ATV with which to travel overland.

In addition to roads and development areas, Year 7 respondents also pointed to other areas that they no longer use or avoid. In a couple of cases, respondents identified places that they avoided due to concerns about contamination. In Year 7, community residents discussed old oil drums which had emerged from eroded banks and washed downriver on the Colville. One individual observed, “I’ve been trying to avoid the area around the drums. I’m concerned about the contamination and all the fluids that are in the barrels” (SRB&A Nuiqsut Interview November 2014). Another individual made a similar comment, but in regards to drums he found on the Itkillik River:

Up Itkillik, I’ve stopped using all these lakes. I know when I harvested one caribou one time it didn’t feel or look good, and when I was butchering the caribou I ran into a lot of drums up in [air]field – drums – and I thought, ‘This might have been contaminated by some chemical leak.’ That’s why I stopped hunting in that area. Back in 40s and 50s, they were hauling a lot of fuel and material up to Umiat. And that’s their winter trail and they’d come across and go over here towards Umiat. There’s a lot of lakes connected to it. Come through Anaktuvuk and Chandler and they go up to Umiat. And I followed it [the cat trail] one time and I could see the drums. (SRB&A Nuiqsut Interview January 2015)

Others reported no longer using certain areas due to environmental factors, particularly shallower water levels. Two individuals reported no longer hunting along Anaktuvuk River and Itkillik River because of the low water. One said, “[No places] other than the Anaktuvuk River, because it’s too shallow, other than that, people don’t go in there because you just ruin your boat” and another, “I used to like to go inside Itkillik River but nowadays it’s too shallow, or I have to wait for high tide to get in” (SRB&A Nuiqsut Interviews November 2014).

Several Nuiqsut harvesters reported decreased use of Fish Creek, and all cited personal reasons for this change. One couple reported that they were getting too old to travel there, and another indicated that while he used to travel there frequently as a child, he no longer does because the difficulties of traveling there by boat. He observed,

Yes – Fish Creek, because I grew up going out there, but when I was growing up we had such a hard time getting there I told myself I’m never ever, ever going to do that again in my life. Ever! Because it’s hard to get there. But I miss it, Fish Creek. I’ll take a four-wheeler there, but I won’t take a boat. There’s a lot of good caribou there, lots of good fish there. They’re big and fat! Once you get out of this area and come around the corner, it’s so shallow – we’ve spent nights and days trying to get out of the shallow water. We spent days just trying to get out of the shallows, and it gets so foggy that you can’t even see what’s in front of you! And then when the fog clears the ground is right there. I told myself when I was growing up – I’m done with it! I put a barricade right there for me. Nigliq is as close to the ocean as I’ll get. (SRB&A Nuiqsut Interview November 2014)

Other places that Year 7 respondents reported using less frequently or avoiding included the area west of Nuiqsut, Chandler river, and the upper Colville River. In most cases, respondents reported personal reasons for these changes. One individual reported hunting less to the west of the community by four-wheeler, indicating that he believes the heavy four-wheeler traffic diverts the caribou; this respondent did not want to contribute to this problem, which he believes prevents others without four-wheelers from harvesting caribou closer to the community. He said,

I try to avoid the outback, four-wheeler hunting [west of the community]. Everyone's been trying to get me to do that, but I think they're pushing them too far. And it's the same people pushing them back. They need to give other people a chance. (SRB&A Nuiqsut Interview November 2014)

In contrast to the above individuals, a number of respondents (42 percent) reported no change in their hunting area at all. As one individual described, “No, not really. I pretty much go to the same place that I've been going to for years” (SRB&A Nuiqsut Interview November 2014).

General Observations Regarding Status of Caribou Herds in Year 7

This section summarizes residents' general Year 7 observations relevant to the behavior, distribution, or migration of caribou in 2014. 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 2014?” In Year 7, respondents' observations trended toward the following topics:

- Changes in caribou population
- Health issues observed in the caribou
- Changes in caribou migration patterns and distribution
- Concerns about development projects and future development
- Ecological changes observed in the area

Respondents expressed concern regarding the scarcity of caribou near the village and in their usual hunting areas. While caribou had been seen, a number of individuals reported seeing them in smaller quantities than usual. Several individuals noted that the herds they observed were a fraction of their typical size. These harvesters indicated that the declining number of caribou is a trend over the last few years. One respondent pointed out that just 10 years prior, herd sizes had been in the thousands, saying, “I miss seeing those big, big herds – over a thousand. These herds we got now, they're not what they used to be 10 years ago,” (SRB&A Nuiqsut Interview November 2014). The following respondents discussed their recent observations regarding herd size:

We usually have a real big herd of caribou come through here, but it's getting smaller. They're all together. One time they went all through town migrating; they went through this river and then right through town. [There were] like 1,000. But they used to be like 10,000. I remember when I used to go hunting with my dad all the time. They used to be bigger [size], too. (SRB&A Nuiqsut Interview January 2015)

I think that there were less caribou coming through, less major herds coming through our area; the caribou [are in] decline. (SRB&A Nuiqsut Interview November 2014)

And the Teshekpuk, we used to see them around all the time before Alpine came around. We used to have big herds coming through here. We used to let about three quarters of them cross first; then we'd go after them. Then they'd come across as well. Now we're lucky to see one or two. (SRB&A Nuiqsut Interview November 2014)

During interviews, a number of respondents discussed recent scientific studies pointing to a recent drastic decline in the size of both the Teshekpuk herd and the Central Arctic herd and expressed concern about the future of these herds. Participants listed various potential reasons for the decline in caribou numbers. They theorized that the decline could be related to increased predator activity, the introduction of harmful chemicals into the area, and changes in the migratory routes of caribou. One respondent observed an upsurge in the number of wolves while another respondent posited that a slower migratory pace had made them more vulnerable to predation:

I notice there's been a lot of wolf activity. There was like 40 wolves that came out of Anaktuvuk Pass, like a week ago. And they just spotted about 17 the other day. [That is] probably [affecting the caribou]. (SRB&A Nuiqsut Interview January 2015)

There's a lot of sickness [in the caribou]. [In the past] hardly any [caribou were sick] because they were moving more and there was hardly anything to chase them but wolves and wolverines. I've seen wolverines get a few. (SRB&A Nuiqsut Interview November 2014)

When discussing potential causes for the decline in caribou numbers in the Nuiqsut area, one respondent speculated that contamination from Umiat, a former oil exploration outpost for the Navy, had affected the health of the caribou. This individual believed that the outpost had introduced chemicals to the area that were still left over:

I think there's a lot of chemicals; when the Navy came around here they left a lot of stuff. They had to keep that [air force base] open for the Early Warning, at the airport. Anything that happened, they always would land at the airport. The Navy kept that open at the airport. A man would be stationed there year-round. (SRB&A Nuiqsut Interview November 2014)

Alternate observations regarding caribou populations were expressed by respondents who had experienced caribou hunting success during Year 7. In most cases, rather than reporting an overall increase in the size of the caribou herds, residents reported seeing more caribou near the community or in their hunting areas. These individuals reported seeing or catching caribou in greater numbers than in years past: "This summer was pretty good compared to the past," (SRB&A Nuiqsut Interview November 2014). One respondent recalled that most of the caribou that came near Nuiqsut were young bulls that had followed the river towards the community:

[Caribou] are popping up more now. They're coming into town, they're by the rivers. That one time I just saw about 30 caribou. Seems like a lot of younger ones, younger bulls. A lot more number of bulls this year. And you get within a mile of them they get pretty skittish. (SRB&A Nuiqsut Interview November 2014)

Another respondent speculated that the increase in caribou could be related to the abundance of vegetation growing in the area. The respondent indicated that the vegetation growth had increased over the last few years and speculated that the upsurge in growth was a result of higher-than-normal levels of summer precipitation:

I'm not sure, maybe it's the vegetation the caribou have been smelling [that has made it a particularly good summer for caribou]. It's the vegetation; the past few summers, we had rain all summer long. (SRB&A Nuiqsut Interview November 2014)

Another respondent maintained that the increase in caribou near Nuiqsut was related to the fact that caribou migration patterns were changing. He observed that caribou had been migrating towards the village from all directions, which was abnormal behavior for that herd:

There was more caribou this summer than last summer, because they were coming from both sides. Last summer we had to go 70 miles to get them. This year they came from the mountains, from the east, and from the west. They were coming from all over. (SRB&A Nuiqsut Interview November 2014)

Changing caribou migratory patterns were a frequent topic of conversation, though most respondents believed that the changing routes were generally diverting caribou away from the village rather than towards it. Harvesters described the distribution, timing, and migration routes of the caribou as being in flux. Several respondents noted the differences between past and current migration patterns. Changes included

fewer herds migrating through the area, displacement of herds to both the south and the far north, and herds travelling in atypical directions. The following respondents discussed these changes:

The migration is different compared to what it used to be. There used to be three herds, but now there's just one. We're talking about the Porcupine. And the Teshekpuk... (SRB&A Nuiqsut Interview November 2014)

The migration has changed over the years – the Porcupine herd comes from the east, then goes down to Ocean Point, then goes out to the west. Then the Teshekpuk herd would have been closer before they started heading south, but now they're diverted to Ocean Point, so the caribou migration has changed a lot to the south. (SRB&A Nuiqsut Interview November 2014)

When it comes to migration, the young ones migrate first and then the bulls come behind. But for some reason they've been going right across down by Ocean Point. Or they're driven further south now in fall time, when it starts freezing up. (SRB&A Nuiqsut Interview January 2015)

A handful of respondents recalled an incident which occurred in Year 6, in which a herd of caribou migrated through the community of Nuiqsut. The following respondents describe the migration through town, which was said to be uncharacteristic in recent years. Respondents noted that the herd did not repeat this migration in Year 7.

There was actually a big migration that came through town. That was something to see – there was like four or five hundred, they came in through the front and went that way. It was five minutes of constant caribou. No [idea why], it was actually pretty quiet [at that time]. (SRB&A Nuiqsut Interview January 2015)

Last year a big herd came through and went through the lagoons, and this year we didn't see any go by. (SRB&A Nuiqsut Interview November 2014)

Timing was another factor highlighted by respondents who discussed changes in migration patterns. One respondent noticed a change in pace, claiming that “[the caribou] were moving kind of quick – too quick,” (SRB&A Nuiqsut Interview January 2015). Others pointed out that the migration of the main herds into the area had been late. The herds were said to have arrived in key hunting areas a month behind the expected schedule. The following respondent explained how the timing of the herds' movement differed from their usual schedule:

Their migration pattern is late this fall. Because in September they are usually all over the dump road. They usually come in from the west in August, September, and they didn't come until late, like October maybe. They usually come in August and they were maybe three weeks late. We just started seeing them maybe 3 weeks ago near CD5. (SRB&A Nuiqsut Interview November 2014)

In contrast, one individual indicated that the caribou arrived at their usual time in his hunting area, saying,

Nope, they were pretty much right on time. Every year, me and my grandparents used to go around here [mouth of the Colville], this same area every year, and wait for them to cross; so I know when they come and they were pretty much on schedule. (SRB&A Nuiqsut Interview November 2014)

A majority of respondents agreed that the caribou herds are generally more scattered and unpredictable than they used to be. Respondents explained that keeping up with changing migration routes can be difficult. The following responses exemplify the sentiments of a number of participants who commented on

unpredictable nature of the caribou migration in recent years. These individuals pointed out that it is confusing and frustrating to hunters, especially those who remember a time when the herds were more predictable.

Just the migration of it – we just don't know which way they rerouted themselves. And we try to keep tabs on it, like when the Western [Arctic] herd came through and then the Porcupine used to come through [from the other direction], but the flying is scaring them off, and that's a question we always ask, is which way have they been re-routed? And we haven't heard any word on that until today. And when you hunted in the Fish Creek area, and then the chopper comes out of nowhere, and then there goes their game. It's happened quite a few times from what I heard on the VHF this summer. (SRB&A Nuiqsut Interview November 2014)

Well, with their migration nobody, in my opinion, knows what they are doing nowadays. They are starting to find them in all these different areas. They are trying to find a newer route to find another main way of migration, I think it takes time. It takes a while and they'll evolve into that. Once they find that one safe route then they can use that. When I was growing up, we never had problems until all that pipelines and everything was built. There was so many different crossings that they use over and over, every migration. Now they don't do that anymore. Except for that one when they go all through that coast. They avoid all of this. (SRB&A Nuiqsut Interview January 2015)

In speculating on reasons why the migration routes had changed, respondents produced a number of hypotheses. As indicated by the above two quotes, a number of Nuiqsut harvesters believe that development-related activities and infrastructure have affected the caribou migration. One respondent listed several potential causes, many of which were also mentioned by other Year 7 participants. The respondent theorized that the changes could be due to ice road traffic, helicopter traffic, the Alpine development, and wildfires, but noted that it is difficult to discern the ultimate cause of the changes. He also pointed out that new development around Umiat might cause further changes to the migratory patterns of caribou:

You can tell it's changing [caribou migratory patterns], but you can't tell who to blame. You know, it might be the four-wheelers, or it might be industry, but it's hard to tell. And the stuff around Umiat is going to change stuff, but I don't know if it's going to move stuff closer or further away. But you go up there and you can tell it's changing, like the moose numbers have started to decline with activity, like with the ice roads. I don't know if [helicopter traffic] is pushing them that way. And sometimes the fires can push them this way [to town], but I don't know about this year. It is what it is. (SRB&A Nuiqsut Interview November 2014)

An often-mentioned potential cause was the tendency for young hunters and non-local hunters to harvest caribou without allowing the first wave of migrating caribou to cross. Respondents noted that traditionally, local hunters have allowed the first herd to pass by, while waiting to harvest from the following herd. According to these individuals, harvesting caribou from the first herd diverts the following herds thus reducing hunter success. Several participants complained that this traditional knowledge has been disregarded by members of the younger generation who are overly eager to harvest from the lead herd. These individuals also noted that hunters along the Dalton Highway are similarly careless in their hunting practices:

The young people are diverting the whole migration! ... Whenever somebody diverts the route those people [who] don't have a boat are [out of luck] ... We need to talk more to our younger people about diverting that first herd. We try to tell them and some people don't even know what we're talking about. (SRB&A Nuiqsut Interview January 2015)

I always tell the young hunters to let the first herd to go through but, no, they don't listen. I think that's one of the reasons that they go down south. They don't make that first herd go through over on the east channel. (SRB&A Nuiqsut Interview January 2015)

In Deadhorse too... they know they can't get hunted there, unless you go around Sagavanirktok. And you get the hunters from Fairbanks. And you see 50 to 60 hunters and they're all stopping at big herds, they don't even let any pass. (SRB&A Nuiqsut Interview November 2014)

Several participants observed a change in the taste and texture of harvested caribou. They speculated that the changes were likely related to the interbreeding of wild caribou and domesticated reindeer. One respondent described the texture of the meat as tough, while another respondent found that the interbred caribou were tasteless:

They [taste] kind of different, because they're mixed with reindeer now. There are hardly any more wild caribous. One year we had a lot of fires in the interior and the interior caribou started coming. They have the antlers that go straight up. And the woodland, they're bigger than the Arctic caribou. And the ones on the Greenland side, they're small. And we're getting them now. And they're tough, they're tough to eat. (SRB&A Nuiqsut Interview November 2014)

The caribous, they change a lot – even the taste, I think they're mixed now. They have no taste. Maybe they mixed – a lot of reindeer mixed with the caribou. (SRB&A Nuiqsut Interview November 2014)

Another prevalent topic discussed by respondents were concerns or comments related to development projects. The amount of development activity in the area was concerning to a number of respondents who believe that development, especially noise from development activities, has negatively affected caribou. The following respondents described their observations related to the effects of general development on caribou. Respondents noted that past and current development projects have diverted herds and worried that future projects will further divert the caribou, ultimately affecting key hunting areas:

Right now there's caribous not too close on the west side, but we don't know how they're going to be affected by the seismic going on. They are up here by Fish Point and they've been coming close to the village, so it's going to affect the caribous here on the right side. Five, six miles – some are just on the other side. (SRB&A Nuiqsut Interview January 2015)

Some of them wanted to cross [by CD2] but it was too noisy up here. And that's the last time I've seen such a big group, nothing but bulls.... We don't know what's going to happen if all of these [development projects] are [built]. It will affect this area that I hunt in. Yeah, it took a lot of time for the caribous to get used to the road system over here [to the east]. (SRB&A Nuiqsut Interview January 2015)

Well [the caribou] changed their migration route, is the main thing to me. They used to come right through here, back and forth. [The herd is] not there anymore. It's there, but they're further up where there's less activity and you have to travel further to hunt on your snow machine or boat or Honda. They don't go round here no more--there's too much activity going on. (SRB&A Nuiqsut Interview January 2015)

I'm worried about the east channel [of the Colville Delta], about development, because that's where I always catch caribou. That's where Repsol is proposing. That's right there, my favorite area. (SRB&A Nuiqsut Interview January 2015)

We've got to preserve Teshekpuk area as much as we can from exploration and development. But our concern is how that seismic is going to affect those caribou out there now. They're out on the tundra. They have those track [vehicles]. They're doing it 24/7; on a clear day you can see their lights just out here [towards Ocean Point]. Once they're done with this portion, they're going to go out here, [to] GMT1. It's more like they [the caribou] are going to take off, thinking it's a snow machine. 'Cause that's one thing that's going to affect the caribou over there when they start doing seismic in this area, but with the road I don't know how it's going to affect... from CD5 to GMT1 I don't know how it will affect the Central and the Teshekpuk herds when they start to connect the road. Because we get more impact on the west side but with less impact on the east. So will it be similar to the east side of Colville. It is gradually, slowly affecting the area. (SRB&A Nuiqsut Interview January 2015)

Responses related to development were often focused on the effects of air traffic on caribou movement and behavior. Respondents observed that helicopter noise startles caribou, causing herds to scatter and travel in atypical directions in smaller groups. Comments regarding air traffic and caribou behavior are summarized above under "Impacts of Helicopter Traffic." While a number of respondents were concerned about the impacts of air traffic on caribou, others believe that the increased air traffic only affects the caribou on a small scale. One respondent used the example of a recent survey conducted west of the community, pointing out that the increased helicopter traffic did not appear to affect the herd in the area:

Out in the area [west of Nuiqsut] they were doing survey, but they weren't really bothering them. There was a chopper out there, it would always land in the same place. They were checking some weather pole. It didn't bother no caribou. They had cameras and a windmill. It maybe bothered three of them but not a whole lot of them. (SRB&A Nuiqsut Interview November 2014)

During a meeting with the Nuiqsut Caribou Panel in April 2015, one panel member expressed sentiments similar to the individual above who referred to being "boxed in" by pipelines. The panel member observed, "...we are nearly 160 degrees of pipeline to be connected. It is guaranteed we are going to be a human corral; one large massive human corral surrounded by pipelines" (Nuiqsut Caribou Panel Meeting April 2015). Several individuals discussed how migration routes had been interrupted by the Alpine development, pipelines, and other oil field exploration projects in the region. One respondent elaborated that these structures had caused caribou to migrate farther south:

Well, their main migratory route has been changed, just because of the pipelines popping up everywhere.... That was since Alpine come up. And it's probably the same thing in the Prudhoe Bay area, but probably no one hunts in that area anymore. (SRB&A Nuiqsut Interview November 2014)

You don't see many caribou migrating through these areas any more since they built all those oil fields. [On] each of my winter hunts, I go from the southeast and come around. I try not to go too far out. [The] last few years, because of all the activities and all the seismic they are doing, they are just driving them out. Ever since, fall time and this winter everybody has been coming down south to get caribou, they haven't been seeing them on the west side... with all of these activities you don't see as many caribous around. Caribou are coming down south. (SRB&A Nuiqsut Interview January 2015)

Maybe three or four years ago. After maybe like maybe 15 years they came in from the east and went to Nigliq. And they came around and went south of the pipeline and went south of [the Putu]... Somehow they have to go around this pipeline, to the south side, but they find a way to go around the pipeline. Three years ago they migrated to the south and westward. (SRB&A Nuiqsut Interview January 2015)

Participants noted that caribou had also displayed erratic behavior resulting from increased infrastructure. Several respondents observed that man-made structures, including pipelines – especially due to their reflective quality – pilings associated with the bridge project, and noise associated with the road and road construction, had spooked or diverted the caribou. The following respondents described how infrastructure projects had impacted caribou behavior during the previous year:

No, [there is] nothing spooking the caribou other than the pilings that they have going through the rivers now, where they're making the bridges. (SRB&A Nuiqsut Interview November 2014)

The pipeline, that Alpine pipeline during the summer season, when the caribou come from the west that big line of line – that spooks them, too. Ever since Alpine got up here, the caribou don't like to see the reflection on there [the pipeline] – that sunlight. (SRB&A Nuiqsut Interview November 2014)

And that gravel [mine] – it was a big hill, but now it's flat, and they did a lot of transporting from here to there [along the Spur Road]. And that might have been it too – the loudness.... When they built the ice bridge, you should have seen the ice road they made; it was so thick. It used to be small, but now it's really big and they were bringing the gravel back and forth 24/7 and that probably diverted the caribou too, with all the noise. That was from December until, I think they stopped in April. And they bring all that gravel from here, that's what they call the gravel mine and they transport it to there. We finally asked questions about making the road, and they have to scrape off the top layer of ice and that's a lot of noise, you know with the chipping, that's a lot of noise... there's a lot of noise for a lot of things, and those caribou, they have good hearing. (SRB&A Nuiqsut Interview November 2014)

The Nigliq Channel Bridge, recently built by CPAI, was another topic of concern for respondents. The bridge, which connects Alpine to the CD5 satellite development, has facilitated roads and development west of the Nigliq Channel downriver from Nuiqsut. Some complained of the visual effects that it had on the area. One observed, “It was weird seeing that bridge [that Alpine built]. I didn't know they built a bridge right there until I went out boating and saw it,” (SRB&A Nuiqsut Interview January 2015). Another said,

It's just - I'm tripped out seeing that bridge get built across the river; that's trippy. There's nothing wrong with it, but just thinking about the vehicles [that are] going to be driving across the river then. (SRB&A Nuiqsut Interview November 2014)

Others expressed concerns that the bridge could affect fish and further divert caribou migration. These respondents explained the issues they had seen so far with this particular development and predicted future issues that might arise:

It seems like they're getting further and further. Like with that Nigliq River bridge now; caribou [are] coming through town and right around this area. And they're heading south and will go westward. Sometimes they come down from this area and around Nuiqsut. They used to come through here all the time, but now they don't with CD5 and CD3, now they start diverting and going around. You have to go further up during the summer time to Fish Creek area [to hunt caribou]. But once in a while you go in this area [Colville] where the caribou are. (SRB&A Nuiqsut Interview November 2014)

I'm all against that bridge that they're putting up there. I've been taking pictures and such. I don't like it. There's going to be a lot of traffic [with that bridge], and that's going to affect the fish. Too much traffic, more heavy equipment. (SRB&A Nuiqsut Interview November 2014)

You know, they had that blasting from ASRC, they did blasting from January to March. Every day they were blasting for the gravel. That could have been part of the source too, for the caribou to not go over there. Every day, blasting starting at 6 o'clock, and over here, maybe they're diverting that way. They're building a bridge over there and they're hauling all the gravel. And we had to get used to that. And that might divert the caribou to different routes. (SRB&A Nuiqsut Interview November 2014)

In addition to the Nigliq Channel Bridge, respondents also discussed the road system to which it is attached. The road connecting CD5 to Alpine, as well as the Spur Road that connects the community of Nuiqsut to that road system, were both discussed. Respondents were concerned that extra traffic related to the development of those roads would further scatter the herds. The following respondents elaborated on those concerns:

The road to CD5 just happened, so we don't know what effect will happen, but the hunters are seeing more [caribou] that stay on that [north] side, and then when they cross they might go further south from the village. (SRB&A Nuiqsut Interview November 2014)

Just that new road up by CD5 [is making the caribou] go the other way or something. I believe people here are starting to go on that road and the caribou just run away I guess. Just past CD5. I used to see more [caribou] but there's less...maybe too much loaders and tractors running by. (SRB&A Nuiqsut Interview January 2015)

Yeah this road has kind of temporarily disrupted the caribou and which direction they want to go across.... They had to go back to make a u-turn; either head east or head south. Now you see caribou go right on top and follow the road towards Nigliq Channel... That's why, where there's a lot of activities – I focus on the places with less activities because the animals go to those places. (SRB&A Nuiqsut Interview January 2015)

As discussed under “Impacts of Man-Made Structures,” another expressed concern that the CD5 road is too high and blocking residents' access to fishing grounds, saying,

Just the road itself, the road is too high. That is the traditional road to the fishing grounds and the road is blocking the traditional way. I still haven't gone out to that area to see how it looks. Just a waste of time and money. (SRB&A Nuiqsut Interview November 2014)

In contrast, several respondents expressed the view that the road will not negatively affect the caribou, and even thought that it could be advantageous for hunters. One respondent observed that caribou have grown accustomed to past development projects and activities, while another pointed out that the road will make hunting access easier:

Just on CD5, it is a brand new road. I don't think there would be any impact [from] the road. All these here, the CDs, I never did hunt in the area... We observed the caribou are kind of getting used to all the activity up here. They don't mind it, when they migrate they go through all of that. They don't even run away from the choppers anymore. (SRB&A Nuiqsut Interview November 2014)

I believe [I'll keep hunting on the Spur Road] because it's a prominent road. It's pretty bumpy on the tundra and this makes it easier. It's pretty safe, I believe, since they made the road wider. (SRB&A Nuiqsut Interview January 2015)

A final topic emphasized by Year 7 respondents, when asked for general observations about the study year, was the changing ecology of the Nuiqsut area. Respondents reported noticing changing weather patterns, changing water levels, increased instances of arctic haze, and growth of non-native vegetation. Participants

described a noticeable shift towards warmer temperatures, especially in the summer and fall. One respondent further speculated that the warmer weather could be affecting the caribou. Several respondents described the changing weather as follows:

Seems like nowadays is much different than it used to be, much warmer than it used to be—too warm. (SRB&A Nuiqsut Interview November 2014)

Last summer was pretty hot, I remember that. It was hot and less mosquitoes last summer I remember that. (SRB&A Nuiqsut Interview November 2014)

I think in between September and October [I was unsuccessful in hunting caribou] because it got really hot, and every time we went out there was nothing, just nothing at all. (SRB&A Nuiqsut Interview November 2014)

Respondents have also observed a change in the amounts of precipitation. They reported noticing higher-than-normal as well as lower-than-normal levels of precipitation occurring in the last few years and observed how this affects the caribou. Two individuals described,

[The amount of ice and snow is unusual]? For this time of year, yes; we have been having rain and snow and it's affecting the herd. (SRB&A Nuiqsut Interview November 2014)

Rain – it was so dry at first and then it started raining, and there was so much rain I think. That was this fall, a lot of rain. It wouldn't really affect the caribou, but uh, for the rain, I think that helps them grow more. Their food grows; but it was pretty dry for a while, and then the rain came. Sometimes the season is so dry. And the lichen is the food for the caribou and that can be a problem sometimes. (SRB&A Nuiqsut Interview November 2014)

Nuiqsut harvesters have also observed changes in water levels in recent years and have noted the impact of shallower rivers on residents' travel through the region. One respondent observed that the Colville River was shallower than expected in Year 7:

Going up the river, it was actually more shallow; that was the only difference I've seen. Upriver was more shallow than usual. (SRB&A Nuiqsut Interview November 2014)

One respondent reported a changes in the vegetation upriver from the community, noting the presence of trees where there never had been trees in the past:

There never used to be trees going up that river. Never used to be [any]. [Now there's] big cottonwood trees. That's what they said when they put it on Facebook. They had other people take a look at the pictures to say what, actually what, kind and they say cottonwood. (SRB&A Nuiqsut Interview January 2015)

Participants also discussed increasing instances of arctic haze. Respondents described the haze as a by-product of development related to the burning off of gas and noted that this haze is problematic due not only to its negative visual effects but also its effects on human and animal health. Respondents found that the haze burned some residents' eyes and suspected that it has also affected the health of fish, caribou, and other land mammals. Two individuals described,

This atmosphere up here is really changing, once in a while we smell that haze and that fog; it burns our eyes. Any time of year, now we can really feel it. (SRB&A Nuiqsut Interview November 2014)

And then another impact is the black ice, [we see it] out there for our sealing, and the snow melts real fast in the spring, because of the particles falling all over [the ice]. You can see that haze, like especially in the winter, the kind of orange, brownish color. I do know that what goes up has got to come down [referring to burning off the gas]. It even probably affects our fish. Like, as time goes by it's probably pertaining to the caribou and the fish, and even the

wolf and wolverine, what they are eating. And even the seals – a few years back they had sores on them, and I had EPA doing a study on that when I was the city mayor, that was four years ago, and I'm waiting for them to come back and talk about that. (SRB&A Nuiqsut Interview November 2014)

The emergence of numerous oil drums along the Colville River during the summer of Year 7 was another contamination-related concern, with one individual observing that the presence of oil drums along the river banks may have been a deterrent to caribou crossing the Colville River. This individual described,

I don't really remember about catching any caribou along Colville. Because there were so many drums, I seen like 300 drums along the edge of the river. When there's too much debris on the land, the caribou think its people. The old time people used to stack up rocks in a circle to scare away the caribou. (SRB&A Nuiqsut Interview November 2014)

Summary

SRB&A, with the Nuiqsut Caribou Panel, has completed seven 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-one respondents were interviewed in Year 7 (60 active harvesters), compared with 60 in Year 6 (including 57 active harvesters), 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 seven study years. In Year 7 ADF&G conducted comprehensive household harvest surveys in Nuiqsut and the relevant caribou harvest data will be incorporated into this report when available.

Sixty active harvester respondents reported 206 caribou use areas for the Year 7 time period (November 2013 to October 2014). They also identified 248 successful harvest locations, a high number compared to previous study years (between 143 [Year 6] and 200 [Year 7] harvest locations). The majority of caribou hunting and harvesting activities were located along the Colville River (including Nigliq Channel and the East Channel) and west of the community toward Fish Creek. Compared to the previous few study years, Year 7 use areas show higher overlapping use to the west and south of the community toward Judy Creek and Ocean Point. In addition, the overall extent of overland travel in Year 7 was larger than in the previous three study years (Years 4 through 6), and similar to Years 2 and 3. Residents' riverine travel was similar to previous study years. One individual reported successfully traveling along Anaktuvuk River, which is generally not navigable due to low water levels.

A high concentration of caribou harvests took place along the Nigliq Channel, the East Channel, 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. Overall, harvest locations during the summer months occurred in similar locations for all seven 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 seven study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. July and/or August are the peak hunting months during all seven study years, with the months of June and September also key hunting months during certain years. In Year 7, the winter months of November through February accounted for more reported caribou harvests than in previous years. 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 and snowmachines during the Year 7. Following an ongoing trend, respondents took only same day trips to a majority (85 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 7 compared to Years 1 and 2. In Year 7, nearly half (45 percent) of hunting areas were visited four or more times. 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. Harvest success in terms of the percentage of successful hunting areas has varied from between 54 percent of areas (in Year 6) to 78 percent of areas (in Year 1). Year 7 success was within the range of previous years, at 61 percent of areas having successful harvests.

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. The percentage of Year 7 respondents reporting a change in trip duration was on the high end of the range of previous years (39 percent), and the percentage reporting a change in hunting area was on the low end (28 percent). Year 7 results show a decrease in the percentage of respondents (32 percent) reporting that they did not harvest enough caribou, lower than in Years 5 and 6, but higher than in Years 3 and 4. For all seven study years combined, causes related to Resource Distribution or Migration (94 observations) were the most frequently cited causes for harvesting less caribou, followed by Personal Factors (91 observations) and Development Activities (32 observations). Conversely, Personal Factors were the primary cause for harvesting more caribou (36 observations), followed by Resource Distribution or Migration (19 observations).

The percentage of respondents observing caribou abnormalities in Year 7, at 23 percent, was lower than in previous years. The total number of caribou with abnormalities in Year 7 (23) was also on the low end of the range of previous years, but still higher than in Year 6 (14 caribou). The two principle types of abnormalities observed in Year 7 were “health” and “size.” “Disease/Infection” was the most common abnormality observation, followed by “Decrease in Resource Size.”

Forty-two percent of harvesters in Year 7 reported one or more Alpine-related impacts on caribou hunting, lower than all other years except Year 4. As in the case of Years 1 through 6, the most commonly reported Alpine-related impact in Year 7 is associated with helicopter traffic, with 32 percent of harvester respondents reporting helicopter traffic impacts. These observations accounted for 48 percent of all impact observations in Year 7 (Table 36). The percentage of respondents reporting impacts related to plane traffic (10 percent) was similar to the previous few study years which ranged from nine percent to 16 percent. 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 increased in Years 5, 6, and 7 (13 percent, 21 percent, and 20 percent, respectively). The presence of new infrastructure in areas previously undeveloped was a new source of impacts to some hunters in Year 7.

Nuiqsut harvesters have also reported impacts from other (non-Alpine) sources, as exploration, development, and research activities have increased within the region. The study team asks respondents only about Alpine-related impacts, so non-Alpine impacts reported during interviews are not cued but volunteered. The percentage of respondents reporting non-Alpine impacts in Year 7 (30 percent) was within the range of all previous years, which ranged from five percent of respondents (Year 3) to 54 percent (Year 1).

Fifty-eight percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previously used. The Alpine/Alpine Satellites areas were the most frequently mentioned for reasons related to development infrastructure and activities, as well as safety concerns and security restrictions. Other areas avoided due to development-related causes included *Kuupaqullurak* (near the new bridge crossing), Tamayayak River, and the Colville Delta in general. Other areas where residents reported decreased use for personal or environmental reasons included Fish Creek, Itkillik River, and Anaktuvuk River.

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**APPENDIX A: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE
HARVESTER INTERVIEW YEAR 7**

3. Compared to 2013, was your hunting area different in 2014? YES _____ NO _____

3a. [IF YES], HOW? _____

3b. [IF YES], WHY? _____

4. Compared to 2013, was the # of hunting trips in 2014 the same, less, or more? LESS _____ SAME ____ MORE _____

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

5. Compared to 2013, was the duration of trips in 2014 the same, less, or more? LESS _____ SAME ____ MORE _____

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

6. Compared to 2013, were the months you hunted for and harvested caribou in 2014 different? YES _____ NO _____

6a. [IF YES], HOW? _____

6B. [IF YES], WHY? _____

7. Compared to 2013, was the # of caribou you harvested in 2014 the same, less, or more? LESS _____ SAME ____ MORE _____

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

8. Did your household harvest enough caribou in 2014 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, 2014

1. Thinking about the caribou you shot or harvested in 2014, 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, 2014

1. In 2014, 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 2014, 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				

APPENDIX B: NUIQSUT CARIBOU MONITORING INFORMED CONSENT, YEAR 7

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Nuiqsut Caribou Subsistence Monitoring Project – Year 7 November 2014 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 2013 and October 2014. 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 C: HARVEST ACTIVITY AND HARVESTED RESOURCE ASSESSMENT
CODES**

Table C-1: Harvest Activity Assessment Codes

Numeric Code	Code Name	Notes
<i>How Codes</i>		
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.
<i>Why Codes</i>		
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 took 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 C-2: Harvested Resource Assessment Codes

Numeric Code	Code Name	Notes
<i>How Change</i>		
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.
<i>Why Change</i>		
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 D: 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 Nigliq 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, USDOJ, 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, USDOJ, 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; USDOJ, 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; USDOJ, 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; USDOJ, 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; USDOJ, 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; USDOl, 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.; USDOl, 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; USDOl, 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. They 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)