

**Nuiqsut Caribou Subsistence Monitoring Project:
2018 (Year 11) Report**

FINAL

Prepared for
ConocoPhillips Alaska, Inc.

15 January 2021

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EXECUTIVE SUMMARY

This 2018 (Year 11) report presents the 11th year of data for the Nuiqsut Caribou Monitoring Project based on research conducted by Stephen R. Braund & Associates (SRB&A) under contract to ConocoPhillips Alaska, Inc. (COP) for the 2018 study year. The study was initiated in response to a North Slope Borough (NSB) permit stipulation for the CD4 project; at the end of 10 years of the study, the stipulation indicated that the NSB and COP would review the need for future research. This 11th year of data collection represented an interim year until further decisions were made about the monitoring study. The purpose of the Nuiqsut Caribou Monitoring Project is to document impacts of CD4 and other COP 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.

COP activities during the 2018 study period included drilling of three exploration/appraisal wells in the Willow area (off of connected ice roads), the Putu 2 exploration well near the village, and the Stony Hill exploration well south of the village. COP also conducted a seismic program south of Ocean Point on state land (on the east side of Colville River). GMT1 pipelines were installed during the winter of 2018, drilling of GMT1 began in April 2018, and the first oil was produced in October 2018.

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 11th annual report is based primarily on hunter observations and a comprehensive household caribou harvest survey in addition to the incorporation of historic data for comparative purposes.

In November of 2018, SRB&A interviewed 50 active harvesters regarding their caribou hunting activities over the previous 12 months (November 2017 to October 2018). SRB&A also conducted a caribou harvest survey for the 2018 study year in February 2019.

Data from the 2018 (Year 11) active harvester interviews complement similar data on hunting activities collected for 2008 (Year 1), 2009 (Year 2), 2010 (Year 3), 2011 (Year 4), 2012 (Year 5), 2013 (Year 6), 2014 (Year 7), 2015 (Year 8), 2016 (Year 9), and 2017 (Year 10). In addition, 2008 household harvest survey data complement caribou harvest data collected by SRB&A for 2010, 2011, 2012, 2013, 2015, 2016, and 2017; 2014 data from the Alaska Department of Fish and Game (ADF&G); and data collected by the North Slope Borough (NSB) and ADF&G in years before 2008.

Active harvester interview participants identified 177 caribou subsistence use areas and 150 caribou harvest locations for the 2018 study year, the majority of which were located along the Colville River (including Nigliq Channel), along the lower portion of Itqiliq River, and north of the community along the Nuiqsut Spur Road (Spur Road), CD5 road, and GMT1 road. The extent of riverine travel in 2018 was relatively similar to recent study years but with less overlapping use along the Nigliq Channel. The overall extent of overland travel in 2018 was similar to many previous years, with increased use along the road system. The concentration of harvests in 2018 were similar to recent years (Years 2012 through 2017) in that fewer areas of concentrated harvests occurred along Nigliq Channel, and only moderate harvest concentration near the camp at *Nigliq*. In 2018, a higher concentration of harvests was documented along the road system and on Itqiliq River.

While certain hunting characteristics (e.g., trip frequency, duration, and travel method) have remained similar over the 11 study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. In 2018, caribou hunting activities, in terms of the percentage of use areas and the percentage of harvests (rather than the frequency of trips), peaked in the months of July and August, but with comparatively less activity in August. Winter hunting also showed a decrease in 2018 compared to previous study years, despite the road access. Across all study years, boats have been the most common method of transportation used, followed by snowmachine or four-wheeler. The last several years showed a slightly smaller reliance on boats for caribou hunting; however, boat remains the primary mode of transportation by far, with 66 percent of 2018 use areas accessed by boat. Snowmachine use in 2018 was higher than the past several years, at nine percent of use areas, but within the range of all study years, while truck use was on the high end (14 percent of use areas), reflecting the increase in hunting along the Spur Road. In general, over all study years, respondents take primarily day trips to their caribou use areas. In 2018, residents' longest hunting trips lasted more than a day at only seven percent of use areas, lower than all previous study years, indicating an increase in "day trips" taken for caribou hunting. 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. While the average number of annual hunting trips has remained relatively stable over time, the areas in which these trips occur has changed. Data show a decrease in the number of hunting trips taken to Nigliq Channel (from an average of 6.4 trips annually between 2008 and 2012 to an average of 1.2 trips in 2018), with a corresponding increase in trips to the area West of Nuiqsut (from an average of 3.7 between 2008-2012 to an average of 7.5 in 2018), including the road system.

In 2018, harvest success in terms of the percentage of successful hunting areas was on the low end of previous years, with respondents reporting successful harvests at 52 percent of hunting areas, compared to between 53 percent and 78 percent in previous years. The average number of caribou harvested per use area and harvest location was also on the low end of previous study years. Data also show a slight increase in the number of trips taken per caribou harvested, although this does not take into account the duration of those trips.

Caribou harvest amounts have remained relatively stable over time, with 2018 harvests within the range of previous years. In 2018, the community of Nuiqsut harvested an estimated 608 caribou, within the range of all previous study years (between 258 and 774 caribou). Household uses of caribou were similar to previous years, with 99 percent of households using caribou, and 84 percent of households attempting harvests of caribou. At 10 percent, the difference between the percentage of households attempting to harvest (84 percent) and successfully harvesting caribou (74 percent) was within the range of previous years (which has varied between one and 16 percent but has increased in the last decade). The percentage of Nuiqsut households who gave and received caribou (88 percent) was the highest since the 2005-06 time period.

In 2018, of the 11 pre-defined hunting areas, the area "West of Nuiqsut" accounted for the highest portion (45 percent) of caribou harvested, higher than the previous study years. No other area contributed more than 15 percent of the harvest in 2018. The Nigliq Channel and Itqiliq River both accounted for 10 percent of the harvest; on the low end for Nigliq Channel and on the high end for Itqiliq River. Other areas show variation in harvest contribution over time but in 2018 were within the range of previous years.

The percentages of active harvester respondents reporting changes in hunting area, hunting months, trip frequency, trip duration, and harvest amounts are somewhat similar over all study years. Overall, the percentages of respondents reporting changes in harvest amounts and duration in 2018 were on the high end of previous years, while other categories (frequency, months, harvest amount) remained within the range of previous years. In 2018, 43 percent of respondents indicated that they did not harvest enough caribou, an increase from the previous four years but within the range of previous years.

The total number of caribou with abnormalities in 2018 was within the range of previous study years. The percentage of respondents observing caribou abnormalities in 2018, at 20 percent, was within the range of

previous years. Abnormal size was the primary type of observation in caribou in 2018, followed by health abnormalities. Decrease in Resource Size was the most commonly reported type of abnormality by active harvesters, followed by Disease/Infection.

In 2018, 68 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting, the highest since 2008, when 72 percent of respondents reported impacts on their caribou hunting in any year since the Alpine development began. The increase in reported impacts in 2018 was also seen in the household harvest surveys, where the percentage of households reporting Alpine-related impacts (53 percent) was the highest of any individual study year. In 2018 helicopter traffic (42 percent of respondents) and man-made structures (40 percent of respondents) were the most commonly reported impact source. These impacts were followed by plane traffic, “other impacts,” oil company personnel, and other traffic. The percentage of respondents reporting “other” impacts, in addition to the percentage of respondents reporting impacts associated with oil company personnel, was higher than any previous year

Seventy-six percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previously used, similar to the 2017 study year but higher than all other study years. Avoidance was primarily attributed to development causes, followed by environmental causes (primarily changes in resource availability). A higher number of avoidance observations were attributed to a change (primarily a decrease) in resource availability in previously used areas. The Nigliq Channel, Alpine/Alpine Satellites, Fish Creek, Upper Colville River, and East Channel areas were the most frequently mentioned, primarily for reasons related to decreased resource availability, development infrastructure, and development activities. A higher than average percentage of respondents reported avoidance of the Nigliq Channel in 2018, consistent with the decreased number of use areas, hunting trips, and respondents associated with that area.

ACKNOWLEDGEMENTS

Stephen R. Braund & Associates (SRB&A) would like to thank the community of Nuiqsut for their cooperation and assistance in completing 11 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. The Nuiqsut Caribou Panel has been instrumental to the success of this project, assisting with the development of the monitoring plan, identifying active caribou harvesters to interview, reviewing results of the monitoring program, and making suggestions to improve the program. Thank you to the members of the Nuiqsut Caribou Panel for their patience, wisdom, and support throughout the study. We would also like to thank the North Slope Borough Department of Wildlife Management for supporting the project and providing valuable feedback and ConocoPhillips Alaska, Inc. (COP) for providing funding and logistical support. Finally, SRB&A would like to thank the 51 Nuiqsut caribou hunters and elders who provided us with the information for the 2018 study year, and the 171 Nuiqsut residents who have participated in the 11 years of this study.

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ACRONYMS AND ABBREVIATIONS

ABR	ABR Inc.—Environmental Research & Services
ADF&G	Alaska Department of Fish and Game
ANSC	Alaska Native Science Commission

COP	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
TNHA	Tagiugmiullu Nunamiullu Housing Authority
USGS	U.S. Geological Survey

INTRODUCTION

As a result of the CD4 permit from the North Slope Borough (NSB), ConocoPhillips Alaska, Inc. (COP) 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 [COP] 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, COP 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. In response to the NSB stipulation, the Year 10 report included a synthesis of the 10 years of the study. Because the 2017 (Year 10) report was not complete before annual monitoring fieldwork typically would have taken place, COP funded an interim year (2018/Year 11) of the study until decisions about future monitoring were made.

COP activities during the 2018 study period included drilling of three exploration/appraisal wells in the Willow area (off of ice road), the Putu 2 exploration well near the village and the Stony Hill exploration well south of the village. COP also conducted a seismic program south of Ocean Point on state land (on the east side of Colville River). GMT1 pipelines were installed during the winter of 2018, drilling of GMT1 began in April 2018, and the first oil was produced in October 2018.

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 11th annual report is based primarily on hunter observations and household surveys in addition to existing use area and harvest information.

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 COP.

STUDY AREA

The NSB permit to COP for development of CD4 stipulates that the subsistence study should consider impacts of the CD4 development as well as other COP 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. Map 1, Map 2, and Map 3 show place names (including Iñupiaq place names) and oil and gas infrastructure in the study area.

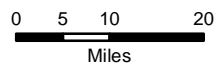
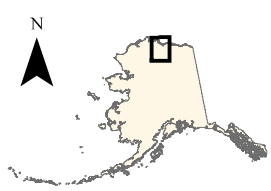
METHODS

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 2018 (Year 11) to design and implement the study. Active harvester interviews for the 2018 study year gathered information for harvesting activity between November 2017 and October 2018 and household harvest surveys gathered information for the 2018 calendar year (January to December 2018). Interviews, surveys, and meetings (including the NSB meeting in Utqiagvik [formerly Barrow] and meetings with the Nuiqsut Caribou Panel) for the 2018 study year took place between November 2018 and September 2019. Thus, the methods describe 2018 and 2019 monitoring program activities, while the results and discussion describe caribou harvest amounts, hunting activities, and impacts for the 2018 study period (spanning from November 2017 to December 2018).

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 2018 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 12, 2018 to discuss the previous hunting season, review draft results from the previous study year, and discuss upcoming fieldwork. The November 12 meeting was attended by seven panel members and four SRB&A staff members who were in Nuiqsut to conduct 2018 active harvester interviews. The following is a summary of issues raised during the meeting:

- A number of panel members expressed that the caribou are less available closer to the community and are being deflected or delayed by new roads connected to the community.
- Panel members indicated that there had been fewer Teshekpuk Herd caribou wintering near Nuiqsut with some attributing the change to increased infrastructure and traffic to the west of the community.
- Panel members discussed the proposed Atigaru Point Module Transfer Island related to the Willow Development and expressed concerns about potential impacts to caribou insect relief areas in addition to marine mammals, including bowhead whales, which feed and rest offshore from Atigaru Point.



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 50 active harvesters in November 2018 and February 2019.

Local Placename

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National Petroleum Reserve Alaska

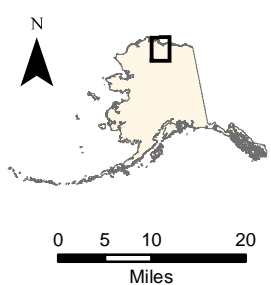


Map 2 - Nuiqsut Overview and Surrounding Infrastructure

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 50 active harvesters in November 2018 and February 2019.

ConocoPhillips Alaska, Inc. (COP) Infrastructure

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

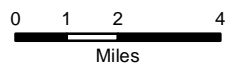
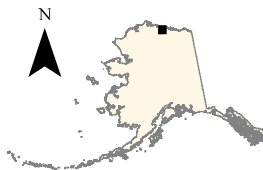


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**Map 3 - Nuiqsut Overview and Placenames:
Colville River Delta**

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 50 active harvesters in November of 2018 and February 2019.



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ConocoPhillips Alaska, Inc. (COP) Infrastructure

- Local Placename
- ▲ COP Existing Pad
- Above Ground Pipeline
- Gravel Footprint
- Ice Road
- National Petroleum Reserve Alaska

- One panel member indicated there had been an increase in reports of sick caribou in recent years while another discussed perceived links to development-related smog and haze which settles on to feeding grounds.
- Panel members discussed the pros and cons of roadless versus road-connected developments, indicating that there will impacts (albeit different types of impacts) regardless of whether a development is roadless or road-connected.
- The panel noted that the community of Anaktuvuk Pass has had difficulty in recent years harvesting caribou and attributed this to caribou being diverted by hunting guides and predators.

A subsequent meeting was held with the Nuiqsut Caribou Panel in September 2019 to review the results of the 2017 (Year 10) report and synthesis. The results of that meeting were incorporated into the 2017 monitoring report.

Study Design and Field Preparation

At the outset of this project in the first study year (beginning in 2009 for the 2008 study year), 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 2008. These surveys were not completed in 2009 (see discussion below) but were completed during subsequent years.

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

Implement work session between hunters and biologists (from Alaska Department of Fish and Game [ADF&G], NSB, or ABR Inc.—Environmental Research & Services [ABR]) to discuss observations about impacts on caribou. (see 2012 [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 2012 [Year 5], 2016 [Year 9], and 2017 [Year 10] reports)
- Incorporation of traditional knowledge about caribou from additional sources. (see 2012 [Year 5], 2016 [Year 9], and 2017 [Year 10] reports)

Field protocols and maps for the active harvester interviews and household surveys were developed during previous study years. The study team updated the active harvester protocol for 2017 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 the first two years of the study (2008 and 2009), the active harvester interviews collected data on the previous calendar year (i.e., January through December). However, because 2010 through 2018 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 purpose of shifting the study period was to place active harvester interviews closer to the end of the peak hunting season to assist with harvester recall.

The first section of the active harvester interviews (Caribou Hunting Activities) included mapping of 2018 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 2018)
- Location of harvested caribou

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

- Number of caribou harvested by sex
- Month of harvest
- Herd size of harvested caribou

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 2013, the study team added a question related to avoidance of any areas previously used for caribou hunting, to better understand the extent to which hunters avoid or stop using traditional use areas, and the reasons why they do so. This question remained on the protocol in subsequent study years.

The second section of the interview (Assessment of Harvested Caribou), gathered data about the following abnormalities in the respondent's harvested caribou in 2018:

- 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 2018 related to CD4 or other Alpine Satellite developments. If respondents indicated that they had experienced impacts in 2018, 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 2009 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 2010 and in subsequent years (Years 2011 through 2018) (see SRB&A (2010) through SRB&A (2019) for a description of the previous efforts to complete the household surveys). In 2014, ADF&G collected caribou harvest data as part of a comprehensive household survey and shared these data with SRB&A. From 2015 through 2018, the study team resumed implementation of the annual household caribou harvest survey.

The 2018 household caribou harvest surveys addressed the 2018 calendar year (January 2018 through December 2018) and consisted of eight questions regarding caribou harvests during the 2018 study period. Questions in the survey included:

- Did you or anyone in your household use caribou (e.g., harvested, received, or utilized in the home)?
- Did you or anyone in your household try to harvest caribou?
- Did you or anyone in your household successfully harvest caribou?
- How many caribou did your household harvest (only harvested or shot by residents in your household; do not count other households' harvests) in 2018?
- Were any of the caribou harvested by your household sick or injured? Did you use the sick caribou?
- Did you or anyone in your household give caribou to other households?
- Did you or anyone in your household receive caribou from other households?
- Did any Alpine-related activities in 2018 make your household's caribou hunting more difficult?

In addition, in 2018 the BLM requested that the study team add questions to the household harvest survey pertaining to road use during caribou hunting activities. The BLM was in the process of preparing an Environmental Impact Statement for the Willow Master Development Plan and sought information regarding the nature of road use and the reasons why individuals do or do not use roads for hunting activities. Thus, the study team added the following questions to the 2018 survey:

- Did anyone in your household use roads to hunt for caribou in 2018?
- Why did you use (or not use) roads?
- Please identify which road segments household members used in 2018
 - AREA 1 (Nuiqsut Spur Road [Spur Road])
 - AREA 2 (road east of Spur Road toward Alpine)
 - AREA 3 (road west of Spur Road to CD5)
 - AREA 4 (road between CD5 and GMT1)

The study team made several changes to the household harvest survey after 2010. First, because residents had difficulty reporting the number of caribou harvested by month, the study team elected to remove this question from the survey. Second, the study team added a question about the number of residents living in the household during the study year; this allowed the study team to produce a per capita harvest estimate. Finally, the study team added a question asking residents whether any of the caribou they harvested were sick or injured and, if so, whether they had used those caribou.

The study team conducted Household Caribou Harvest surveys in February 2019. Surveys were conducted in person in the community.

Respondent Selection Process

Active Harvester Interviews

In order to collect accurate data for the 2018 caribou hunting season, it was necessary to interview currently active caribou harvesters. The study team attempted contact with 2008 through 2017 respondents with the goal of achieving consistency between study years. As anticipated, not all 2008 through 2017 respondents were available to participate in 2018 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.

Study team members have periodically received comments from community residents that certain participants in the active harvester interviews—particularly walk-in participants—are not “active harvesters.” These observations are sometimes backed up by interviews which document limited harvesting activity in the previous 12 months. In other cases, the respondent proved to be an active harvester and other respondents have confirmed this. The study team consulted with the Nuiqsut Caribou Panel regarding how interviews should address requests by walk-ins, and how the study team should ultimately “select” active harvesters for inclusion in the study. The study team provided the caribou panel with a list of residents believed to be active harvesters. Panel members preferred not to comment specifically on the list, other than providing the names of several individuals they believed were missing and referred the study team to the City of Nuiqsut’s cultural coordinator. Follow-up consultation with the cultural coordinator resulted in the decision that the study team should allow any resident who has hunted caribou in the last 12 months to participate in an interview if they request to participate, and that the study team should continue its efforts to interview an adequate number of individuals identified as active harvesters, with a focus on previous participants to facilitate comparison to previous study years.

Walk-in interviews were selectively conducted only after confirming that the individual had hunted caribou during the 2018 hunting season; if the schedule was full, 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. A majority of individuals who were “walk-ins” at the time of their first interview were later nominated or otherwise confirmed as active harvesters by community members. The largest percentage of “walk-in” respondents occurred in Year 1 (33 percent of respondents) when the study team was just beginning to develop its list of active harvesters. In nine of the remaining 10 study years, “walk-ins” accounted for between three and 15 percent of active harvester respondents, and these numbers have not increased or decreased over time.

Household Caribou Harvest Surveys

SRB&A obtained an updated household list from the City of Nuiqsut in November 2018, and study team members also walked each segment of the community, confirming that all households were accounted for. Based on that information, the study team identified 119 occupied residences within the city limits, not including schoolteacher housing, TNHA (Tagiugmiullu Nunamiullu Housing Authority) and NSB housing which were not included in the household survey. For the purposes of the Nuiqsut household caribou harvest survey, the study team identified “eligible households” as those that were occupied at the time of the survey, had been occupied during the study year (2018), and were occupied year-round, thereby excluding seasonal workers and teachers who left the community during the summer months. The study team worked with KSOPI to review and finalize the household list. Of the 119 residences initially identified by the study team, 11 of the residences were later determined to be either unoccupied or out of town for an extended period of time, or were occupied by seasonal workers, making 108 total households eligible for the survey. The final household list (108 households) that was developed by SRB&A included all households that were permanently occupied during the 2018 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented.

Interview Process

Active Harvester Interviews

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

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

Interviewers recorded each mapped feature as a polygon, line, or point. Caribou hunting areas were recorded as polygons, and harvest locations were recorded as points. In most cases, impact locations were recorded as points in order to pinpoint the location where the respondent experienced the impact. SRB&A assigned numbers to each feature as the interview proceeded (e.g., “Polygon 1”) and recorded this number next to the feature on the map and in the notes about that feature. This provided a link between the notes and the map and was later used to create distinct feature codes in the Geographic Information System (GIS) and Access databases. In addition to recording data on the acetate and in the laptop, the interviewers also recorded data next to the relevant questions on the field protocol used to guide the interview. The protocol for each interview was later referenced while entering data to ensure the accuracy of the notes.

In three 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 between less than 30 minutes and up to one hour, depending on the respondent’s age, experience, activity level, and interview participation. The number of participants in each interview also affected the length of the interview. At the conclusion of the interview, each participant received a \$50 honorarium for their participation and time and signed a receipt.

Household Caribou Harvest Surveys

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

Fieldwork Summary

Active Harvester Interviews

The study team traveled to Nuiqsut once to conduct 2018 active harvester interviews in November 2018 and conducted a few additional interviews in February 2019. As shown in Table 1, SRB&A researchers interviewed 50 Nuiqsut active harvesters. Researchers interviewed an additional respondent who had not actively hunted in the previous year but provided traditional knowledge about caribou; thus, a total of 51 interviews occurred for the 2018 study year, and 50 active harvester interviews (one respondent had not hunted caribou during the previous year but provided traditional knowledge). The number of active harvester interviews was lower than recent years but within the range of all study years. Over the 10 previous study years, SRB&A developed a list of 130 active caribou harvesters in Nuiqsut (Table 1), which include all residents interviewed and/or identified as active harvesters during 2008-2017 (Years 1 through 10). 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. In addition, some previous participants have moved out of the community or are deceased. 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: Fieldwork Summary, 2018

# of Permanent Occupied Households (2018)¹	Population (2018)²	# of Persons Identified as Active Caribou Harvesters	# of Persons Eligible for Interviews	# (%) of Eligible Active Harvester Respondents Interviewed	Number of Interview Workshops	Number of Interview Trips to Community
108	470	130	124	50 (40%)	48	2

¹Based on eligible households identified during the 2018 household harvest surveys. Does not include schoolteacher housing, or vacant TNHA (Tagiugmiullu Nunamiullu Housing Authority) or NSB housing.

²Estimated based on reported household occupants during the 2018 household harvest surveys. Does not include estimates for schoolteacher housing, NSB housing, or other non-permanent households.

Stephen R. Braund & Associates, 2020.

Table 2 depicts the number of persons eligible for interviews during each study year. A person was not eligible for an interview if he or she did not go caribou hunting during the study year, 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 in Table 1, in 2018 SRB&A had a list of 130 potentially active harvesters, 124 of whom were assumed eligible for an interview based on the information available to the study team. Other individuals may have been ineligible; the study team did not document the status of every potentially active harvester in 2018. The list of active harvesters includes individuals who had been nominated as active harvesters in the past but who had never participated in 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. Others had been added to the list through their participation in the study.

Table 2: Respondent Summary, 2008-2018

Respondent	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of Active Harvester Respondents	36	53	57	58	57	57	60	58	63	68	50
Number of Respondents also Interviewed in 2018	14 (39%)	17 (32%)	19 (33%)	19 (33%)	24 (42%)	22 (39%)	27 (45%)	28 (48%)	32 (51%)	36 (53%)	-

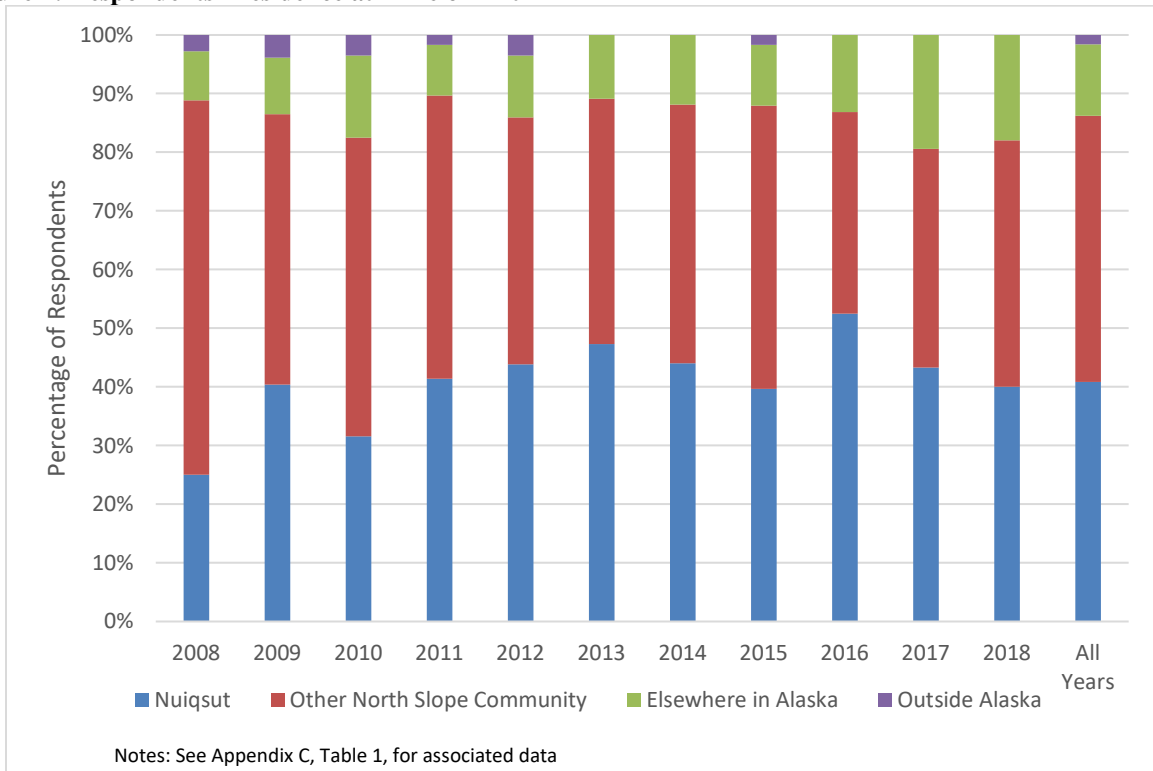
Stephen R. Braund & Associates, 2020.

The study team attempted to interview respondents from previous study years again in 2018 with a focus on respondents who have participated in multiple study years or have been highly recommended as active harvesters. SRB&A interviewed 50 individuals, or 40 percent of those eligible for interviews (Table 1). As shown in Table 2, during each previous study year, between 32 percent and 53 percent of respondents also participated in 2018 interviews. As the study has proceeded, the sample has been more likely to include respondents who had participated in a previous study year (see Table 2).

The following figures and tables (Figure 1 through Figure 3; Table 3) show descriptive data for the 2008 through 2018 (Year 1 through Year 11) respondents. Associated data tables are in Appendix C, Tables 1 through 3. During all study years, a majority of respondents were born on the North Slope (Figure 1). The percentage of 2018 respondents born in Nuiqsut was within the range of the study years, at 40 percent, as was the percentage of respondents born in Other North Slope communities (42 percent). Many respondents who were born before the establishment of the present-day Nuiqsut were born in Utqiagvik and moved to Nuiqsut with their families to establish the village in 1973. The percentage of 2018 respondents born elsewhere in Alaska (e.g., Anchorage, Fairbanks) was somewhat higher in 2017 and 2018 than previous years (Appendix C, Table 1).

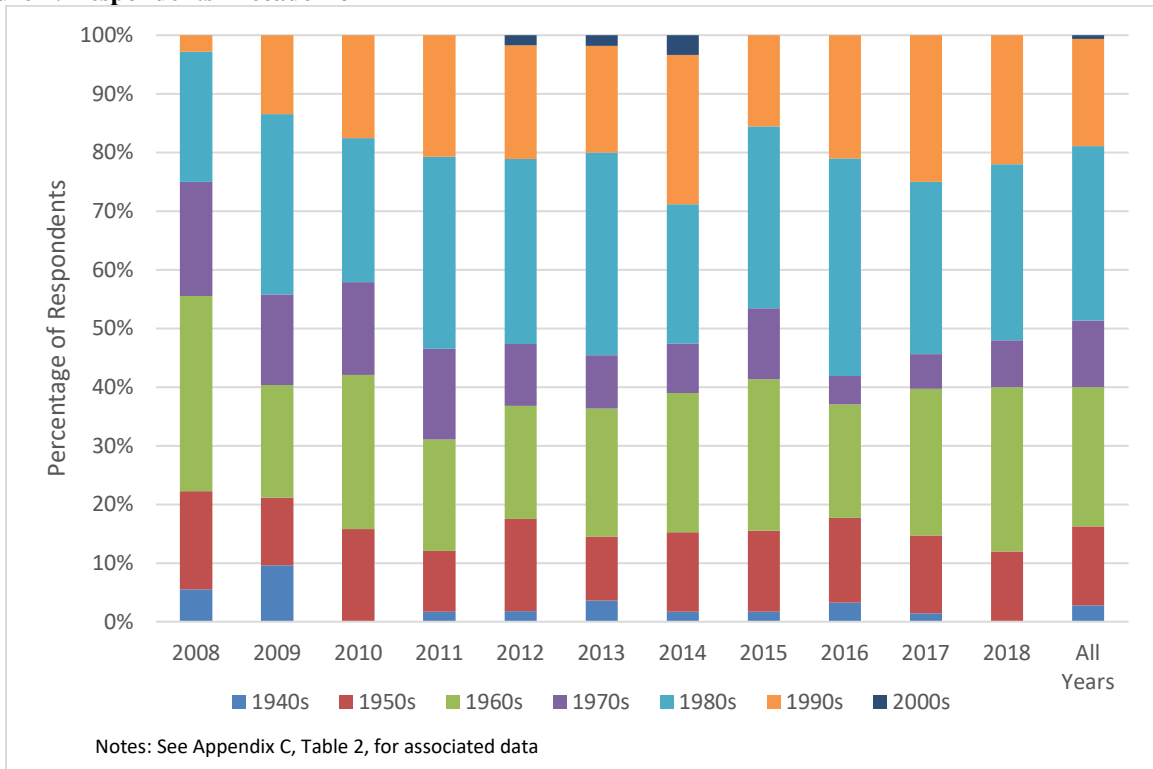
The distribution of decades in which respondents were born remained fairly consistent in 2018 compared to previous years, with the percentage of 2018 respondents born in the 1950s and 1970s on the low end and the percentage born in the 1960s and 1990s on the high end (Figure 2). The greatest percentage of respondents were born in the 1960s and 1980s. The large majority (between 73 and 83 percent in the various study years) of respondents have resided in Nuiqsut for 20 or more years (Table 3). The majority of active harvester respondents have been male for all study years, although the study team has interviewed an increasing number of females in recent years, with a peak in female participation from 2016 through 2018 (27, 31, and 30 percent, respectively) (Figure 3; Appendix C, Table 3).

Figure 1: Respondents' Residence at Time of Birth



Stephen R. Braund & Associates, 2020.

Figure 2: Respondents' Decade Born



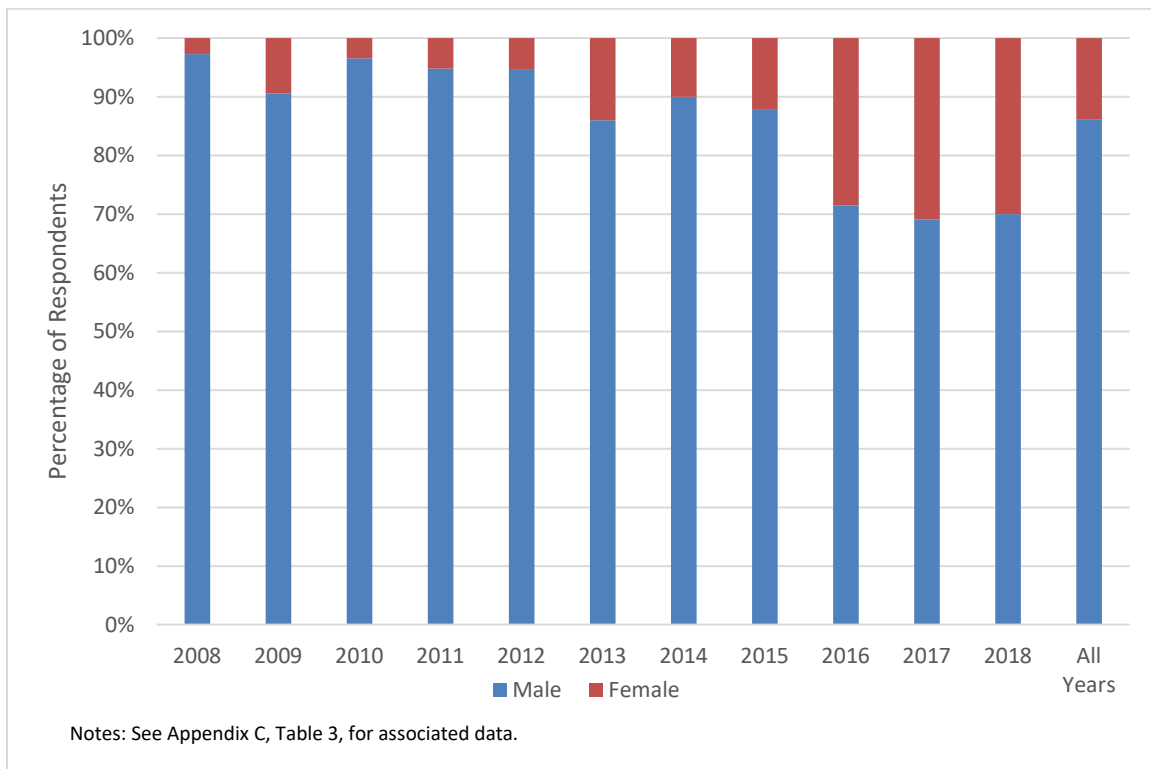
Stephen R. Braund & Associates, 2020.

Table 3: Respondents' Years of Residence in Nuiqsut, 2018

Years of Residence	Percent of Active Harvester Respondents
	2018
5 years or less	0%
6-10 years	0%
11-19 years	20%
20 plus years	78%
20 plus seasonal	2%
Total	100%
Number of Respondents	49

Stephen R. Braund & Associates, 2020.

Figure 3: Respondent Gender



Stephen R. Braund & Associates, 2020.

Household Caribou Harvest Surveys

As noted above (Respondent Selection Process), households considered eligible for the household caribou harvest surveys were those that were permanently occupied during the 2018 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented. SRB&A acquired an updated list for 2018 of 119 occupied households (not including teacher and itinerant housing) from the City of Nuiqsut. Out of the 119 residences on the household list for 2018, 10 households were either unoccupied or out of town for an extended period of time. Another household was ineligible for other reasons (household member not able to answer questions). Therefore, the total number of eligible households for the 2018 household surveys was 108.

The study team generally aims to achieve a response rate of 80 percent in order to provide a representative sample of the community that could be expanded to estimate for the community as a whole. SRB&A completed a total of 86 (80 percent) household surveys in the community of Nuiqsut (Table 4).

Table 4: Nuiqsut List of Occupied Households, 2018

Type of Household	Number of Households
Original Household List	119
Unoccupied or empty at time of survey	10
Not eligible for other reasons	1
Total Eligible Households	108
Surveyed Households (Percentage of Eligible Households)	86 (80%)

Stephen R. Braund & Associates, 2020.

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 11 study years is shown in Table 5. 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 5: Nuiqsut Datasets, 2008-2018

Nuiqsut Dataset Component	Number of Records										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Active harvester respondent characteristics (age, residence duration, place of birth)	36	53	57	58	57	57	60	58	63	68	50
Subsistence use areas	137	187	215	194	211	196	206	153	195	233	177
Harvest locations	182	152	196	162	195	143	248	173	163	190	150
Observations of changes in harvest patterns	36	53	57	58	56	57	57	58	63	68	50
Observations of changes in condition of caribou	87	67	71	68	83	51	67	72	67	74	55
Impacts on harvest activities	111	109	81	72	102	107	87	83	84	105	103
Number of respondents	36	53	57	58	57	57	60	58	63	68	50
Notes: The numbers in this table represent the number of database records within each of the associated tables (Respondent characteristics, subsistence use areas, harvest locations, caribou health and condition, and impacts on harvest activities), by study year. The number of respondents varies by study year, as does the number of subsistence use areas, harvest locations, abnormal caribou, and impacts reported by respondents.											

Stephen R. Braund & Associates, 2020.

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

Digitizing

To facilitate digitizing, SRB&A first had all the acetate overlays scanned. This step permitted multiple staff to complete the digitizing process by editing scanned images. All digitizing was done using ArcGIS ArcEdit software. Digitized features included polygons associated with subsistence use areas and impact areas; lines associated with impacts and other data; and points associated with harvest locations and impact locations. Altogether, SRB&A digitized 177 use areas and 150 harvest locations for the 2018 study year (Table 5). 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

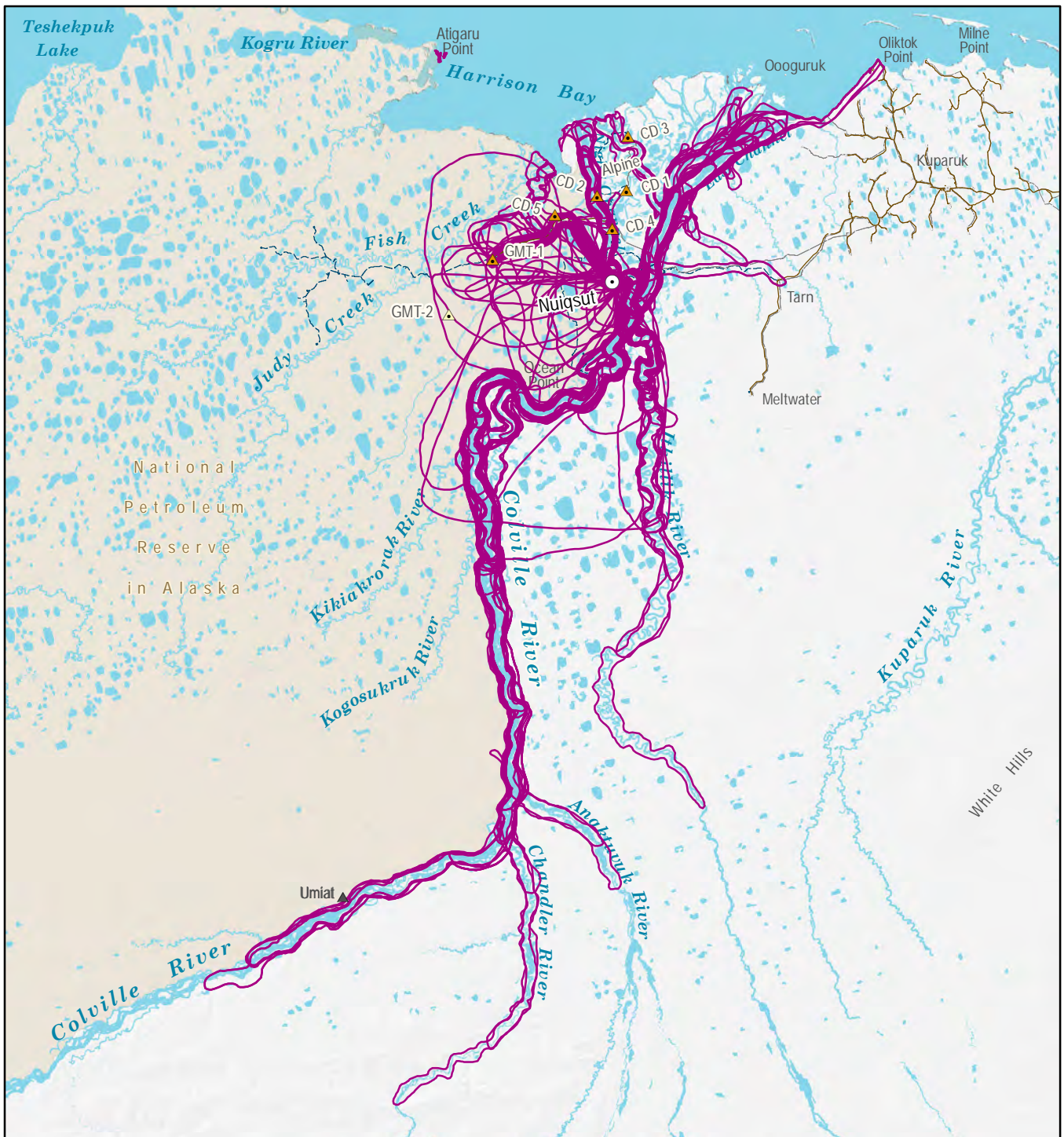
The Access Database resulting from entry of field data consists of six related tables, which are described above ("Data Entry"): (1) Respondent; (2) Harvest Area; (3) Harvest Location; (4) Harvest Activity Assessment; (5) Harvested Caribou Assessment and (6) Hunting Impact. SRB&A used Stat Transfer to 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 2018 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

Similar to the data analysis steps for the active harvester interviews, the study team entered the data from each household harvest survey form into an Access database developed by the study team and used Stat Transfer to convert the Access tables to SPSS for analysis. To create a community harvest estimate based on the results of the household surveys, the study team multiplied the sum of all reported caribou harvests by a weighting factor. The weighting factor was computed by dividing the total number of eligible households for the study year (108) by the number of interviewed households (86). The study team operated under the assumption that the 22 households who did not participate in the household survey (or could not remember the number harvested) were not substantially more active or less active (in terms of caribou harvesting) than the community as a whole.



Map 4 - Spaghetti Example: Caribou Subsistence Use Areas, 2018

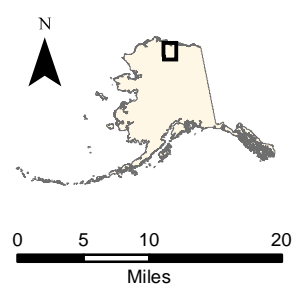
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

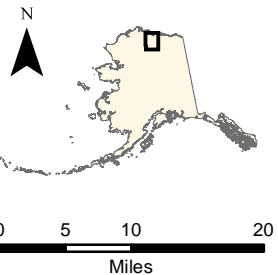
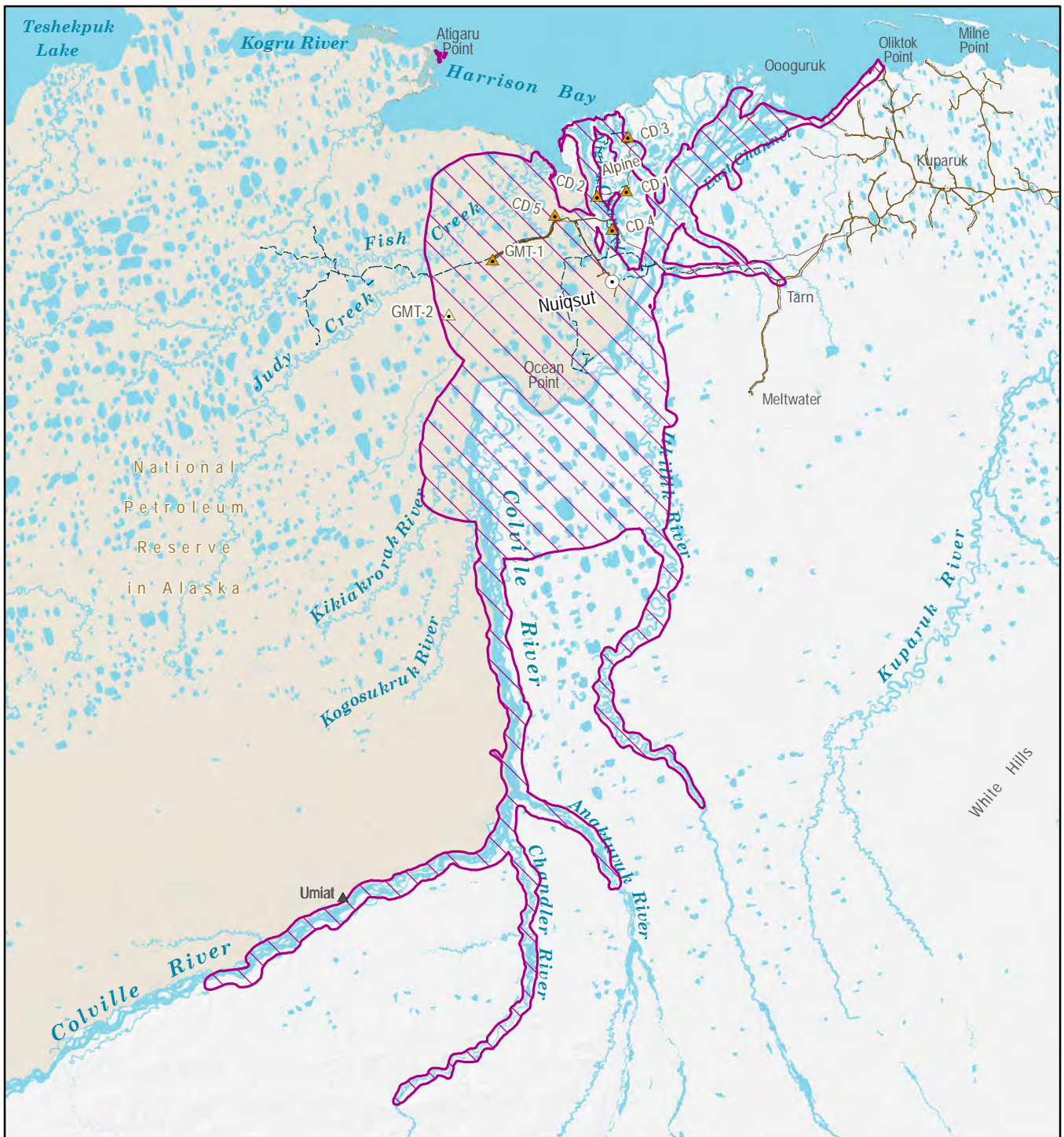
Year 11: November 2017 - October 2018

 177 caribou areas used by 50 respondents

 National Petroleum Reserve Alaska



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**Map 5 - Dissolved Polygons Example:
Caribou Subsistence Use Areas, 2018**

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 50 active harvesters in November 2018 and February 2019.

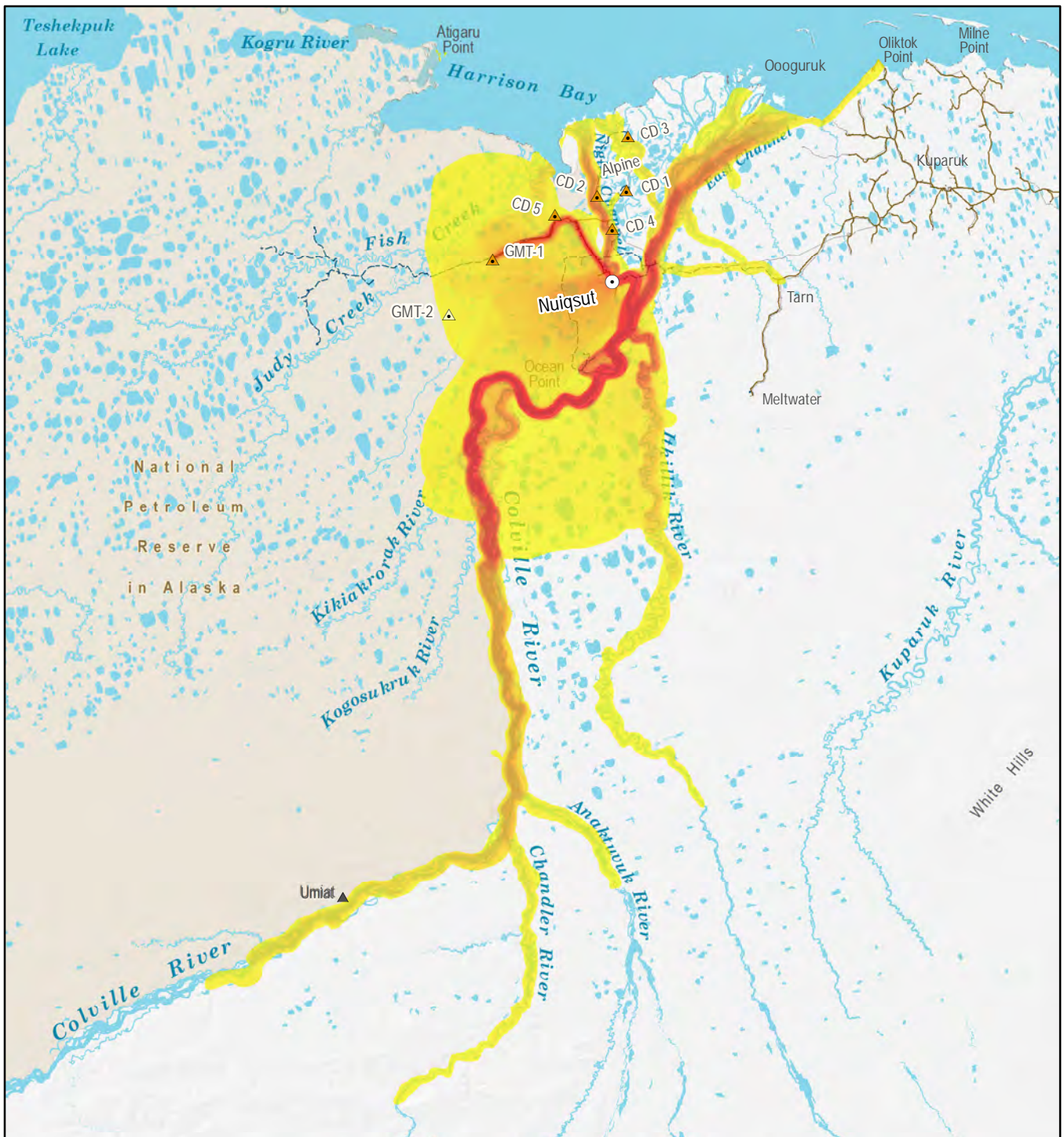
Other areas may have been used for resource harvesting.

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**Year 11: November 2017
- October 2018**


177 caribou
areas used by
50 respondents


National Petroleum
Reserve Alaska



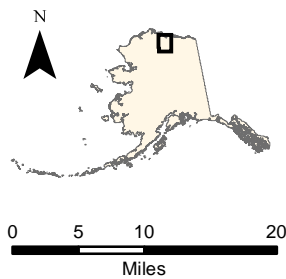
Map 6 - Caribou Subsistence Use Areas, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

**Year 11: November 2017
- October 2018**

High 177 caribou areas used by 50 respondents
Low



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National Petroleum Reserve Alaska

To determine the total pounds of caribou harvested, the study team used a conversion factor of 117 pounds per caribou. The study team chose this conversion factor because it was the one most recently used by ADF&G for the North Slope in Braem, Kaleak, Koster, Leavitt, Neakok, Patkotak, Pedersen, and Simon (2011). During a NSB review meeting in Utkiagvik on April 16, 2013, several meeting attendees asked about this conversion factor and expressed concern that 117 pounds seemed high; in contrast, Nuiqsut Caribou Panel members later expressed that the conversion factor may be low, noting that Nuiqsut residents use not only the meat of the caribou, but the heart, head, stomach, brains, bones (for marrow and for use in soups), and skin (for clothing and crafts). However, to facilitate comparison with other recent harvest studies which have used the 117-pound conversion factor, the study team has retained the conversion rate of 117 pounds per caribou for this study.

The study team also calculated confidence limits for estimated harvests, expressed as a percentage, using the methods described in ADF&G Technical Paper No. 426 (Brown, Braem, Mikow, Trainor, Slayton, Runfola, Ikuta, Kostick, McDevitt, Park, and Simon 2016). The study team also included confidence limits as calculated and reported by ADF&G for the 2002-2007 and 2014 study years.

Data Review

SRB&A submitted a draft of the Year 11 report to CPAI in December 2019 and met with CPAI via teleconference on April 9 and April 15, 2020 to review and discuss their comments on the Year 11 report. The study revised the Year 11 report based on CPAI comments and submitted the revised draft to CPAI in July 2020 for final review. In August 2020 the study printed and sent copies of the draft Year 11 report to the Nuiqsut Caribou Panel, KSOPI, and the NSB Department of Wildlife Management. Due to the ongoing COVID-19 pandemic, the study team was unable to meet with the NSB or the Nuiqsut Caribou Panel in person to review the Year 11 report. In December 2020, the study team prepared a summary handout, similar to those distributed to panel members during annual review meetings, and sent this summary handout to each member of the Nuiqsut Caribou Panel to encourage their review. The study team received comments from the NSB in December 2020, revised the draft Year 11 report based on their comments, and finalized the Year 11 report in January 2021.

Presentation of Interview Results

This report summarizes the results of the active harvester interviews through analysis of the data collected during the 2018 (Year 11) active harvester interviews and household harvest surveys. While the Year 11 time period covers the November 2017 through December 2018 time period, for ease of reporting, this report refers to the primary calendar for which data were collected—in this case, 2018.

In most cases, the first 10 monitoring reports provided the results of all individual study years in the main body of the report. Due to the increasing difficulty of presenting all years' data in a single figure or table in a way that is reader friendly, in the 2018 monitoring report, the study team adjusted the presentation of interview results. This report shows all individual study years in figures where appropriate; however, longer data tables or tables with multiple variables have been moved, along with all individual study year data tables, to an appendix (Appendix C). Where it is not appropriate to show all individual study year data in a figure, the study team presents the current study year (2018) alongside an all year average, referencing the appendix tables for individual study year data. Some figures provide data during “at least one year,” which reflects the number of respondents across all study years who reported a variable at least once. In addition, with the exception of maps which show all study years combined, the majority of individual previous years' mapping data (2008-2017) have also been moved to an appendix (Appendix E).

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.

TRADITIONAL KNOWLEDGE OF CARIBOU AND CARIBOU HUNTING PATTERNS

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 and Alpine satellite developments, it is helpful to view current trends in the context of historic and long-term trends. This section provides a summary of Nuiqsut traditional knowledge about caribou, particularly as it relates to the Colville River Delta. In addition, this section includes a summary of prehistoric and historic hunting and use patterns which provide a basis for comparison to current hunting patterns. This summary is based on interviews with Nuiqsut residents conducted by SRB&A during the Nuiqsut Caribou Subsistence Monitoring Project (SRB&A (2010) through SRB&A (2019)), in addition to a review of historic accounts and traditional knowledge in existing literature.

The traditional use of the lower Colville River and surrounding region 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, Libbey, and Spearman 1988). While little data on prehistoric use patterns are available, Burch (1980) estimates that there were approximately 500 Kuukpigmiut (people of the lower Colville River) living on the Colville River in the mid-1800s; many of these individuals had moved to Utkiaġvik by the early 20th century, although some families remained year-round. 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, Itqiliq River, 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. As Elijah Kakinya stated of the Nuiqsut people in *Puiguitkaat*,

And so some of them had gone here to Barrow but we now have some of them up there as a part of us. And so these here, their relatives, stayed here for a time all right, but then became people-of-Nuiqsat, that river has been their river since time immemorial, it has been the root of these people-of-Nuiqsut, they have it today as a place of their roots. They have returned to a place of their roots, these. (Kakinya 1978)

Caribou Migration, Distribution, Behavior, and Health in the Colville River Delta

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 prior to oil and gas development in the region. In addition to traditional knowledge related to caribou migration and distribution, various studies conducted since the 1970s have documented Nuiqsut subsistence use areas and traditional knowledge related to Nuiqsut caribou hunting activities. These data are incorporated into the section entitled, “Changes in Caribou Hunting Areas Over Time.”

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. These migratory patterns as described by Nuiqsut elders are generally consistent with biological studies of caribou movements through aerial surveys and radio collar data.

During public hearings in the late 1970s and early 1980s, Nuiqsut elders were 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) (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) (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 (NPR-A). 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) (BLM 1998)

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) (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) (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.) (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) (BLM 2003)

The presence of impacts on caribou prior to initiation of the Nuiqsut Caribou Subsistence Monitoring Project were echoed during a recent meeting of the Nuiqsut Caribou Panel. As one panel member observed, caribou movement patterns had begun changing well before Alpine Development began, due to the various exploratory activities happening in the region:

In 2000, before Alpine started, we saw no caribou in this area because they were doing summer studies for the EIS. This was new to us; we never dealt with any of this. If you go back to 2000, we [had] not see[n] any caribou for many years; they were doing studies to get Alpine going. As I told you guys, I was the only one that got caribou in the village [that one year], because I had to go way out. (Nuiqsut Caribou Panel Meeting May 2018)

In more recent years, Nuiqsut elders and hunters 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 *Pisiktagvik*, where they used to cross more regularly and in greater numbers. Respondents commented that the reflection 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 Itqiliq 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, many elders reference the Porcupine Herd when discussing changes in migration over the years. The Porcupine Caribou Herd, as defined by wildlife biologists, generally does not range as far west as the Colville River; however, some Nuiqsut residents refer to any large herd arriving from the east into the Colville River area as Porcupine caribou, and many of these individuals make a distinction between those caribou and the Central Arctic herd, which also migrates from the east. It is unclear whether these differences are related to terminology, or whether they are a result of different observations of historic movement patterns. One elder noted that the Porcupine herd once traveled into the Nuiqsut area 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 (Alaska Native Science Commission) 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 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 Ahnupkana) (AECOM 2011)

In summary, traditional knowledge of the Nuiqsut people indicates that prior to oil and gas development in the region, caribou movement through the Colville River delta area was relatively predictable, followed similar patterns from year to year, and included large herds measuring in the thousands. Over time, residents have observed that caribou movement into the Colville River delta is generally less frequent, less predictable, and involves smaller or more widely distributed herds. Through traditional knowledge and first-hand observations, residents indicate that various development-related factors have the potential to deflect or delay caribou movement in the region, including pipelines and other infrastructure causing physical or visual obstructions to caribou (including glare/reflection from pipelines disorienting the caribou); and air traffic, ground traffic, boat traffic and human activity disrupting or delaying caribou movement.

In addition to observations about caribou migration and distribution patterns, Nuiqsut 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 2012, 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)

Prehistoric and Historic Use Patterns

During SRB&A's interviews, several elders described hunting caribou while growing up in the region near the Colville Delta, along the Colville River, and at coastal settlements to the east of the delta. 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).

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 region 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 to the east 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 Itqiliq River (referred to as Killiq) by boat just before freeze-up. From there, they would travel inland following the caribou by dog team:

And then when they are ready there at Nigliq those Eskimos there, hoping to cut the distance which they would have to travel by dog team, 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 [It]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))

According to IAI (1990), during the early 20th century, Iñupiat stayed at various settlements in the lower Colville River and at coastal settlements and trading posts to the west and east of the delta including Cape Halkett, Oliktok Point, Beechey Point, and Flaxman Island. After the collapse in the fur trade in the 1930s and 1940s and in response to government requirements that Iñupiaq children attend school, most families from the Colville River region moved to Barrow permanently. However, many returned to the Colville River area during the summer and stayed at fish camps or coastal settlements east of the delta, or they would take shorter subsistence hunting trips during the winter months as time allowed. These patterns persisted until the early 1970s when the region was resettled.

A cultural plan entitled *Nuiqsut Paisanich* was prepared in cooperation with the community of Nuiqsut in 1979 and provides insight into community use patterns around the time of resettlement (Brown 1979). The *Paisanich* notes that prior to resettlement in 1973, several individuals with ties to the Nuiqsut area had traveled to the area to hunt and trap; these travels were documented as part of a study of use and occupancy on the North Slope. These individuals' subsistence pursuits occurred in an area extending from Teshekppuk Lake to the Colville River, extending upriver along the Colville River to the mouth of the Chandler River, overland in an area between the Itqiliq and Sagavanirktok rivers, and in a coastal and inland area between the Colville River delta and Prudhoe Bay. Soon after resettlement in 1973, documentation of caribou hunting areas showed use occurring throughout the Colville River delta and upriver; overland in coastal areas west of Nuiqsut to Fish Creek; and overland east of the Colville River delta to Deadhorse. Oil production at Prudhoe Bay began in 1977, and the Prudhoe Bay area was subsequently closed to subsistence hunting and harvesting. Contemporary subsistence use patterns are discussed below.

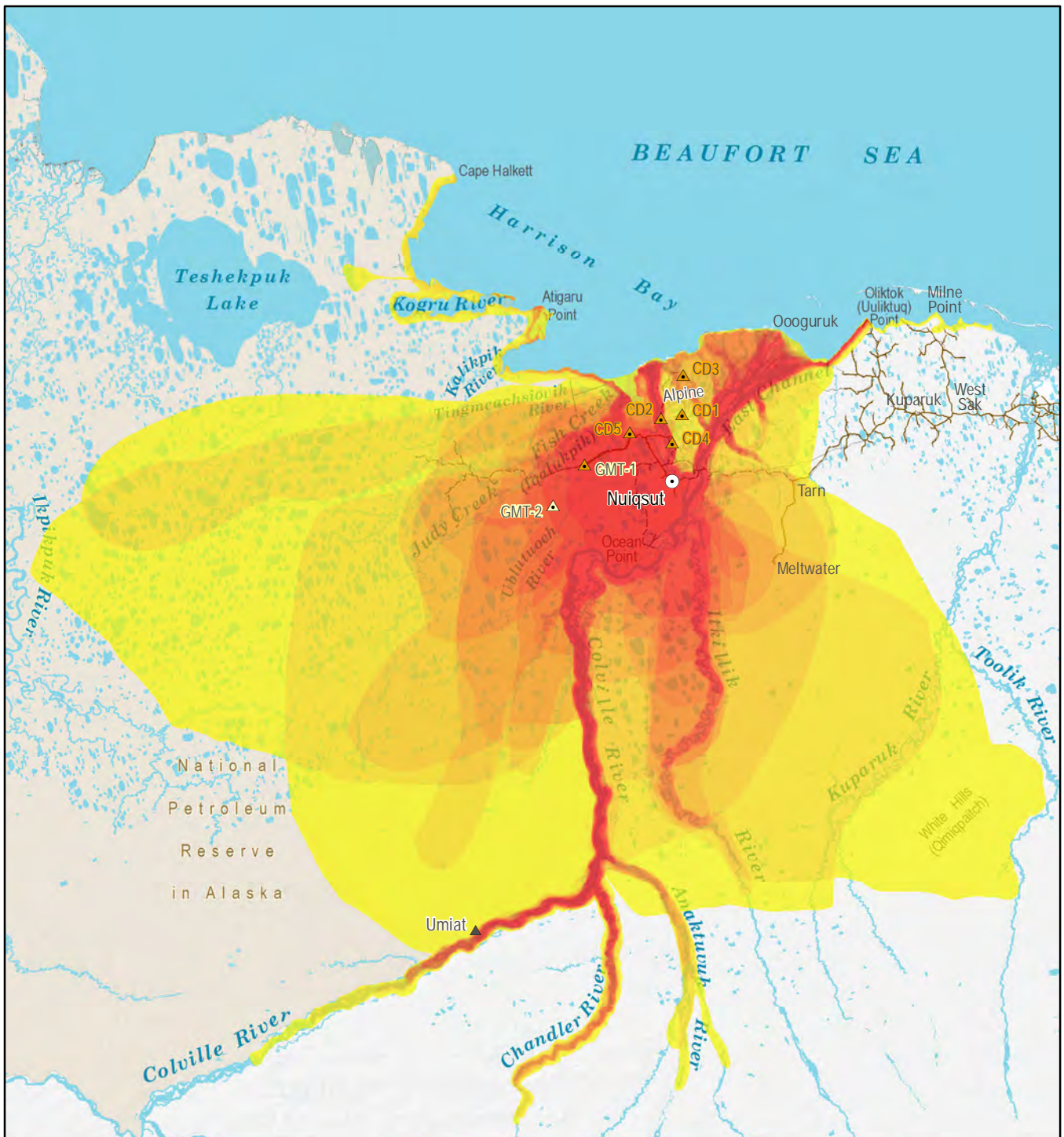
RESULTS

Caribou Subsistence Use Areas and Harvest Sites

Nuiqsut respondents reported 177 caribou subsistence use areas for the 2018 study period. In addition to providing the location of their 2018 caribou hunting areas, respondents identified the location of the 150 harvest sites within the use areas. The locations and characteristics of 2018 caribou use areas and harvest sites are described below.

Location of Caribou Use Areas and Harvest Sites

Nuiqsut 2018 caribou use areas, as reported by 50 Nuiqsut respondents, are depicted on Map 6. Combined Year 2008 through 2018 caribou use areas are depicted on Map 7. Use areas for previous study years (2008-2017) are provided in Appendix E, Maps 1 and 2. During the 2018 time period (November 2017 through October 2018), study participants reported searching for caribou along local rivers, along the coast of the Beaufort Sea east of the Colville Delta to Oliktok Point, and overland to the west and south of the community. Residents' riverine travel extended along Nigliq Channel and the East Channel of the Colville River, along Fish Creek and Qakimak creeks, upriver along the Colville River past Umiat, and along the Itqiliq, Chandler, Anaktuvuk, and Milugiaq rivers. Overland travel extended in the area west of Nuiqsut in an area bounded by the Fish and Judy creeks and Ocean Point, in addition to farther south along the Kikiakrorak, Kogosukruk, and Itqiliq river drainages, and farther north beyond Fish Creek. Use areas also extended north of the community along the Spur Road and the road to CD5 and GMT1.



**Map 7 - Caribou Subsistence Use Areas,
Years 2008 - 2018**

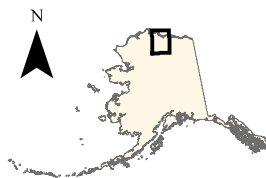
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 161 active harvesters from March 2009 through February 2019.

Other areas may have been used for resource harvesting.

**Years 1 - 11: January 2008
- October 2018**

High 2102 caribou areas used by 161 respondents
Low


National Petroleum Reserve Alaska



0 5 10 20
Miles

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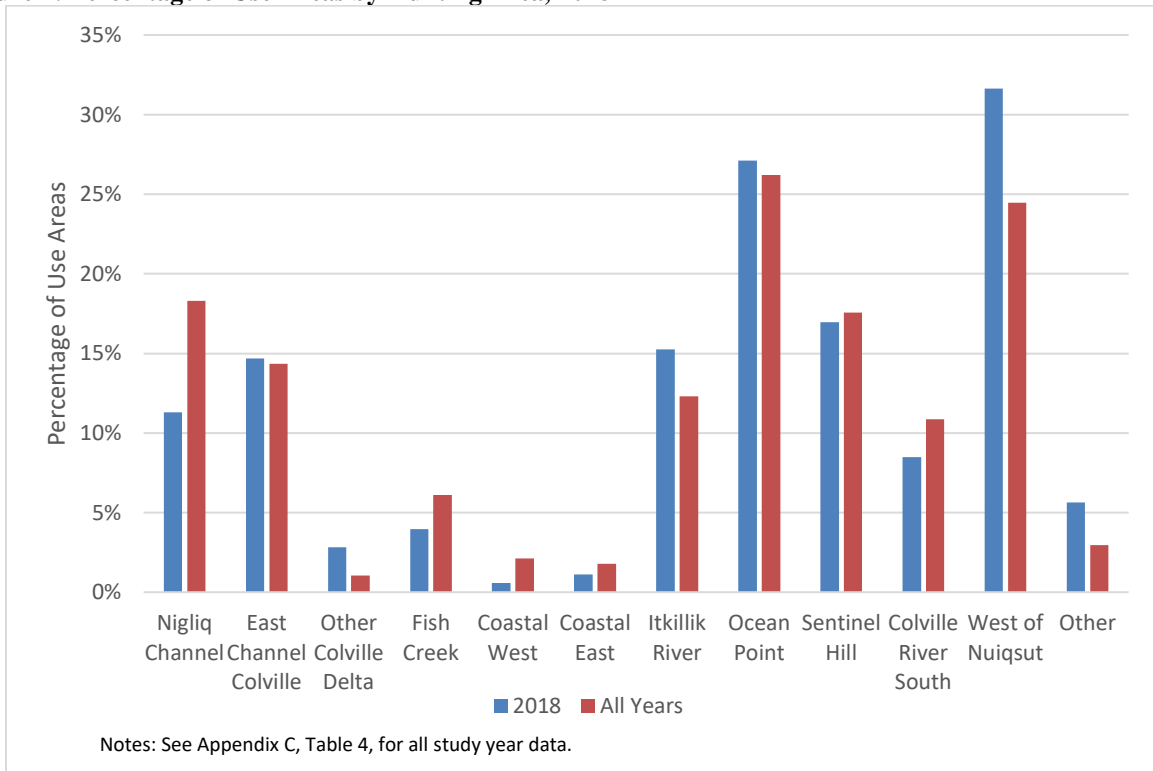
The highest numbers of overlapping caribou use areas in 2018 occurred along East Channel, upriver along the Colville River between the East Channel and Sentinel Hill, along the lower portion of the Itqiliq River, and along the Spur Road and GMT1 road north and northwest of the community. A moderate number of overlapping use areas extended overland to the west and south of the community, along the Nigliq Channel, along the lower East Channel, and farther upriver along the Itqiliq and Colville rivers. Across all study years (2008-2018; Map 7), Nuiqsut caribou hunters have traveled over a large area extending east to the Kuparuk River, west toward Ikpikpuk River, and south beyond Umiat on Colville River. Areas of high overlapping use across all study years occur along the Colville River and Delta, including most Colville River tributaries. Moderate to high overlapping use has also occurred in overland areas surrounding Fish and Judy creeks, Ublutuoch and Kikakrorak rivers, and Itqiliq River (Map 7).

In terms of use areas, 2018 (Map 6) was relatively similar to previous study years (Map 7; Appendix E, Map 1 and 2). The extent of overland snowmachine or ATV travel was less than some previous years but similar to others; the extent of road travel was higher in 2018 than previous years as a result of increased road access. The change in overland extent from year to year is often associated with a subset of hunters who hunt over large areas by snowmachine during the winter, particularly for furbearers. Often, these hunters may hunt over a large area in one year, and a smaller area the next year due to factors such as lack of time, lack of gas, lack of working snowmachine, or unsuitable snow conditions. Thus, the overall extent of use areas depicted on study maps can be greatly affected by the sample of active harvesters each year and in most years likely underrepresents total use area extent. Riverine travel was similar to previous years but with somewhat less overlapping use along Nigliq Channel. Recent study years have also seen decreased overlapping use farther upriver past *Umiuraq* (Sentinel Hill). Similarities between Map 6 (2018 use areas) and Map 7 (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, the area west of Nuiqsut, and the lower Itqiliq River.

Figure 4 and Figure 5 provide data on the percentage of use areas and respondents occurring within 12 pre-defined hunting areas (Map 8). On average across all study years, the area upriver to Ocean Point has had the most use in terms of percentage of use areas and respondents, followed by the area West of Nuiqsut, Nigliq Channel, and Sentinel Hill. Across all study years, over 80 percent of respondents have reported using the Ocean Point and Nigliq channel areas, followed by West of Nuiqsut (72 percent), Sentinel Hill (70 percent), and East Channel (65 percent) (Figure 5). The least commonly used areas have been the Other Colville Delta, Coastal East, and Coastal West areas. Over time, use of areas upriver to Ocean Point and Sentinel Hill have remained relatively steady while use of Nigliq Channel has decreased and use of the area West of Nuiqsut (which includes the Spur and associated industry roads) has increased (Figure 4 and Figure 5; Appendix C, Tables 4 and 6). Use of the road system has also increased since construction of the Spur, CD5, and GMT1 roads, with over 20 percent of use areas occurring along roads in 2018 and over 60 percent of respondents using the road system (Figure 6 and Figure 7; Appendix C, Tables 5 and 7). The 2018 study year saw continued and increasing use of gravel and ice roads by caribou harvesters, a relatively new hunting pattern which emerged in 2015 due to construction of the Spur Road and subsequent construction of the road to CD5 and GMT1. The GMT1 road was fully constructed and accessible to local hunters starting at the end of 2017. As indicated by the following quotes, hunters frequently described using the Spur Road, CD5 road, and GMT1 road to facilitate their access to overland areas, or they searched for caribou using a combination of road and overland hunting:

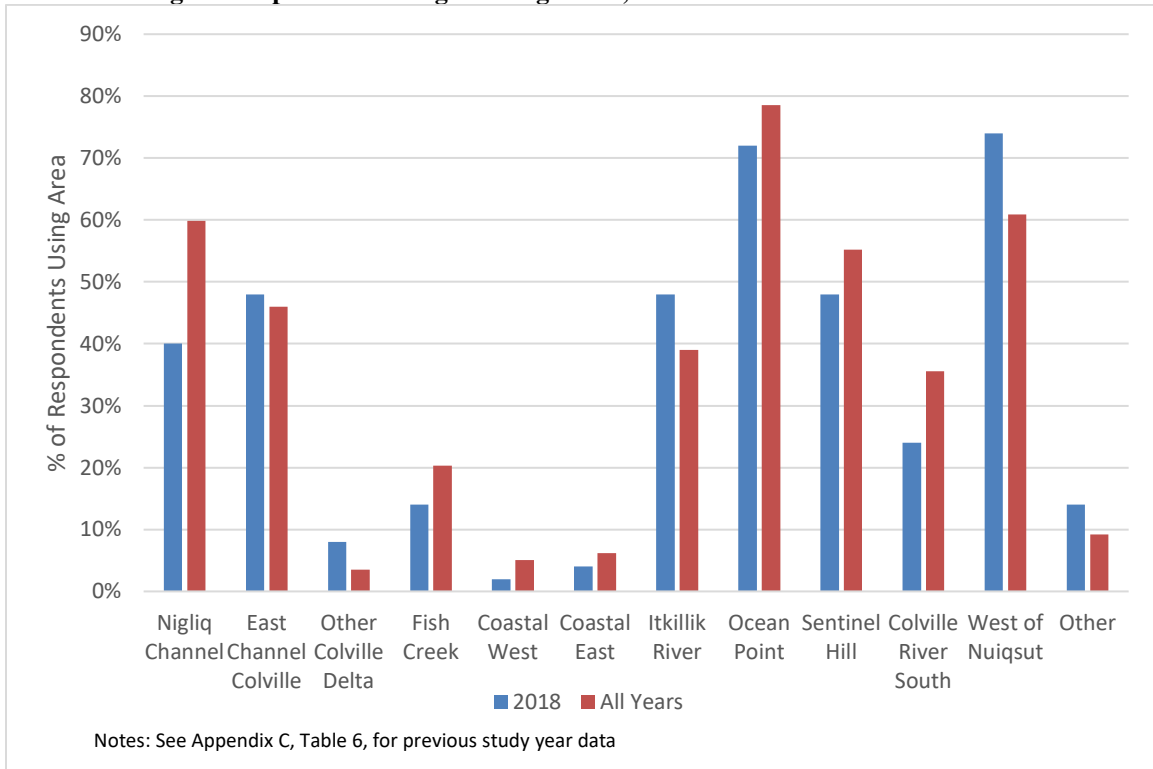
Yeah [I hunted on GMT1 Road] by snowmachine and four-wheeler. We got off— you see that, past GMT1 and you see a pull off? There's a pull off, there's a second pull off the one more west, that is where we got off from. There's that Spur Road yeah, [out from there]... Probably just like three times [on GMT Road]... I drove my truck out there with my trailer, and then I watched [the caribou]. One [caribou] went this way and went back over there, [I was] seeing some more over here, and then more to the northeast, on the other side of Fish Creek, there was some [caribou]. (SRB&A Nuiqsut Interview November 2018)

Figure 4: Percentage of Use Areas by Hunting Area, 2018



Stephen R. Braund & Associates, 2020.

Figure 5: Percentage of Respondents Using Hunting Areas, 2018



Stephen R. Braund & Associates, 2020.



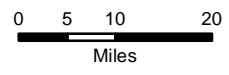
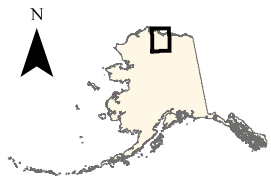
Map 8 - Nuiqsut Caribou Hunting Area Groups

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 161 active harvesters from March 2009 through February 2019.

Other areas may have been used for resource harvesting.

Areas categorized as follows:

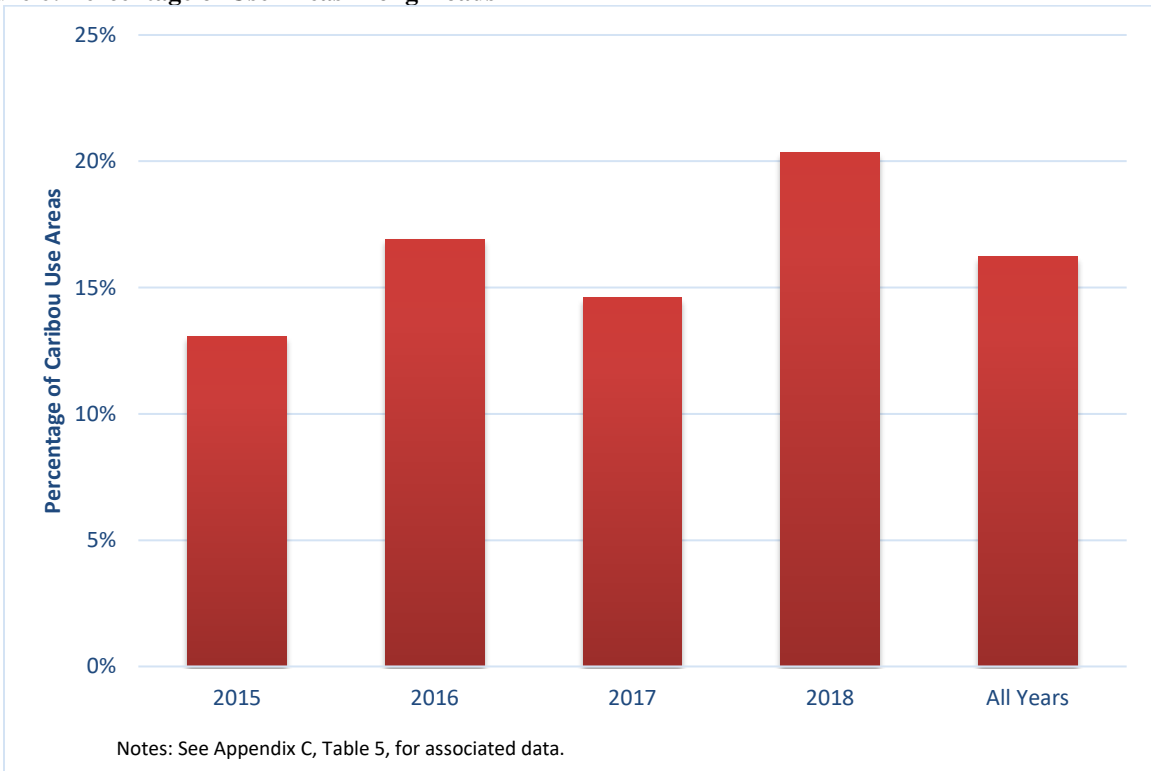
- 1** Nigliq Channel
- 2** East Channel Colville
- 3** Other Colville Delta
- 4** Fish Creek
- 5** Coastal West
- 6** Coastal East
- 7** Itkillik River
- 8** Ocean Point
- 9** Sentinel Hill
- 10** Colville River South
- 11** West of Nuiqsut



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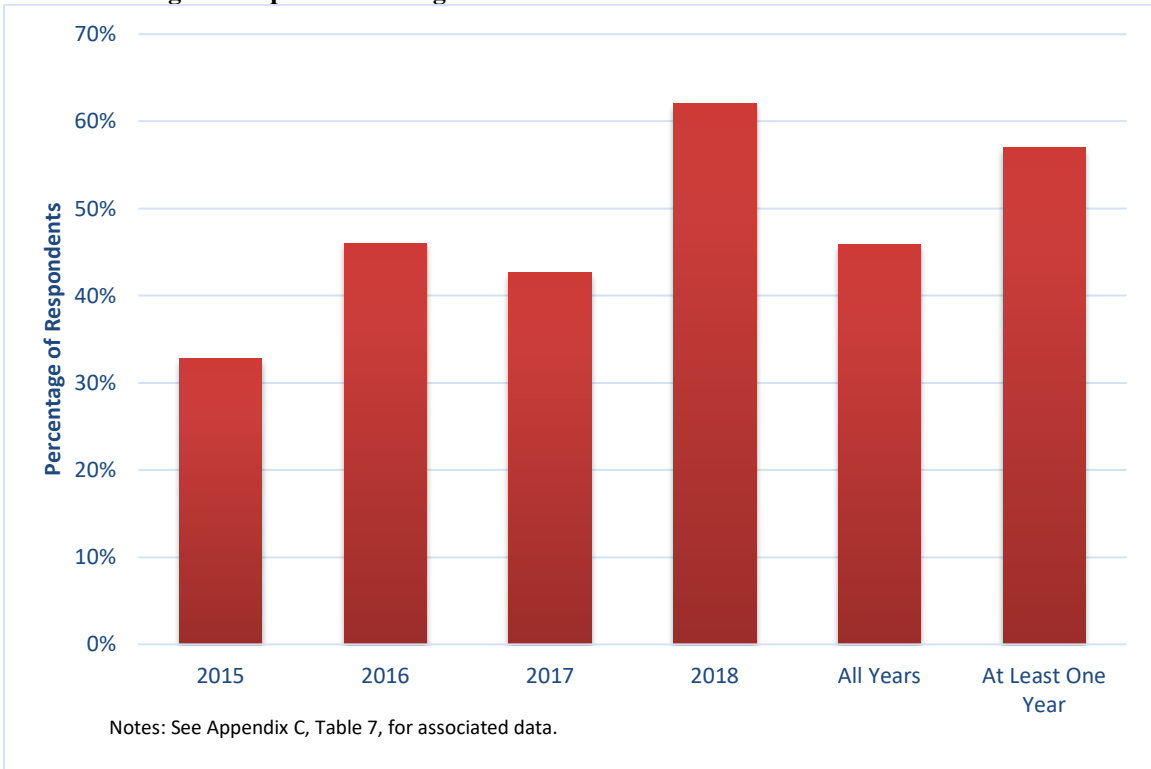
 National Petroleum Reserve Alaska

Figure 6: Percentage of Use Areas Along Roads



Stephen R. Braund & Associates, 2020.

Figure 7: Percentage of Respondents Using Roads



Stephen R. Braund & Associates, 2020.

We went by the GMT area. We were pretty much on this [road], like this. We took the trailer, and then we went out there and looked around this area.... This was August and September. I would say [we went] about 10 times maybe. (SRB&A Nuiqsut Interview November 2018)

You know [the proposed] Willow Pad? Way off [from] GMT1, all the way to the end of the gravel road and right off, you see that big, that main one is a gravel road, make [the area] there to that gravel road and right off to that lake right there. I got three of them right off the back side of that lake; I spotted some when I made it to the end of the road, and I looped around the lake and went and got them. We use the Spur Road to get out there and then go tundra jumping. We'll see them [caribou] off in the distance on the horizon... [We're hunting] the whole Spur Road; all the way to CD5. It's a gravel road from here all the way [to GMT1]. ConocoPhillips gives us permission to drive as close we can get, and we jump off from there. That's our big loop right there. Yeah, it's off the road since it's summer, that's our summer trip. GMT1. We look all over right here, and if we see any by these lakes, we jump over. It's kind of a big circle, just like that. Yeah, just closer to the road, anything we had access to. (SRB&A Nuiqsut Interview November 2018)

A few hunters took advantage of the ice road system for winter hunting and reported successful hunts in these areas. Two respondents described hunting on ice roads as follows:

Respondent 1: There was an ice road that went out towards Stony Hill and we did get a couple of caribou. It came off of the Spur Road and it was down.

Respondent 2: We went around right here [west of Nuiqsut]. It's not even that far... He had the Ski-Doo, I had the car.

Respondent 1: That was January. That might have been February. It might have even been March.

Respondent 2: [We went] a few times.

Respondent 1: We went out there quite a few times. It wasn't necessarily for caribou each time.

Respondent 2: Maybe five times [just for caribou]. (SRB&A Nuiqsut Interview November 2018)

Others reported using local roads to hunt but expressed difficulties with or reservations about hunting along the road. Difficulties included trouble getting on or off the road (or ramps) with four-wheelers or snowmachines; not being able to shoot in certain directions due to the presence of pipelines, oil fields, or human activity/traffic; and encounters with oilfield security. Two individuals described,

That bridge off the Spur Road that is supposed to help us... [we went hunting in] July, August, September, the hottest freaking time. I was able to get a babysitter five times. We went all the way to GMT1. Close to GMT1 they have a really big [ramp] that goes down, a ramp that goes up that way—that was the one we couldn't get up, we had about five or six caribous on the Hondas. (SRB&A Nuiqsut Interview November 2018)

I don't go too far.... There were caribou, but security tell me I need to turn back. I was going towards GMT1 and GMT2, right here. There was security. They tell me I have to turn back, because I wasn't wearing my helmet. [They said] because you were on a state road, you have to wear a helmet. If you don't wear your helmet going towards that road, then they can flag you [down] and tell you to turn around... [So], I only hunted nearby here on Nuiqsut road. Just right here. Nuiqsut road only. If I go further out on the Spur Road then it is traffic, traffic, traffic, traffic. (SRB&A Nuiqsut Interview November 2018)

Those respondents who did travel overland in 2018 traveled primarily to the west of the community by four-wheeler or snowmachine in an area between Nigliq Channel, Fish Creek, and Ocean Point. In 2018, overland hunting extended somewhat farther northwest from the community, likely due to the use of the road to access overland hunting areas directly to the south of Fish Creek. Several individuals reported hunting directly overland to the west of their community by four-wheeler and snowmachine, with some crossing over the road as needed:

I just went out fishing by Tingmeachsiovik. Where it goes, where there is a “y” from this little creek to this creek. Yeah, [I was hunting for caribou too]. I saw one alright, but I missed it. It’s easy with a snowmachine [to cross the road] but it is really difficult with a four-wheeler. The snowmachine doesn’t have a problem going up over the road, just the Hondas [because they are easier to flip]. I went through the land first and then crossed the road. But I started leaving my snowmachine on the side of the road because we didn’t have much snow and it was really rough. (SRB&A Nuiqsut Interview November 2018)

We got our first one of the season just right down there by the hill; it’s on the back side of the airport. We took off seven miles this way. We also took off 16 miles out that way [northwest] toward the Fish Creek area. We went straight out like this—we can only go so far to [Ublutuoch] and find a good crossing spot, sometimes it’s shallow enough to cross, and we found a spot just by this bend [on the river] and crossed it and looped around. Not really close, just a small loop like that, we did almost had to come back where we crossed because we couldn’t find any place else to cross, so we had to make a loop and come back around. (SRB&A Nuiqsut Interview November 2018)

The one [area] I just told you [west of Nuiqsut]. That one was last January. Yeah, when I went six miles out with [local resident]. We were in between the two [GMT1 and proposed GMT2 drillsite]. It was the weirdest thing—we went out there to the same area we got those tuttu last year, but there was absolutely no tuttu whatsoever. Just last week, my uncle said he had to go out farther than usual to get tuttus around this time. (SRB&A Nuiqsut Interview November 2018)

While most residents hunt caribou in overland areas during the fall months of September and October, when caribou are migrating through the area, residents also hunt in the winter by snowmachine to harvest wintering caribou as needed, or while hunting for other resources such as wolf and wolverine. In 2018, residents reported hunting by snowmachine in an area to the west, northwest, and south of the community. Two individuals described their snowmachine hunting activities in 2018 as follows:

Yes, during the spring, yes, [I hunted by snowmachine]. I got a caribou by Itqiliq, kind of near Puviqsuq. I came straight across the [Colville] river and then south [following Itqiliq]... I got the caribou on Itqiliq and then went straight back home through Puviqsuq. That was in February, it was pretty cold. This was just me.. My son had actually got a caribou down Stony Hill. [I went] maybe six times into that area. I ended up down here by Umiuraq. You can probably extend this out down here. That one I went straight west and I hit Umiuraq. (SRB&A Nuiqsut Interview November 2018)

A little bit [of snowmachine hunting], yeah. I think I went out here somewhere. I made a circle [from Itqiliq to Nuiqsut and then Kikiakrorak River]. There is a few places to cross [the Colville] where there are little valleys or creeks. I was just looking for wolf and wolverine out there. But during almost spring time in February and March and April, the caribous will always be running. That is the hardest time to catch caribou. No luck. Maybe just three [trips]. (SRB&A Nuiqsut Interview November 2018)

Use of different river systems is similar from year to year with some differences in the intensity of use based on the location of caribou and navigability of rivers. The study year of 2018 shows the highest overlapping use along the Colville River upriver to *Umiuraq* (Sentinel Hill), lower Itqiliq River, and upper East Channel, with more modest use of the Nigliq Channel, upper Colville River (beyond Sentinel Hill), upper Itqiliq River, and Fish Creek. Other river systems with relatively limited use in 2018 include Qakimak and Milugiaq rivers, Anaktuvuk and Chandler rivers, and the middle Colville Delta (Tamayayak River). Coastal hunting also occurred to a limited extent for caribou in 2018 and included coastal hunting from the mouth of the East Channel to Oliktok Point, and near Atigaru Point.

Similar to previous years, in 2018 the Nigliq Channel was a key travel corridor for ocean-bound and upriver-bound hunters, as well as a fishing and hunting area for residents. In 2018, residents traveled along the channel to and from fishing and hunting locations, sometimes hunting along the way. Some residents also specifically used Nigliq Channel for caribou hunting, although use of the Nigliq Channel specifically for caribou hunting has decreased in recent years compared to some other river corridors. In 2018, residents reported varying success hunting caribou on Nigliq Channel. Two individuals reported encountering large herds of caribou from which they harvested:

It's on the Nigliq side. [Near Nanuq]. I saw caribou on the east side [on Nanuq Lake side]. Just by the cabin, they came across by the cabin. Sometimes at this camp that is right next to our cabin. [I went in] July. Maybe three times. Just day trips... I mostly focused in here [Nigliq] but that is where most of the caribous came, non-stop and travelled all the way past Barrow, Wainwright. Three separate good sized herds. It has been too long, I haven't seen herds come back to back like that. (SRB&A Nuiqsut Interview November 2018)

There were so many [caribou], we couldn't even count them [on Nigliq]. Me and my uncle. We wait there on the river and they were moving back and forth, back and forth, and they always have that what you call them, bees with them? So they keep bugging them, and they go back and forth. (SRB&A Nuiqsut Interview November 2018)

Others reported hunting along Nigliq Channel while traveling to and from the ocean or while fishing at Nigliq camp but with limited success rates. These individuals cited a general lack of caribou along Nigliq Channel or indicated that development-related traffic and infrastructure affected their ability to harvest caribou in that area:

I went up there [to Nigliq] a few times, it being my mother-in-law's camp, my wife loves to go up there. I never went in there [Kuupaqullurak] since they built that bridge. There's just no caribou in there. July to August, about 10 times. [I didn't get any caribou]. I never seen none, just some by Nanuq area, but they were too far. (SRB&A Nuiqsut Interview November 2018)

We did but that was just for the ocean—to Nigliq. There were none [no caribou] up there. We didn't see anything. We just went towards the ocean. [As far as the camp]. There was like three or four but they were in a shallow area and they didn't want to try to get to them. (SRB&A Nuiqsut Interview November 2018)

We made quite a few trips out to the ocean this year, mostly for seals but there were times that we saw caribou crossing... Just travelling straight to the ocean. My grandma caught a bunch at her fish camp. We would stop there and catch some fish. If we had seen a caribou we would've gotten them but then when we did they were close to the road or the structures. (SRB&A Nuiqsut Interview November 2018)

I did [go to Nigliq], I've been helping [camp owner]. She asked if I could help her. But it's basically a traffic jam out there [along Nigliq Channel]. When we were going back and forth with the whale, hauling from Cross Island, there was basically a traffic jam [on Nigliq

Channel]. All summer. Every time I am going to the ocean, then I am looking out for caribou. So basically all summer if we go do our ocean hunting and then we see nothing, we come home and we are looking for a caribou. (SRB&A Nuiqsut Interview November 2018)

Residents also hunted caribou along the East Channel of the Colville River Delta, sometimes continuing to the ocean and hunting along the coast to Oliktok Point, particularly when picking up or dropping off individuals for Haul Road travel. Coastal hunting along the coast west of the Delta was limited in 2018 although a small number of hunters scouted for caribou near Atigaru Point. In 2018, residents hunted along the main “Kuukpik” and connected channels, along Tamayyak River in the middle Colville Delta, and along the Milugiaq and Qakimak rivers. Residents reported scouting for and harvesting caribou near locations such as *Pisiktaġvik*, *Nuiqsapiaq*, and Helmericks. Several individuals reported seeing herds of caribou approaching from the east and harvesting from these herds:

Yeah, [I hunted on the] East Channel. I didn't have no luck on the west side this year. Usually we always do. ... Oh, I went downriver a lot. I drop off my parents [at Oliktok Point] and on the way back I try to look. So, about 50 times a year. It was June to September. I actually travel this downriver [area] more than I do upriver. We caught them right below this river right here. They are all on this side [east of the Colville]. Even if I do see something over there [on the west side of the channel], I'll let them go because it's all a sandbar. It'll get the meat dirty. (SRB&A Nuiqsut Interview February 2019)

*I started taking [my daughter] hunting with me and we have been focusing on the Colville channel. We went in *Pisiktaġvik*, right here. There is a little cross. That is where it gets shallow and we had to turn back. But we ran into a large herd of caribou in here. I would say maybe a hundred of them. Where is Neil Allen's house? It has to be somewhere near Helmerick's. *Nuiqsapiaq* is right here. It is across from Helmerick's. [local resident's] fish camp is right there. We went right here and I was trying to cross but I went in the wrong channel. We ran into the caribou right here. Only last year we went through the Putu channel because it was an extremely high tide. I didn't see that this last year. When the tide is extremely high we are able from the Colville to enter some of these large lakes on the side of the Colville. That is kind of an exciting thing because we are able to see where we weren't able to see before during the summer. (SRB&A Nuiqsut Interview November 2018)*

Over here right by the mouth of the Colville Channel and there were a whole bunch. They got stuck over here because there were some oil activities going on in that area. There were maybe 300 plus, maybe more stuck on that side because they could see all those people working. There was a lot of boats over there that day. They were waiting for the leader to come back. When the leader doesn't come back, they follow across but that leader went back to that herd and then they went a different way. It was like four or five boats that were out there.... There were quite a few of us, like five boats waiting. This was in June last summer. This was in June. And we could see all of the winter fur on the river. They had been trying to cross. It was springtime, right after breakup and that is where we went. There were 300 plus, maybe more. No. We couldn't catch them because that leader went back to the herd. My ancestors told me that they let the leader go first and if the leader doesn't come back, they follow in a few hours. It is the female that goes first. They follow the leader. She is the leader of the pack. I have seen that quite a few times when I have been growing up. (SRB&A Nuiqsut Interview November 2018)

Several individuals also commented on difficulties navigating the channels of the Colville Delta due to shifting channels, sedimentation, and shallow waters:

I went through [East Channel]. But this is the one [route] I mainly use right here. It's changing though, it's changing a lot. There're more sandbars, so you have to maneuver more. It's not like the old days when you just go straight. More turns out there. Same way upriver, there's more sandbars up here... (SRB&A Nuiqsut Interview November 2018)

[We also hunted] on the East Channel—Pisiktagvik. Helmerick's—there was caribou but too far away and too shallow. There's a couple of rivers around here that are too shallow. They are really shallow. The one close over here, [it] goes to the land. That is the shallowest part. We can't get there, we have to be on the Main Channel all the time, depending on how high the river is. (SRB&A Nuiqsut Interview November 2018)

While coastal hunting west of the Colville Delta was limited in 2018, several respondents did travel into Fish Creek by boat during the summer months:

Yeah, we went to Fish Creek too, by boat, but we didn't see anything.... Yeah, Fish Creek, that was in early August, that was before this trip [upriver]. We came in up through here, we went to [local resident's] cabins. But we didn't see no caribou out there... Yeah, just one time. Just for the day, we were there all day long. (SRB&A Nuiqsut Interview November 2018)

In addition to hunting caribou within the Colville River Delta and coastal areas, respondents travelled upriver from the community in 2018 to destinations such as Itqiliq River, *Puviqsuq*, Ocean Point, *Qitik*, *Umiuraq*, and beyond. Itqiliq River was a particularly common hunting area in 2018, with residents traveling at varying distances along the river depending on water levels and transportation types (e.g., jet units versus outboards). An old air strip is a common turnaround point. One individual reported hunting along Itqiliq River due to the relative lack of traffic and activity in that area:

[I went] to Itqiliq River [by Square Lake]. There's an old airport about six miles from here [mouth of Itqiliq River]. A lot of people don't like to go because it's too shallow. I pretty much had to learn; it took me two years to really learn the river. For a lot of people, it's too shallow... July, and August, three in August—, they were all in August [Two in July]? [We went to Itqiliq] Pretty much all summer—, more than six times. All day trips. Yeah [July and August]... I just go inside Itqiliq because there is no traffic anywhere, except for Meltwater. (SRB&A Nuiqsut Interview November 2018)

Many Nuiqsut residents traveled farther upriver on the Colville to *Puviqsuq*, Ocean Point area, *Qitik*, and *Umiuraq* (Sentinel Hill). For day trips, Ocean Point and *Umiuraq* are common turning-around points. A number of individuals traveled even farther upriver past Sentinel Hill toward Anaktuvuk River, Chandler River, and *Umiat*. Travel to these areas often occurs during moose hunting season, when residents often also hunt caribou, particularly when unsuccessful harvesting moose. A few individuals traveled into the Chandler and Anaktuvuk rivers by boat; travel along Anaktuvuk River was more extensive than previous years. Several individuals described hunting upriver as follows:

Probably [hunted] up to Puviqsuq this year but there was no caribou, but we didn't get any... Maybe Ocean Point, yeah, we did go up past Ocean Point right there and then turned around, because that's the farthest I could go with my ocean boat without hitting bottom... Yeah, that's a gas saver [the shortcut by Puviqsuq]. In and around, that's the right way and it comes back in at the Colville [River]... We didn't see any, we usually hang out at Puviqsuq. It's usually there or at the cabin at [Itqiliqppaa]... Maybe four or five [trips]. (SRB&A Nuiqsut Interview November 2018)

We would always go all the way up into Chandler River but there is hardly any caribou. We just got our SJX boat and we were exploring where a prop can go. Inside Chandler, Anaktuvuk and Killik River. There are other boaters. Killik River is off of Chandler. It's past Big Bend.

It is closer to the mountains. We went 100 miles from Nuiqsut. We were like 48 miles from the village of Anaktuvuk Pass. On Chandler River there is a “Y” and Killik River goes south and Chandler goes south. We went up there all summer. Like I said, we got an inboard and we were always on those rivers.... That was all summer long [June through August]. We went in Anaktuvuk but not even that far. (SRB&A Nuiqsut Interview November 2018)

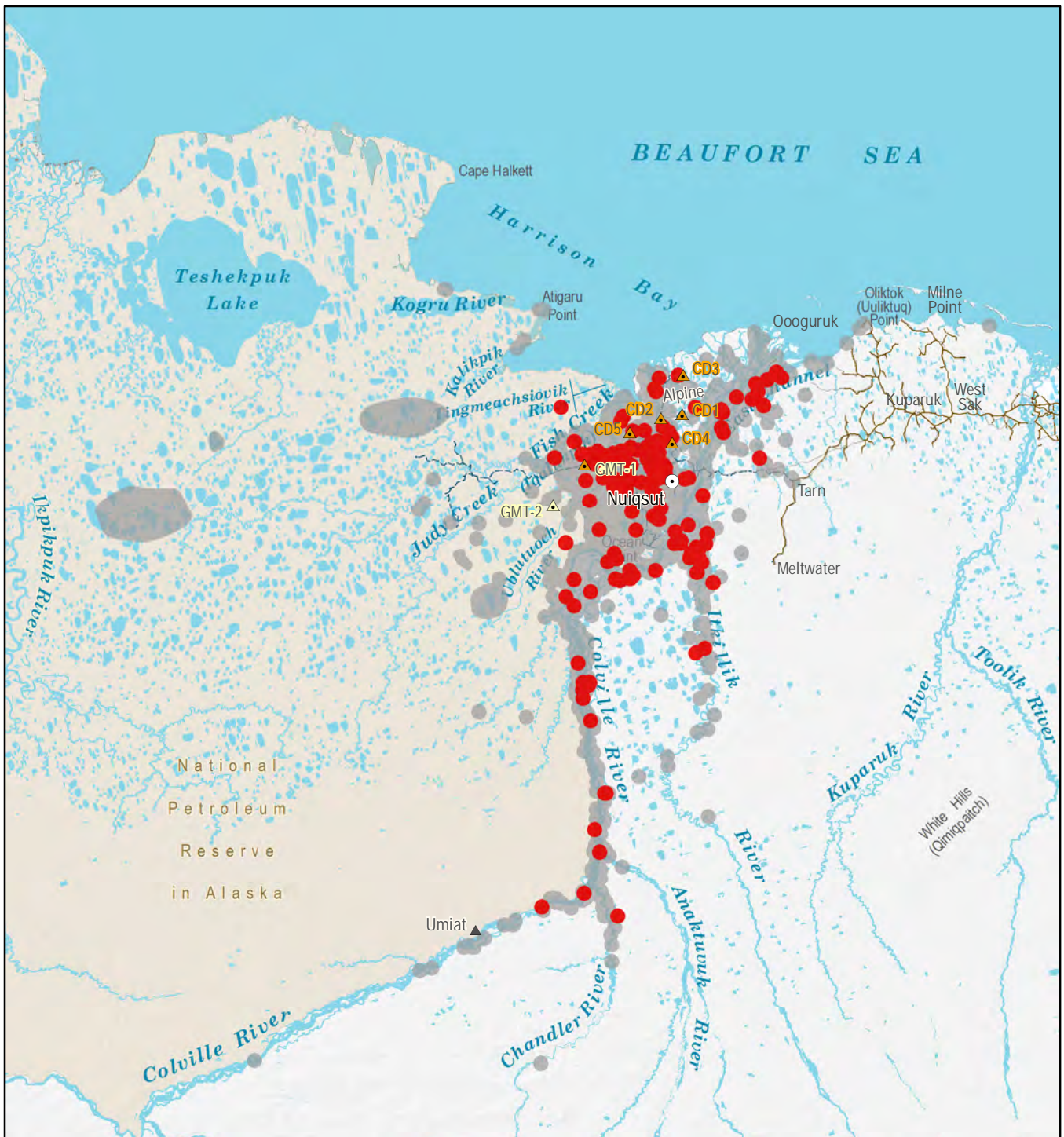
Umm, yeah I just went [points to Umiuraq], that’s the furthest I went up. Yeah, by boat. No, we thought about [going through the shortcuts], but we just stayed on the Main Channel. Ah, that was in August... We were scouting for moose and we seen a bear try to go after [a caribou]. [The caribou] went around a hill and into the water. That’s when we ran down and got some caribou meat. We were there for five days; we wanted some extra meat... We just went about halfway to Ishukpak [Bluff]. (SRB&A Nuiqsut Interview November 2018)

[I hunted to] Chandler. Right at the mouth. That was my gas limit. That was in August, that was the last time I went up there. But I didn’t see a single caribou. Then I went to that high bank there and I searched around, I was looking for the fat caribou, but I didn’t see any. Between Puvuqsuq and inland there, that’s where they were hanging out, but they were too far inland. Oh, that shortcut, basically it’s cutting a river through there, and sooner or later it’s going to cut a river through that freshwater lake. [It was] early. We been trying to get the caribou before September. But we didn’t luck out on that because they’ve been being hard to spot. We were just scouting out. We started soon as the river broke, like June. July. August. We try to leave them around until they get a little fatter. Like August. I say that we spent \$1000 of gas. Took a lot of gas to get up there. (SRB&A Nuiqsut Interview November 2018)

Map 9 shows the geographic locations of Nuiqsut caribou harvest sites, as noted by respondents during interviews using a 1:250,000 scale USGS map. The 2018 caribou harvest locations are shown in red, with previous study years’ harvest locations shown in gray. 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. Forty-six respondents reported harvesting caribou at 150 harvest locations in 2018.

Respondents reported successful harvests in the Colville River Delta; upriver toward Umiat area, along Itqiliq River, Qakimak Creek, and Fish Creek; and in overland areas to the west of Nigliq Channel and the community. A large number of caribou harvests took place in the area to the west between the village of Nuiqsut and Fish Creek, along the road system west of the Colville Delta, around Ocean Point, along the Itqiliq River, and along the Nigliq Channel and East Channel of the Colville River.

Map 10 shows harvest density for 2018, with areas of higher harvest concentration shown in red. SRB&A determined harvest density through the use of the Kernel Density Tool (or Point Density Tool) located in the Spatial Analyst toolbox in ArcGIS. The Kernel 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 9) 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 2018. Harvest density for all years combined is shown on Map 11, and individual previous years (2008-2017) are shown in Appendix E, Map 3.



Map 9 - Caribou Harvest Locations, 2008 - 2018

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 161 active harvesters from March 2009 through February 2019.

Other areas may have been used for resource harvesting.

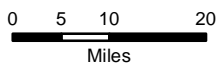
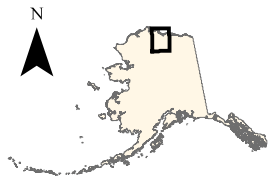
Year 11: November 2017 - October 2018

● 150 caribou harvest locations
46 respondents

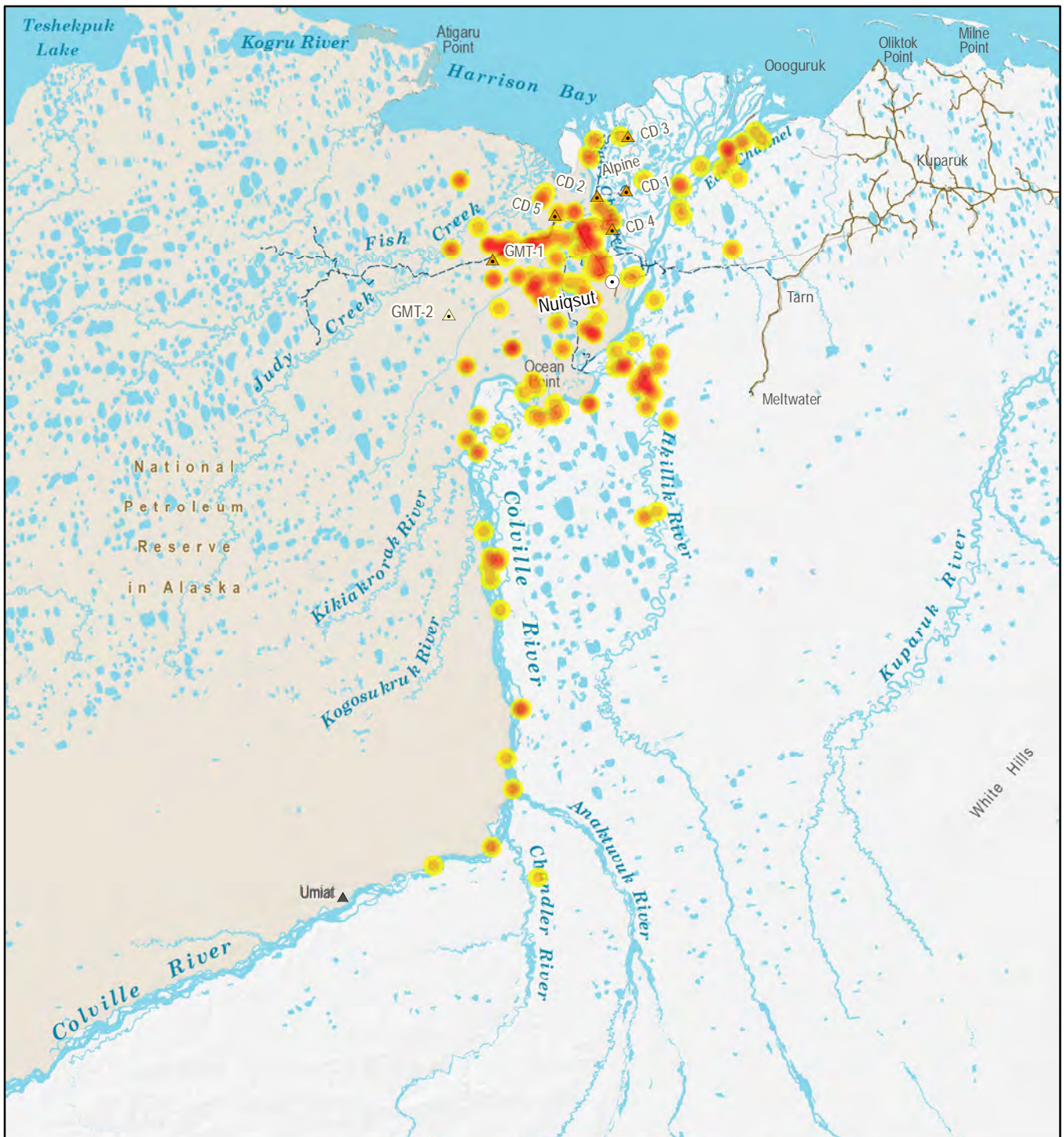
Years 1-10: January 2008-October 2017

● 1804 caribou harvest locations
149 respondents

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Map 10 - Caribou Harvest Density, 2018

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 50 active harvesters in November 2018 and February 2019.

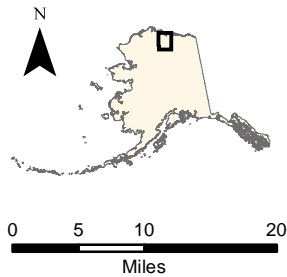
Other areas may have been used for resource harvesting.

Harvest Density

- Fewer caribou harvested
-
- More caribou harvested

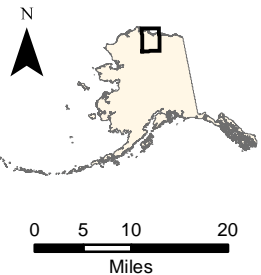
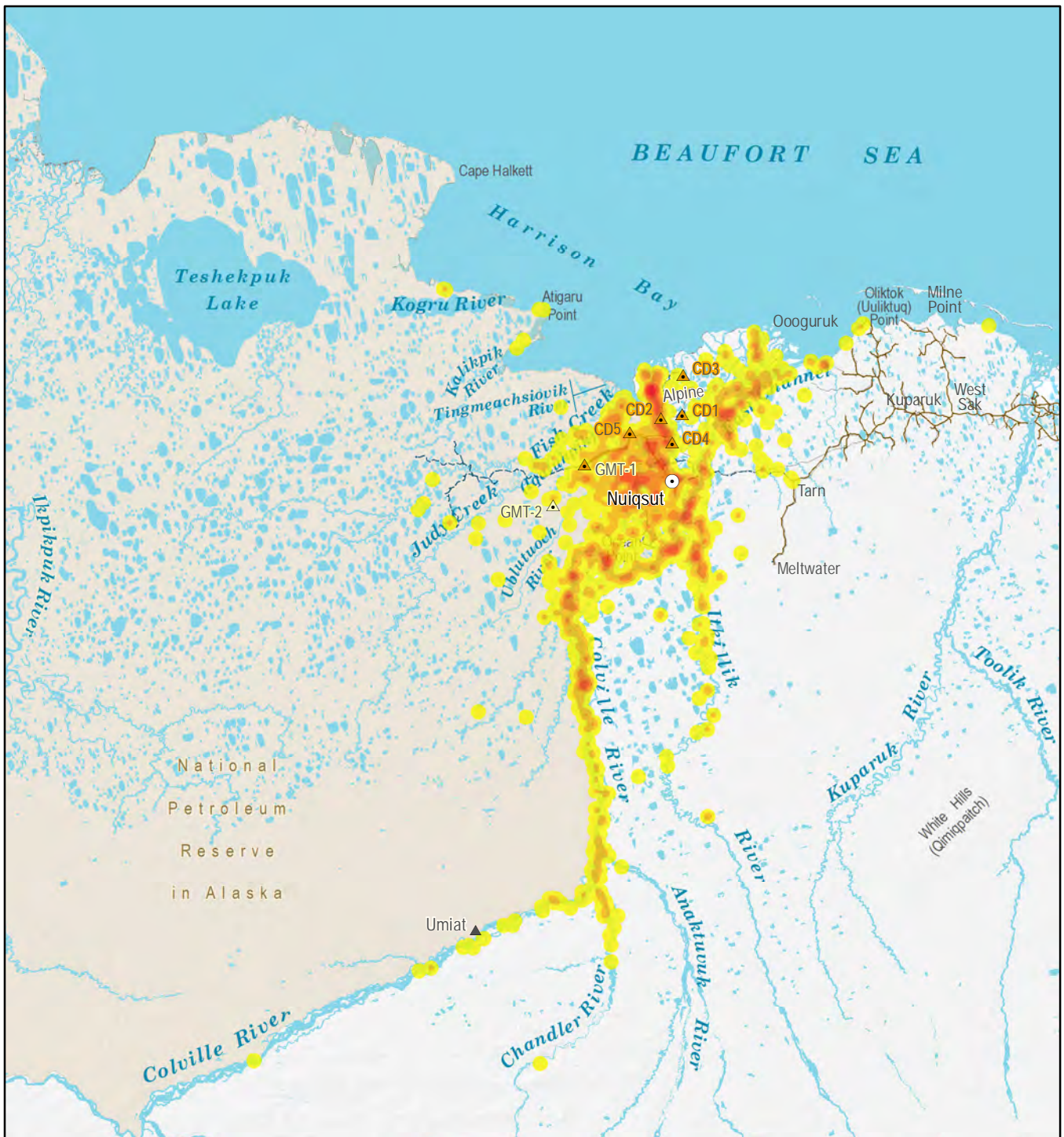
150 caribou harvest locations, 46 respondents

* This map does not include harvest locations that were reported as polygons



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Map 11 - Caribou Harvest Density, 2008 - 2018 Combined

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 161 active harvesters from March 2009 through February 2019.

Other areas may have been used for resource harvesting.

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Harvest Density

- Fewer caribou harvested
-
- More caribou harvested

1914 caribou harvest locations, 152 respondents

* This map does not include harvest locations that were reported as polygons

The highest concentrations of harvest locations (shown in red) over the 11 study years have occurred along the Nigliq Channel to the north of the community; along the East Channel near *Pisiktagvik*; within a few miles of Nuiqsut overland to the west and north; and along the Colville to the south, particularly near the mouth of Itqiliq River, in the area of Ocean Point, near the mouth of Kikiakrorak River, and near Sentinel Hill (Appendix E, Map 3). In 2018, the highest concentration of harvests (shown in red) occurred to the west and northwest of the community—both in overland and road-accessed areas—along the Itqiliq River, and at a location on the East Channel (Map 10). Moderate harvest density (shown in orange) occurred along the Nigliq Channel, East Channel, and upriver along the Colville River. 2018 shows comparatively less harvest density on the Nigliq Channel, and comparatively more harvest density to the northwest of the community along the CD5 to GMT1 road, and on the Itqiliq River. Decreased harvest density along Nigliq Channel is evident in several previous study years (Years 2013 through 2017; Appendix E, Map 3), with the exception of the camp at *Nigliq* which residents continue to use for fishing while waiting for caribou to approach the river corridor. In 2018, the camp at *Nigliq* showed moderate levels of harvest density (shown in orange).

Characteristics of Caribou Use Areas and Harvest Sites

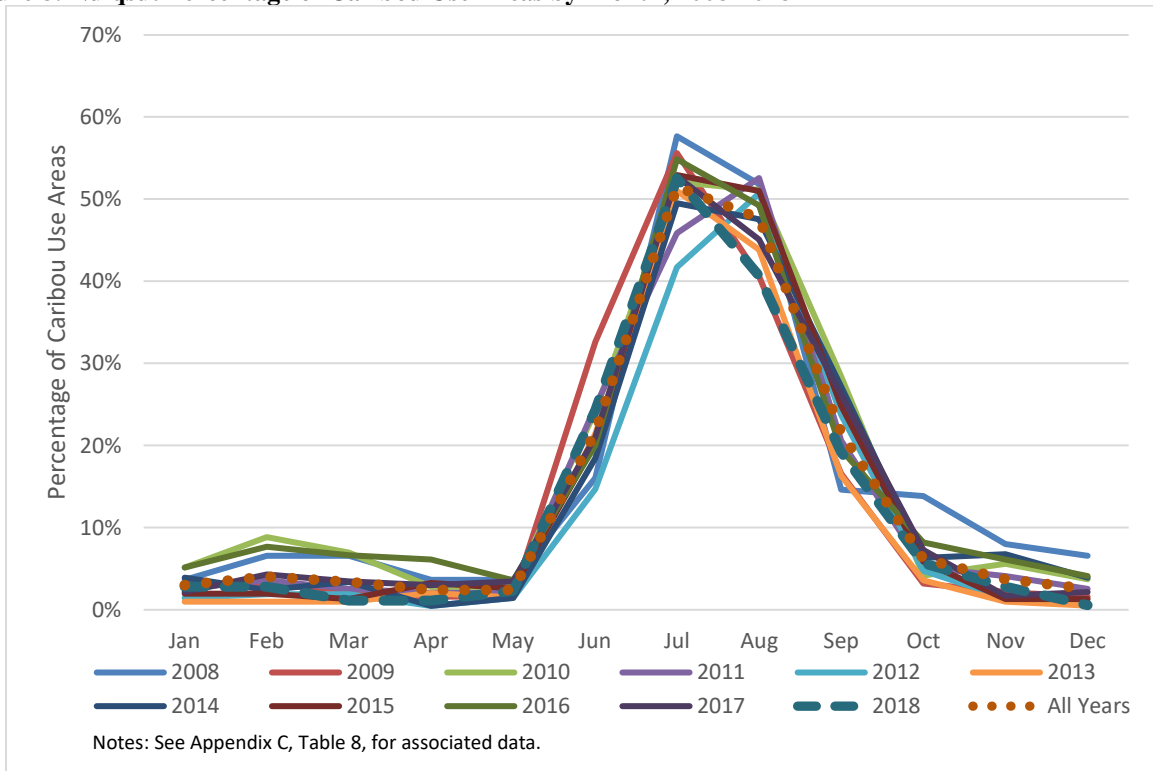
Study participants characterized their 2018 caribou use areas for the following variables: timing of hunting activities, travel method, success (measured according to whether the respondent successfully harvested caribou in the use area or not), duration of trips, and frequency of trips. Caribou harvest locations were characterized by month, number of caribou harvested, sex of caribou harvested, and size of herd from which the caribou were harvested. The following sections describe the characteristics listed above as they pertain to caribou use areas and harvest sites in 2018.

Timing

Figure 8 shows that caribou hunting activities over the 11 study years have occurred during every month of the year, with the most use areas reported in July and August. For 2018, similar to previous years, respondents reported traveling to over 50 percent of their caribou use areas during the month of July (52 percent), with somewhat fewer (41 percent) visited in August, a decrease from most previous years. Similar to previous study years, in 2018 just over 20 percent of use areas were visited in June (22 percent) and September (22 percent). Winter hunting in terms of percentage of use areas, was somewhat lower than previous study years, despite the increased road access. Figure 9 shows the percentage of caribou harvested by respondents, by month. These data show a substantial increase in May harvests in addition to an increase in harvests during the month of November compared to most previous years. In both cases, these increased harvests could be due to the accessibility of the road at times when riverine and overland travel are sometimes difficult due to poor travel conditions (i.e., breakup and freeze-up). Similar to previous study years, July and August accounted for a majority of the harvest in 2018, with over 50 percent of the harvest occurring during those two months. September accounted for 14 percent of the harvest, and May and June both accounted for nine percent of the harvest. November (five percent) showed a slightly higher percentage of harvests compared to the all years average.

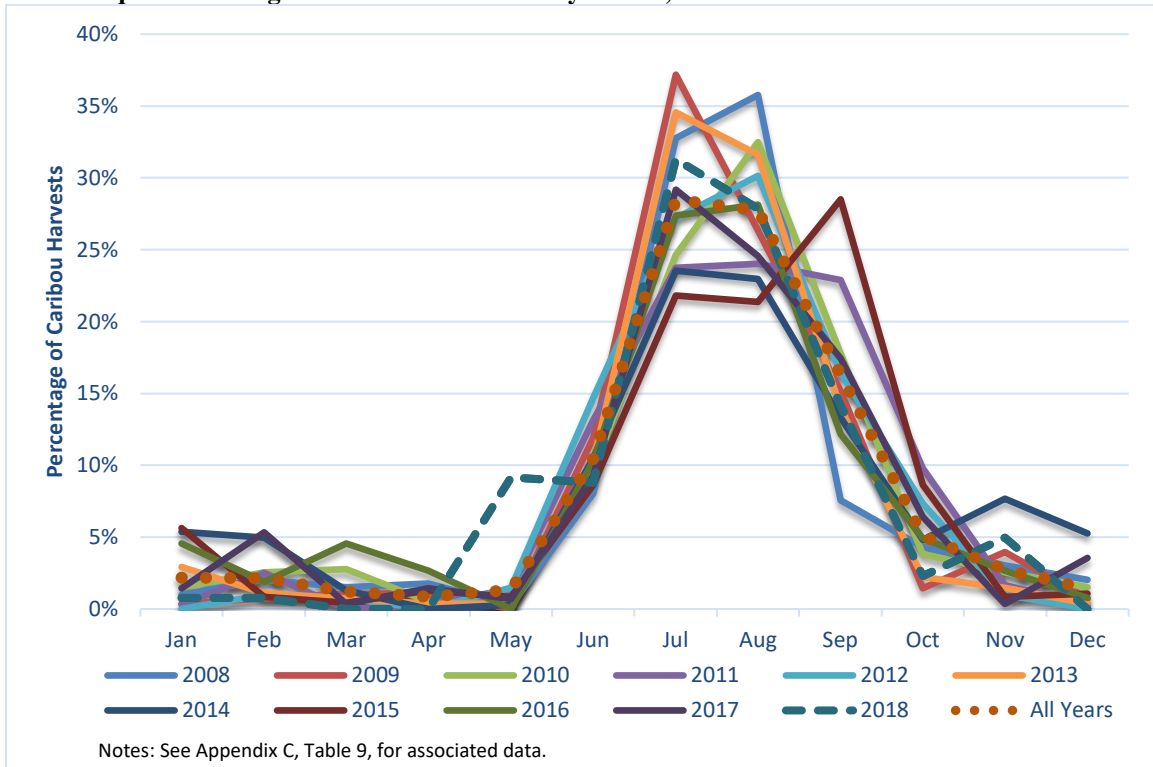
July and August are usually the peak months for caribou harvest activity because caribou are migrating into the area in large numbers in search of insect relief, the rivers have opened which allow for boat travel (many residents' preferred method to hunt caribou), and other major subsistence activities are not occurring (e.g., moose hunting, bowhead whaling, *qaaktaq* fishery). Residents note that the caribou begin to fatten up in July and are at their fattest in August and September. Harvesters note that hunting in the later summer months of August and September are sometimes preferable because the peak mosquito season has passed.

Figure 8: Nuiqsut Percentage of Caribou Use Areas by Month, 2008-2018



Stephen R. Braund & Associates, 2020.

Figure 9: Nuiqsut Percentage of Caribou Harvested by Month, 2008-2018



Stephen R. Braund & Associates, 2020.

Two individuals described hunting caribou in the summer as follows:

In the end of July, we were waiting for the mosquitoes to settle down a little bit. We did most of our hunting in August, but some was during the end of July; we waited for those mosquitos to settle down a bit... All of these areas were the end of July and the first week of August and by then the fat was already beginning to start on them, they didn't seem to be runners or spooked in anyway, just kind of seemed hanging out, we didn't even have any problems creeping up to them, they were calm and grazing along, enjoying the no mosquitoes, oh man, they were bad this summer. (SRB&A Nuiqsut Interview November 2018)

In August, me and a couple of guys [went hunting] close by the old airport by Itqiliq. We saw some but they were too far. It was small herds. I keep seeing small herds on the bluff side. In [early] August they are still coming north. They are usually heading south in August, middle part of August. All of the caribous that are in this area, they are interior caribou.... We went up here more than ten times. July, August—I am always going upriver. (SRB&A Nuiqsut Interview November 2018)

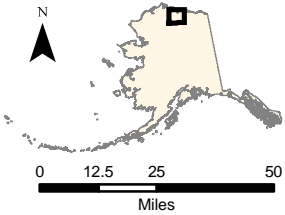
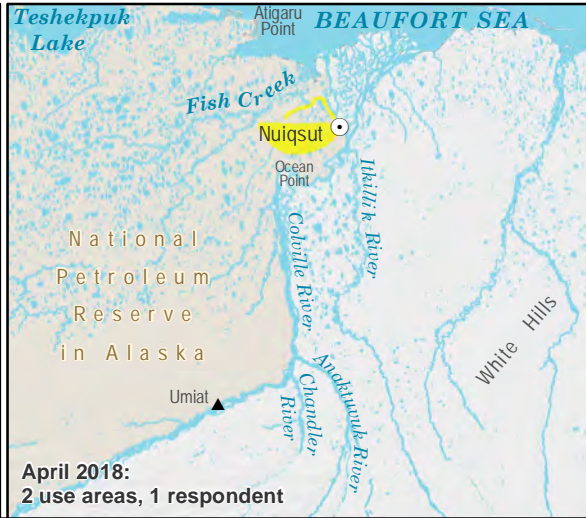
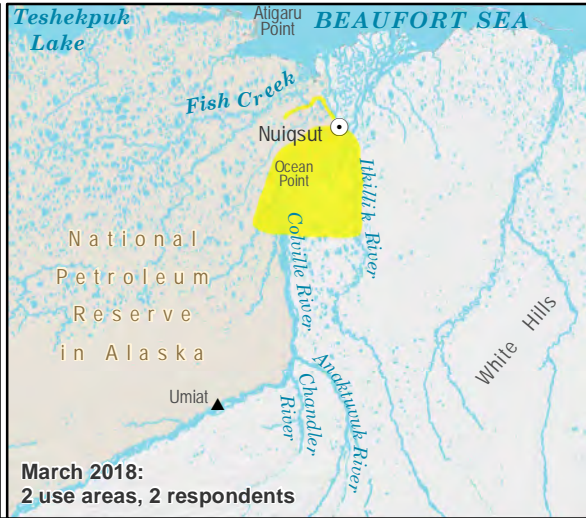
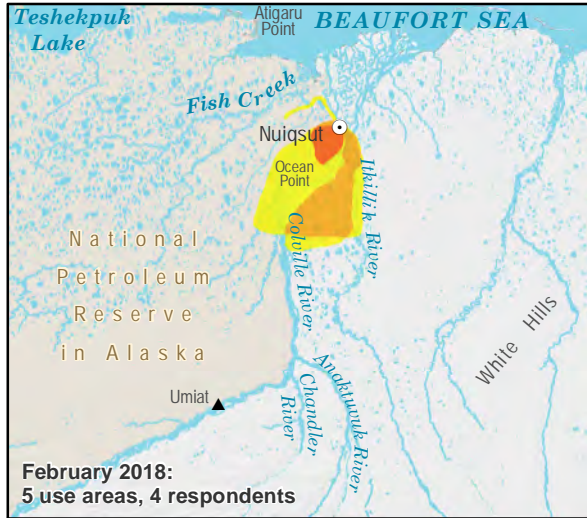
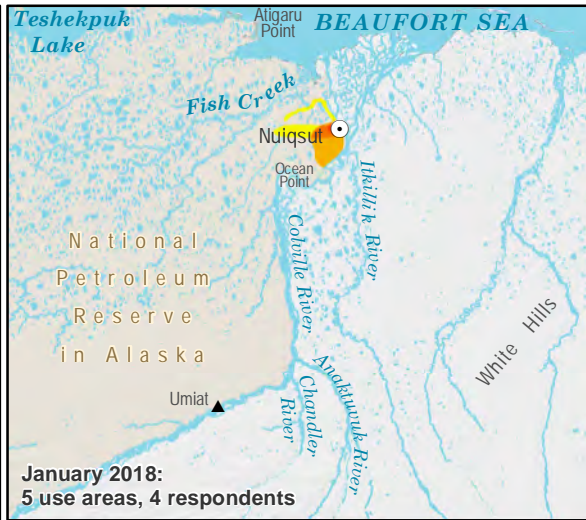
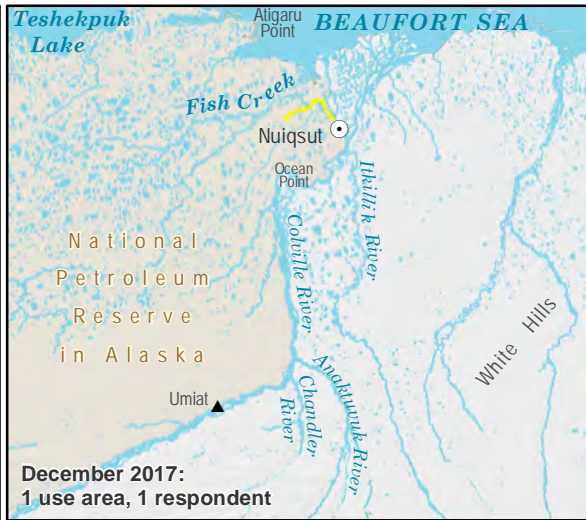
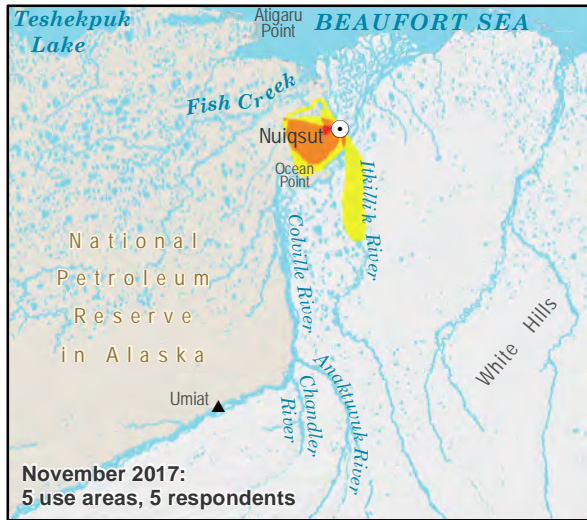
September is also important as the fall caribou migration often brings herds close to the community as they migrate from north to south. While many individuals continue to hunt caribou during September, some shift their focus to bowhead whaling or moose hunting:

[I hunted caribou in] July—all of July and the first week, second week, third week of August. I've got to get ready for whaling the last week of August, just stay home and hurry up and wait for a whale.... There was hardly any caribous out there until the last few weeks of August. (SRB&A Nuiqsut Interview November 2018)

Residents generally indicate a decrease in caribou hunting in the late fall/early winter (November) when bulls are rutting, although some will pursue cows during this time. Hunting of caribou occurs through the winter as residents run out of caribou meat from their summer and fall harvests. Winter caribou hunting often occurs concurrently with furbearer trapping and hunting:

I was just looking for wolf and wolverine out there. But during almost spring time in February and March and April, the caribous will always be running. That is the hardest time to catch caribou. No luck. Maybe just three [trips]. (SRB&A Nuiqsut Interview November 2018)

Map 12 through Map 15 show 2018 caribou subsistence use areas and harvest locations by month, and Appendix E, Maps 4 and 5 show the extent of previous study years (2008-2017) as a single polygon, with all harvest locations, by month. According to 2018 active harvester interviews, during the winter/spring months of November through April, harvesters traveled primarily to the west and south of the community between Ocean Point, Ubltuoch River, and Itqiliq River. In addition, residents traveled along the Spur Road, part of the CD5 road, and GMT1 road. A small number of harvest locations were reported during the November through April time period, with the majority occurring in November. These harvests occurred along the road system, directly to the west of the community, near Ocean Point, and along the lower Itqiliq River. Compared to previous years for the November through April time period (Appendix E, Maps 4 and 5), 2018 hunting activities from November to April occurred within the extent of previous years. Travel along the road system increased in May and continued at moderate to high levels from June through October. In June, hunting activities shifted to concentrate more along river channels, although road activity continued throughout the summer. Some use of the Nigliq Channel started in June, increased in July and August, and continued at low levels into September. Use of the Colville River upriver from the community occurred at moderate and high levels throughout June through September, with use of the East Channel limited primarily to June and July. Use of the Itqiliq River was highest in June but continued throughout the summer. Overland travel to the west of the community occurred at varying extents throughout the June through October time frame but peaked in September.



Map 12 Caribou Subsistence Use Areas, November - April, 2018

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 50 active harvesters in November of 2018 and February of 2019.

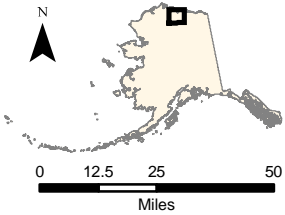
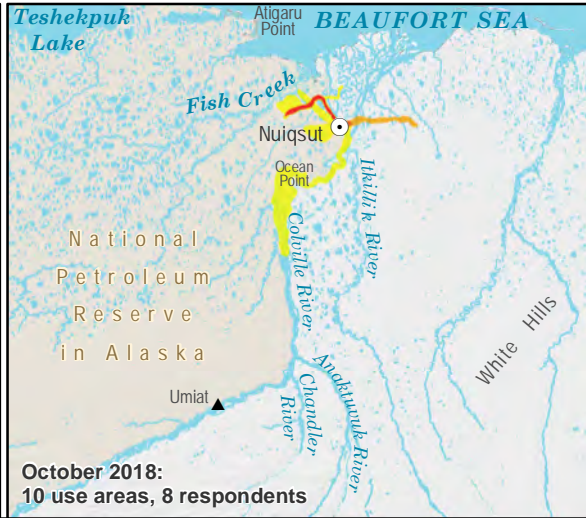
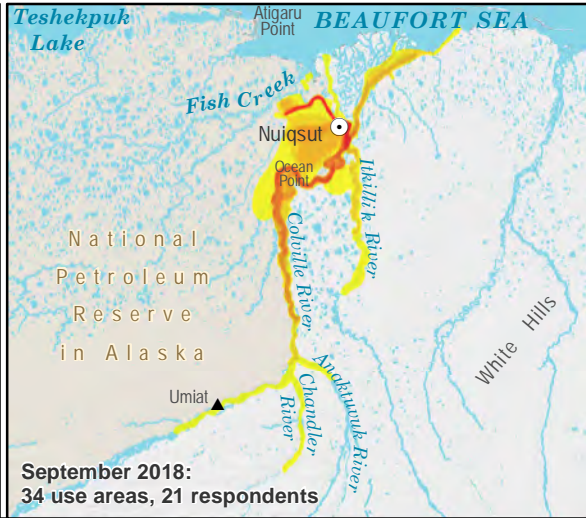
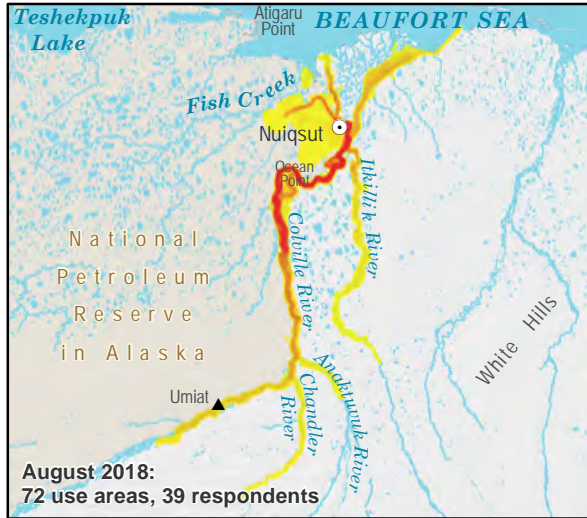
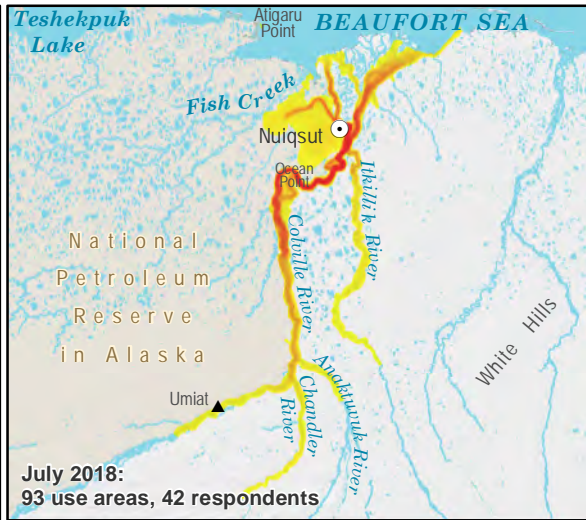
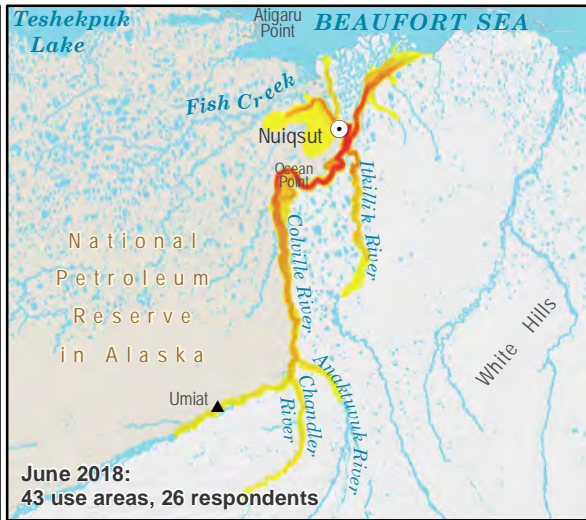
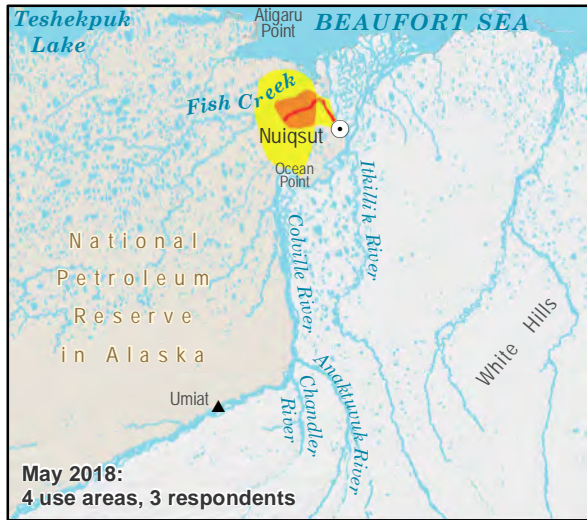
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Other areas may have been used
for resource harvesting.

National Petroleum
Reserve Alaska

2018





Map 13 Caribou Subsistence Use Areas, May - October, 2018

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 50 active harvesters in November of 2018 and February of 2019.

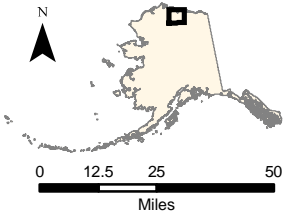
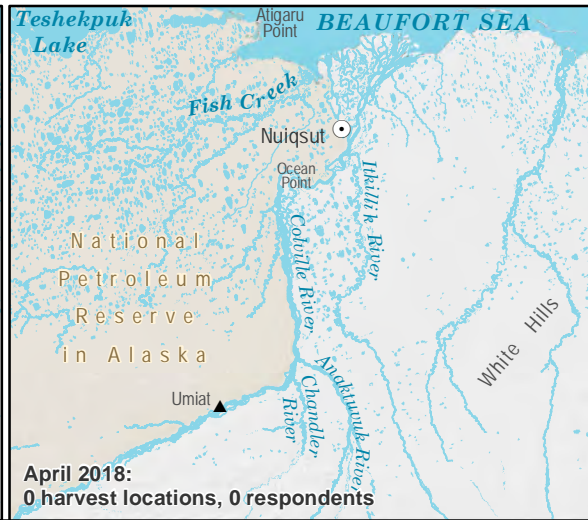
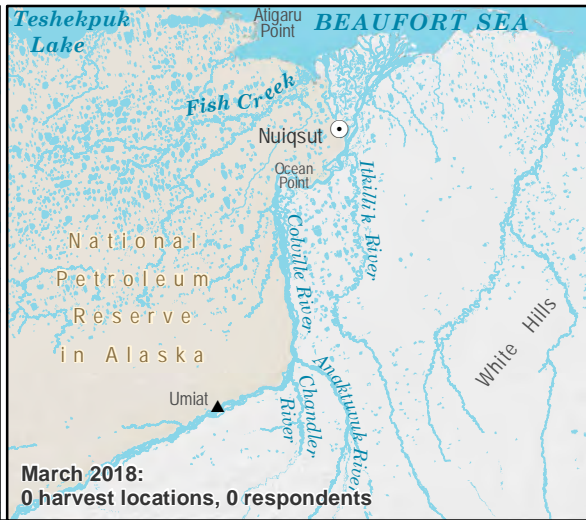
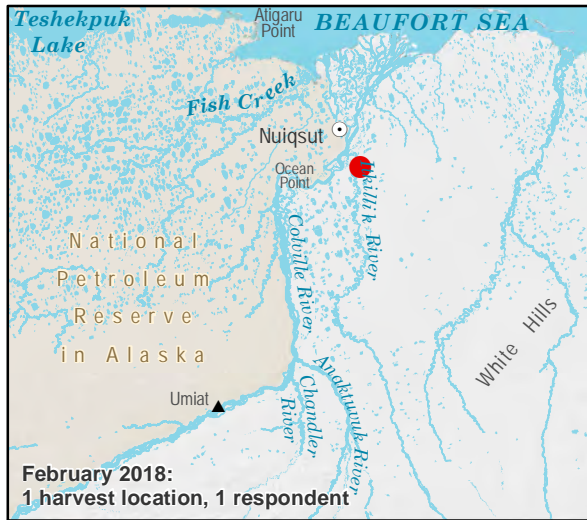
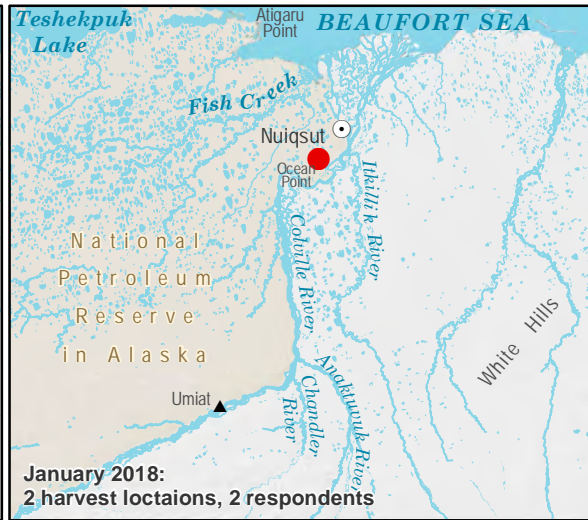
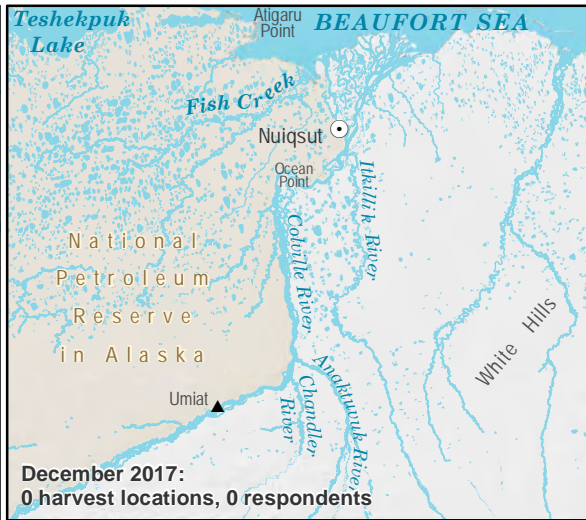
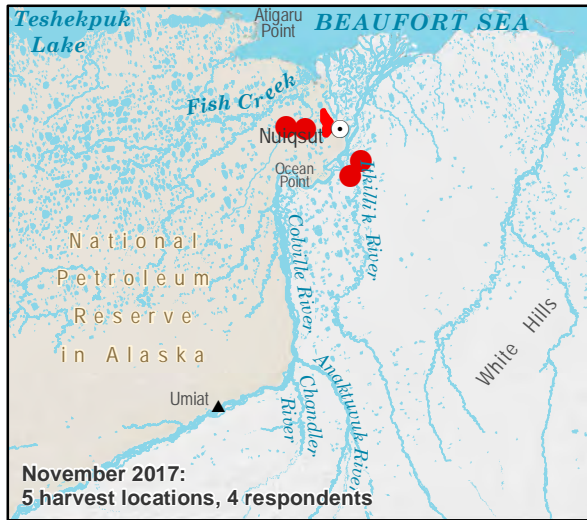
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Other areas may have been used
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2018





Map 14 Caribou Harvest Locations, November - April, 2018

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 50 active harvesters in November of 2018 and February of 2019.

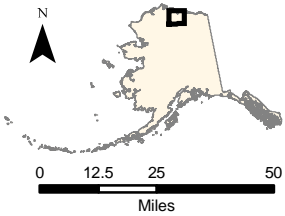
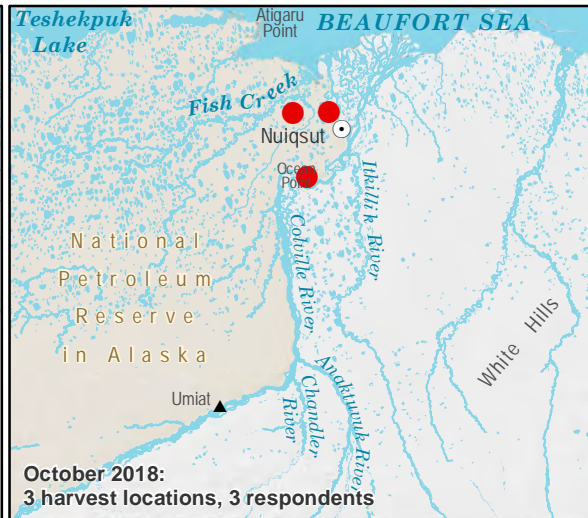
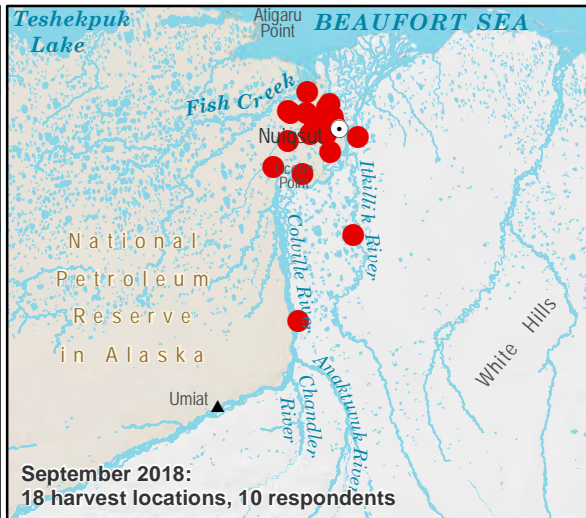
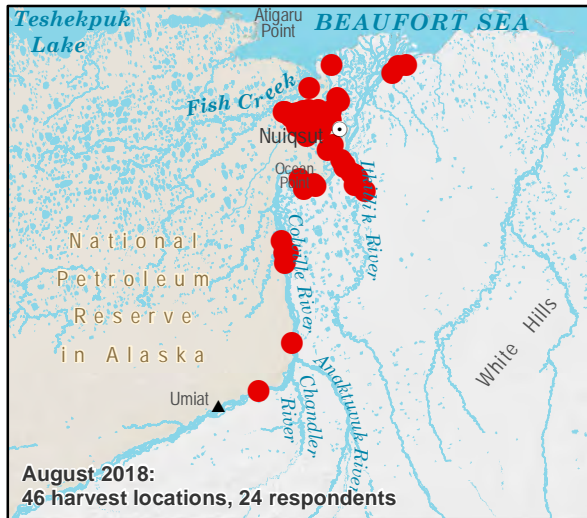
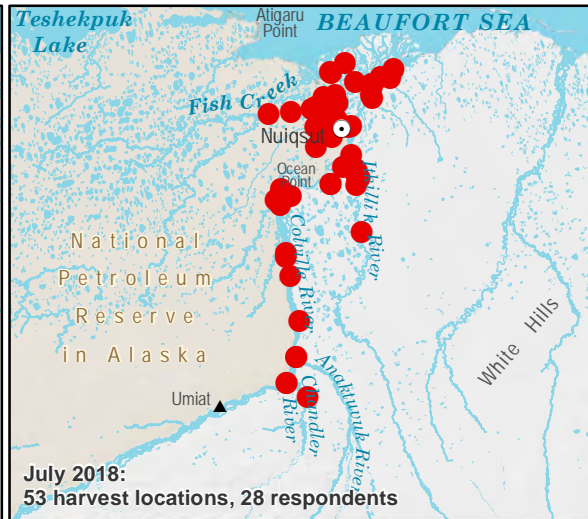
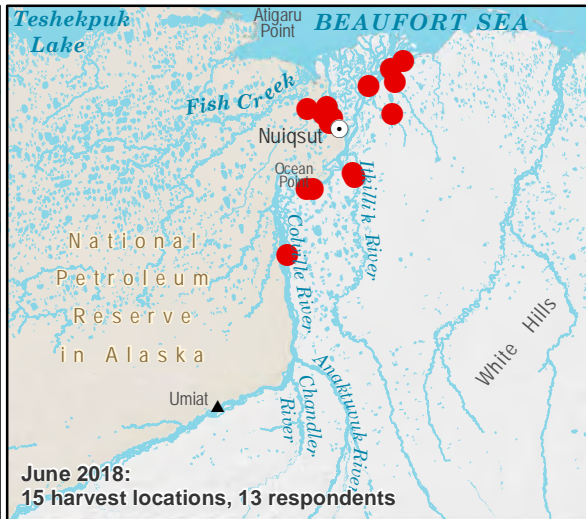
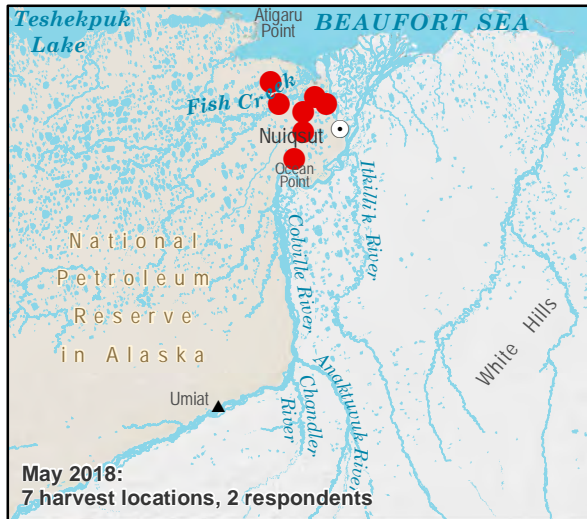
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Other areas may have been used
for resource harvesting.

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Reserve Alaska

Harvest Locations





Map 15 Caribou Harvest Locations, May - October, 2018

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 50 active harvesters in November of 2018 and February of 2019.

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Other areas may have been used
for resource harvesting.

National Petroleum Reserve Alaska

Harvest Locations

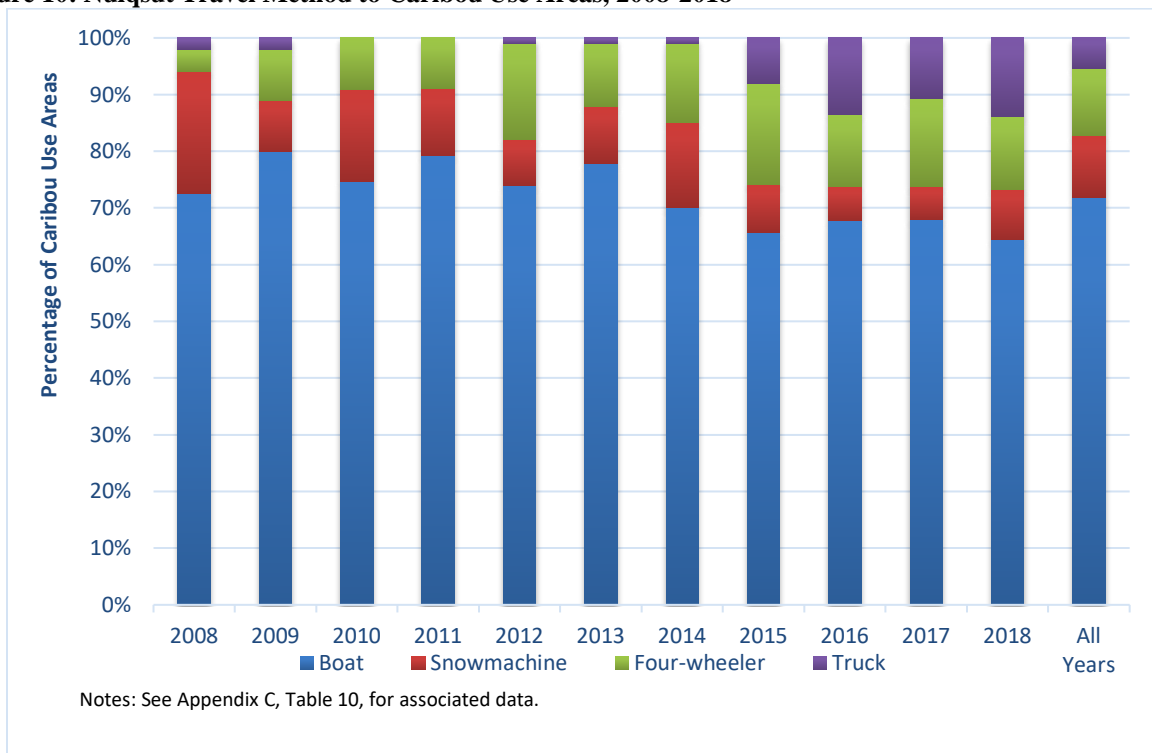


Harvest sites were generally located in areas of moderate to high overlap during each month. Harvest locations were reported in every month from May through October. Harvests in June were focused along the road system, East Channel, Itqiliq River, and upriver from the community as far as Sentinel Hill. In July, harvests increased in number and density and extended to Nigliq Channel, farther upriver to Chandler River, and west of the community in overland areas. July harvests also continued to occur on the East Channel, Itqiliq River, and along the road system. In August, harvests focused along the road system and Itqiliq River as well as specific upriver locations (e.g., Ocean Point, Umiuraq), with lesser harvesting on the Nigliq and East channels. In September, harvests began shifting away from the river system to the overland and road-accessed area to the west of the Colville River, with harvests continuing in that area but decreasing in October. 2018 use areas and harvest locations for the May to October time period were within the extent of previous years (Appendix E, Maps 4 and 5).

Travel Method

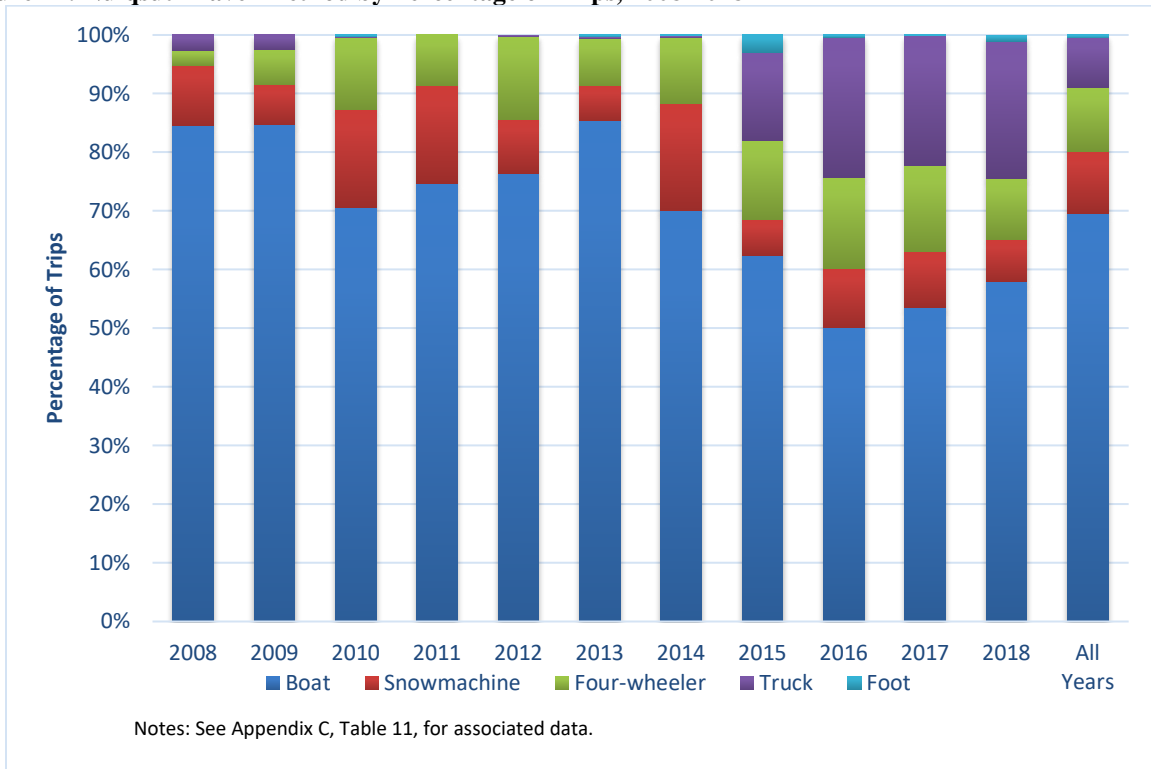
Across all study years, boat has been the primary method of travel to caribou hunting areas (Figure 10 and Figure 11). Boat remained the principle travel method to caribou use areas in 2018, with 66 percent of use areas and 59 percent of hunting trips accessed using this method. Truck was the second most commonly used travel method in 2018 (14 percent of use areas and 24 percent of hunting trips), followed by four-wheeler (13 percent of use areas, 11 percent of trips), and snowmachine (nine percent of use areas, seven percent of trips) (Figure 10 and Figure 11; Appendix C, Tables 10 and 11). Use of boats for caribou hunting has declined slightly over time, from a high of 80 percent of use areas during the 2009 study year, to 70 percent in 2014, and 66 percent in 2018. Snowmachine use has also decreased, while use of four-wheelers and truck have increased. Increased truck use has coincided with the construction of roads in the region beginning in 2015 (Figure 10; Appendix C, Table 10). Four-wheeler use was reported at 13 percent of use areas, slightly higher than the average across all years. The increased use of truck, and possibly also four-wheeler, in recent years is due to respondents’ increased use of the recently constructed Spur Road and roads to CD5 and GMT1.

Figure 10: Nuiqsut Travel Method to Caribou Use Areas, 2008-2018



Stephen R. Braund & Associates, 2020.

Figure 11: Nuiqsut Travel Method by Percentage of Trips, 2008-2018



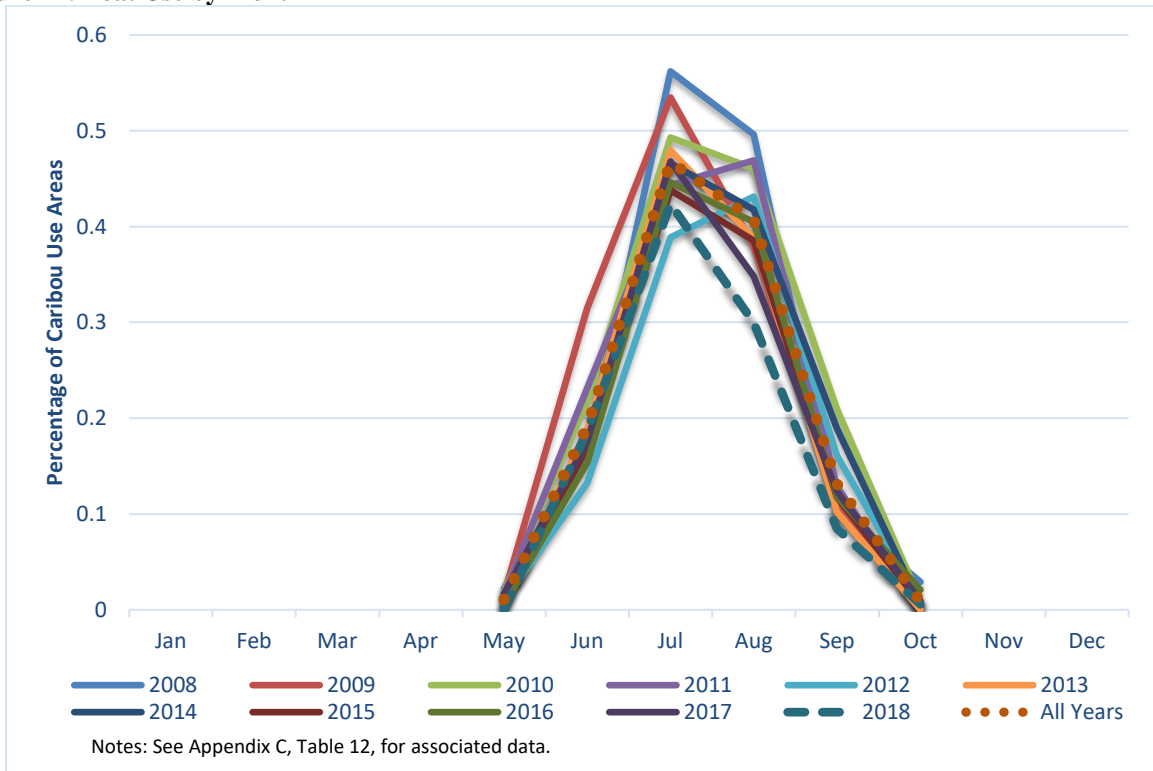
Stephen R. Braund & Associates, 2020.

In general, boat travel begins as soon as the ice breaks up in June and continues until freeze-up, sometime in September; in some years, boat travel can commence as early as May and extend as late as October. In terms of the percentage of use areas, the peak month for boat travel for all years is July, followed by August, June, and September (**Error! Not a valid bookmark self-reference.**). Annual differences in the peak of boating activities may be explained by the timing of break up in the spring and the availability, or lack of availability, of caribou in boat-accessed use areas during each ice-free month. Boat travel in 2018 was similar to previous years in terms of timing, but with lesser use in the months of August and September (**Error! Not a valid bookmark self-reference.**).

Across all study years, snowmachine use by active harvesters generally occurs beginning in September through April or May depending on the snow cover (Figure 13). The timing of snowmachine travel in 2018 was similar to previous study years which show peaks in early winter (October/November) and late winter (February and March). During 2018 snowmachine use occurred at varying levels from September through May, peaking in September, November, January, and February (between two and three percent of use areas) (Figure 13). As with boat, the extent of snowmachine travel is dependent on the weather and the availability of caribou during the winter months.

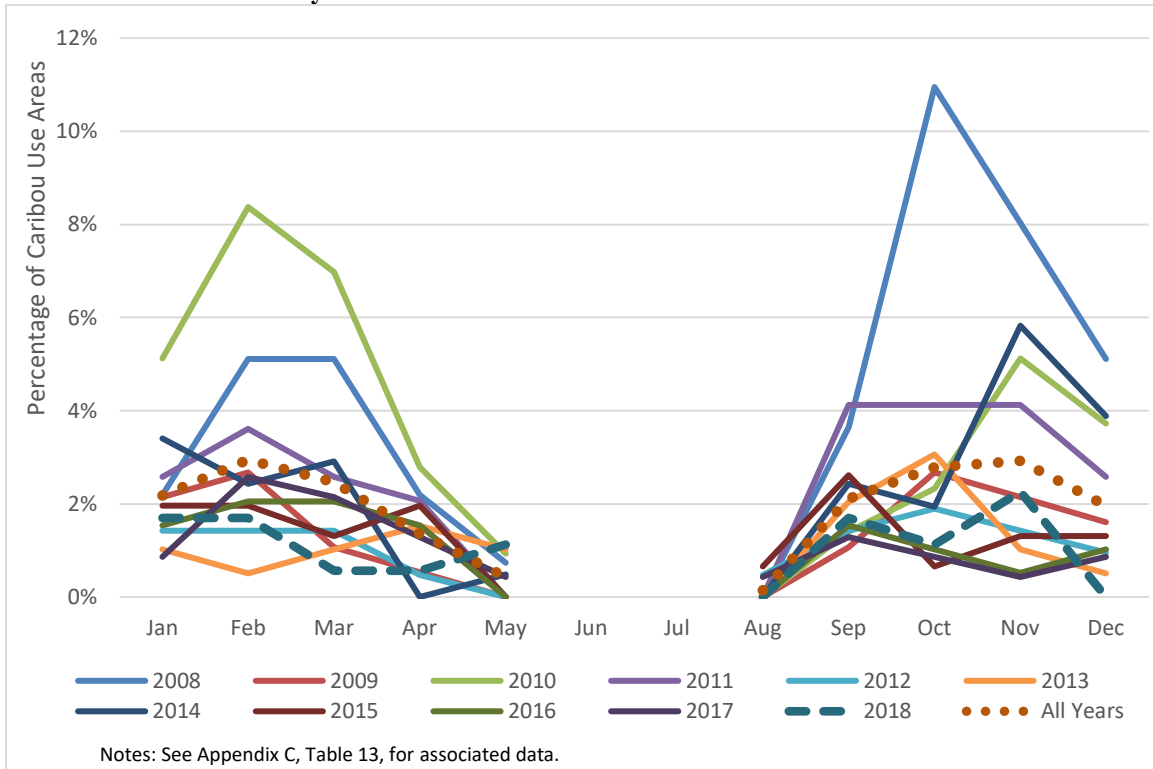
In 2018, residents reported using a combination of road and overland vehicles to access hunting areas to the west of the community. Residents commonly used trucks or cars to spot caribou from the road. If close to the road, residents hunted on foot. If farther from the road, residents used overland vehicles—either hauled or retrieved once caribou were spotted—to access harvest sites. The GMT1 road can be used to access areas not usually accessed using overland methods, particularly during the snow-free months.

Figure 12: Boat Use by Month



Stephen R. Braund & Associates, 2020.

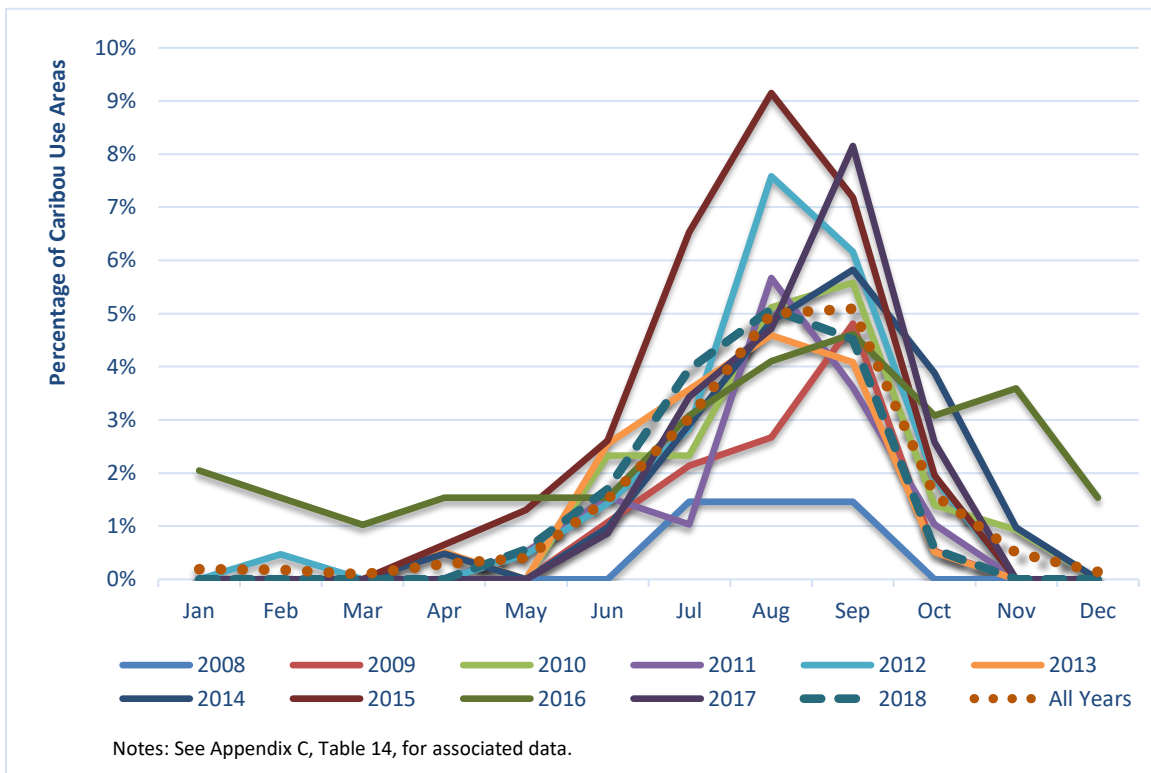
Figure 13: Snowmachine Use by Month



Stephen R. Braund & Associates, 2020.

Four-wheeler use is usually limited to the summer and fall months, starting in April/May and tapering off in October/November (Figure 14). While some previous study years (2012, 2016) showed some winter four-wheeler use at lower levels, the most study years, including 2018, showed four-wheeler travel being limited to the summer and fall months of May through October. Four-wheeler use in 2018 peaked in August with slightly lesser use in July and September. Recent years have shown somewhat higher levels of four-wheeler use (greater than 10 percent) compared to earlier study years (Figure 10). As one individual said, “It is increasing, the Honda hunting” (SRB&A Nuiqsut Interview November 2018).

Figure 14: Four-wheeler Use by Month, 2008-2018



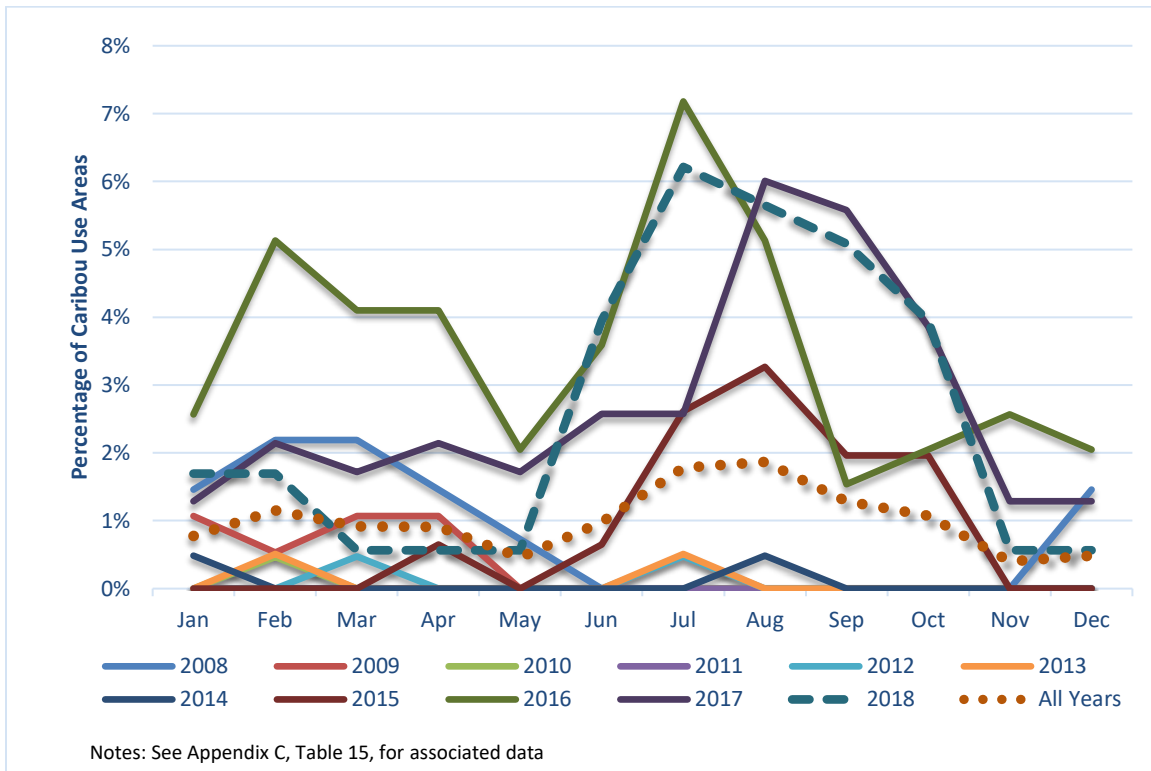
Stephen R. Braund & Associates, 2020.

Another respondent observed that boat travel burns more gas and requires more investment than four-wheeler travel, and reported greater success rates when hunting by four-wheeler:

I went out with a boat a couple times but didn't see any [caribou]. I said, 'Man, we are having more luck with four-wheeler than boat!' We use a lot more gas with boats..... It takes just about seven gallons to get to Ocean Point, that's about 14 gallons round trip [by boat]. That's burning too much gas. Our four-wheelers in a round trip would only burn three gallons. I'm so concerned about burning gas, saving more gas, and getting better mileage with our four-wheelers. I said, 'The heck with that [boat hunting], we're going out with four-wheelers!' (SRB&A Nuiqsut Interview November 2018)

Increased access to roads allows some individuals—particularly those without overland forms of transportation such as snowmachines and four-wheelers—to hunt caribou throughout the year. However, residents must either harvest the caribou close to the road or have means to access them from the road. As shown in Figure 15, truck travel across all years has occurred year-round with somewhat higher levels of truck use in the summer months. In 2018, a greater percentage of use areas was accessed using truck during the summer and fall months of June through October.

Figure 15: Truck Use by Month, 2008-2018



Stephen R. Braund & Associates, 2020.

Caribou use areas by transportation method are shown on Map 16 through Map 19. Caribou use areas by travel method for previous study years are shown in Appendix E, Maps 6 through 9. Map 16 shows that in 2018 respondents traveled by boat primarily along the Colville River, with high overlaps occurring upriver to Ocean Point and Umiuraq (Sentinel Hill) areas and along the East Channel. Moderate overlaps occurred along the Nigliq Channel and lower Itqiliq River, and farther upriver toward the mouth of the Chandler River. Fewer overlapping use areas occurred along Fish Creek, the middle Colville Delta, Milugiaq and Qakimak rivers, the upper Itqiliq River, Chandler and Anaktuvuk rivers, the upper Colville River near Umiat, and in coastal areas. Boating use areas for 2018 are similar to those for previous years, but do not extend as far along the coast east or west of the Colville Delta, or as far along the Colville, Chandler, and Itqiliq rivers, as some previous years (Appendix E, Map 6).

In 2018, four-wheeler areas were generally located west of the Colville River near the community and to the northwest of the community along and extending from the Spur Road, CD5 road, and GMT1 road (Map 17). Four-wheeler travel extended as far as Fish Creek in the north and to the Kikiakrorak River in the south. A majority of four-wheeler use areas extended directly west from the community toward the Ublutuoch River, or to the north and northwest of the community along the road system. In earlier study years, areas of high overlapping four-wheeler use were generally limited to areas south of the CD5 and GMT1 road system and east of the Ublutuoch River. In 2018, respondents used the road system to access overland use areas to the south and north of the road as well as accessing areas off the end of the GMT1 road, thus expanding the area of high overlapping use accessed by four-wheeler. In 2018, four-wheeler activity (Map 17) was similar to previous years (2008-2017) in terms of extent (Appendix E, Map 7), but included greater overlapping use in areas farther toward Fish Creek and along the road system.



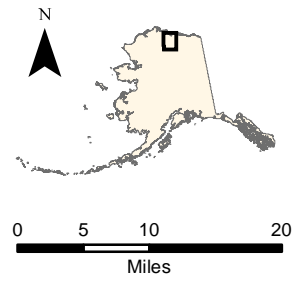
Map 16 - Method of Transportation to Caribou Use Areas, Boat, 2018

Year 11: November 2017 - October 2018

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 50 active harvesters in November 2018 and February 2019.

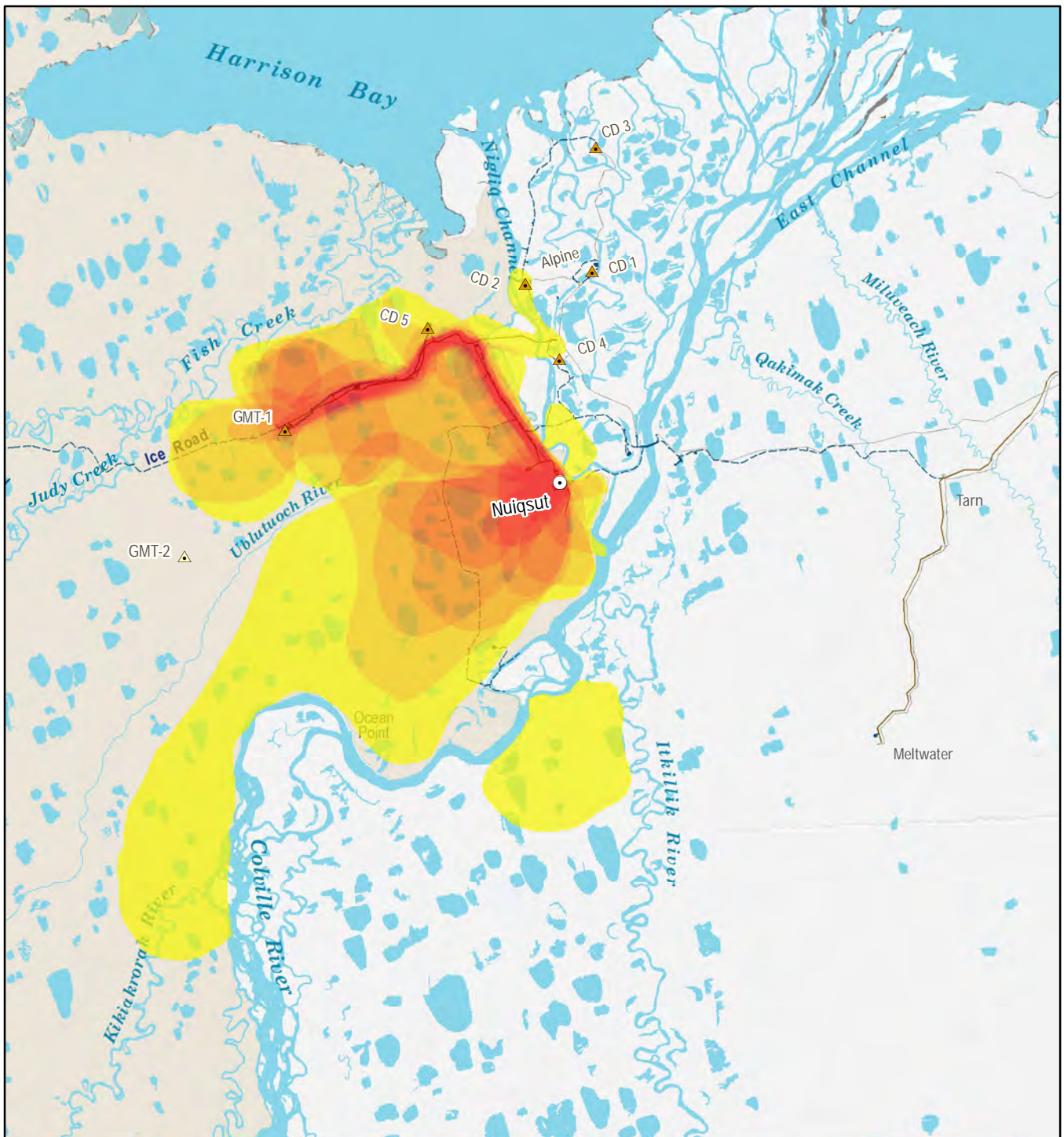
High 116 caribou areas used by 42 respondents
Low

Other areas may have been used for resource harvesting.



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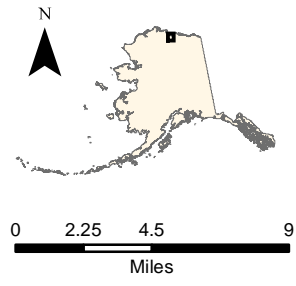
Map 17 - Method of Transportation to Caribou Use Areas, Four-Wheeler, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

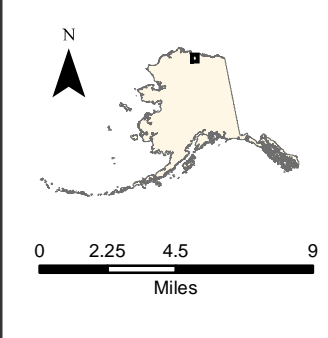
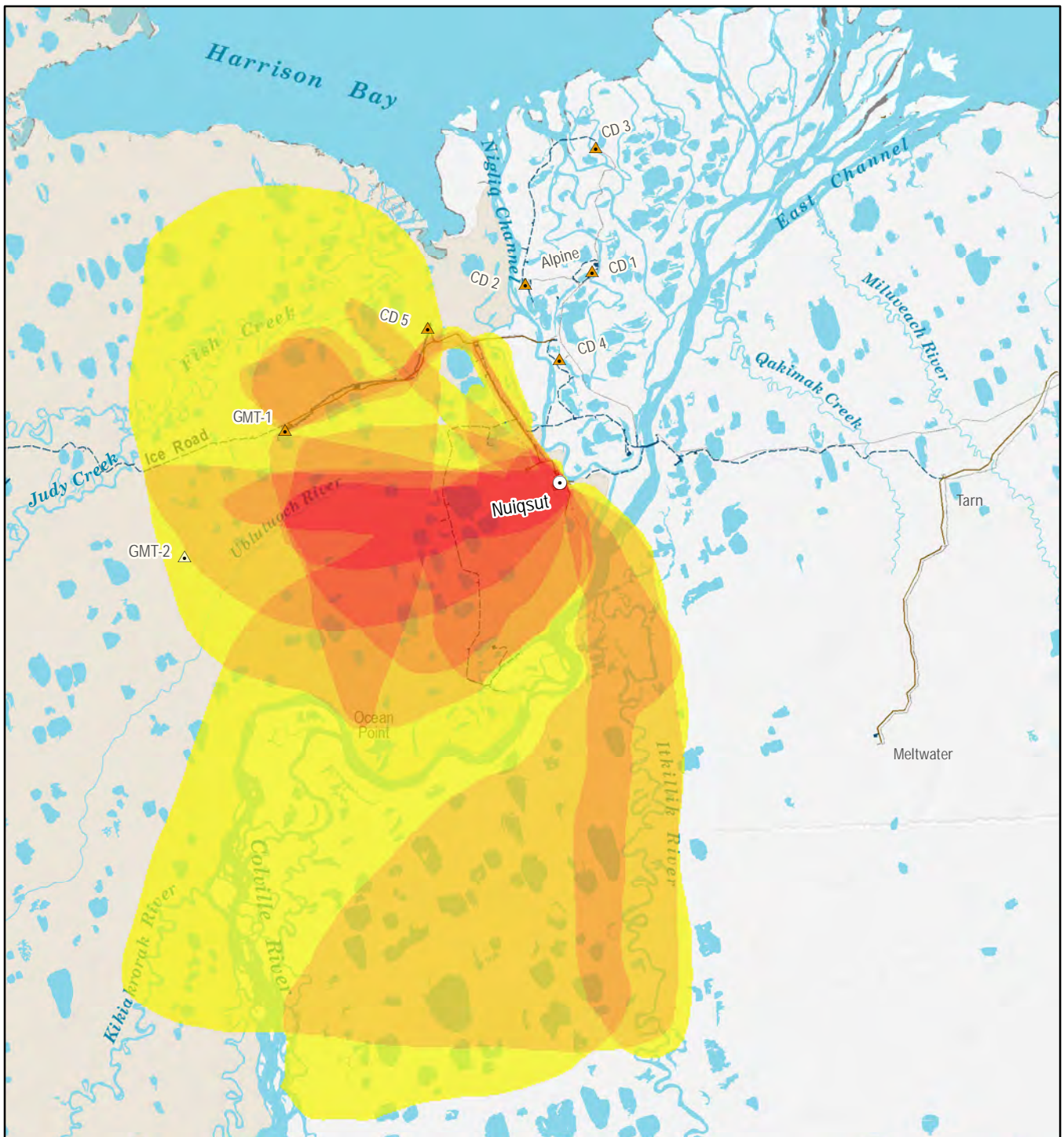
Year 11: November 2017 - October 2018

High 23 caribou areas used by 16 respondents
Low



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Map 18 - Method of Transportation to Caribou Use Areas, Snowmachine, 2018

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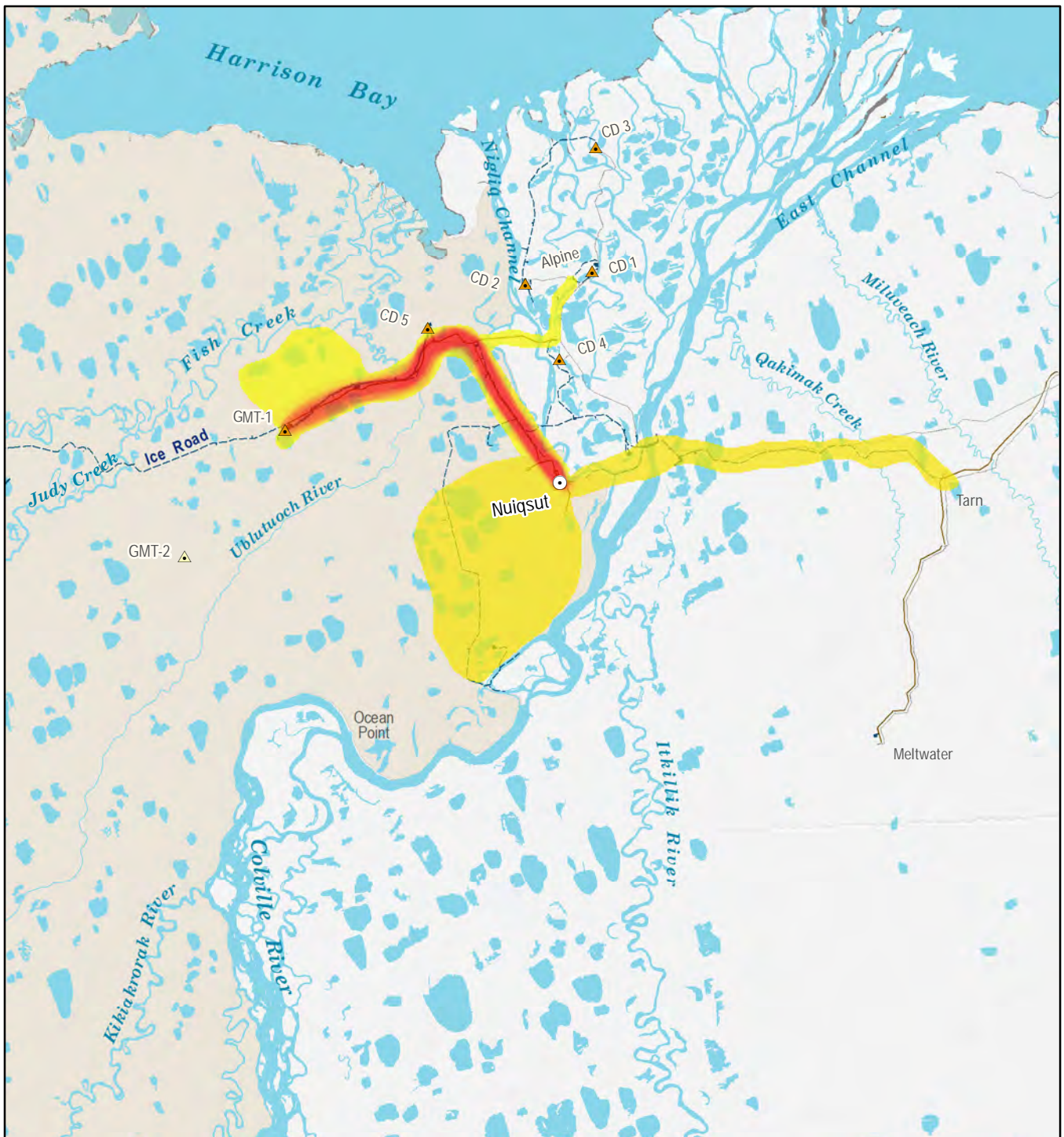
Other areas may have been used for resource harvesting.

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**Year 11: November 2017
 - October 2018**

High 16 caribou areas used by 9 respondents
Low


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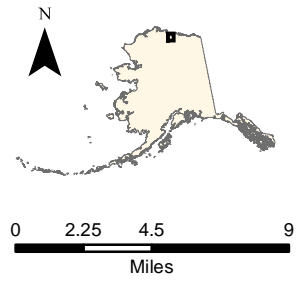
Map 19 - Method of Transportation to Caribou Use Areas, Truck, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

Year 11: November 2017 - October 2018

High 25 caribou areas used by 23 respondents
Low



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Compared to hunting by four-wheeler, snowmachine hunting generally occurs over a larger area and varies the most from year to year. During 2018, the area of snowmachine use was relatively similar to the area of four-wheeler use but with less focus along the road system. Snowmachine use areas of high overlapping use occurred directly to the west of the community to the Ublutuoch river (Map 18). Areas of moderate overlapping snowmachine use extended along the road system and farther west, northwest, and south of the community toward Fish Creek and surrounding Itqiliq River. Use areas extended directly south in an area between the Kikiakrorak River and Itqiliq River as well. In general, the extent of snowmachine use areas in 2018 compared to previous years (2008-2017) was much smaller than the extent of all previous years, but larger than some recent study years (Appendix E, Map 8).

As noted above, truck use by Nuiqsut caribou harvesters increased starting in 2015 due to construction of the Spur Road and subsequent construction of the Nigliq Channel bridge, road to CD5, and road to GMT1. In 2018, truck use areas were concentrated equally along the Spur Road, road to CD5, and road to GMT1. A small number of use areas were reported along the road system to CD1 and along ice roads east and south of the community (Map 19). Use of the CD5 and GMT1 roads was higher in 2018 than in previous study years. In previous years, respondents have reported use of other ice roads not present in 2018 (Appendix E, Map 9).

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. For example, 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

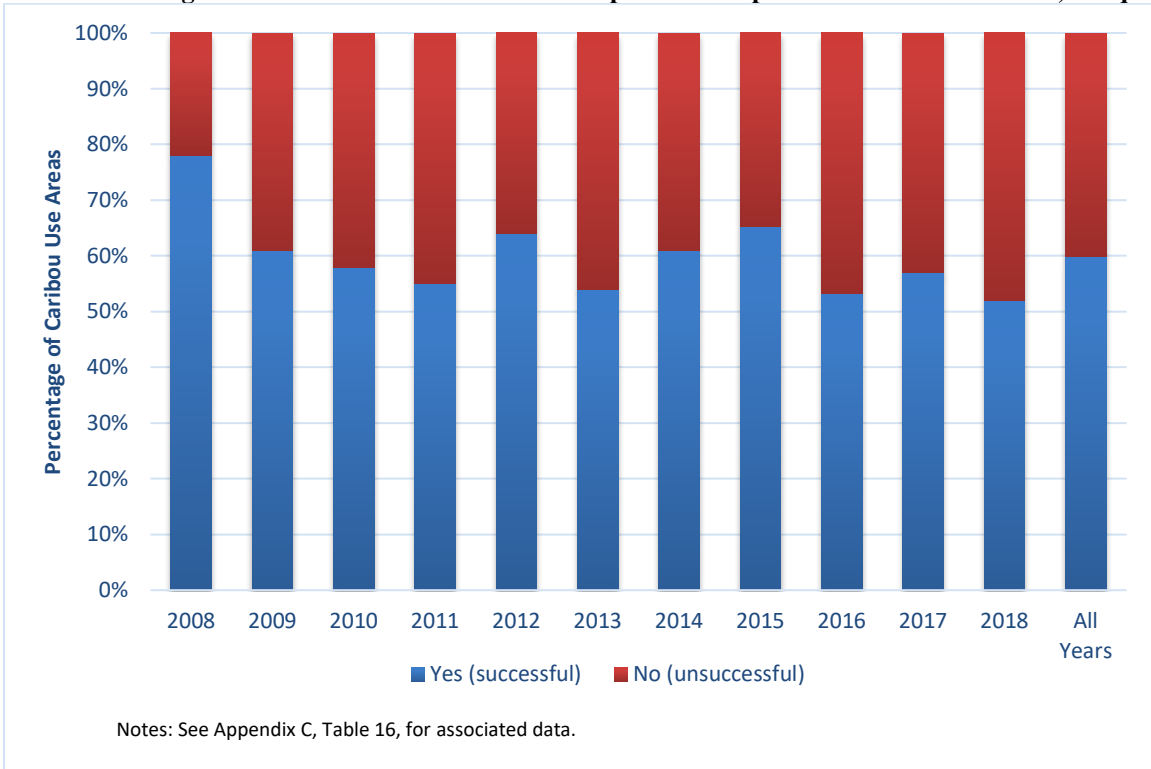
Figure 16 shows the percentage of caribou use areas in which respondents reported successful harvests. Over time, the percentage of use areas where respondents report successful harvests has declined slightly, from 78 percent of use areas successful in the 2008 to a low of 52 percent in 2018, with all other years ranging from 53 percent to 65 percent of areas successful. In 2018, the average number of caribou harvested per use area (1.4) and harvest location (1.7) was lower than most previous years with the exception of 2017 (Figure 17; Appendix C, Table 17). The mean number of caribou harvested per use area and harvest location peaked in 2008, 2014, and 2015, decreasing in 2017 and 2018 (Figure 17; Appendix C, Table 17).

In previous years, the average number of caribou harvested per use area ranged from 1.3 to 2.7, and the average number of caribou harvested per harvest location ranged from 1.6 to 2.3. There does not seem to be a direct correlation between the percentage of successful caribou use areas and other variables such as community harvest amounts or self-reported changes in harvest amounts (e.g., harvested more or less than the previous year). This could indicate that the data in Figure 17 are more likely to reflect caribou distribution or movement patterns in a given year (i.e., were the caribou more concentrated in a specific area or spread out across multiple use areas?), rather than overall harvest success.

A number of respondents discussed their hunting success in 2018, indicating that the distribution/availability of caribou within traditional hunting areas, in addition to hunting access, affected their success. Residents reported varying hunting success along the road system, with some indicating that the caribou were not available close to the road, and others reporting success after varying amounts of effort.

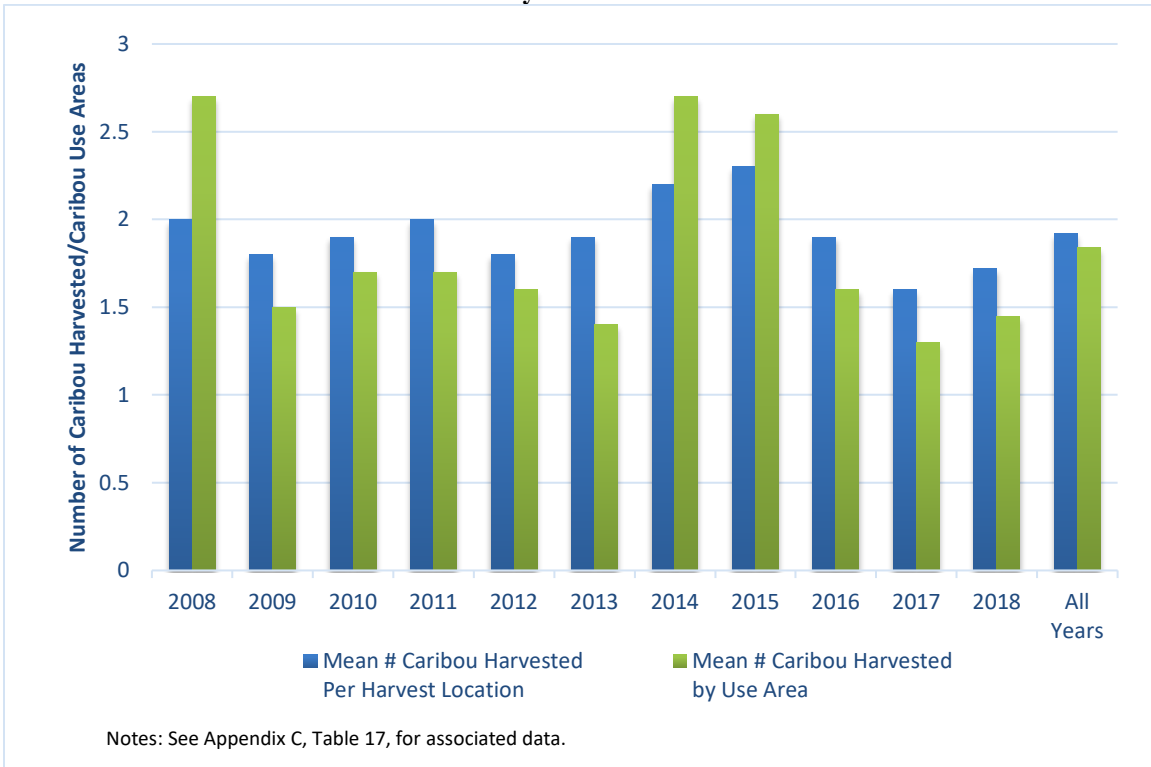
That was more close to the road, and the one I caught the year before was closer to the river... I got on there, then go on to GMT 1 road, I seen a few on the south side of GMT 1 road, but they were just too far. I hunted multiple times on that road, and on the Spur Road. (SRB&A Nuiqsut Interview November 2018)

Figure 16: Percentage of Caribou Use Areas in which Respondents Reported Successful Harvests, Nuiqsut



Stephen R. Braund & Associates, 2020.

Figure 17: Mean Number of Caribou Harvested by Use Area and Harvest Location



Stephen R. Braund & Associates, 2020.

I was right here [on the road], in my Jeep. And it was not too close, we were planning on if we saw one near the road, there is a hill somewhere around here, my son calls it Seven-mile [where we see caribou]... But ever since that road it is ghostly out there [to the west], we don't see them. But on the Alpine side we do still see them on that side. I don't know if it's because there is more lakes and ponds? Maybe beginning of September when it is starting to cool off [is when we went]. We just went out there once or twice. (SRB&A Nuiqsut Interview November 2018)

Then after that, I got my next three caribous on the gravel road... No, that was with my truck. That was October 3. And that took me a week to find them and finally spot caribou. So basically I drove out there until I hit the right day. I knew that I was going to spot something sometime. But it took me that long to spot something. (SRB&A Nuiqsut Interview November 2018)

At least 30 times [on the road], yeah. Nine or 10 of them I was unsuccessful. We were going out just to go for a ride and see nothing. (SRB&A Nuiqsut Interview November 2018)

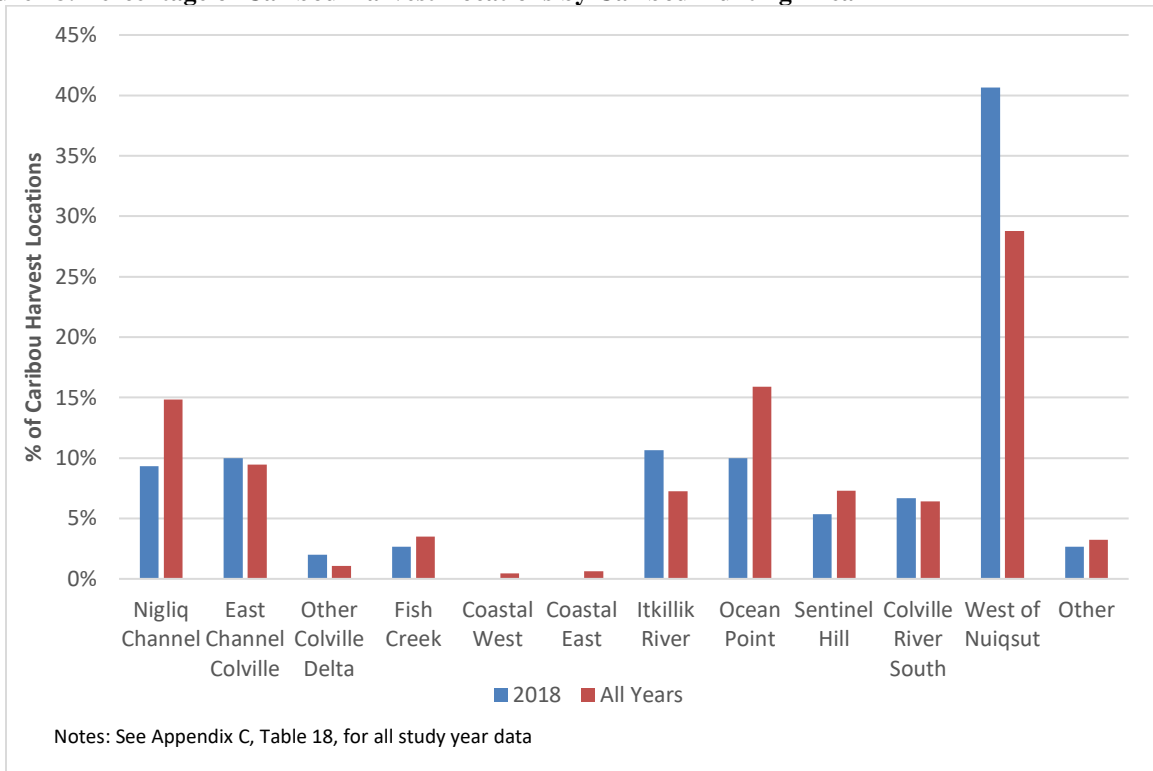
Others believed that development infrastructure or activities had affected their caribou hunting success in 2018. One respondent reported spotting for caribou along the road system but noted that the presence of oil field infrastructure made it difficult to harvest those caribou that were available near the road:

Off the Spur Road I got a little bit of geese but that was it. I tried to [get caribou] but they were too close to the oilfield so I didn't. That's kind of hard to say what time. I would say July. That was out of my truck. I went on that road a lot. At least thirty times I would say. Probably throughout the whole summer [starting in June through August]. Day trips. The caribou were too far, I wasn't going to haul that far. Or there were areas where it was too close for comfort to shoot [to the oil structures]. (SRB&A Nuiqsut Interview November 2018)

In contrast to the comments above, a number of respondents reported good success rates in 2018 and described frequent encounters with small herds of caribou from which they harvested. One respondent said, "Man, I had a good year" (SRB&A Nuiqsut Interview November 2018).

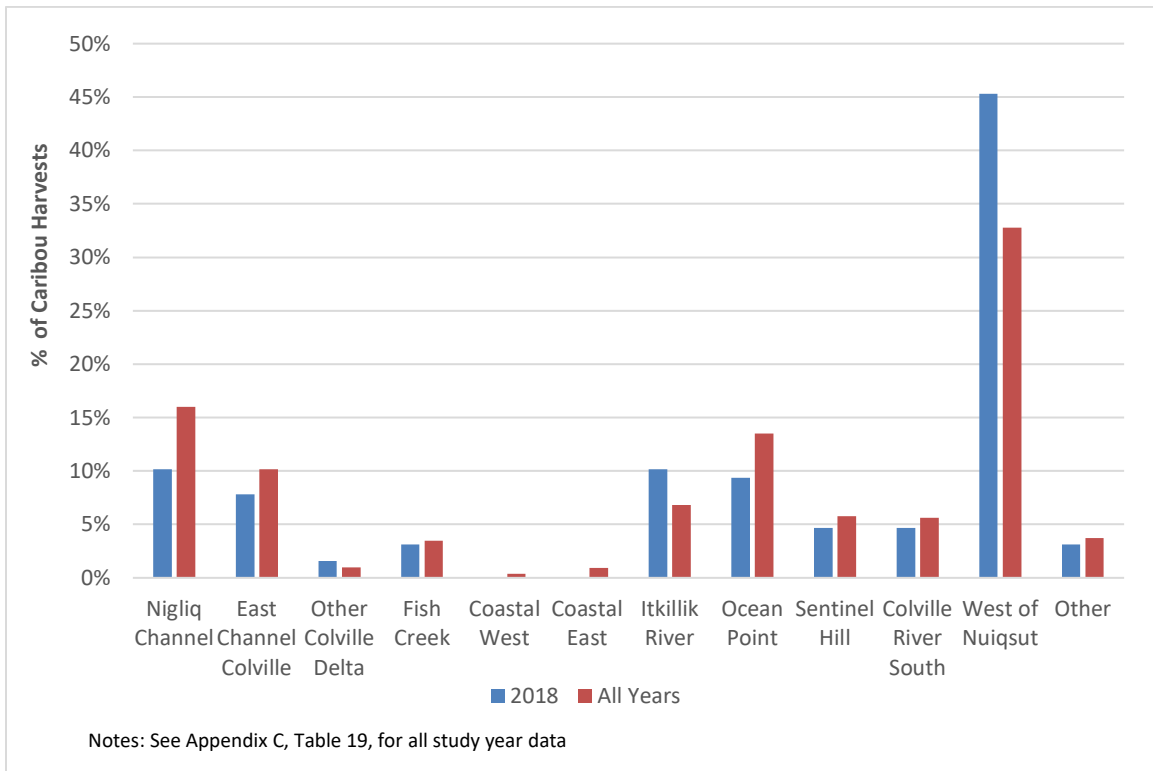
Figure 18 through Figure 22 report various measures of success, including percentage of caribou harvest locations, percentage of caribou harvested, percentage of successful use areas, and average number of trips per harvested caribou, by 12 caribou hunting areas for the 2018 study year and on average across all study years (see Appendix C, Tables 18 through 22 for individual study year data). 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); the defined areas were reviewed by the Nuiqsut Caribou Panel for accuracy and appropriateness (see Map 8). The Coastal West area (Area 5) 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 five percent of the harvest (Figure 18; Appendix C, Table 19). Areas along the Colville River upriver from the community (Ocean Point, Sentinel Hill, Colville River South, Itqiliq River), have generally provided between two and 15 percent of the harvest, with Ocean Point accounting for less of the harvest over time, and Itqiliq River providing for more of the harvest over time. In 2018, Itqiliq River accounted for more of the harvest (10 percent) than Ocean Point (nine percent) (Figure 19).

Figure 18: Percentage of Caribou Harvest Locations by Caribou Hunting Area



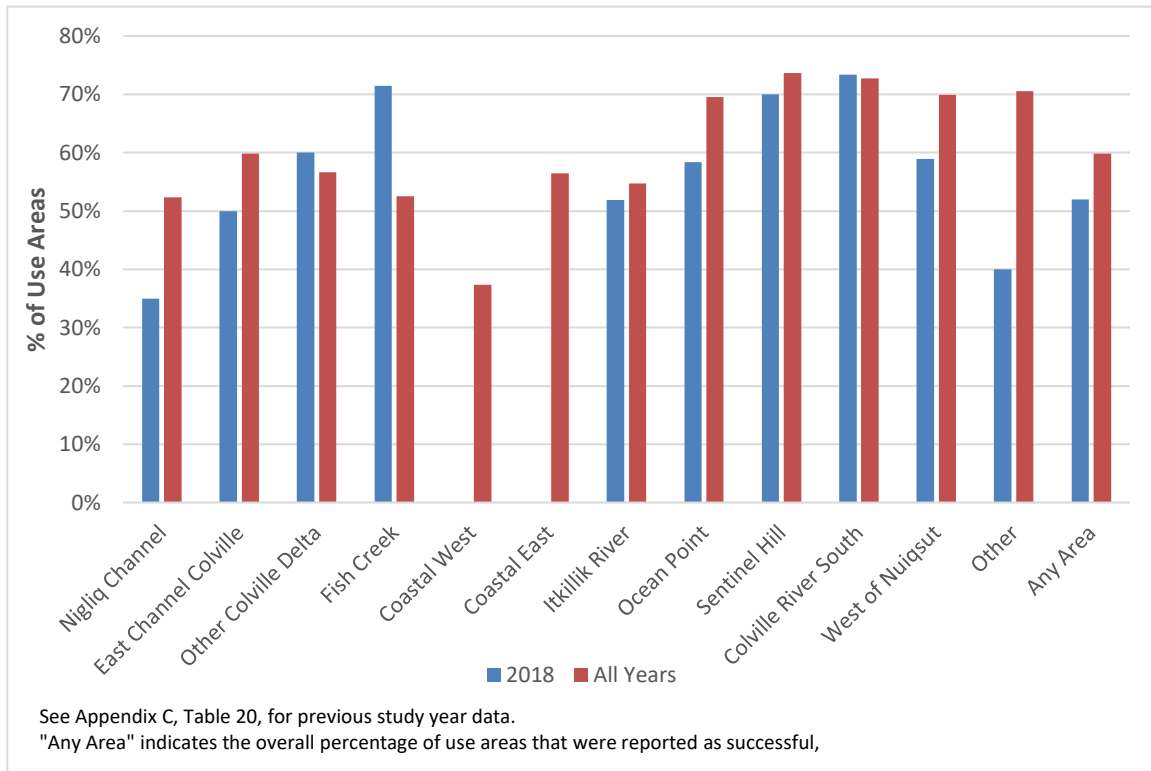
Stephen R. Braund & Associates, 2020.

Figure 19: Percentage of Caribou Harvests by Caribou Hunting Area



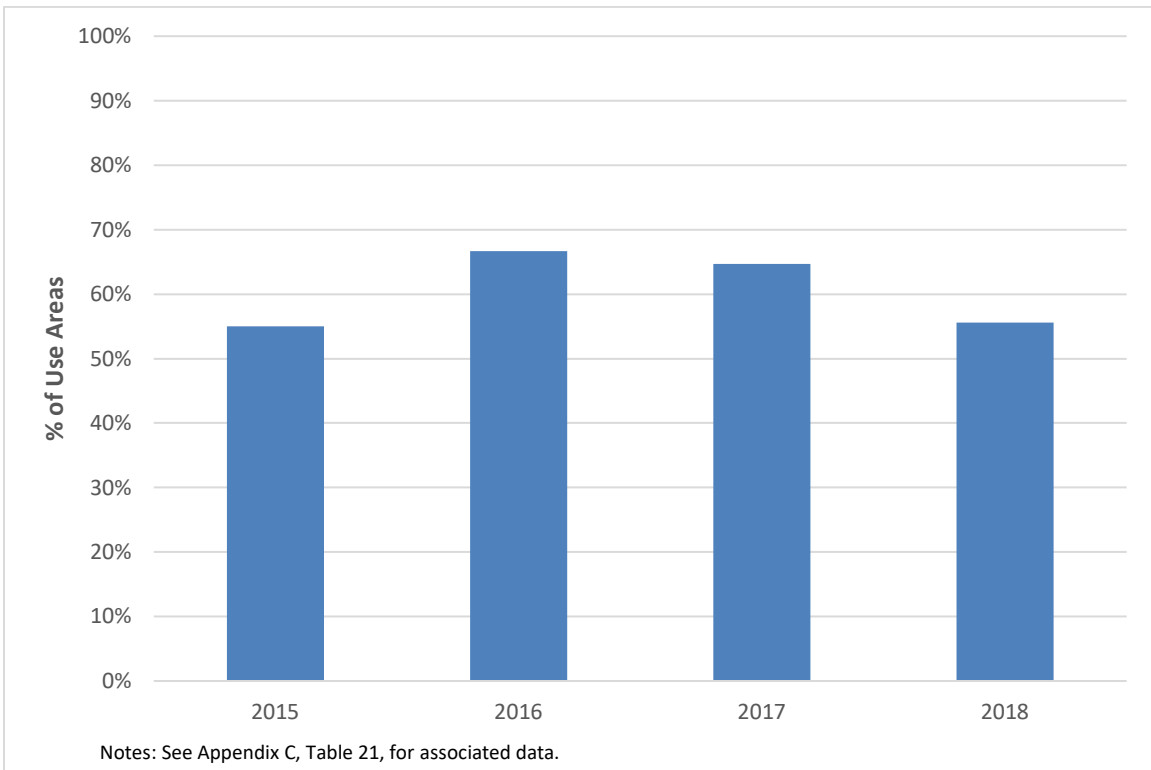
Stephen R. Braund & Associates, 2020.

Figure 20: Percentage of Successful Use Areas by Hunting Area



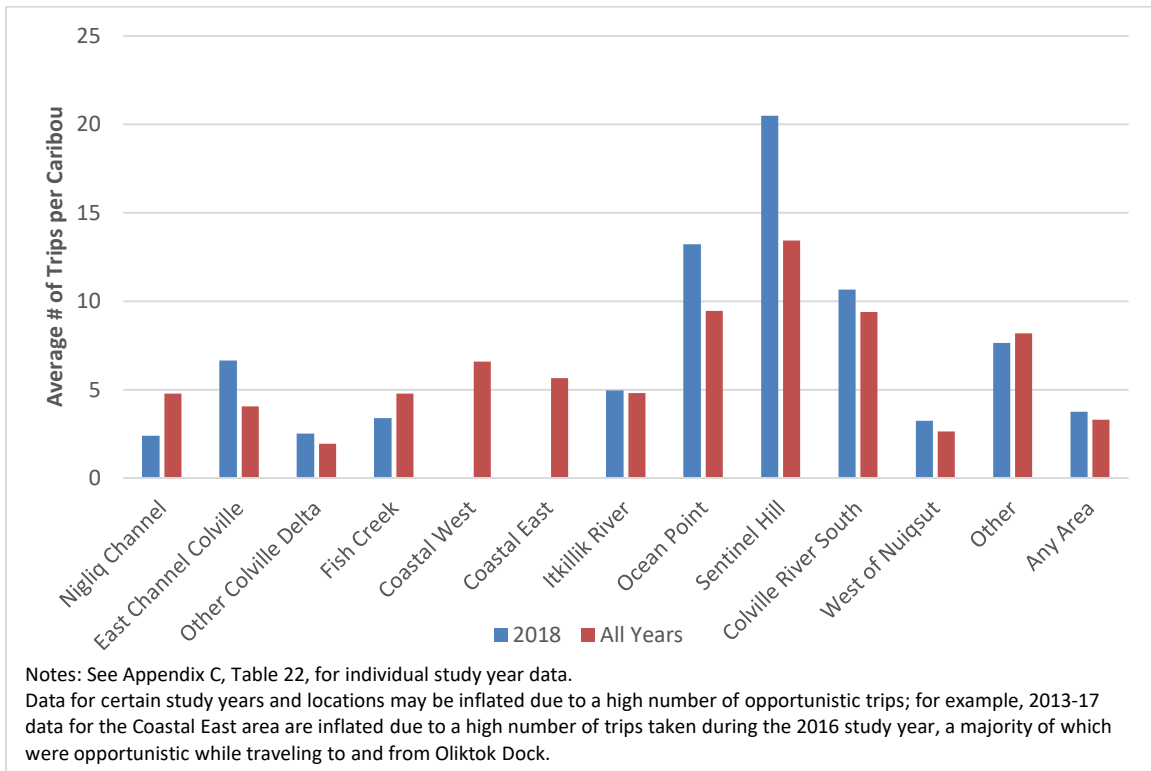
Stephen R. Braund & Associates, 2020.

Figure 21: Percentage of Successful Use Areas Along Roads



Stephen R. Braund & Associates, 2020.

Figure 22: Average Number of Trips Per Caribou Harvested by Hunting Area



Stephen R. Braund & Associates, 2020.

Another area that has shown decreased harvest contribution over time is Nigliq Channel. The Itqiliq River area and area West of Nuiqsut are the primary areas that have shown an increase in harvest contribution over time. The area West of Nuiqsut accounted for 18 and 17 percent of the harvest in 2008 and 2009, respectively, to a high of 45 percent in 2018; all other study years ranged from 27 percent to 43 percent. Figure 19 shows that during 2018 the area West of Nuiqsut (Area 11) accounted for the highest portion of caribou harvested at 45 percent, on the high end of previous years. 2018 was the first full year that the GMT1 road was in place, which may explain the increase in use of the area West of Nuiqsut during that time period. The area West of Nuiqsut was the only area contributing more than 15 percent of the harvest in 2018. Itqiliq River and Nigliq Channel both accounted for 10 percent of the harvest, the Ocean Point area accounted for nine percent of the harvest, and East Channel area accounted for eight percent.

In terms of the percentage of successful use areas attributed to each hunting area (Figure 20), the Sentinel Hill area has had the greatest percentage of successful use areas, on average, followed by the Colville River South area, “Other” areas, and the area West of Nuiqsut. Areas with the lowest percentage of successful use areas include the Coastal West area, Fish creek, and Nigliq Channel. Road accessed areas show success rates, in terms of percentage of successful use areas, within the range of other hunting areas (Figure 21). In 2018, the Colville River South area had the greatest percentage of use areas which were reported as successful, followed by Fish Creek, Sentinel Hill, and Other Colville Delta. These success rates are influenced by the number of use areas reported in each area and the nature of hunting activities in those areas. For example, while the Fish Creek area and Other Colville Delta areas show a high rate of success in 2018, these success rates are based on a small number of reported use areas. Other areas may be visited more often and in combination with other activities.

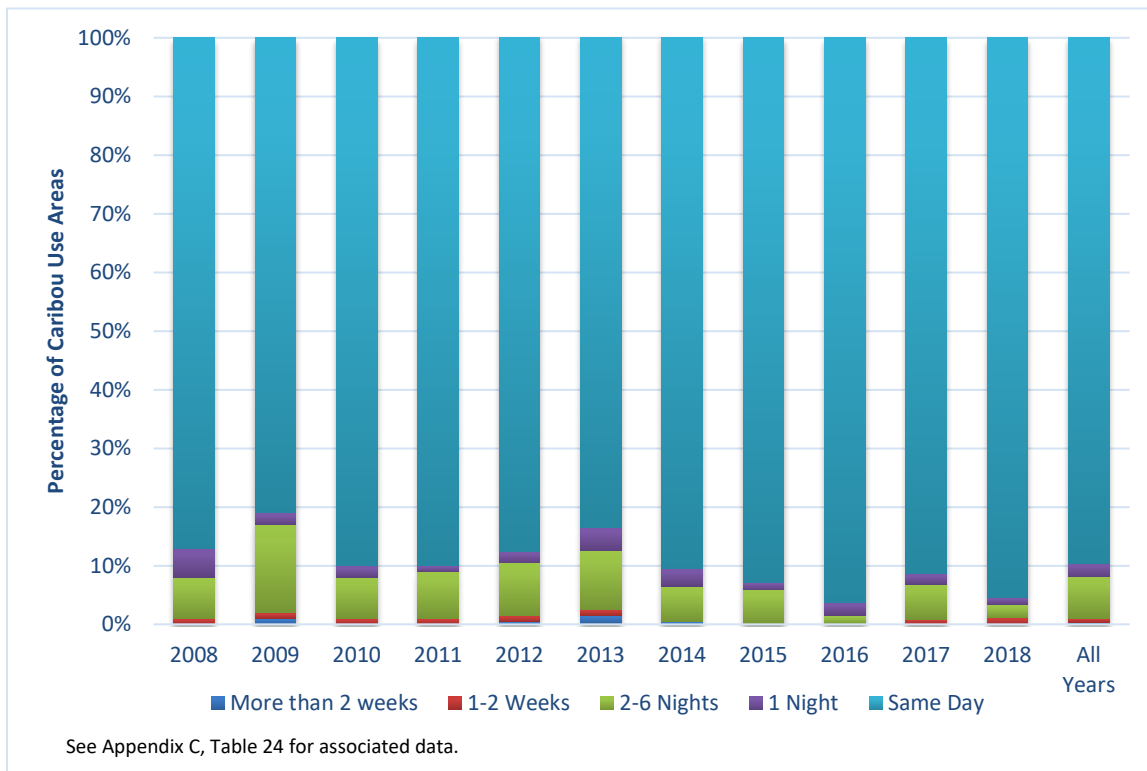
Another measure of success is the average number of trips taken per caribou harvested within each hunting area. As shown in Figure 22, Sentinel Hill shows the highest average number of trips taken per caribou,

followed by Ocean Point, and Colville River South. The areas with the lowest numbers of trips taken per caribou include the Other Colville Delta, area West of Nuiqsut, and East Channel Colville.

Duration of Trips

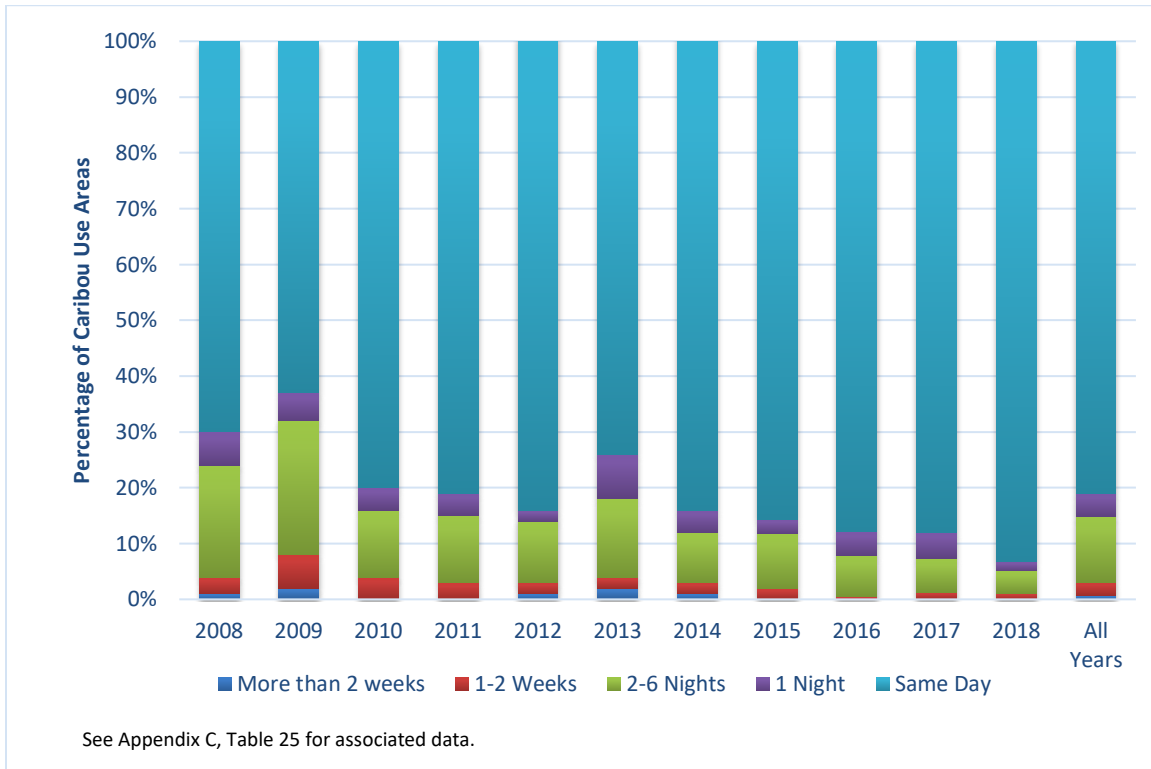
The typical duration of caribou hunting trips has maintained a similar pattern across all study years. Residents typically take day trips to over 80 percent of their caribou hunting areas (Figure 23). The percentage of use areas typically visited during same day trips has risen slightly over time, from 81 and 90 percent in the first six years of the study to between 91 and 96 percent in subsequent years (Appendix C, Table 24). In 2018, the longest trips residents took lasted two to six nights at four percent of use areas; 1 night at two percent of use areas; and one to two weeks at one percent of use areas (Figure 24). In some cases, residents stayed at camps, such as Nigliq Camp, at various times throughout the summer months, returning to the community regularly for work or personal reasons or to stock up on supplies before returning to camp. No caribou hunting trips in 2018 lasted over two weeks, similar to many previous years. At 93 percent of use areas, residents did not take any overnight trips (Figure 24). In general, the data indicate an increasing trend of same day trips, rather than overnight hunting trips, which were more commonly reported in the early years of the study (2008-2013). In 2008 and 2009, respondents reported at least one extended/overnight trip to 37 to 40 percent of use areas, compared to between 7 and 26 percent in Years 2010 through 2018 (Appendix C, Table 25).

Figure 23: Caribou Hunting Typical Trip Duration



Stephen R. Braund & Associates, 2020.

Figure 24: Caribou Hunting Longest Trip Duration



Stephen R. Braund & Associates, 2020.

According to respondents, camping is usually reserved for longer upriver trips, particularly during moose hunting season, or for longer stays at fish camps such as the camp at Nigliq. Residents often hunt caribou as available during these extended trips:

Usually I would end up in Umiat. August. Sporadically June and July. That is where we spent the night, right here (by Umiat) and we went to here but this is where we caught the—My focus was the moose.... The longest I stayed was maybe three days to the south of Umiat. (SRB&A Nuiqsut Interview November 2018)

We went all the way past between Umiat and Umiuraq. Between that. We went farther upriver for moose but we didn't catch any moose. We were looking for caribou during that time. We went passed Umiat. Maybe we went ten miles past [Umiat]. We went up Chandler. I don't know if we went up Anaktuvuk River. We didn't go too far because it was too shallow. Maybe five miles... [We went upriver in] June and July. And then August. I can't remember into September. [We went there] probably a dozen times. Yes [we camped] twice up there but my husband went again. I went out twice and my husband went three times. They were two- to three-day trips. (SRB&A Nuiqsut Interview November 2018)

While this study 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; the hours spent searching for caribou has not been documented in this study. 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.”

Work and personal commitments are often cited as a reason for taking primarily day trips. Several residents described the length of their hunting trips in 2018 as follows:

We just made two trips and then we went out for moose on another trip. If we had seen caribou we would have caught them but we didn't see any... They were day trips. We were going to go camping on our moose trip but our motor started breaking so we turned home. It was a 21-hour boat ride. (SRB&A Nuiqsut Interview November 2018)

Day trips, I never did spend the night out there this year, to be honest. I never even went moose hunting, I was too busy with work. (SRB&A Nuiqsut Interview February 2019)

[Just] a day! You go home, then you go back down, then you get a cigarette, you go to the store, you go back down. That was in July. There is caribou in July. Well, I bring my tent along, then I put my tent and I wait for caribou. But I don't spend the night. (SRB&A Nuiqsut Interview November 2018)

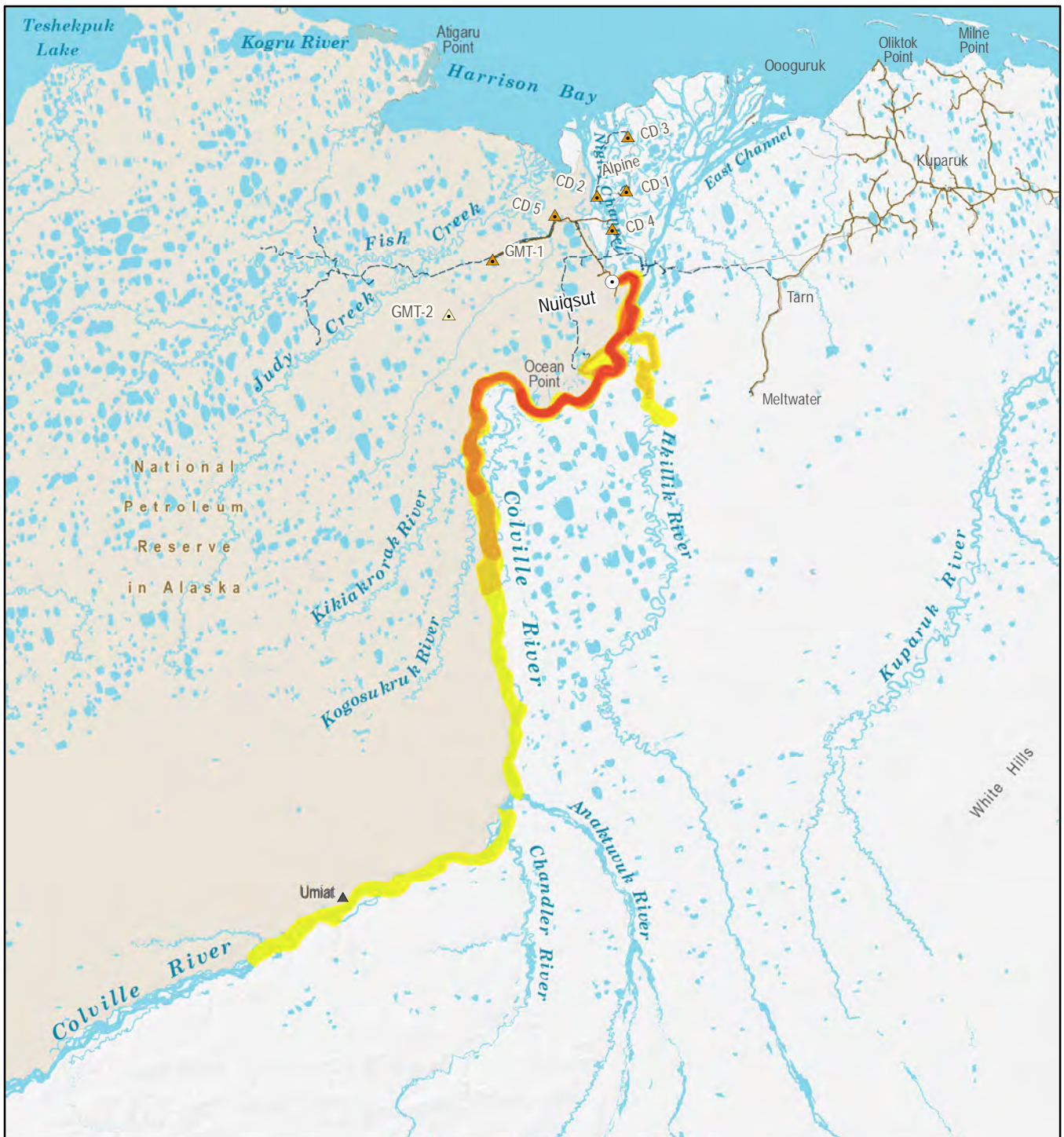
Map 20 depicts use areas where respondents reported staying for one or more nights in 2018, and Map 21 depicts use areas where respondents reported taking same day trips. The red areas depict higher number of overlapping use areas on each map and do not reflect differences in trip length. As shown in Map 20, in 2018, respondents reported taking overnight trips when traveling upriver by boat from the community toward Sentinel Hill; this is evident by the higher number of overlapping use areas compared to other areas. Unlike previous years, no overnight trips were reported along the Nigliq Channel. Same day trips (shown on Map 21) more commonly occurred in overland areas, along the road system, and in boating areas easily accessible from the community (e.g., Nigliq Channel, East Channel, Colville River Delta, and Itqiliq River).

In general, resource availability, distance from the community, power and efficiency of transportation equipment (e.g., jet outboard versus propeller outboard motor), harvest season, time and work commitments, money available for fuel, and associated subsistence activities are the primary factors that determine trip duration.

Frequency of Trips

Across all study years, respondents have reported visiting over 50 percent of use areas between one and three times annually, and between 40 and 50 percent of use areas four or more times annually (Figure 25; Appendix C, Table 26). Over time, the percentage of use areas visited one time rose slightly, from between 18 and 24 percent during the first four study years, to between 21 and 33 percent during the remaining study years. The percentage of use areas visited more than 20 times has remained relatively stable over time with a slight decrease in 2018 compared to recent years. Overall, 2018 responses were within the range of all previous study years for each trip frequency category (Appendix C, Table 26).

Figure 26 through Figure 28 shows the average number of trips reported by harvesters in each hunting area (see Map 8), in addition to the percentage of trips taken to these areas as well as along the road system. The study team assigned each use area polygon to an associated hunting area, in addition to indicating whether the use area occurred along roads, and therefore was able to query the number of trips by each area. The data show that across all study years, respondents have taken the greatest number of trips, on average, to the Ocean Point area, followed by the area West of Nuiqsut, Nigliq Channel, and Sentinel Hill (Figure 26 and Figure 27). In 2018, residents took the greatest number of trips, on average, to the area West of Nuiqsut; the number of trips to this area has risen over time, as has the number of trips to the Itqiliq River area (Figure 26; Appendix C, Table 29). The number and percentage of trips to Nigliq Channel dropped substantially from previous study years.



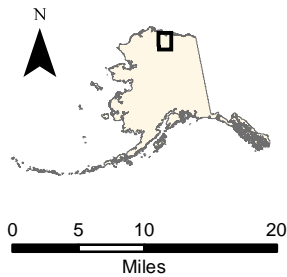
Map 20 - Duration of Trip to Caribou Subsistence Use Areas, One or More Nights, 2018

Year 11: November 2017 - October 2018


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 50 active harvesters in November 2018 and February 2019.

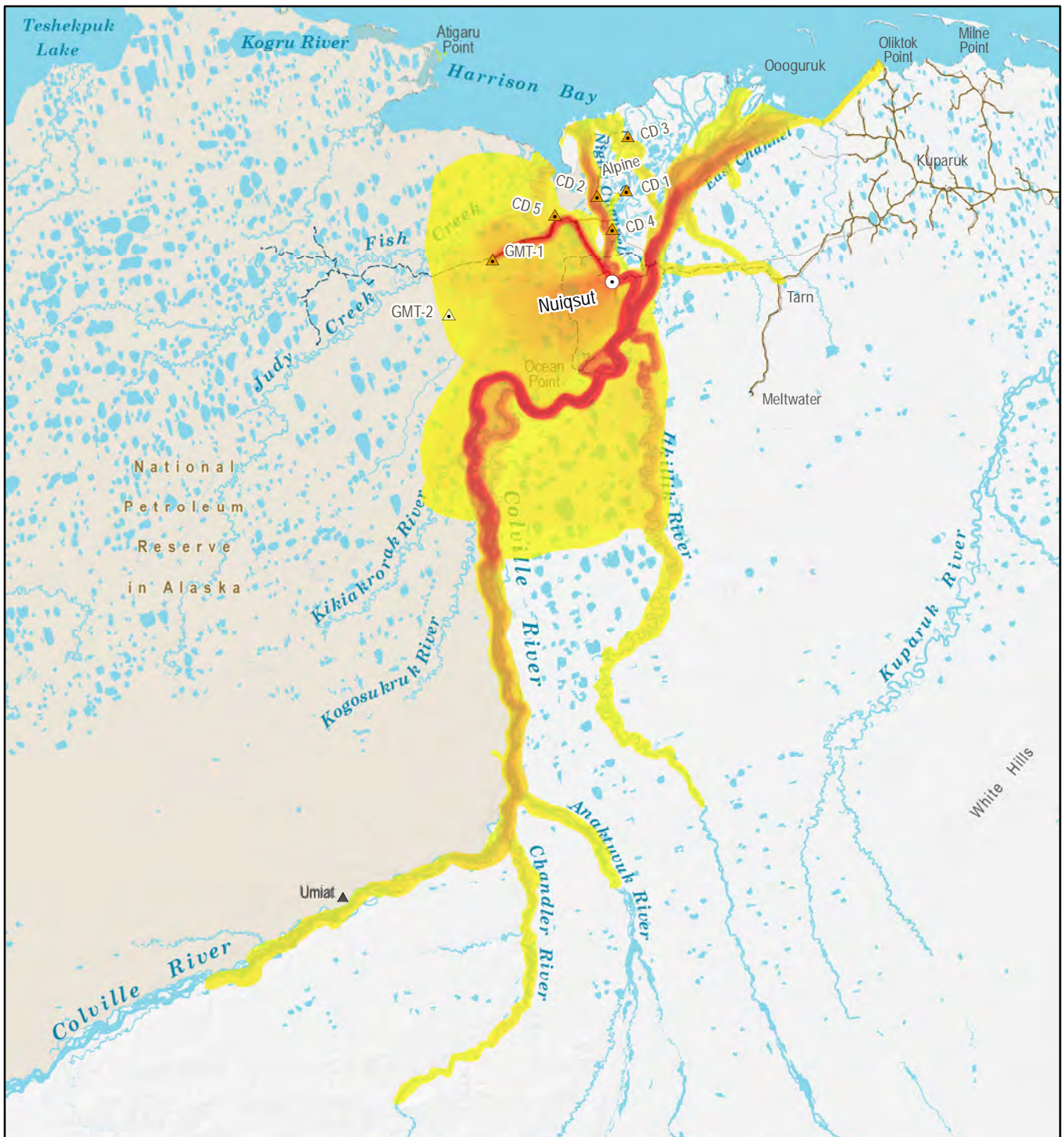
High 8 caribou areas used by 8 respondents
Low

Other areas may have been used for resource harvesting.



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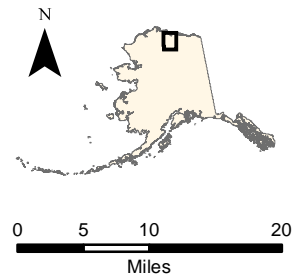
Map 21 - Duration of Trip to Caribou Subsistence Use Areas, Same Day, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

**Year 11: November 2017
- October 2018**

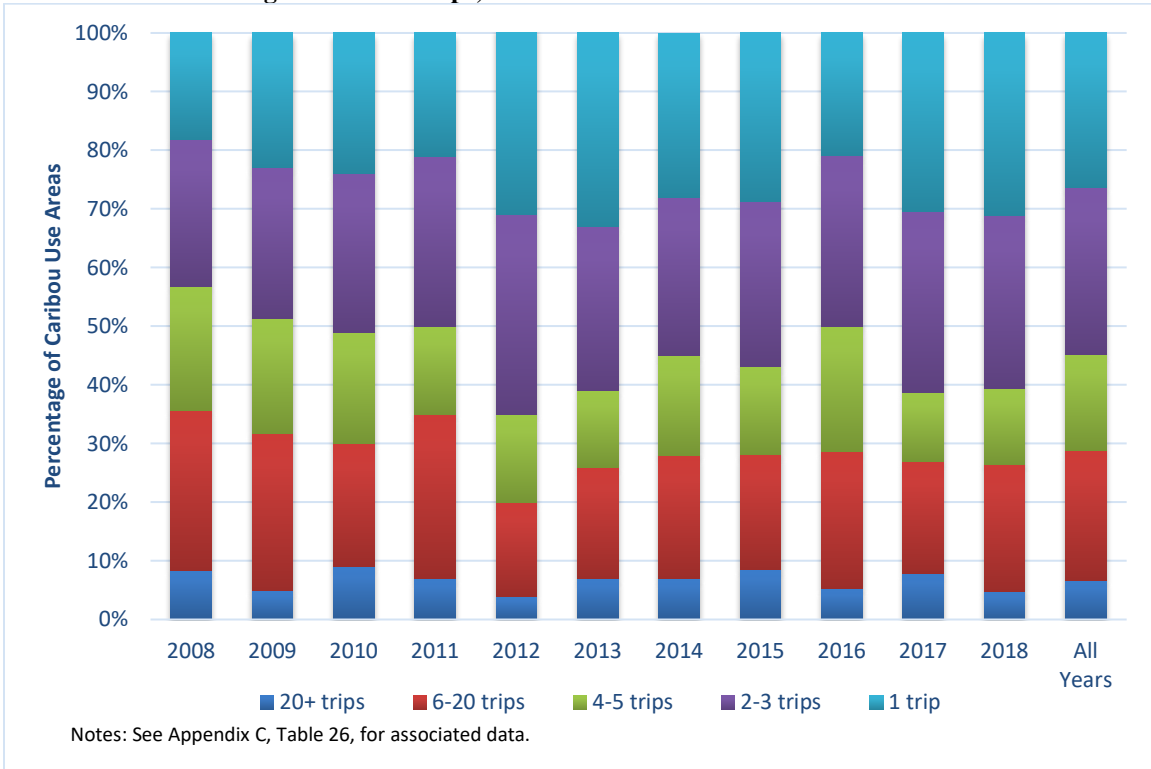
High 168 caribou areas used by 50 respondents
Low



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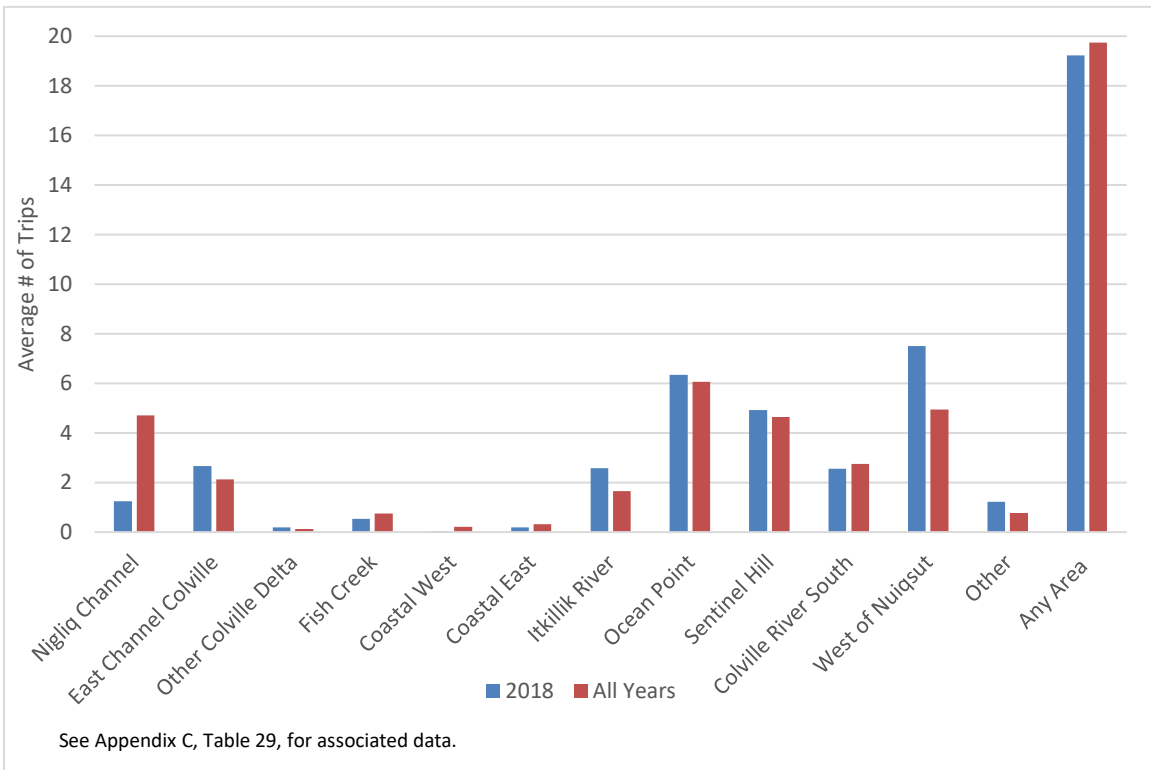

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Figure 25: Caribou Hunting Number of Trips, 2008-2018



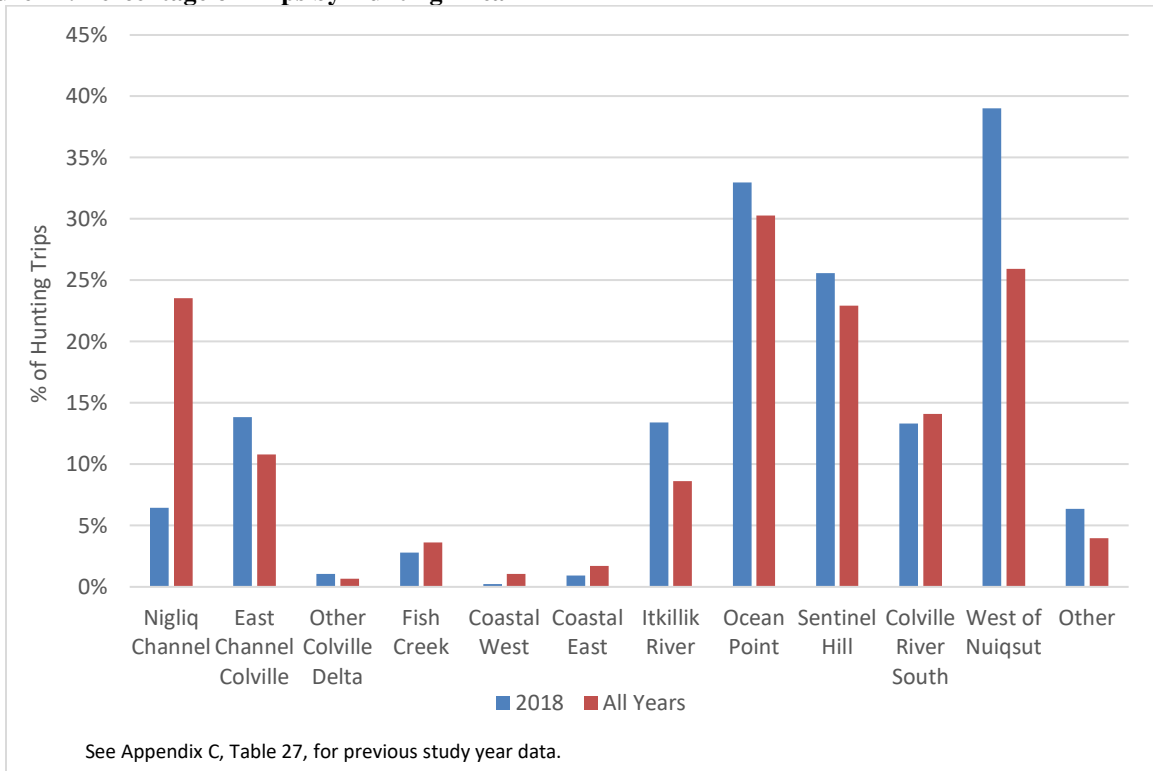
Stephen R. Braund & Associates, 2020.

Figure 26: Average Number of Trips Reported by Harvester



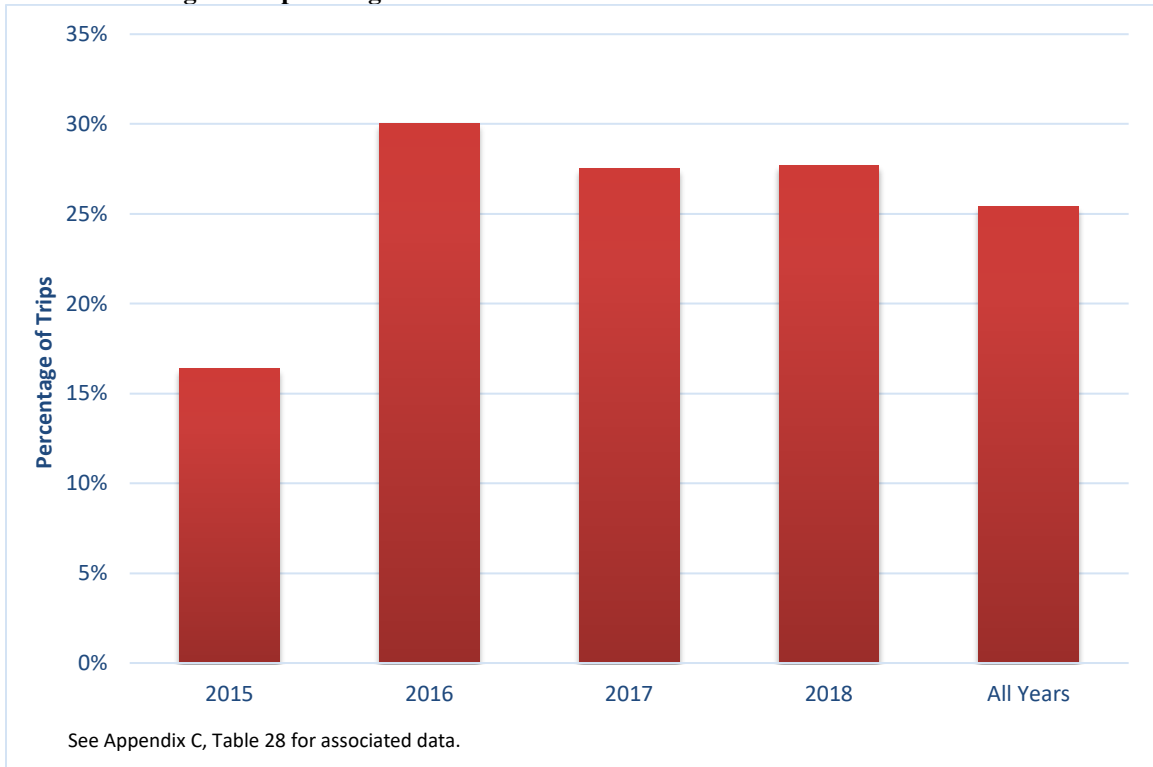
Stephen R. Braund & Associates, 2020.

Figure 27: Percentage of Trips by Hunting Area



Stephen R. Braund & Associates, 2020.

Figure 28: Percentage of Trips Along Roads



Stephen R. Braund & Associates, 2020.

Across all available study years, an average of one-quarter of trips have been taken along the road system since construction of the Spur Road, and this percentage was slightly higher in 2018, which was the first full year the GMT1 road was in place (Figure 28).

Use areas visited multiple times—particularly those visited more than 20 times—are typically those which are easily accessible or those which are used for multiple purposes. Thus, residents frequently reported taking multiple hunting trips along the local road system including the Spur Road and road to CD5 and GMT1. Respondents frequently characterize such hunting trips as “going for a ride” while spotting for caribou, as these trips do not require the amount of preparation and investment as boat or overland hunting trips.

We were going all the time. Just to June ‘til October is when my truck broke down. At least three. At least a dozen, a few times a month sometimes. Yeah, I have a big family. It’s cheaper than buying at the store. Maybe 10. I averaged about three [per week] I’d say. Three [caribou] a week. [In total], 10 or so. Yeah, [50 trips] for two caribous [laughs]. Well, it’s good to get out of the house. I also like the ride. So, it is a two-for-one. (SRB&A Nuiqsut Interview November 2018)

I went on the Spur Road. I caught one, two, three... Three on the Spur Road with a car. The GMT1 road is where I got two big bulls... Yeah, the end of August, because my dad was out whaling. A lot, we are bored of cruising in town, other times we go on the Spur Road, I went on there countless times, that was all summer [June through September]. Maybe once a week. Near the end of the summer, I would go out three or four times. (SRB&A Nuiqsut Interview November 2018)

[I went hunting] 15 to 20 times I think, [always in a vehicle]... About twice a month, every month. And sometimes I’m going out there twice in a day. [It’s] just easier [on the road], it’s a day trip, I could bring my family with me. (SRB&A Nuiqsut Interview November 2018)

I’d say I just went out there [road] occasionally for a drive, if our freezer was half empty we would choose to get one or not. [That hunting was] just the month of July, I’d say once a week. Yeah, once a week. Uh huh, just day drives... I think about four times by car. (SRB&A Nuiqsut Interview November 2018)

Residents also reported taking trips along the Nigliq Channel when traveling to and from the ocean, or to and from the fish camp at Nigliq, searching for caribou along the way. Other areas which are more easily accessible include those located somewhat closer to the community, such as four-wheeler areas West of Nuiqsut or upriver areas to Itqiliq River, Puviqsuq, or Ocean Point. Areas which require greater preparation or which are more difficult to access, such as Fish Creek or the upper Colville River, are generally visited less frequently, with some exceptions. The following respondents described their frequency of hunting trips along the river system and in overland areas in 2018:

I never go on the road, but I went out on a four-wheeler out here this way [west of Nuiqsut]. This was July. We got four bulls. The whole month of July, every day. Because we couldn’t catch up to the caribou, they would run off. I’d say about 20 trips. (SRB&A Nuiqsut Interview November 2018)

We went up there [upriver] all summer. Like I said, we got an inboard and we were always on those rivers. Quite a few times, 30 to 38 times. No [camping], just day trips. (SRB&A Nuiqsut Interview November 2018)

Last year I traveled 560 miles, that doesn’t include the trip all the way to Umiat, I couldn’t really tell you how many times I went up there – that was all summer. [Other respondent

estimates 20 times]—that's what I'm thinking. Right after breakup, yeah [June until] September. (SRB&A Nuiqsut Interview November 2018)

Every time I am going to the ocean, then I am looking out for caribou. So basically all summer if we go do our ocean hunting and then we see nothing, we come home and we are looking for a caribou. (SRB&A Nuiqsut Interview November 2018)

In addition to distance from community, other factors that affect the frequency of trips to a use area include availability of time, money, and equipment; need for and availability of caribou; and weather conditions:

Oh, I think somewhere during June and July. It was about three times; once in June and twice in July, I believe. Yeah, just day trips... No, I didn't see any caribou this way [north of Qitik]. I usually go upriver all summer long, but we hardly seen any [caribou], so we just went up just a few times. (SRB&A Nuiqsut Interview November 2018)

[I went] about two or three times. The third time we had outboard problems. We barely made it back. Bad gas. Just day trips... I only went out three times. (SRB&A Nuiqsut Interview November 2018)

[We hunted] the whole month of July, every day, because we couldn't catch up to the caribou—they would run off. I'd say about 20 trips. (SRB&A Nuiqsut Interview November 2018)

Herd Characteristics

As discussed in Prichard et al. (2018), the primary herds that occur within the Colville River drainage are the Teshekpuk Herd (TH) and Central Arctic Herd (CAH). The Colville River Delta is generally on the eastern periphery of the TH and the western periphery of the CAH. The TH caribou winter on the coastal plain, usually to the west of the Colville River, while the CAH generally winters south of the Brooks Range (outside of Nuiqsut's general hunting area), which explains the focus of winter hunting to the west and southwest of the community. In some recent years, TH caribou have wintered farther to the south and east of the community (Prichard et al. 2018). Both the TH and CAH populations grew steadily until around 2010, after which both herds experienced a substantial decline. Surveys after 2015 have since shown a modest increase in the TH and CAH populations. VHF, Satellite, and GPS collar data show that the Colville River Delta primarily sees caribou from the CAH, whereas the area west of the Colville River (and community) primarily sees TH caribou. However, both herds sometimes travel to the west and east of the Colville River.

The timing of the caribou hunt in Nuiqsut generally coincides with the primary movements of both herds into the area. Winter (December through April) is spent hunting TH caribou in their wintering grounds to the west and southwest of the community, although hunters have often indicated over the course of the monitoring study that the herd is farther west than they want to travel. Limited caribou hunting occurs during the spring (May and early June) when the caribou are migrating to calving grounds west and east of the delta; community members are generally busy hunting geese at this time. In addition, travel conditions are sometimes a limiting factor in the spring due to melting snow and inaccessible rivers. During the mosquito season (late June through early July), the caribou from the two herds move to coastal areas to the west and east of the community, with some CAH caribou traveling into the delta where residents hunt them by boat; when available, residents can sometimes find large herds along the East Channel. While communities traditionally hunted in coastal areas west of the delta during this insect relief season, residents note that these coastal areas (e.g., Atigaru Pt. and Cape Halkett) have been difficult to access in recent years due to sedimentation along the coast. The oestrid fly season (July and early August) brings larger numbers of caribou from both herds into the community's primary hunting area along the Colville River (including the delta), and this coincides with the community's peak hunting and boating season. In late summer (August through mid-September), the TH caribou remain to the west of the community as well as along the

upper Colville River. Some CAH caribou continue to move into the upper portions of the river. This season coincides with increased overland hunting (by four-wheeler) to the west of the community and increased effort upriver from the community, particularly in combination with moose hunting. During the fall migration (mid-September through November), overland hunting intensifies with the migration of TH caribou into areas to the west of the community (Prichard et al. 2019, Figures 8 and 9). Overall, TH caribou are more frequently available within the community of Nuiqsut's current hunting area.

Residents have expressed concern that the cumulative impacts from development are dispersing caribou into smaller and smaller groups (rather than the large herds of the past) and these smaller groups reduce the hunters' chances for successful harvests. In response to this concern, the monitoring study documents the size of the herd or group in which each caribou is harvested. Group size at harvest locations is displayed on Map 22. In 2018, residents reported harvesting most caribou from groups of 10 or less (82 percent of harvest locations compared to between 62 and 79 percent of locations in past years) (Appendix C, Table 30). Groups of 30 or more caribou were reported at the remaining 18 percent of harvest locations, with over 100 caribou reported at four percent of locations, lower than all previous years except 2017.

As shown on Map 22, in most cases larger groups (i.e., over 100 caribou) were reported on the East Channel of the Colville River, where residents frequently indicated herds were located after arriving from the east during the spring/summer migration.

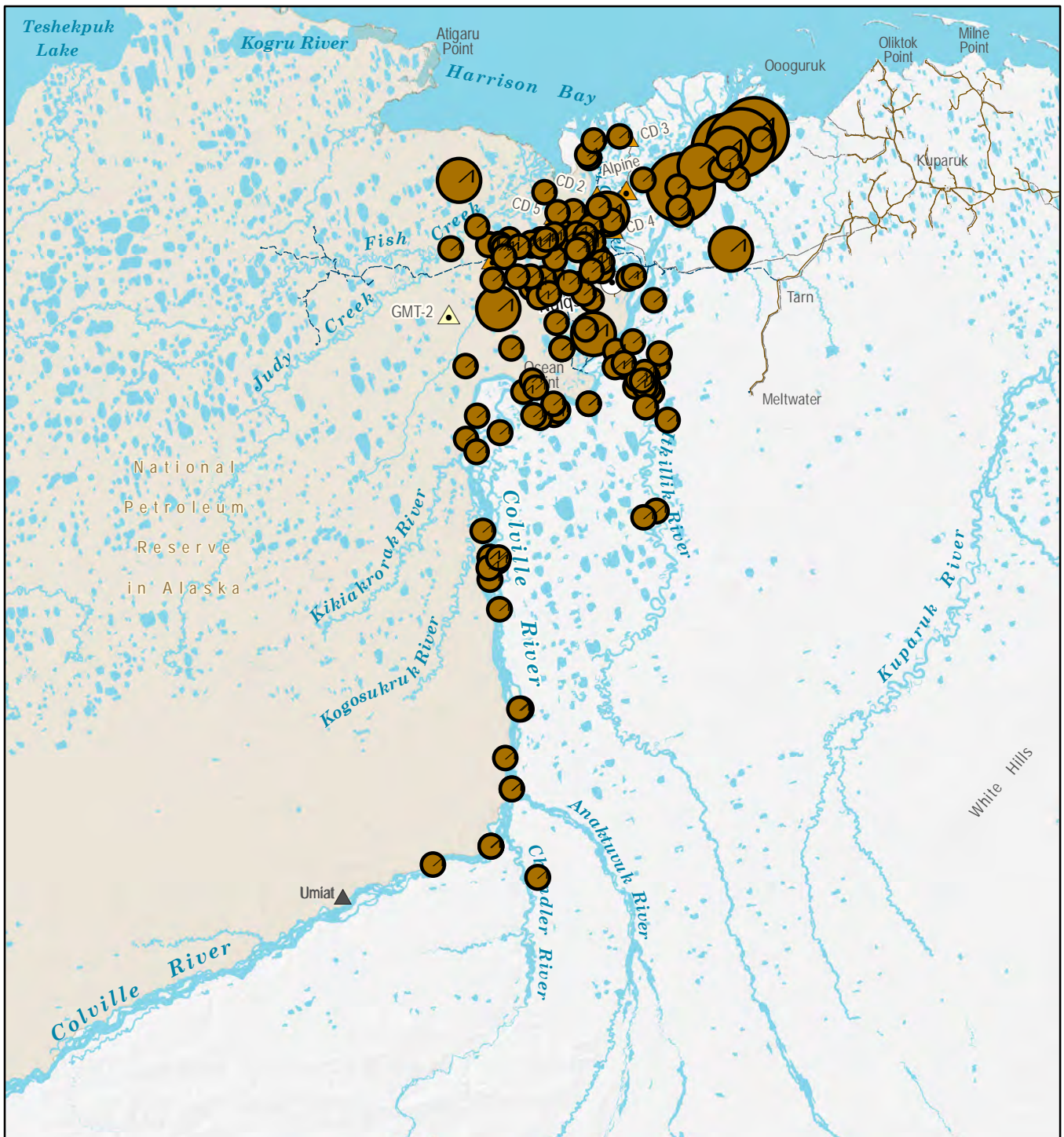
They got stuck over here [east of the Colville River/East Channel] because there were some oil activities going on in that area. There were maybe 300 plus [caribou], maybe more stuck on that side because they could see all those people working. There was a lot of boats over there that day. They were waiting for the leader to come back. When the leader doesn't come back, they follow across, but that leader went back to that herd and then they went a different way. It was like four or five boats that were out there....There were quite a few of us, like five boats waiting. This was in June last summer. This was in June. And we could see all of the winter fur on the river. They had been trying to cross. It was spring time, right after breakup and that is where we went. (SRB&A Nuiqsut Interview November 2018)

We stopped at this cabin by Nuiqsupiaq, that's where we saw this caribou herd over here. There was about 200, it was pretty big. (SRB&A Nuiqsut Interview November 2018)

Caribous were on the south side [of the East Channel]. We tried to go in Qakimak but ended up going into Aanayyuk. It was the first week of June. [We got] two bulls, there were like 40 in the herd. I went there twice. There were like 60 of them. (SRB&A Nuiqsut Interview November 2018)

Some groups of between 31 and 100 caribou were also spotted along the Nigliq Channel and in overland areas to the west, northwest, and south of the community. In most other areas, caribou were harvested in groups of between one and 30 (Map 22). Generally, residents indicated that the caribou they harvested were on their own; these caribou are often referred to as "stragglers." When describing their harvest locations in 2018, respondents provided observations about caribou distribution and behavior:

They were alone. They seem to be like that every year on that side of Itqiliq. It seems to me they are always eating in that area. They were just right here. I was looking at them outside of my house. I found the largest with the biggest horns and I took it. We are not going out there and trying to massacre the caribou, we are just catching one and taking it back. (SRB&A Nuiqsut Interview November 2018)



Map 22 - Caribou Group Size Noted at Harvest Locations, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

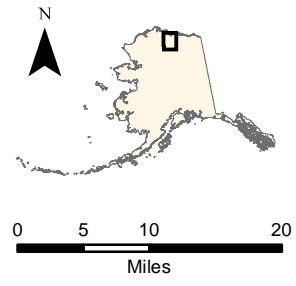
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National Petroleum Reserve Alaska

Year 11: November 2017 - October 2018

- 1 to 30 caribou
- 31 to 100 caribou
- 101 to 300 caribou

142 caribou harvest locations, 45 respondents



Just right off, not even from the hill [west of Nui]. The caribou comes up, there is a trail. There is always a trail this way. Or we will catch a caribou going back down. Yes, me and my cousin. I shot two. Usually when we go out, we were always together. There was a group of like nine. We got four out of them. There were bunches in groups of like ten or fifteen out there too. (SRB&A Nuiqsut Interview November 2018)

We got one [on Nigliq Channel]. It was right here, it was trying to cross the river. That was a bull. That was a decent one. It was a healthy one. I did [shot it] it took me two shots. There was maybe three others with it but they kind of scattered whenever I shot the one. (SRB&A Nuiqsut Interview November 2018)

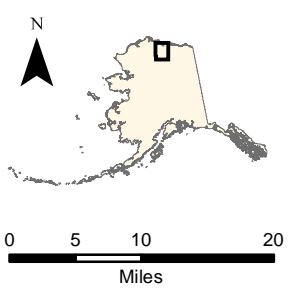
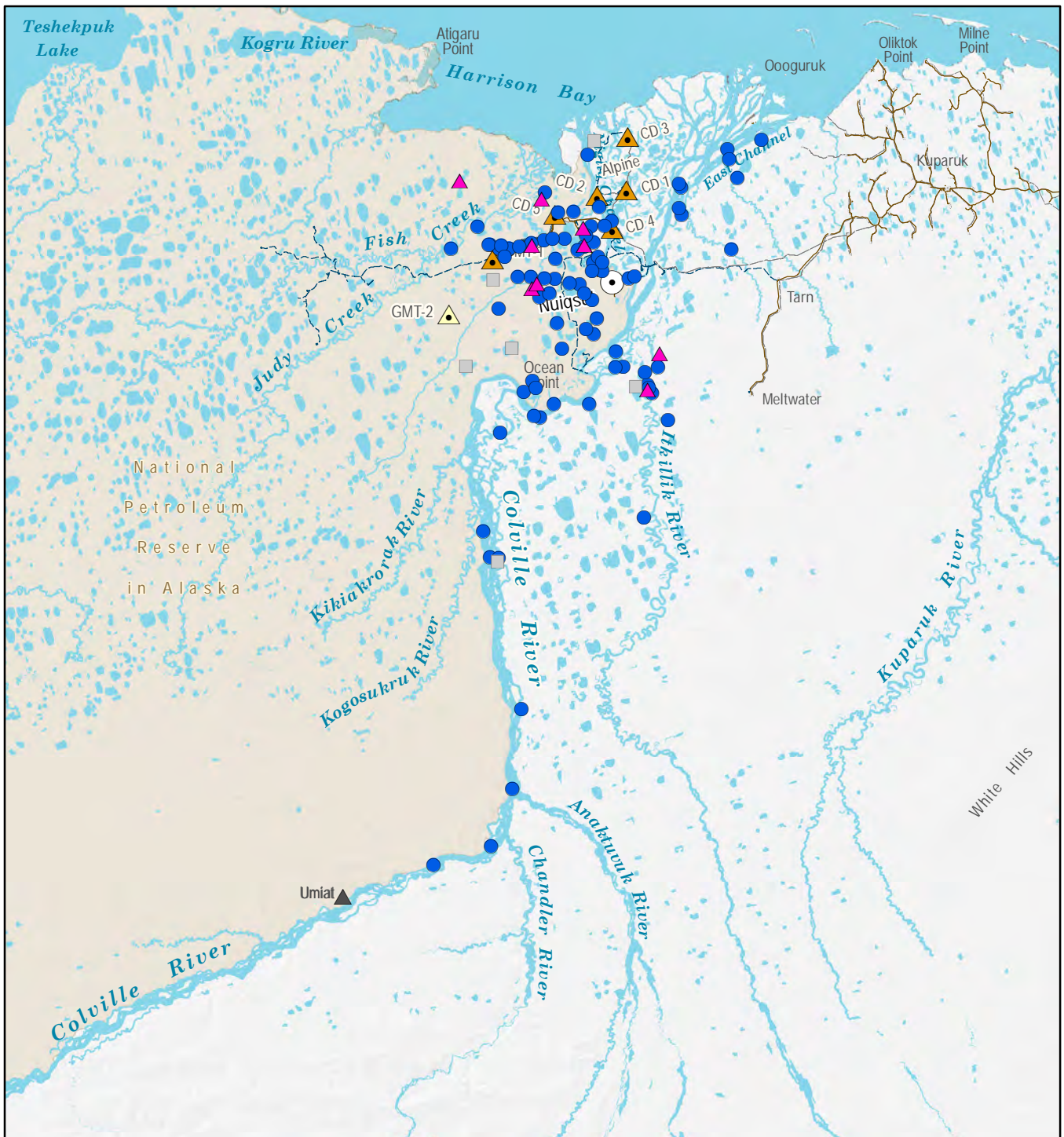
Around Kuupaquullurak between those two lakes me and my buddy got ten of them but I got five myself. I got five. That was May. We were still on the snowmachine... They were all young females. There was 50 of them or so [in the group]. (SRB&A Nuiqsut Interview November 2018)

Although three quarters or more of harvest locations have generally occurred in groups of caribou 20 or smaller, the percentage of caribou harvested in groups of more than 20 have been higher during some study years; in Years 2013 through 2015, over 20 percent of caribou harvest locations occurred in groups of more than 20 (Appendix C, Table 30). This percentage was lower in 2012, at 14 percent, and in 2017 and 2018, the percentage dropped to 10 and 11 percent, respectively. The 2017 and 2018 study years were the first years with available data that no caribou were harvested in groups estimated at 500 or more. In general, the past several years show respondents harvesting caribou in smaller groups than in previous years.

Map 23 shows the sex of harvested caribou in 2018; a majority of harvested caribou are reported as males. Females were more frequently harvested to the west and northwest of the community and along the Itqiliq River. In all other upriver and East Channel areas, respondents reported harvesting only males.

Harvest Amounts (Household Harvest Surveys)

This section presents the caribou harvest data from the 2018 household caribou harvest surveys in Nuiqsut alongside harvest data available from ADF&G and NSB harvest studies from previous years. Table 6 and Figure 29 compare 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 on the high end at 99 percent in 2018. The percentage of households attempting to harvest and successfully harvesting caribou has varied over time, with the percentage in 2018 (84 percent attempting to harvest and 74 percent harvesting). The difference between the percentage of households attempting to harvest and successfully harvesting caribou (10 percent) was within the range of previous years (which varied between one and 16 percent but has increased somewhat over time). The estimated number of caribou harvested in 2018 (608) was on the higher range of previous study years. The estimated per capita harvest (157 pounds) was also within the range of previous years. Confidence limits for available study years are shown in Figure 29 and Table 6. As these data show, the 95 percent confidence interval for 2018 was low end of previous years (plus or minus 10.3 percent). The highest confidence intervals (indicating the lowest confidence in the estimates) occurred in 2014, which had a higher estimate of harvested caribou than any previous year.



Map 23 - Sex of Caribou Harvested by Location, 2018

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 50 active harvesters in November 2018 and February 2019.

Other areas may have been used for resource harvesting.

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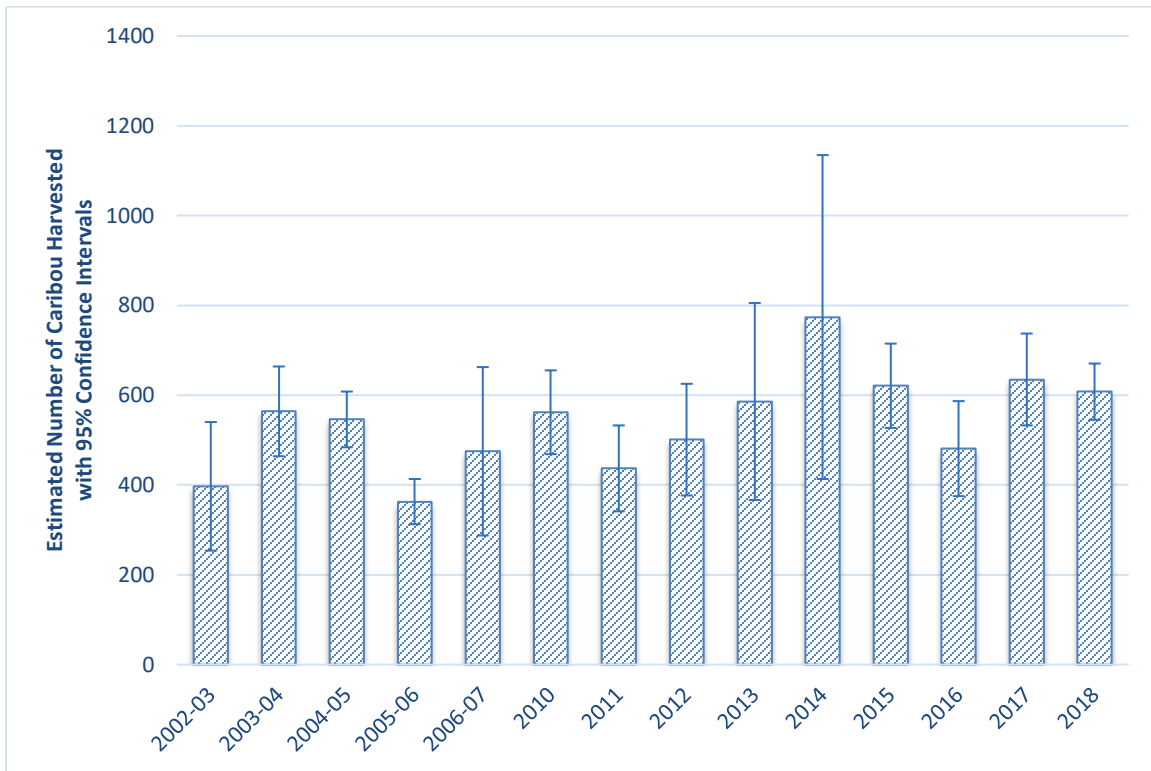
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- Locations where Respondents Harvested Only Female Caribou**
 ▲ 9 locations
 5 respondents
- Locations where Respondents Harvested Both Female and Male Caribou**
 ■ 6 locations
 5 respondents
- Locations where Respondents Harvested Only Male Caribou**
 ● 85 locations
 29 respondents

Table 6: Nuiqsut Caribou Harvests 1985-2018

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	95% Confidence Interval (+/-)
1985	98%	90%	90%	80%	60%	513	60,021	790	150	NA
1992		81%				278	32,551	310	78	NA
1993	98%	74%	74%	79%	79%	672	82,169	903	228	NA
1994-95						258	30,186	364	73*	NA
1995-96						362	42,354	455	99*	NA
1999-00						413			112	NA
2000-01						496	57,985	453	134*	NA
2002-03	95%	47%	45%	80%	49%	397	46,449	442	118	32.4%
2003-04	97%	74%	70%	81%	81%	564	65,988	617	157	16.2%
2004-05	99%	62%	61%	81%	96%	546	63,882	597	147	10.4%
2005-06	100%	60%	59%	97%	96%	363	42,471	442	102	11.4%
2006-07	97%	77%	74%	66%	69%	475	55,575	579	143	32.4%
2010	94%	86%	76%	67%	63%	562	65,754	707		13.2%
2011	92%	70%	57%	49%	58%	437	51,129	544	134	17.6%
2012	99%	68%	62%	65%	79%	501	58,617	598***	147	20.8%
2013	95%	79%	63%	62%	75%	586	68,534	692	166	31.7%
2014	90%	66%	64%	67%	59%	774	90,558***	839	218	43.1%
2015	96%	84%	78%	74%	72%	621	72,631	719	178	12.9%
2016	96%	76%	67%	79%	81%	481	56,277	592	132	22.0%
2017	96%	72%	60%	74%	85%	635	74,338	715	164	16.1%
2018	99%	84%	74%	88%	88%	608	71,113	658	157	10.3%
Mean (All Years)	96%	73%	67%	74%	74%	502	57791	601	149	
Sources: ADF&G (Alaska Department of Fish and Game) (2019) (1985); Bacon, Hepa, Brower, Pederson, Olemaun, George, and Corrigan (2011) (2000-01); Braem et al. (2011)(1994-95, 1995-96, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07); Brower and Hepa (1998) (1994-95); Brown et al. (2016) (2014); Fall and Utermohle 1995 (1993); Fuller and George (1999) (1992); Pedersen and Taalak Unpublished as cited in Braem et al. (2011) (1999-00); SRB&A (2012) (2010); SRB&A (2013) (2011); SRB&A (2014) (2012); SRB&A (2015) (2013); SRB&A (2016) (2015); SRB&A (2017) (2016); SRB&A (2018) (2017); SRB&A (2019); 2018 Household Surveys (2018).										
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 (Braem et al. 2011) based on Alaska Department of Labor and Workforce Development (ADOLWD) population estimates for those years.										
***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.										

Figure 29: Estimated Caribou Harvests with Confidence Intervals, Nuiqsut, Available Study Years



Stephen R. Braund & Associates, 2020.

Observations of Changes in Harvest Patterns

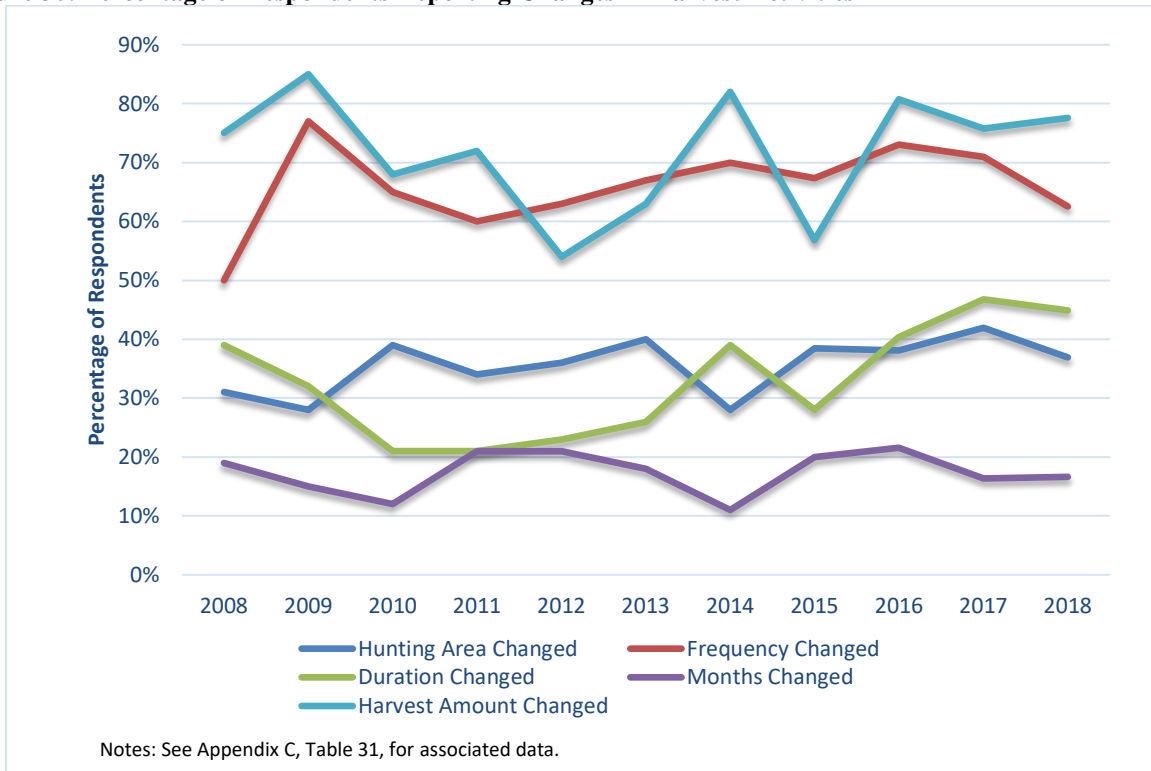
During the active harvester interviews, respondents were asked if any of the following hunting attributes had changed from the previous year: hunting area, frequency of trips, duration of trips, months of use, and harvest amounts. In each case where they answered that a change had occurred, harvesters were asked to describe the change and to state what they believed (or thought) caused the change. Figure 30 summarizes the percentage of respondents reporting a given type of change from the previous year. Overall, the percentages of respondents reporting changes in hunting area, frequency, and duration in 2018 were within the range of previous study years (Figure 30). Compared to previous study years and the all year average (Figure 30; Appendix C, Table 31), the percentage of respondents reporting a change in duration and harvest amounts in 2018 was on the high end, at 45 percent and 78 percent, respectively (Figure 30).

As shown in Figure 31, respondents also indicated whether they harvested enough caribou during each study year. In 2018, 43 percent of respondents indicated that they did not harvest enough caribou, within the range of previous years but the highest since 2013 (Figure 31; Appendix C, Table 32). The percentage of respondents not harvesting enough caribou varies widely from year to year, with a high of 54 percent in 2013 and a low of 16 percent in 2011.

Changes in Harvest Amount

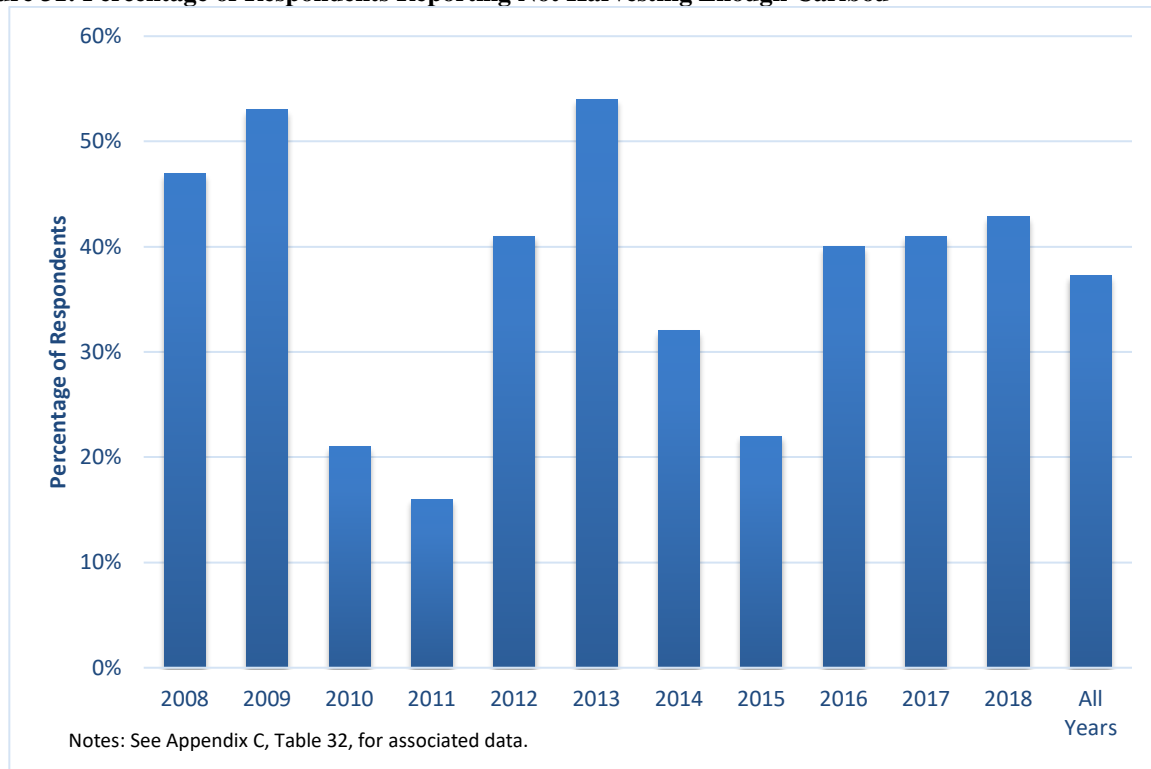
In 2018, 78 percent of Nuiqsut respondents reported a change in harvest amounts, on the high end of most previous years (Figure 30). Specifically, 61 percent of harvesters reported harvesting less and 16 percent reported harvesting more caribou. The other 22 percent of respondents reported harvesting the same amount as the previous year (Figure 32). In 2017 and 2018, the percentage of respondents reporting a decrease in harvest amounts from the previous year (61 percent) was the highest since 2009 (70 percent) (Figure 32; Appendix, Table 33).

Figure 30: Percentage of Respondents Reporting Changes in Harvest Activities



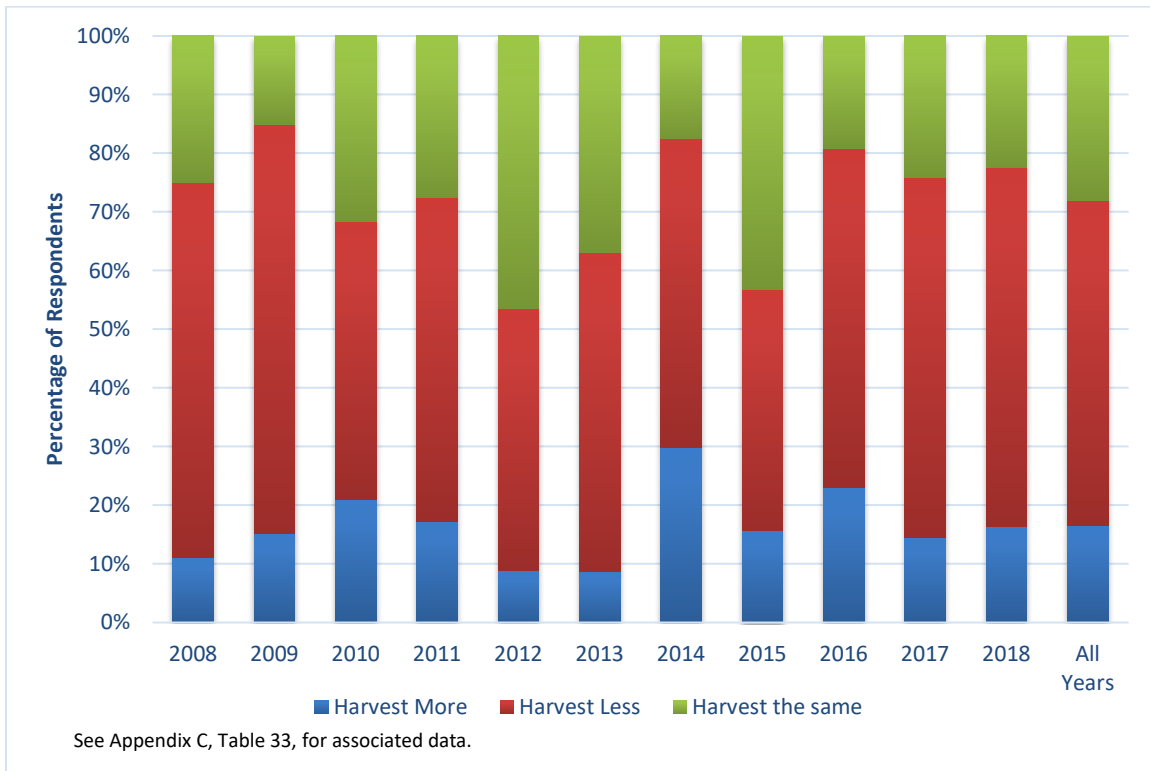
Stephen R. Braund & Associates, 2020.

Figure 31: Percentage of Respondents Reporting Not Harvesting Enough Caribou



Stephen R. Braund & Associates, 2020.

Figure 32: Type of Change in Harvest Amount Compared to Previous Year



Stephen R. Braund & Associates, 2020.

Appendix C, Table 34 shows a cumulative list of reasons given for a decrease in harvest from the previous year, which have been organized under broader categories. In 2018, Personal Factors were the most common reason given for a decrease in harvest amount, with 16 observations, followed by Resource Distribution/Migration Factors (13 observations). Personal reasons (seven observations) was the most commonly reported individual reason for harvesting less caribou, followed by Resource Availability (five observations); Migration Changed or Diverted (four observations); and Lack of Transportation/Equipment (four observations). Over all 11 study years, Resource Distribution/Migration factors were the most frequently cited causes for harvesting less caribou (149 observations), followed closely by causes related to Personal Factors (147 observations). Other types of causes cited by respondents have included Development Activities (42 observations), Environmental Factors (10 observations) and Hunting Success (nine observations).

In 2018, under the Personal Factors category (16 observations, or 40 percent of all observations), residents indicated that general personal reasons (e.g., lack of money, medical reasons), a lack of transportation or equipment (four observations), or a decrease in the frequency of hunting trips (two observations) resulted in them harvesting fewer caribou in 2018. Respondents described the personal factors that affected their hunting success in 2018 as follows:

I got more the other year. Family reasons, probably. [Family member] passed away last year so we really never went out after he passed away. He was mainly the one who loved to go out. We weren't really into anything for a while. He was always giving to the elders. (SRB&A Nuiqsut Interview November 2018)

I think we were pretty close to the same. If I had gotten the chance to get out on four-wheeler we definitely would have caribou right now. It is strange, it has been more than a month since

we've had caribou in our freezer. I just didn't have one [a four wheeler]. (SRB&A Nuiqsut Interview November 2018)

Everything broke down, and then I had no transportation to go out. (SRB&A Nuiqsut Interview November 2018)

That was less, way less. Like I said, just too busy this year. Then I took a few days of leave to go hunting, then that is when I got that two caribou. (SRB&A Nuiqsut Interview November 2018)

Gas is too expensive, I don't have a job, [and] there are no fuel vouchers. They weren't giving [fuel vouchers] out to people that don't work, and that would help us. Then you would also have to have a hunting license, and sometimes we don't have that so.... And I need to get a rifle of my own. I want to go hunting my own. (SRB&A Nuiqsut Interview November 2018)

Under the category of Resource Distribution/Migration (13 observations, or 33 percent of all observations), respondents most commonly cited resource availability more generally, indicated a change in migration (including diverted migration and later migration/arrival), or indicated that the caribou were farther inland from riversides, making them more difficult to harvest.

It's really hard to say. The reason—over time from the '80s until recently, I know there is large herds on the Colville. One time I go up to a spotting place and wait and I see they will go out from the bushes and then back to the bushes. It blew me away. Maybe 500 caribou all of the sudden walk out of the bushes, get their fill of water, and then back. And it is like wow, what the hell we have been out here looking for weeks and we didn't see that. The elders say they seem to be less disturbed by the mosquitos in the bushes so that is why they go back in. that is something that I got to see.... So I can say they are out there but not where I could catch them. (SRB&A Nuiqsut Interview November 2018)

We are starting to see hardly any big caribou herds, even on the west side. Just caribous here and there. I keep missing out on the big herd that comes from the east. Sometimes they travel at nighttime. Daytime they are out on the coast because there are too many mosquitos. (SRB&A Nuiqsut Interview November 2018)

I did see more caribou than I did last year, just that they were too far from the river. As for last year they were too hard to find. Got to put more gas, buy more gas, for my next trip. (SRB&A Nuiqsut Interview November 2018)

In six cases (observations), respondents specifically attributed the change in harvest amounts to Development Activities, including general development, drilling noise, and traffic disturbance, which were said to affect caribou movement into the area:

I mostly think because of the GMTI and the rig on this side east of Colville, both across from each other, and that was the main place that the caribou crossed in our back yard. [They are] going around the rigs now, to prevent them [from crossing] I guess. When herds were coming in from Prudhoe, a lot of people were seeing them on that side [East Channel], they would see them on that side. They said, 'Go to Fish Creek or toward Alpine, you'll see a lot of them.' But I never see anything out there. So, I mostly stay in my backyard doing what I was doing, and it's been working. (SRB&A Nuiqsut Interview November 2018)

I don't know, maybe all the noise from the oilrigs. It seems like [caribou] are changing their migration routes. (SRB&A Nuiqsut Interview November 2018)

My answer would be because of the activities out there [GMT1]. They are doing more activities here [middle Colville Delta] and here [East Channel]. They are not migrating the way they used to, that's the way I see it. Unless we are getting more bears keeping them away... we heard there is more brown bears than caribous around. (SRB&A Nuiqsut Interview November 2018)

I think it's because of this development going on. GMT went up and the caribou went farther out. They were getting caribou in Wainwright when they were supposed to be here because of development, they are going around and then turning the other way. When GMT2 goes up, we will have no caribou. I think we will have to go way farther out. (SRB&A Nuiqsut Interview November 2018)

Appendix C, Table 35 shows the reasons given for harvesting more caribou in 2018. Over the 11 study years, Personal Factors were the most common reason for harvesting more caribou, followed by Resource Distribution/Migration Factors. In 2018, Personal Factors accounted for 86 percent of observations (six observations), with only one additional observation which was attributed to resource distribution or migration. Under Personal Factors, residents cited an increase in trip frequency, followed by general Personal Reasons, Better Transportation/Equipment, and Change in Subsistence Dependents. In the following quotes, one individual cited the Spur Road as facilitating hunting trips, while another observed there were more caribou in the area compared to the previous year:

I think that that Spur Road helped me out. It was just a question of waiting that out, but it helped gas wise. (SRB&A Nuiqsut Interview November 2018)

We got more [caribou] than last year. Because there was a lot out there compared to last year. Because last year there was only 10. When we went out there we saw 80 or 90 caribou and [my sister] said, 'Wow, I can get two!' (SRB&A Nuiqsut Interview November 2018)

Changes in Trip Frequency

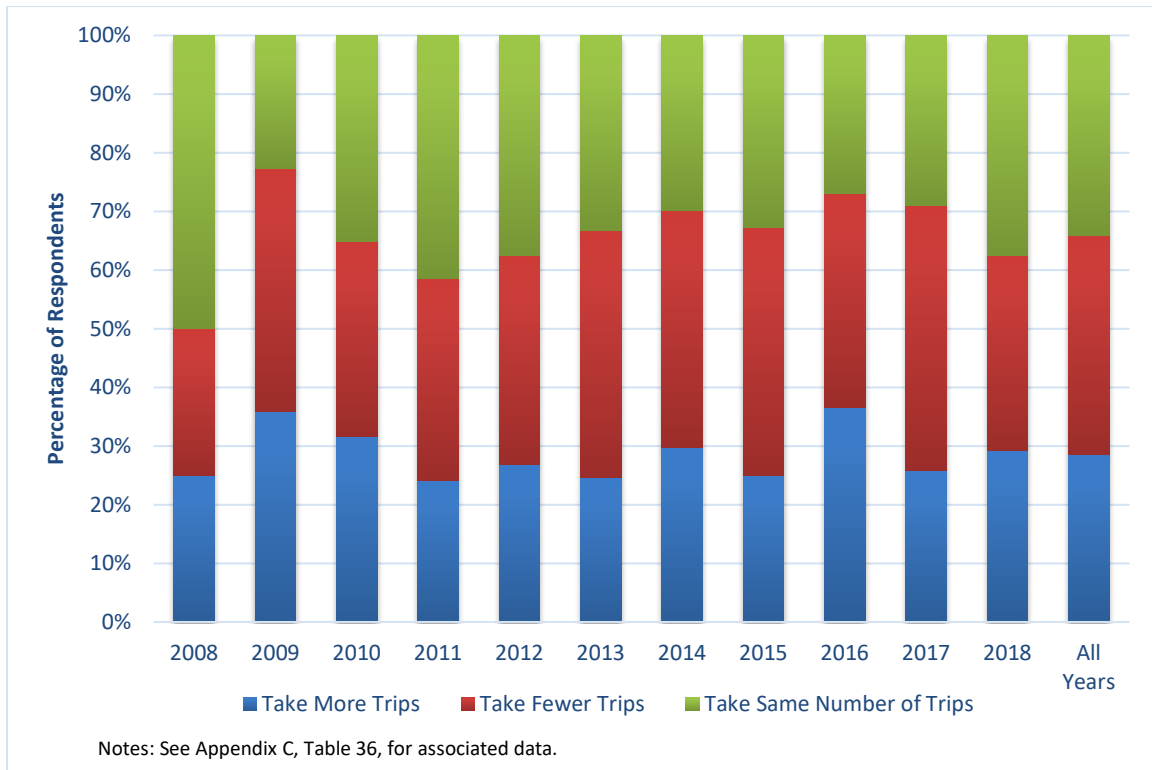
As shown in Figure 30, changes in trip frequency had generally ranged from between 60 and 70 percent of respondents across the 11 study years. In 2018, 63 percent of respondents reported a change in the frequency of their hunting trips, within the range of previous years; a somewhat higher percentage of respondents reported taking fewer trips, at 33 percent, than more trips (29 percent) (Figure 33). The percentage of respondents taking fewer and more trips in 2018 is within the range of previous years (Figure 33; Appendix C, Table 36).

Reasons for a decrease in trip frequency are provided in Appendix C, Table 37. Personal Factors were the most frequently cited causes (accounting for 68 percent of observations), including the more general Personal Reasons and Lack of Transportation/Equipment (six observations each), followed by Employment/Lack of Time (one observation). Personal Reasons involved local harvesters having to reduce their caribou hunting activities due to medical problems, or simply not making it out as much. Several individuals indicated that they took fewer trips due to lack of adequate transportation/equipment or funds (specifically a lack of money to purchase gas). As one individual said, "No transportation, my four-wheeler went down, and I just finally got a new boat. No transportation" (SRB&A Nuiqsut Interview November 2018).

In addition to Personal Factors, an equal number of respondents cited causes related to Economic Factors and Resource Distribution/Migration. In three cases (observations), residents noted that a lack of funds to purchase fuel and supplies was the reason for a decrease in caribou hunting trips in 2018. Respondents reported taking fewer trips because of reasons related to Resource Distribution/Migration, indicating that they went out less due to the general lack of caribou in their hunting areas. This is in contrast to those who

went out *more* due to the lack of caribou (see Appendix C, Table 38) and illustrates the differing hunter responses to similar conditions.

Figure 33: Type of Change in Trip Frequency Compared to Previous Year, Nuiqsut, 2008-2018



Stephen R. Braund & Associates, 2020.

Several respondents noted that unpredictable caribou movement in 2018 resulted in reduced hunting success, which they responded to by hunting less frequently to save on gas:

That was less. They are mostly staying out on the south side or the west side. They aren't coming in close. Those hunters when they see them out there they go out and get them right away, those young hunters, I know that quite a few of them go out and get them, but I think maybe they know now to let the first herd pass through. People are hungry for caribou. (SRB&A Nuiqsut Interview November 2018)

I didn't know where the caribou were. There were hardly any caribou out there. Years back, I used to be confident that I would catch something every single time I went out. Now it [seems like it might be a waste of gas]. Years ago before all of this came around, there was always caribou around this area, neighborhood caribou. You don't see that nowadays. (SRB&A Nuiqsut Interview November 2018)

Over the 11 study years, Personal Factors have been the most frequently cited causes of an increase in trip frequency, followed by Resource Distribution/Migration Factors (Appendix C, Table 38). In 2018, similar to most previous years, respondents most commonly cited Personal Factors (11 observations)—specifically, general personal reasons (six observations), Better Transportation/Equipment (four observations), and Change in Subsistence Dependents (one observation). Several residents provided the following explanations regarding how personal factors affected their frequency of trips in 2018:

A lot more often. Same reason, being able to drive around our vehicles [because of the roads]. (SRB&A Nuiqsut Interview November 2018)

More this year, less last year. I went out more this year because my sisters don't have that much help. When they go hunting they ask my help [to] carry. My sister is a good hunter, she can shoot from long ways. (SRB&A Nuiqsut Interview November 2018)

Yeah [I went more], because I actually had access to a four-wheeler this summer because [friend's] health is not too good, I did a lot of caribou hunting for him. I think I brought them four or five caribous. (SRB&A Nuiqsut Interview November 2018)

Those who identified Resource Distribution or Migration causes for their increase in trip frequency attributed their need to conduct additional trips due to caribou being unavailable in the areas where they typically find them (Resource Availability):

Last year was more. It was harder for me to find caribou. This year we went to more places in one trip. Same day go here and down here and here. Some years it goes up, some years it goes down. (SRB&A Nuiqsut Interview November 2018)

More, just didn't catch. Less, there wasn't anything. I'm hungry for animals. We didn't get much ducks, we got a few. We didn't get much caribou, only got what we saw. (SRB&A Nuiqsut Interview November 2018)

Changes in Trip Duration

The percentage of respondents reporting a change in trip duration in 2018 (45 percent) was somewhat higher than most previous years (Figure 30). In both 2017 and 2018, the percentage of respondents reporting a change in trip duration was higher than any previous study year (Appendix C, Table 31). In 2018, 29 percent of respondents reported longer trips and 16 percent reported taking shorter trips, both within the range of previous study years (Figure 34).

As shown in Appendix C, Table 40, the primary reasons given for taking longer hunting trips were Personal Factors (six observations), Resource Distribution or Migration (four observations), and Development Infrastructure (specifically roads; one observation). A number of residents who reported taking longer trips indicated that they simply stayed out longer for reasons related to personal enjoyment and need:

Longer [trips], because we were out there and we got more caribou. Yeah, anybody that was needing caribou we would go out and get caribou, we got a couple of elders full caribou, gutting them and bringing them over to their house, we gave Sam one, we gave them whole caribous, anybody else that wanted caribou, our porch was always full, anybody was always welcome to ask for caribou. (SRB&A Nuiqsut Interview November 2018)

Because I like it! Get out, hardly any rain, sunshine, clear skies, hardly any bugs this year! (SRB&A Nuiqsut Interview November 2018)

Longer, about the same. A little bit longer from time to time if my cousins feel like it. They just want to spend time out there. (SRB&A Nuiqsut Interview November 2018)

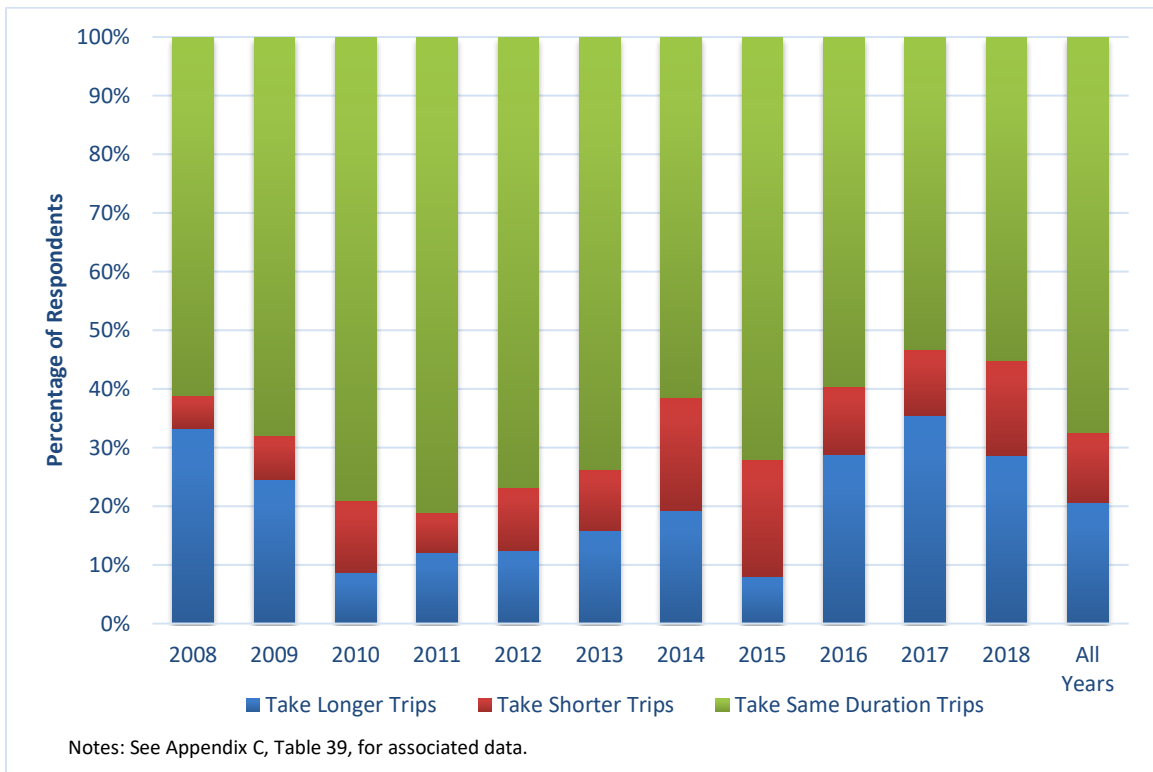
Those individuals who reported taking longer trips for Resource Distribution/Migration causes generally indicated that the caribou were less available during the previous study year or that their movements were less predictable. Several individuals reported either having to travel farther or staying out longer to scout for caribou, resulting in longer trips:

I would say that a couple of times it was longer. From lack of caribou around the areas. Just have to see them and find where they are at. (SRB&A Nuiqsut Interview November 2018)

They were longer this year. I would go farther and push ourselves to try to get something and it's a waste of trips. We did get a couple of seals and ducks, but the caribou we hardly see anymore. They are seeing them more on the road. Oh, I didn't want to [hunt on the road]. I like to hunt on the river. Maybe this year I'll try it. Just didn't feeling like cutting caribou along the side of the road. You park and have so many vehicles watching you, you know? (SRB&A Nuiqsut Interview November 2018)

Last year was a little bit longer. I stayed out there trying to keep looking for some caribou. It took me a while to find these four [caribou] over here. (SRB&A Nuiqsut Interview November 2018)

Figure 34: Type of Change in Trip Duration, Nuiqsut



Stephen R. Braund & Associates, 2020.

One individual indicated that the added length of road to GMT1 in 2018 allowed them to hunt farther and stay out longer:

Yeah, [I hunted] more on the road and we had a four-wheeler too. [I'm hunting] longer now that the road is open to where that] GMT1] pad is. I don't know that one oil well, before the road turns. (SRB&A Nuiqsut Interview November 2018)

The primary reasons for taking shorter trips over all study years were related to Personal Factors (Appendix C, Table 41). In 2018, an equal number of observations were attributed to Personal Factors, Resource Distribution or Migration, and Environmental Factors (two observations each). One observation was attributed to Development Infrastructure (roads/ice roads). In a couple of cases, respondents indicated that

they took shorter trips because of resource availability, indicating that they were less available (and they did not want to waste gas). One individual said, “Because there is no caribou. You scout around and you don’t see nothing so you just go back” (SRB&A Nuiqsut Interview November 2018). Residents noted poor weather conditions also contributed to their shorter trips in 2018:

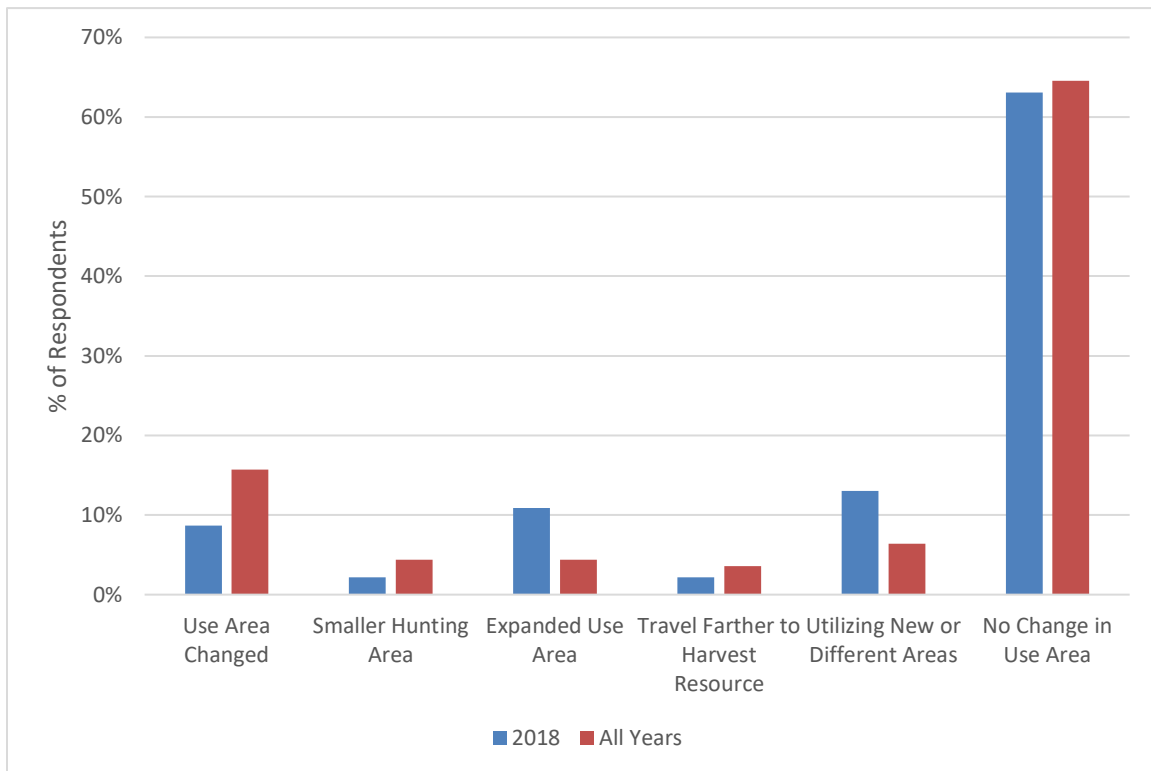
No camping. I was so impacted! The warm air and the cold weather at the same time was really bad. It took me four months to dry a skin. Usually, it’s first shorter, rain, warm, sleet, freeze! Four times it changed and I had to wait until October and it was still raining in October. (SRB&A Nuiqsut Interview November 2018)

They were just day trips, it was too windy all summer. It was like sand storms along the river. (SRB&A Nuiqsut Interview November 2018)

Changes in Use Area

Thirty-seven percent of harvester respondents reported that their hunting area was different in 2018, within the range of previous study years (between 28 percent and 42 percent of harvesters) (Figure 30; Appendix C, Table 31). Thirteen percent of Nuiqsut caribou harvester respondents reported using new or different areas in 2018, higher than the average of all study years, but lower than the previous two years (Figure 35). In addition, nine percent of individuals reported a general change to their use area and a smaller percentage (two percent) reported a small hunting area or traveling farther to harvest caribou (Appendix C, Table 42).

Figure 35: Type of Change in Use Area, Nuiqsut, 2018



Stephen R. Braund & Associates, 2020.

Appendix C, Table 43 shows the reasons given for any change in use area. 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. Over all 11

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, Development Activities, and Development Infrastructure. In 2018, similar to most previous years, Personal Factors were the most commonly cited cause for a change in use area (40 percent of observations), followed by Development Infrastructure (20 percent), Environmental Factors (10 percent), and Resource Distribution/Migration Factors (10 percent).

Personal Factors cited in 2018 included Personal Reasons (three observations), Lack of Transportation/Equipment (two observations), Better Transportation/Equipment (two observations), and Change in Transportation Method (one observation). As indicated in the following quotes, the availability of transportation can facilitate or hinder access to subsistence use areas:

Yes, they were different. Because we were able to captain our own vehicles. We had our own boat, we had our own snowmachine. (SRB&A Nuiqsut Interview November 2018)

Last year [2017], I went way up river. Past Umiat. I didn't get my outboard fixed [is why I didn't go so far]. (SRB&A Nuiqsut Interview November 2018)

I think on the river [was different]. I was able to go out on the river last year. We had no boat [this year]. Yeah, we are working on our boat this year. Thank you ASRC. (SRB&A Nuiqsut Interview November 2018)

The 2018 study year was the first full year with the GMT1 road in place, and a number of hunters reported using the road to hunt caribou, noting that this was a new hunting area for them:

Yeah, this one [area along GMT1 road]. I am kind of glad that road is there because that is what I have been using. I have been taking my dad's truck. (SRB&A Nuiqsut Interview November 2018)

Went more [farther] to GMT1 looking and scouting, that's it. [Farther]. (SRB&A Nuiqsut Interview November 2018)

This whole back area is a similar place. But since they got the Spur Road with GMT [it's been different]. So, it's new finding them back there [by GMT1]. (SRB&A Nuiqsut Interview November 2018)

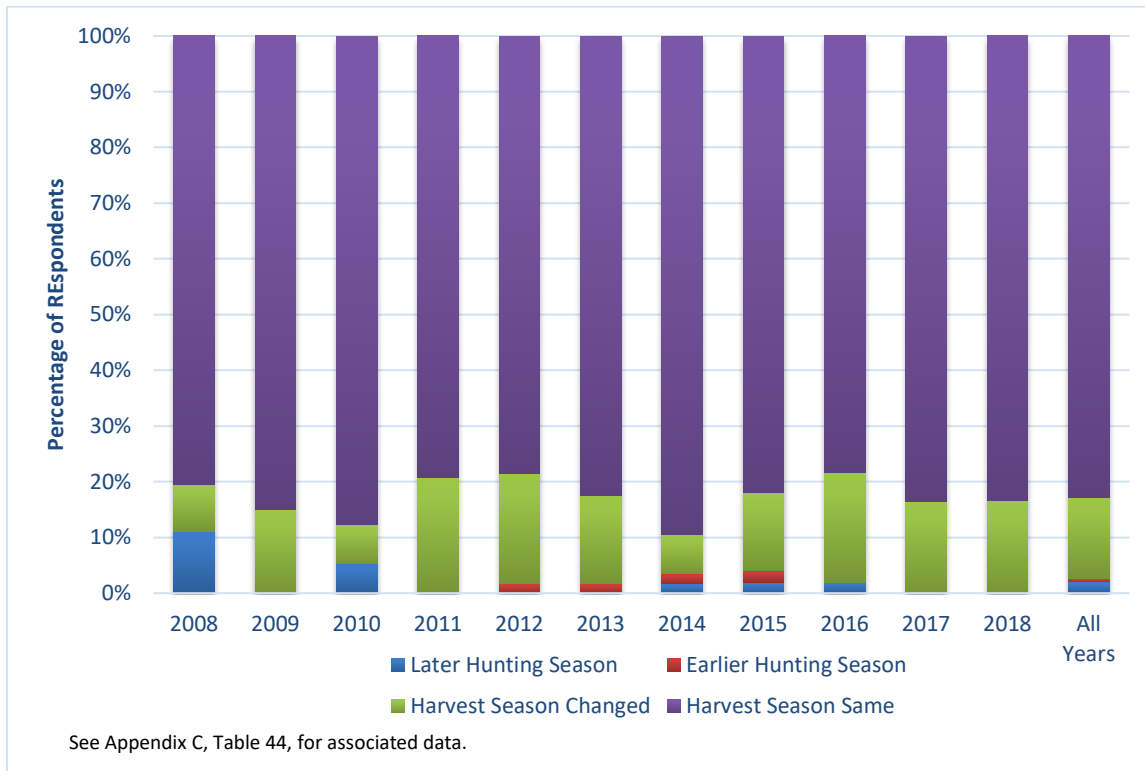
A couple of hunters in 2018 attributed their change in use area to resource distribution or migration causes, indicating that they traveled farther or used different areas because they could not find caribou. Finally, two individuals cited a change in river channels for causing a change in their use areas in 2018. One individual noted that flooding of rivers and lakes affected his overland hunting area, saying,

I guess some of the lakes were a little bit different. We kind of had to navigate our way around the lakes. It wasn't much of a difference, but we did have a harder time going around. This is the only place that I really go out hunting. When the rivers had flooded, there were some spots that were kind of wider so that I couldn't get around them and there were some spots that were a little bit deeper for me to go around the lakes. (SRB&A Nuiqsut Interview November 2018)

Changes in Hunting Months

Seventeen percent of Nuiqsut caribou harvester respondents reported a change in their hunting months in 2018, similar to previous years (Figure 30; Appendix C, Table 44). In all cases, these respondents reported a general change within their normal harvest season, rather than an overall shift in the timing of their hunting season (Figure 36).

Figure 36: Type of Change in Months of Harvest by Type of Change, Nuiqsut, 2008-2018



Stephen R. Braund & Associates, 2020.

Over the 11 study years, Personal Factors were the most commonly cited reasons for a change in harvest seasons, and this trend held true in 2018, with six observations (Appendix C, Table 45). Residents cited Personal Factors including general Personal Reasons, Lack of Transportation/Equipment, and Need Less. Two individuals discussed a change in the timing of their hunt in 2018 due to Personal Factors, with one discussion a general change in the community’s reliance on snowmachines for caribou hunting:

I used to run around a lot with a snowmachine. I was thinking about that, too—hunting years ago compared to nowadays. Years ago we needed it more than we do now. Now we have the store, the food bank, the food stamps so we are not as dependent as we were then. People used to hunt more by snowmachine. If you look at in the ‘70s up here, the access to Fairbanks or Anchorage compared to now, you can see that we can get our nutrition from the Western World too now. We like to call the Lower 48 the Western World. But we are able to live off both worlds. The Caribou and the Hamburger. (SRB&A Nuiqsut Interview November 2018)

Same months except I didn’t go winter hunting yet. I usually follow my cousin out a few times especially to go check his trap line. [I didn’t go last year] because my Ski Doo broke down. (SRB&A Nuiqsut Interview November 2018)

Other reasons cited for a change in hunting months included Resource Distribution/Migration Causes, and Development Infrastructure Causes, including Roads, Earlier Migration/Arrival, and Change in Distribution/Migration, with residents noting that increased access to roads in addition to a change in the timing of caribou availability affected when they went hunting:

The timing of the migration has changed. We don’t see the migration come through the Colville River delta area no more. That used to be the first week of July and the end of June. A lot of the caribou I got this summer were thin, no fat. All of the caribou. Just a little bit of

fat. That is it. They were all skinny during the summer. The only fat caribous that I got was last week. Two females, finally, these ones out here. Even the moose were skinny too. The moose hunters caught thin, no fat. (SRB&A Nuiqsut Interview November 2018)

It was kind of like different this year. I don't know, I guess it was just the migration this year. I don't know. They were taking their time with their feeding. I guess they must have had a lot of nutrition from the east side, so they stayed before they came to the west side. (SRB&A Nuiqsut Interview November 2018)

One respondent noted that access to the road allowed him to hunt in the winter, which he would typically not do, saying, "I went out a little more than I normally do in the winter, like in January, on the Spur Road. Because it's easy" (SRB&A Nuiqsut Interview November 2018).

Harvested Enough Caribou

In 2018, 43 percent of Nuiqsut respondents indicated that they did not harvest enough caribou, somewhat higher than all years average (Figure 31) but within the range of all previous years. The percentage of respondents not harvesting enough caribou in 2018 was the highest since 2013. Respondents discussed a variety of reasons for not harvesting enough caribou during the 2018 study period, often referring back to their reasons for harvesting fewer caribou during the same time period (see Appendix C, Table 34). The primary reasons were a lack of caribou hunting success, and harvesters sharing much of their caribou with other households:

It was not enough. I ran out. I still got some hindquarters outside aging. It was late in the rut season we were trying to get as many as we can because we don't get females and calves. Right now they are in Anaktuvuk Pass. They are on the south side. They are used to them going through the valley but it changes. Right now they are in the Chandler valley and going to Bettles that way. They should be hunting right now, they already let the first ones pass. They complain about the caribou not coming around. The caribou has been choosing another route. They used to always go through Anaktuvuk Pass. But they don't anymore. Times have changed and we have to change with them.

I have a big family. Lots of people come visit my household. So not quite enough. (SRB&A Nuiqsut Interview November 2018)

I can't really say that [we have enough] because the way my dad hunts... he doesn't just hunt for our family, he hunts for the whole community. So whatever we don't salvage, we give away. That's just a little part we are keeping, and the rest are just [given away to the community]. (SRB&A Nuiqsut Interview November 2018)

One respondent noted that the availability of at-home food storage equipment is a factor in determining whether one can harvest enough for the entire year:

We needed more. Right now, there is a little stash in my mom's freezer. That is a real issue with the hunters is the hunting during the summer time, not all the meat—even though you might have brought it all back, some of it will spoil because it is hot and it spoils more quickly, so you have to have a freezer if you are going to be a big time hunter. That is another factor of the hunter: if they have the large freezer, they will get more fish, have more caribou, more geese, versus just the poor guy with just a freezer on top of his fridge. That is another factor of the hunter. (SRB&A Nuiqsut Interview November 2018)

Other respondents indicated that they had to rely on others in the community for caribou meat since they did not harvest enough themselves:

Yeah [we had enough], but we are almost out. We kind of ran out real quick. I had to ask Facebook for some the other day. Luckily, someone was nice enough to share. (SRB&A Nuiqsut Interview November 2018)

Others reported harvesting enough even if it was not as much as they would have liked. As two respondents stated,

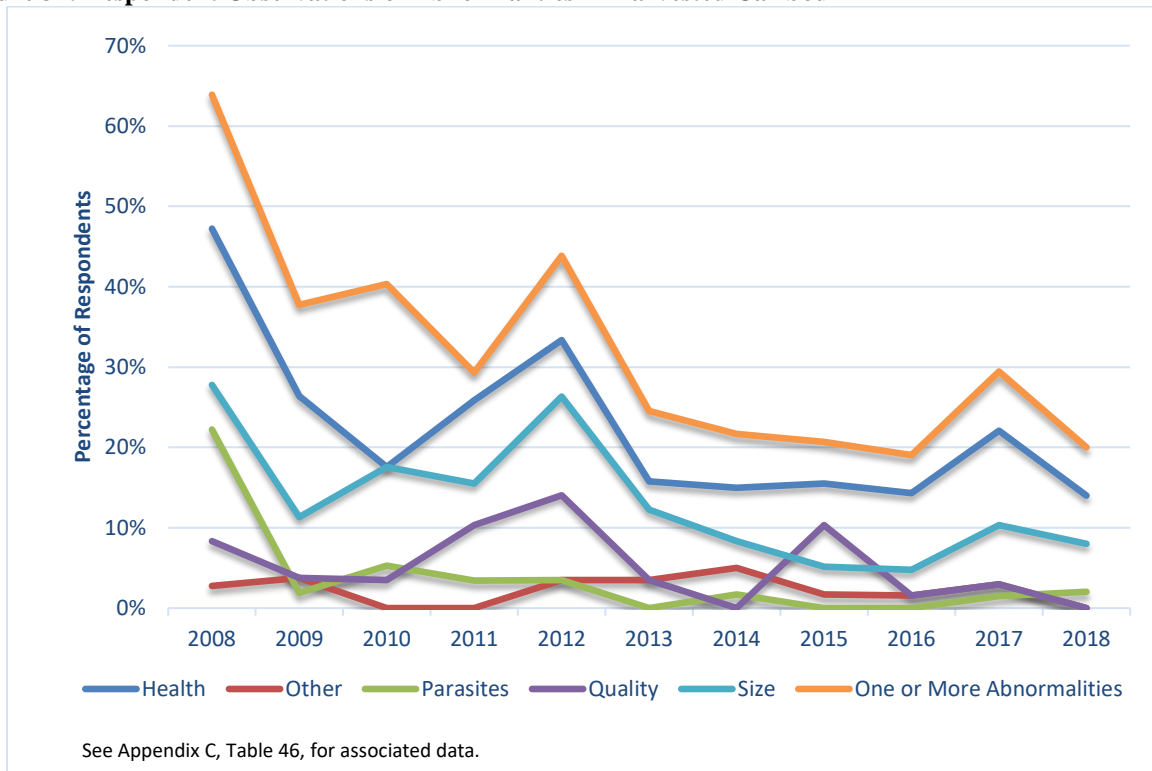
Yes, we need to get more though. We are almost running out. (SRB&A Nuiqsut Interview November 2018)

We got more than enough. I give it out. I have a lot of kids out there. They come in and they ask if they can get a share. You know, I don't say no to my kids. I can't. If the elders want some too, I'll give them some. (SRB&A Nuiqsut Interview November 2018)

Observations of Harvested Caribou Health and Condition

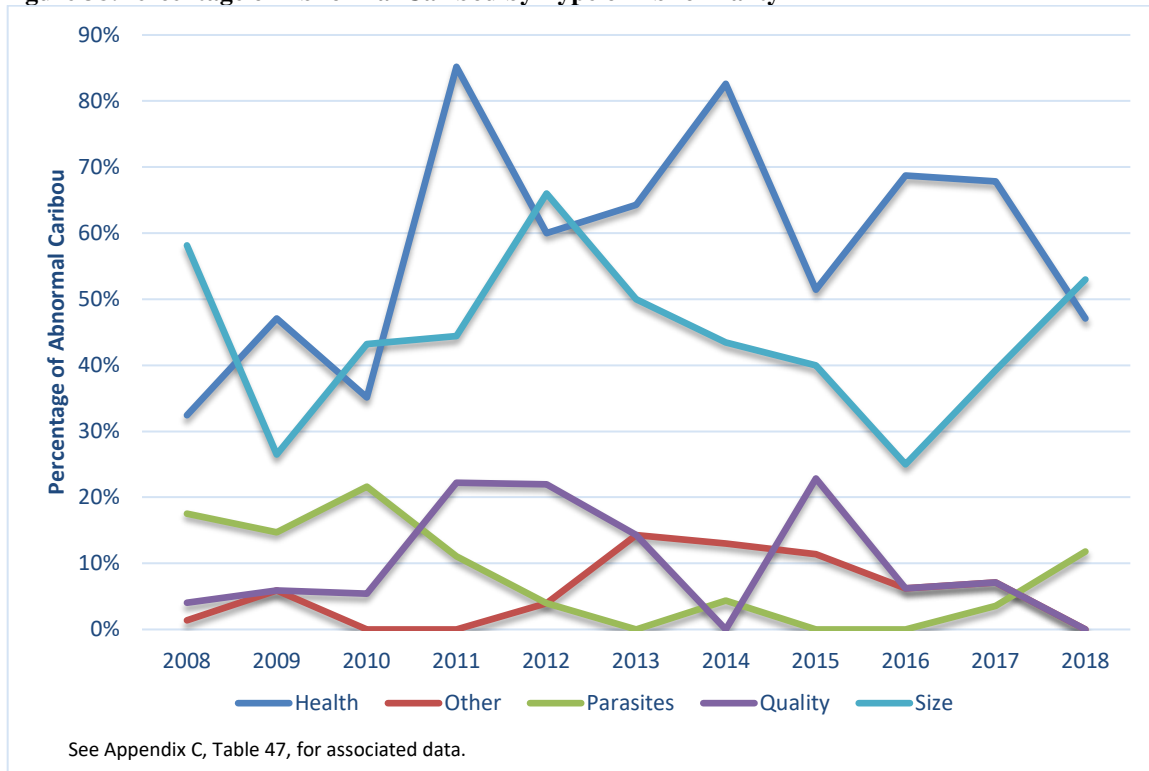
The percentage of respondents reporting one or more “abnormalities” in caribou has varied from 19 percent (in 2016) to 64 percent (in 2008) over all study years (Figure 37; Appendix C, Table 46). The percentage of respondents reporting abnormalities was somewhat higher during the first five years of the study (2008-2012), at between 29 and 64 percent, declining to between 19 and 29 percent during the 2013-2018 time period (Figure 37; Appendix C, Table 46). In 2018, 20 percent of respondents reported harvesting one or more caribou with abnormalities, the second lowest percentage across all study years. While health problems have generally been the most commonly reported observation in caribou in previous years, in 2018 respondents most commonly reported caribou of abnormal size (53 percent of abnormal caribou), followed by caribou with health problems (47 percent of abnormal caribou) (Figure 38). Respondents reported using 41 percent of caribou identified with abnormalities (Figure 39), specifically 67 percent of caribou with size-related abnormalities and 13 percent of caribou with health-related abnormalities.

Figure 37: Respondent Observations of Abnormalities in Harvested Caribou



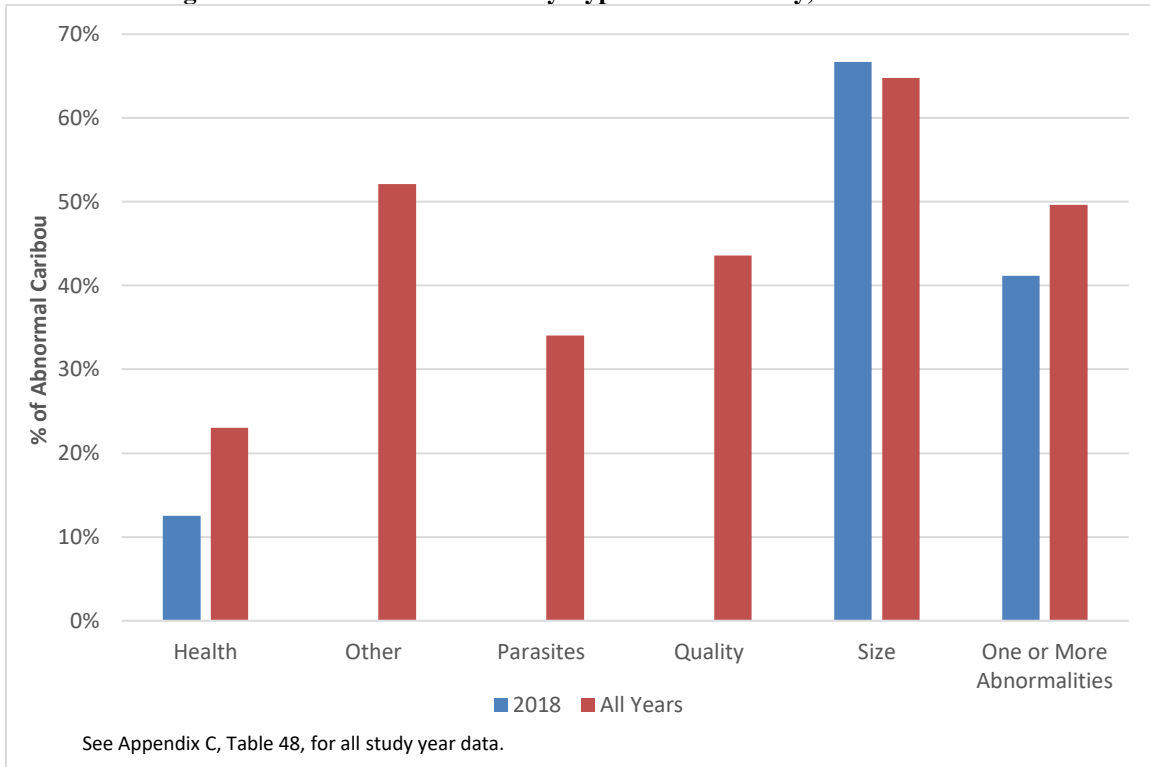
Stephen R. Braund & Associates, 2020.

Figure 38: Percentage of Abnormal Caribou by Type of Abnormality



Stephen R. Braund & Associates, 2020.

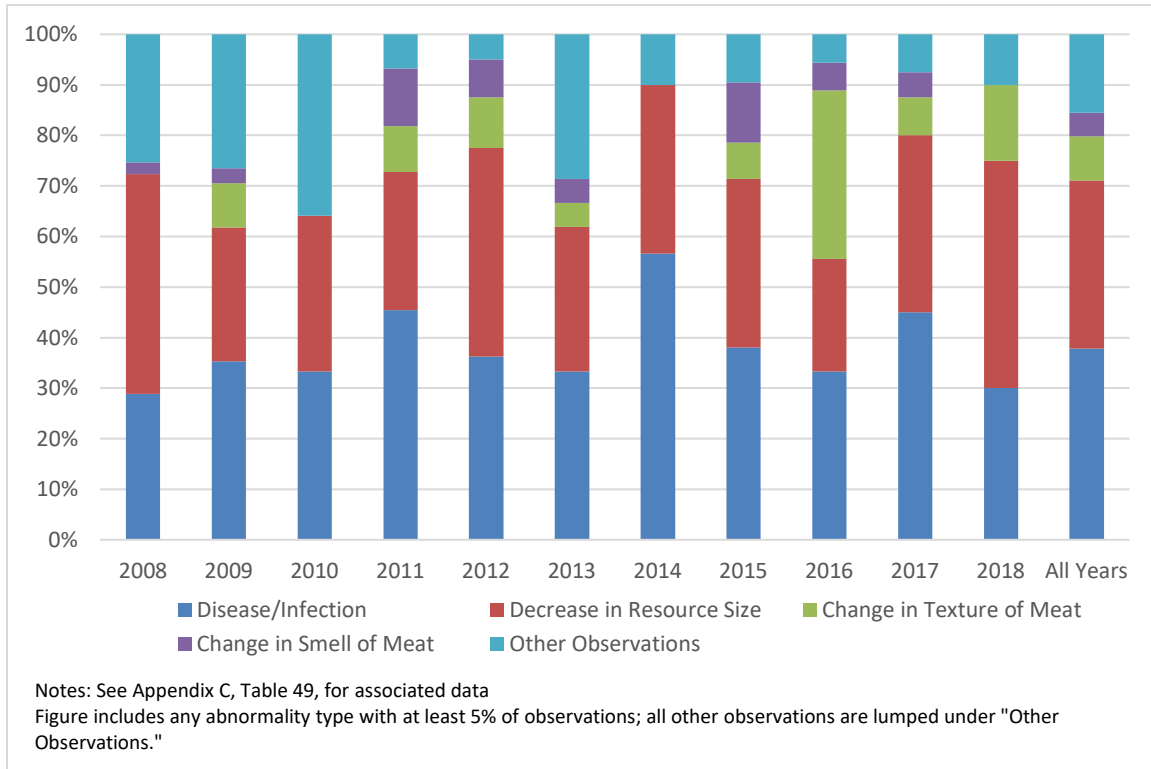
Figure 39: Percentage of Abnormal Caribou Used by Type of Abnormality, 2018



Stephen R. Braund & Associates, 2020.

As shown in Figure 40, the most commonly observed abnormalities in 2018 were Decrease in Resource Size (45 percent of observations); followed by Disease/Infection (30 percent); Change in Texture of Meat (15 percent). The most common “other observation” of abnormalities in 2018 was More Parasites (10 percent; Appendix C, Table 49).

Figure 40: Types of Observed Abnormalities, 2018



Stephen R. Braund & Associates, 2020.

Respondents who reported a decrease in resource size generally reported harvesting caribou that had less fat than usual (“Just no fat – no fat at all”) or that seemed skinny to an unhealthy extent:

[It was male] but that was [skinny]. No, [I didn't use it. It was] too skinny, all the other ones were nice and fat. It was too skinny, all bones. Normally when they are healthy you can't see through the ribs, but the one I got you could really see through the ribs—, really thin, barely any meat. (SRB&A Nuiqsut Interview November 2018)

One of them was kind of unhealthy, super skinny. I can't remember where. But I remember one of them was so skinny my grandma didn't want it because she thought it was so sick. I ended up having to give it to my dog. It looked okay other than that it was so skinny. It was much smaller than it should have been for its age. (SRB&A Nuiqsut Interview November 2018)

One resident harvested a caribou that was skinny, in combination with diseased or infected organs:

Yeah, [it was skinny]. You could see the pelvic bone in the back. From the distance, it looked healthy, it looked good. But when we got close and personal to it... It was brownish and green. That's when my brother stopped cutting. There was like a tumor or something on the stomach. That's what made us stop hunting there was something hard on the belly button. We just cut the head off and [trails off]. (SRB&A Nuiqsut Interview November 2018)

A number of those who observed Disease/Infection noted pus or a slimy substance in the ribs and legs of the caribou and discolored organs and/or meat¹:

Actually I got four out of the five but the fourth one was a sick one. But the fourth one had the lumps on its knees. And that seems to be reported all the time. The workers keep reporting that to me, but by the time I got to it, it was with several other caribous, and it had the bigger antlers, and I got it, and it had one of those legs looked like a pus leg, but it was like a yellow gel. I don't know, it was like this [yellow color] I was like this, skinning it, and then when I got to that I just decided to leave it. (SRB&A Nuiqsut Interview November 2018)

One of the hind legs [other hunter] and I was cutting was green and the then leg had white pus bubbles. We got [that sick caribou] on the Spur Road. We maybe had a good 15-minute walk to [the harvest location]. After we were done cutting them up, security came up to us and said, 'You can't leave them out there.' That was on the Spur Road. Security was asking, 'What are you guys doing?' ... Green on the hind leg, meat, and the other one had white pockets right here, I really wanted one to cut it off, and open it and see what it is, and take pictures, the pockets are that big, right here, I was like what the hell, the best part, my brother has found them on the spine, those pockets, we didn't eat them, we can't. (SRB&A Nuiqsut Interview November 2018)

Observations of a Change in Texture of Meat were generally reported in combination with observations of Disease/Infection and included meat and organs that were an unusual color and a tough or rough texture to the meat and/or bones. In the following quote, a respondent noted discolored meat and jelly-ish texture while butchering a caribou they harvested:

We had one that had a jelly shoulder. When I brought it home, it looked normal. It didn't smell different. It didn't look different either. But when I took the skin off, the whole one side was just jelly, like it had been hit or kicked. It looked like a recovering bruise. The meat was discolored and dark. [That was] just on the one area. I was able to use the rest of it. Just the one front arm [was sick]. I should have saved it [to have it tested]. It had a lot more jelly that it normally does. (SRB&A Nuiqsut Interview November 2018)

One respondent noted the presence of an abnormal number of bot flies in one of the caribou they harvested, saying,

Last year was bad, this year we saw a few of the fluid things from the bot flies. We sent specimens to the borough last year. Bot flies. I brought this to our elders here in Nuiqsut and I let them look at this especially in the abdomen area. Along here. From the bot flies. There was bot flies sticking out the side of their body. There were holes about that big... There was one more that we knocked a caribou down but we saved only the hind end because of the same bot fly things. That was in Itqiliq. I decided to save the leg and the marrow. They wanted the fluid type of thing so I sent it to them [NSB] both times. (SRB&A Nuiqsut Interview November 2018)

When asked by researchers what they thought caused the sicknesses observed in the caribou, most respondents reported not knowing or were unsure what could have caused the disease/infection. Those individuals who did discuss a cause for the abnormality cited wounds caused by injuries, contamination from development, including spills on ice roads and tundra, and warmer weather:

¹ These observations likely include instances of Brucellosis, a common disease in the Teshekpuk and Central Arctic Herd that is characterized by pus-filled swellings and swollen joints.

What I would think, my opinion—because you know, these ice roads, they don't clean them too good. The air and oil, they [caribou] just eat the grass and everything around here and where you find them over here they are small and skinny, they are funky, the fur we couldn't even use this year. The fur would just come off. That was the first time in my entire life I had seen that. (SRB&A Nuiqsut Interview November 2018)

I think maybe it just stay too long around the pollution. Some of those cars they stay in the same place, and then you could see like a pollution line on the snow. Or you never know if they been having trouble with the equipment [resulting in spills]. Like I been out there, and if they have trouble, they just dump their antifreeze right on the tundra, wherever they broke down. They did that right in front of me.... But it's like when they are out there no one is around and they can do anything. And that antifreeze is really attractive to the animals. That one time I was at my cabin and I left a little bit of that out, and I went in the cabin, and then when I went back out a white fox was licking that. It was on the nose and tongue. That's what it was doing, licking on that. In my mind that fox probably died. But they do get attracted to that stuff. (SRB&A Nuiqsut Interview November 2018)

There is more bot flies, maybe because of the warmer weather, I can't exactly say. When I was little, when we used to watch the caribous migrate here, we would watch the caribous go crazy because of the bot flies. Here they, can't go to the ocean [for insect relief] where it is cold. (SRB&A Nuiqsut Interview November 2018)

Several individuals indicated that all of the caribou they harvested during the 2018 time period were healthy, although some reported hearing of other individuals harvesting sick caribou:

No, I haven't seen any sick caribou lately. They are all healthy and a lot of fat on them. (SRB&A Nuiqsut Interview November 2018)

They're all healthy, there wasn't any sickness or any concerns. There was some weird stuff in one caribou, but that is the only thing I heard. (SRB&A Nuiqsut Interview November 2018)

The locations where respondents in 2018 reported harvesting caribou they perceived to be abnormal are depicted in red on Map 24, and locations identified during previous study years (2008-2017) are shown in gray. For the 2018 time period, respondents reported harvesting “abnormal” caribou in the overland area west of the community, along the Spur Road and GMT1 road, on the Itqiliq River, and at a single location on the East Channel. Locations of abnormal caribou were concentrated closer to the community than in some previous years, where abnormal caribou were harvested upriver toward Ocean Point, Sentinel Hill, and as far as Umiat.

During the 2018 household harvest survey, respondents were asked whether any of the caribou they harvested were sick or injured. In 2018, 17 percent of households reported harvesting sick caribou, within the range of previous years (Table 7). The number of sick caribou reported was also within the range of previous study years, at 27 caribou, which accounted for seven percent of all caribou harvested. Households reported using 19 percent of the sick caribou they harvested, somewhat higher than previous study years.

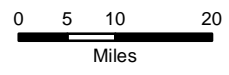
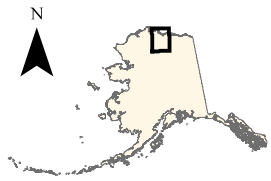


Map 24 - Harvest Locations where Respondents Harvested Abnormal Caribou, 2008 - 2018

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 161 active harvesters from March 2009 through February 2019.

Other areas may have been used for resource harvesting.

- Year 11: November 2017 - October 2018**
- 11 caribou harvest locations
9 respondents
- Years 1-10: January 2008 - October 2017**
- 266 caribou harvest locations
83 respondents



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Table 7: Household Harvest Survey Observations of Sick/Injured Caribou

Study Year	Percentage of HH Reporting Sick/Injured Caribou	Sick/Injured Caribou*		Sick/Injured Caribou Used by HH	
		#	%	#	%
2011	18%	21	6%	3	14%
2012	24%	40	10%	6	15%
2013	17%	33	7%	1	3%
2015	15%	15	3%	1	7%
2016	11%	26	7%	2	8%
2017	21%	57	11%	2	4%
2018	17%	27	6%	5	19%
All Years	18%	219	7%	20	9%

Notes: ADF&G data for 2014 (Year 7) not reported due to low response rate.

Stephen R. Braund & Associates, 2020.

Impacts on Harvesting Activities

In 2018, 68 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting², the highest since 2008, when 72 percent of respondents reported impacts on their caribou hunting, although many reported impacts in 2008 were more general impacts that had occurred since the Alpine development began³ (Figure 41; Appendix C, Table 50). The number of impact observations in 2018 (80) was also higher the previous eight study years (between 28 and 67 observations) and similar to the first two years of the study (87 and 82 observations, respectively) (Appendix C, Table 50).

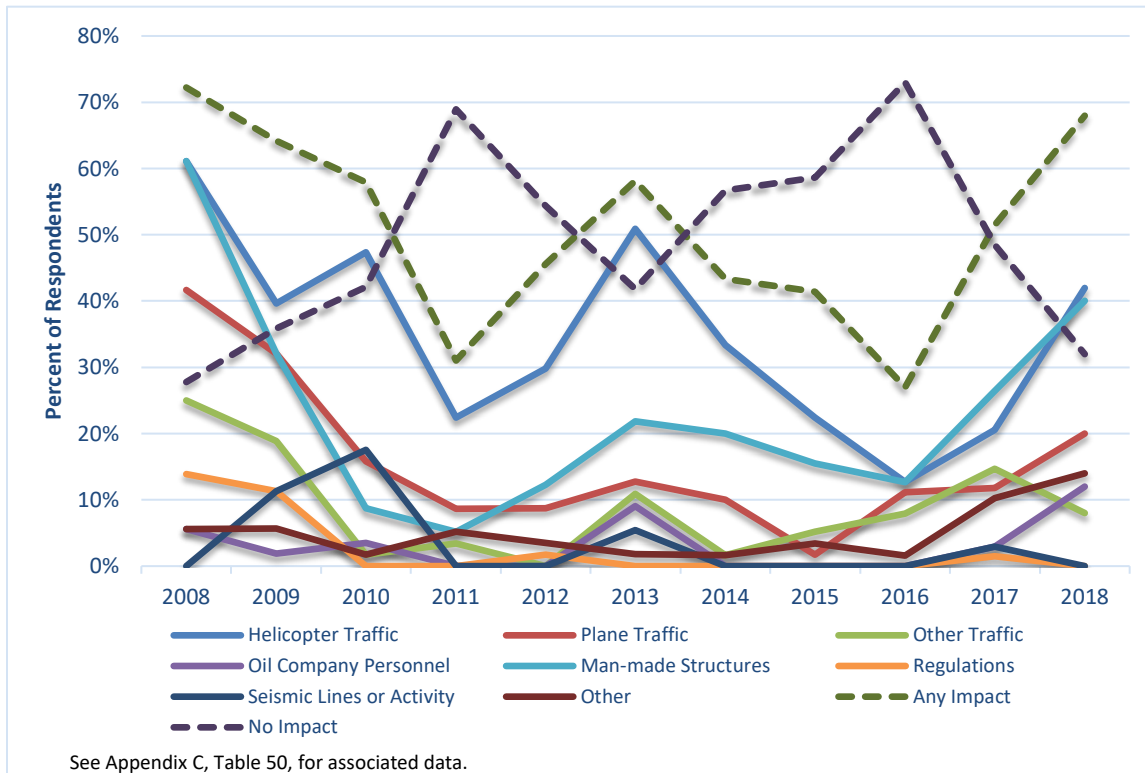
The most commonly reported impacts were related to helicopter traffic (42 percent of respondents, 30 percent of observations) and man-made structures (40 percent of respondents, 34 percent of observations). Other sources of impacts reported by Nuiqsut harvesters in 2018 included plane traffic (20 percent of respondents), “other” impacts (14 percent), oil company personnel (12 percent), and other traffic (eight percent) (Figure 41; Figure 42). The percentage of respondents reporting plane impacts in 2018 (20 percent) was higher than the previous eight study years, but within the range of all previous years (Figure 41; Appendix C, Table 50). The percentage of respondents reporting “other” impacts, in addition to the percentage of respondents reporting impacts associated with oil company personnel, was higher than any previous year. In 2008 and 2009, respondents were more likely to report impacts related to man-made structures—specifically pipelines—than in most subsequent years. This may be in part due to 2008 data collecting documenting changes that started since the beginning of the Alpine development and because residents were more likely to discuss indirect impacts (e.g., impacts of pipelines on caribou migration which indirectly affects harvester success) earlier in the study. In 2018, 40 percent of respondents reported impacts related to man-made structures, the highest since 2008 (Figure 41).

The increase in reported impacts in 2018 was also seen in the household harvest surveys, where the percentage of households reporting Alpine-related impacts (53 percent) was the highest of any individual study year (Appendix C, Table 52) and follows a trend of increasing impact reports during the household surveys (Figure 43).

² 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.

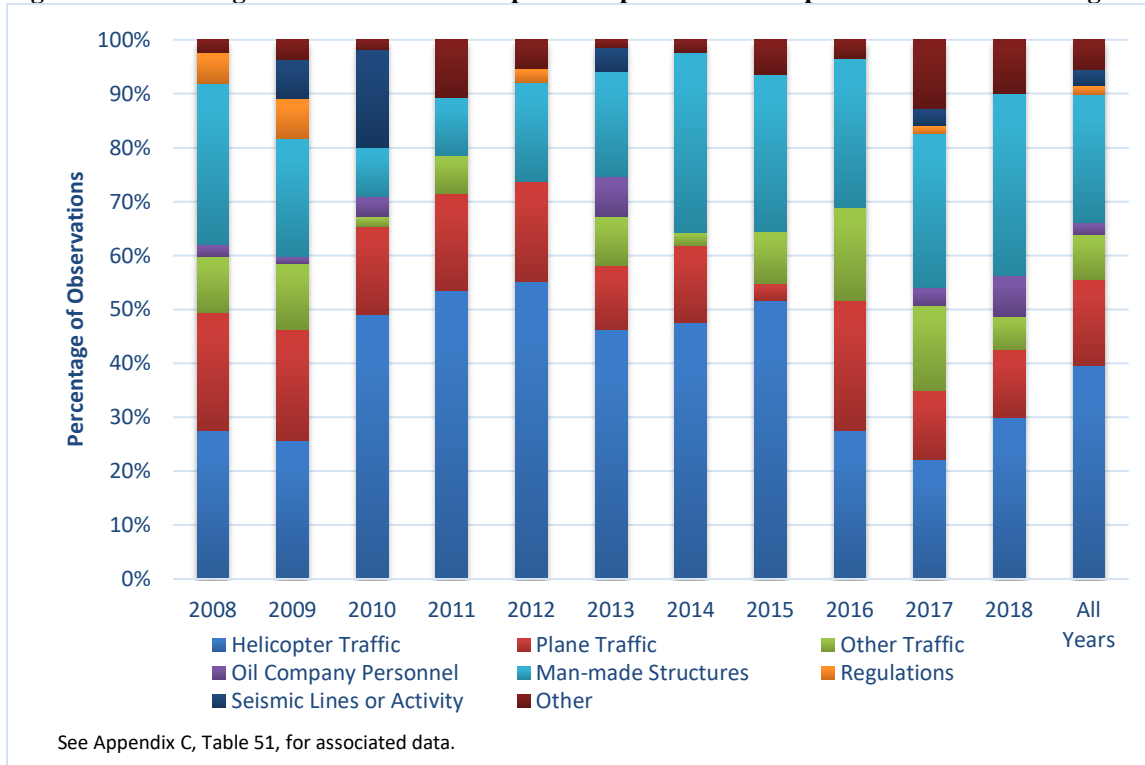
³ In subsequent years, interviewers were more careful to document only direct impacts that had occurred during the study year, in order to allow for monitoring over time.

Figure 41: Percentage of Respondents Reporting Alpine-Related Impacts on Caribou Hunting



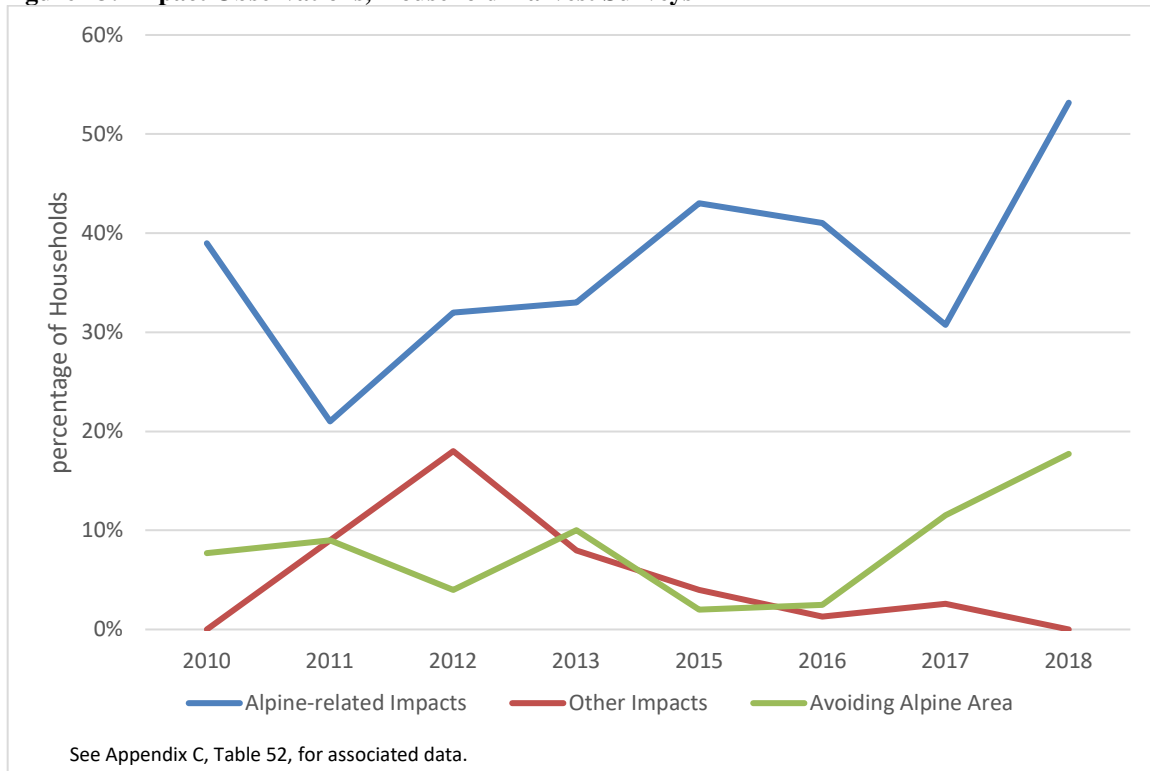
Stephen R. Braund & Associates, 2020.

Figure 42: Percentage of Observations of Reported Alpine-Related Impacts on Caribou Hunting



Stephen R. Braund & Associates, 2020.

Figure 43: Impact Observations, Household Harvest Surveys



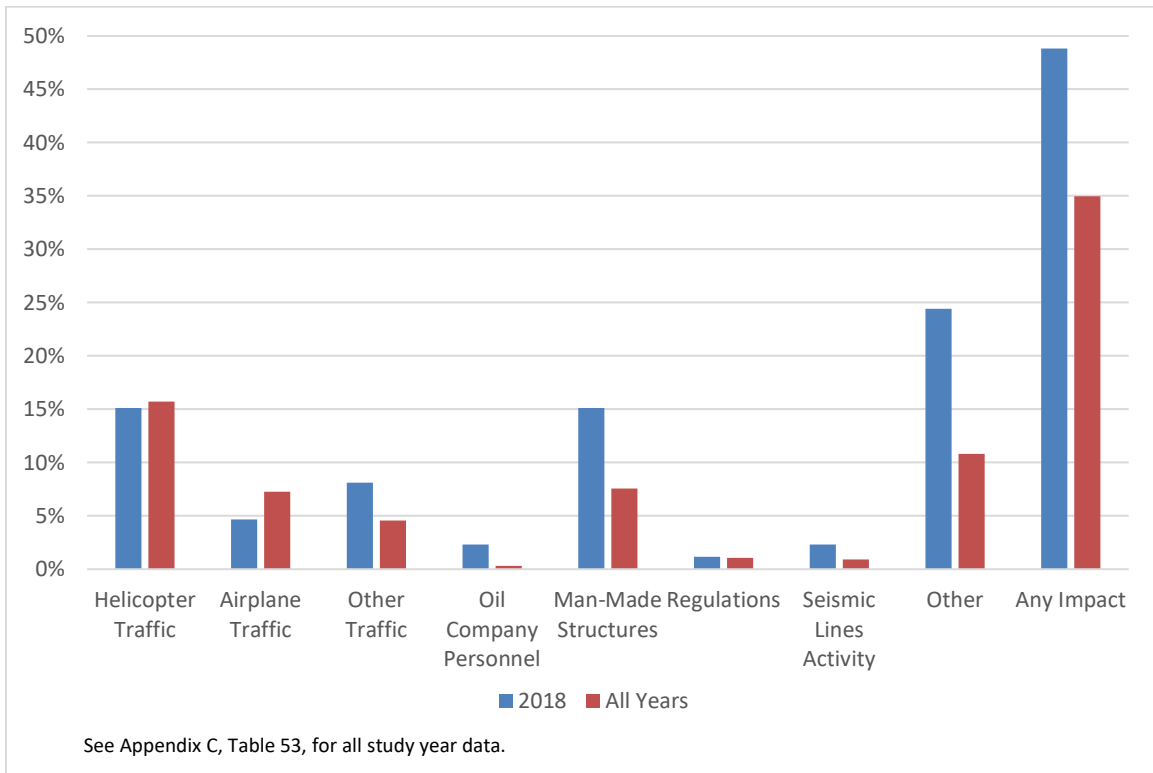
Stephen R. Braund & Associates, 2020.

The 2018 study year also showed 18 percent of households reporting avoidance of development areas altogether, higher than previous study years (Figure 43; Appendix C, Table 52). This percentage may actually be higher, as these observations were volunteered by respondents and not cued during the survey. For further discussion of hunter avoidance, see the section below, entitled “Reported Avoidance of Use Areas.” The types of impacts most commonly reported during the 2018 household harvest surveys were “other” impacts (24 percent), impacts related to man-made structures (15 percent), helicopter traffic (15 percent), and other traffic (eight percent) (Figure 44). The percentage of households reporting man-made structure impacts was higher than any previous year, while the percentage of households reporting helicopter impacts was within the range of previous years (Appendix C, Table 53).

Across all study years, over 70 percent of active harvester respondents have reported experiencing Alpine-related impacts on their caribou hunting during one or more study years, with over 50 percent reporting impacts related to helicopter traffic, over 40 percent reporting impacts related to man-made structures, and over 30 percent reporting impacts related to plane traffic (Figure 45).

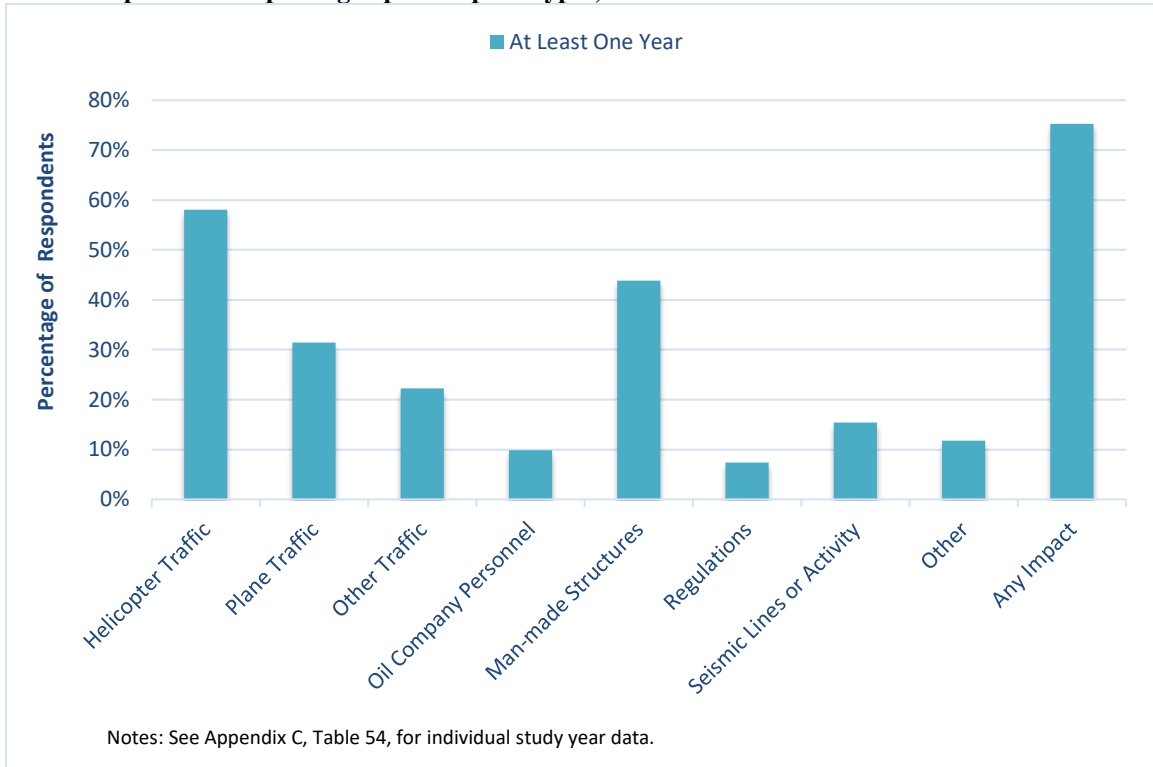
Figure 46 shows the number of reported impacts on caribou hunting of all types by month for all study years. Respondents do not always provide a specific month associated with a reported impact, instead indicating that the impact did not occur at a specific time or was more of a general and ongoing occurrence. The peak months for reported impacts in most years are June, July, and August, the same months as peak caribou hunting activity (Figure 46, Figure 8). However, impacts are reported year-round. In 2018, a somewhat higher percentage of impacts were reported to occur during the late fall, winter, and spring months (October through May). In addition, a higher percentage of impacts were reported to occur in June and July compared to many previous years. In general, it appears that more impacts were reported to occur “year-round” in 2018.

Figure 44: Impact Observations by Impact Types, Household Harvest Surveys, 2018



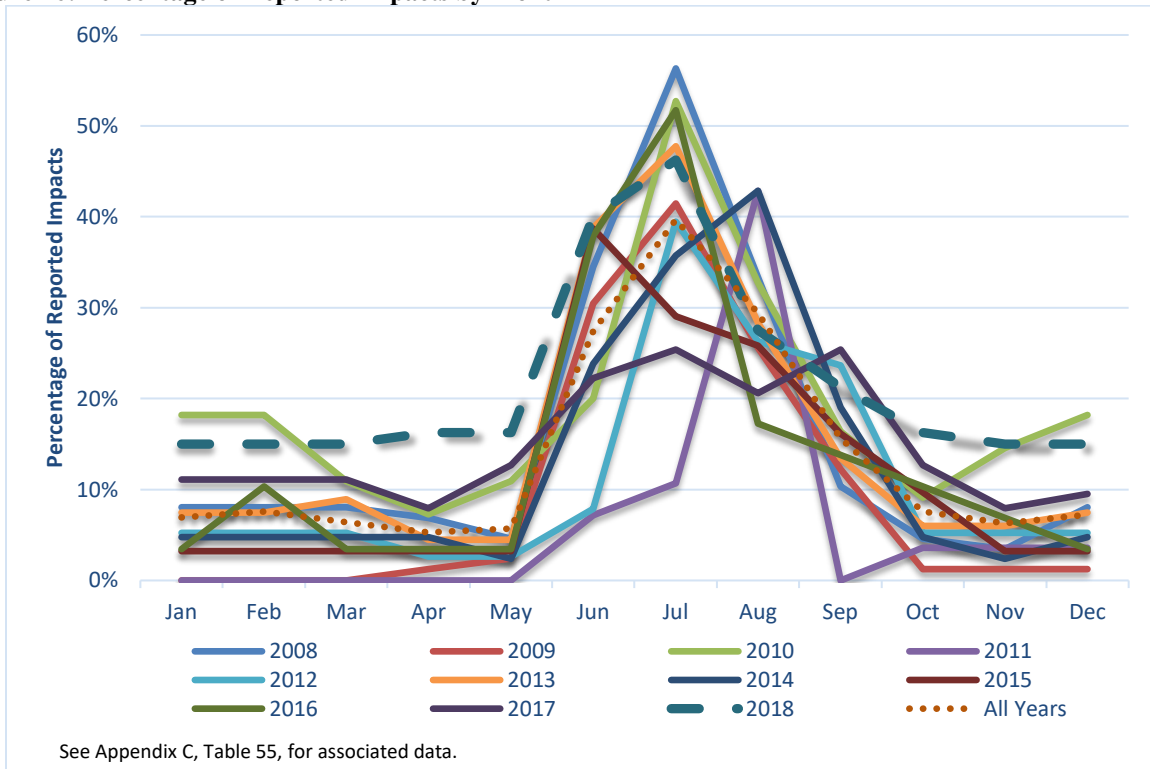
Stephen R. Braund & Associates, 2020.

Figure 45: Respondents Reporting Alpine Impact Types, At Least One Year



Stephen R. Braund & Associates, 2020.

Figure 46: Percentage of Reported Impacts by Month

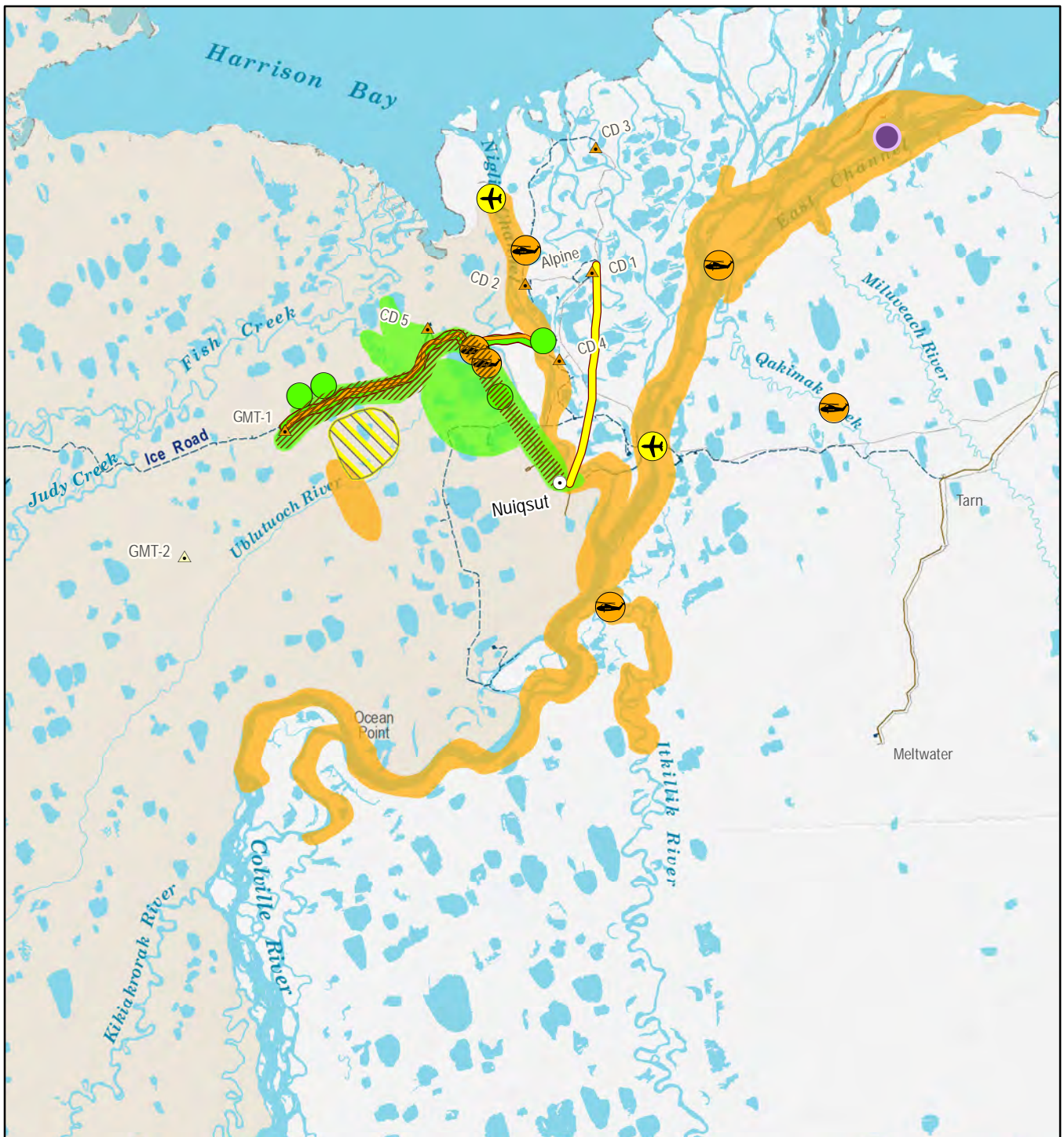


Stephen R. Braund & Associates, 2020.

Map 25 shows the locations of Alpine-related impacts reported by respondents in 2018. In some cases, respondents could not identify the location of an impact, noted that the impact was more general (e.g., general air traffic throughout the hunting season), 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 25, impacts in 2018 were primarily reported along the existing road system, to the west of the community, and along the Nigliq and East channels of the Colville River Delta. Impacts related to helicopter and plane traffic were located along the Spur Road and road to GMT-1, and at various locations along the Colville River, Nigliq Channel, East Channel, and on Itqiliq River and Qakimak Creek. Impacts related to manmade structures generally occurred along the road system between the community, the Nigliq bridge, and GMT-1. Other traffic impacts were also reported along the road system (presumably trucks and other road vehicles). Finally, one individual reported an “other” impact occurring near the mouth of the East Channel (Map 25). The specific nature of these impacts are described in the sections below.

Impacts of Helicopter Traffic

As shown in Figure 41, 42 percent of respondents reported helicopter impacts in 2018, a higher percentage than the last four years but within the range of all previous years (Appendix C, Table 50). Helicopter impacts accounted for 30 percent of the reported impacts during the 2018 study period (Figure 42), lower than the average of all years but within the range of previous years (Appendix C, Table 50). In recent years, respondents suggested that construction of the CD5 and GMT1 roads had decreased (although not eliminated) the need for helicopter traffic associated with development, which led to lower reports of impacts from 2015 through 2017. CPAI has also adopted a number of measures meant to reduce impacts to local subsistence hunters resulting from helicopter traffic. These measures include communication of daily

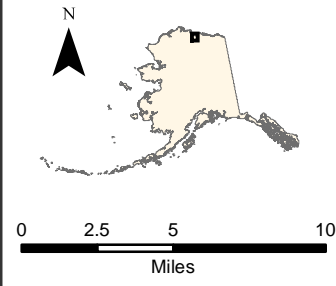


Map 25 - Perceived Alpine Related Impacts, 2018

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 50 active harvesters in November 2018 and February 2019.

LEGEND

- 17 helicopter impacts
14 respondents
- 11 structure impacts
8 respondents
- 2 other traffic impacts
2 respondents
- 4 plane impacts
4 respondents
- 1 other impact
1 respondent



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flight plans to community entities and local residents and hunters via KSOP and a local Subsistence Representative; daily helicopter coordination conference calls between community representatives and helicopter operators; and documentation of complaints from local hunters by KSOP. In 2018, reports of helicopter traffic were somewhat more common than the previous several years. Several individuals indicated that the increased traffic was associated with oil and gas exploration and development in the NPR-A to the west of the community:

The only difficulty we had was with the choppers, that just makes it more difficult sometimes when they are flying around. They always want to fly around when we are having spring break up, end of May until second week of June, I think they are monitoring that. It's always Conoco Phillips or BLM because they have been doing a lot of flying into NPR-A ever since there has been that stuff west of us. (SRB&A Nuiqsut Interview November 2018)

The choppers for Conoco Phillips, they have a certain route for them to check out there, there was a white [helicopter] and a green, yellow, and white [helicopter]. I thought when they see you they would go higher. Every time I went back behind the dump, [the helicopter] would be crossing back and forth this way. I'm not sure where it would land; somewhere over there. It leaves from east, goes west, checks something out there and then goes back east. [The green/yellow/white helicopter], it never really bothered me. It was just that white one. Just in August. I never had any problems with me and my dad. (SRB&A Nuiqsut Interview November 2018)

There were choppers over here and choppers on this side on the North of Fish Creek. BLM, Conoco Phillips and also towards Atiguru, BLM was back here and also towards Teshekpuk Lake and Conoco Phillips was in this area a lot. They do a lot of studies right in the middle of caribou migration. We always tell them that there is a time when you should not do your studies, you are just harassing the caribou.... Stick picking will be in July right in the heart of caribou migration. That is what we are telling Conoco too, is that you better start hiring locals with sleds to go get those. They go back in June and July right in the heart of caribou migration. [Impacts are from helicopters]. And from GMT1 to GMT2, this whole area is all impacted by studies. The Fish Creek area. And then you have BLM back here in the northwest Teshekpuk [area]. Summer it starts picking up. We haven't seen Teshekpuk herd come through yet, it is somewhere out there. It came and then turned back westward. We haven't seen them since GMT1 and CD5 was being built.... The summer studies don't bother us, it is just the choppers and the planes and that we are hearing their equipment out there. They stopped using the air boats too. (SRB&A Nuiqsut Interview November 2018)

Respondents also described helicopter activity to the east of the community along the East Channel in the vicinity of Pisiktagvik and Qakimak, associated both with COP and other operators:

Chopper activities going on everyday during hunting, people been recording those, we have meetings with those oil companies, low flying choppers in the area, disturbance yeah. In this area [near Pisigtagivik] we have been seeing a lot of chopper activity. Yeah, that's disturbing. One time when they had that meeting with ConocoPhillips, it was confirmed about helicopter activity in that area where we are hunting caribou. Conoco Phillips and oil companies. Armstrong, I think, USGS, they were doing a survey, couple years now, white geese, surveying, yeah. (SRB&A Nuiqsut Interview November 2018)

Just the Alpine facility that deflects—the activity going to Nigliq, there was [helicopter traffic] around that area [East Channel], I probably think so because they were just mainly flying around this area [East Channel] I don't know there's different helicopters going out, I know

they have different color codes and numbers on the tails, but I wouldn't know which ones. (SRB&A Nuiqsut Interview November 2018)

Respondents noted that caribou reactions to helicopter traffic result in the caribou moving away from hunters' locations, making them inaccessible on foot. This is particularly common when residents are hunting along riversides where all access to the caribou is on foot, or when hunting along roads without access to four-wheelers or snowmachines. Even small disruptions in caribou—such as the caribou moving away from riversides or to the other side of a lake, or moving more frequently and acting skittish—can result in an unsuccessful harvest for a hunter:

This side of the airport, lots of choppers that we were seeing below us. When we were up Itqiliq they were down below us. Seems like they were flying right above them [caribou], I don't know what they were doing, there's no reason for them [to do that], and I have no idea if they were tagging them or what. Yeah, couldn't get chopper numbers or nothing, just I know they were scaring caribou, yeah, they were reacting to choppers flying. Yeah, [they become] a lot more skittish. Takes them awhile to calm down. (SRB&A Nuiqsut Interview November 2018)

That was another thing, when we were in Nuiqsut a couple days after shooting those caribous we were going after maybe five tuttu on the other side, but a helicopter landed right on the cliff... we were going to [get those caribous] but that helicopter scared them away. That one was black. And it was a big helicopter too. That one made me mad, all the other times I didn't get mad, but [laughs]. (SRB&A Nuiqsut Interview November 2018)

There was a couple of helicopters and a couple planes, and that was about it. They ran off, they booked it. That was in the middle of summer because it was hot. The place might have been near August. It's always near Itqiliq. (SRB&A Nuiqsut Interview November 2018)

Where we found them was on the Spur Road. We were like, 'Why are they sticking around there?' Then just when my brother was about to shoot them, a helicopter flew over and [the caribou] went around the lakes. That would take us one and a half hour to walk, which wasn't happening... I believe it was ConocoPhillips, it was a green one, we could see it right there, it was green with a yellow stripe. July. He posted it, he notified the village, they did—they should have asked the village when your subsistence hunting time is. (SRB&A Nuiqsut Interview November 2018)

When asked to describe the helicopters causing the impacts, respondents most commonly reported “Unknown Owner” (42 percent of observations) followed by “ConocoPhillips Helicopter” (25 percent), red helicopters (13 percent), and helicopters for scientific activity (eight percent). A small percentage of helicopters were described as black, blue, and blue and white (Appendix C, Table 56).

Impacts of Airplane Traffic

Impacts related to airplane traffic were reported by 20 percent of respondents (Figure 41), higher than the previous five year average but within the range of previous study years (between two percent and 42 percent of respondents) (Appendix C, Table 50). Impacts related to plane traffic accounted for 13 percent of impacts in 2018 (Figure 42). Residents noted that plane traffic included regular flights to and from Alpine as well as other plane traffic and resulted in caribou acting skittish or running away from the source of noise. Active harvesters described 2018 impacts related to airplane traffic as follows:

That time I went to Nanuq, there was a bunch of planes flying low, like really low. When I was going there, there was a bunch of them flying around and they were super low. Like 207s.

Flying back and forth. I haven't seen [any other impacts] really, just those planes that were flying from Prudhoe. (SRB&A Nuiqsut Interview November 2018)

[We were] hearing the planes take off from where it takes off over near Alpine. That was maybe right around here, a little farther. I saw the plane out there but it was hard to explain now because it has been a while. We went out there and we heard the plane coming and the caribou were already running and then we didn't catch up with them because it started getting pretty rough out there. (SRB&A Nuiqsut Interview November 2018)

I have noticed that [plane traffic] when I have travelled, I have seen caribou all the time. The plane I saw this year, that the caribou seemed alarmed. I have never seen them act like that. (SRB&A Nuiqsut Interview November 2018)

When asked to describe the airplane affecting their caribou hunting activities, respondents reported “Unknown Owner” (50 percent of observations), followed by Alpine Airplane (20 percent), and an equal number of observations of a Twin Otter, Cessna, and white airplane (10 percent each) (Appendix C, Table 57).

Impacts of Other Traffic

Eight percent of respondents reported impacts related to other traffic (i.e., not helicopters or airplanes) in 2018, similar to previous study years (Figure 41). These observations accounted for six percent of Alpine impact observations, somewhat lower than the past several years (Figure 42). In most cases, participants noted that road traffic on recently built roads to CD5 and GMT1 and along the Spur Road causes caribou to avoid the area or reduces hunting success in the vicinity of the roads. Respondents provided the following descriptions of the impacts of road traffic on their caribou hunting activities in 2018:

The volume of gravel trucks and the presence they have are making our caribou go away. That's a lot of traffic and that's a lot of unwanted noise. They are going to avoid all those trucks. (SRB&A Nuiqsut Interview November 2018)

Industrial cars, the pipeline, the trucks—when they go by, those big loaders, those caribous are gone. About year-round, we're going to test it out this winter, me and my brother are getting ready to go look for them.... Once they hear one of those big trucks, 'Boom!' They are gone. (SRB&A Nuiqsut Interview November 2018)

Impacts of Oil Company Personnel

Twelve percent of respondents in 2018 reported experiencing impacts related to oil company personnel, higher than any previous study year (Figure 41). Impacts related to oil company personnel accounted for eight percent of all impact observations (Figure 42). In most cases, Nuiqsut active harvesters reported encountering oil company personnel on the local road system. In several cases, residents indicated that they were questioned by oil company personnel or were told by personnel that they were in a restricted area:

And I got one controversial caribou I need to talk about too. That was on that GMT 1 road. On that road I got one caribou, near the road, and then we were forced to stop hunting there. Just this time. This spring. We were out hunting out there, and then they come out there and they stop us and they tell us that we are not able to hunt there no more. And yet we have an assurance from Conoco Phillips that we can be hunting there no matter what. That's disrupting my caribou hunt! And then I never go again because of the security. That is not right. That was in May. June. First part of June. There was five caribous, and we just wanted one for the whaling feast, just one. That was right in the middle of where this took place. Do

they have a right to tell us to stop hunting in that area? Do they have a right? That is not right. I want you to put that in writing. (SRB&A Nuiqsut Interview November 2018)

I went there, last week, two weeks ago, I went to Nuiqsut road, and I was driving and they say, 'What are you doing here?' and I say 'I'm hunting the caribou, I see them right there,' and he said, 'No sir you have to turn around.' I say, 'What do you mean I have to turn back?' He said, 'Sir, I'm sorry.' I think it was a state road, connected to an Alpine road. (SRB&A Nuiqsut Interview November 2018)

The people working the employees for the oilfield, they say we have to stop, we tell them we know the rules and regulations, they always want us to know them, just in case. (SRB&A Nuiqsut Interview November 2018)

We got [that sick caribou] on the Spur Road. We maybe had a good 15-minute walk to [the harvest location]. After we were done cutting them up, security came up to us and said, 'You can't leave them out there.' That was on the Spur Road. Security was asking, 'What are you guys doing?' (SRB&A Nuiqsut Interview November 2018)

Impacts of Man-made Structures

Impacts related to man-made structures were reported by 40 percent of respondents in 2018, which is higher than every individual study year since 2008 (Figure 41; Appendix C, Table 50). As shown in Appendix C, Table 58, roads/bridges accounted for 41 percent of man-made structure impact observations, followed by general infrastructure (30 percent), pipelines (19 percent), and ice roads and bridges (seven percent). Roads and bridges have emerged as a reported impact in the last four study years, since the CD5, GMT1, and connected Spur roads were built.

Impacts associated with man-made structures as reported by active harvester respondents included the overall increasing presence of permanent infrastructure (e.g., the CD5 and Spur roads and the bridge over Nigliq Channel) and avoidance of these areas by some hunters; pipelines, roads, and other infrastructure blocking hunters from shooting at caribou; difficulty crossing or traveling on and off roads; and changes in caribou distribution and behavior due to the presence of bridges, roads, and pipelines. Several individuals repeated a concern from the past couple of years that the roads are too high and therefore act as a barrier to both caribou and hunter movement. Several individuals reported safety issues using the ramps along the road which are meant to provide access for local subsistence hunters, while one reported a need for additional ramps. COP has worked with the community to address concerns in specific locations, and in the winter of 2019 (after Year 11 interviews) added a ramp and upgraded existing ramps along the road system. However, during the 2018 study year respondents continued to report impacts along the road. Residents described impacts on hunter access associated with road height and design as follows:

You guys ever driven out there? [The ramp] is so high! There is an ATV pad and they built a ramp. There are maybe three miles between each one. There is no slope. If you fall you are going to fall 15 or 20 feet high. I don't like that road. I got stuck at their ramp with my snowmachine. From Nigliq bridge all the way west it is really high. We tell them to knock it down. It is too high. I got stuck and had to call for help on my snowmachine. They put a stop sign where you have to stop on the ramp and I got stuck. Slowly they are working on them but—I went out in April. I go shortcut by Kuukpik pad. ' (SRB&A Nuiqsut Interview November 2018)

There are certain areas that are too steep. They do need to make more of them [ramps]... Yeah, because there's none [no ramps] on the Spur Road, and it's good. But from the dump to KPAD I have never had any problems., just toward GMT1, we should show them where to

put them, I mean, I know four places that they should put them. (SRB&A Nuiqsut Interview November 2018)

In addition, several individuals reported that the presence and design of infrastructure affects caribou movement, particularly linear infrastructure such as roads and pipelines:

Well, structures. Roads. One is that GMT road being so high, you could see it from miles away. So they tend to follow that road, and some of them do cross, but not that many. Pretty much year round. And it could be the traffic on the road too. (SRB&A Nuiqsut Interview November 2018)

Just the bridge, that took a lot of hunting rights to cross the bridge because when the caribou don't want to cross that way, they don't want to cross that way, they are scared of the bridge, they went the opposite way, they didn't go in the water. I think it looks dangerous to them; that was curious to me. Why wouldn't they go in the water and walk by it, but they... yeah, by that bridge. That bridge took most hunting rights away from people that go hunting over there because they are not around. That was in August. (SRB&A Nuiqsut Interview November 2018)

This high part—even though they tried to put ramps where four-wheelers can go through, they still have no way of knowing how to make it so the caribou could go through. I don't know why. You could tell that's an impact. (SRB&A Nuiqsut Interview November 2018)

The pipeline [affected my hunting]; they [caribou] stay close to the road but do not want to cross. (SRB&A Nuiqsut Interview November 2018)

Respondents also expressed the belief that the presence of the GMT1 and Spur roads, in addition to associated traffic and hunting activities, has resulted in changes to caribou distribution in the region which requires residents to use the roads to access herds that are located farther north and west:

Probably, I'm pretty sure if GMT wasn't here they would be going that way, there used to be always some over here [west of the community] but now there's nothing, you have to go 20 miles. Not as much [caribou] as we used to [see]. The ones that stay right here I think stay all year [nearby the bluffs east of Itqiliq]. Once in a while probably, they are the ones that migrate, I don't know. Last week we saw two big bulls right here by Puviqsuq, you could still see the tracks right here [Puviqsuq]. (SRB&A Nuiqsut Interview November 2018)

Well, today, I'm seeing a lot of impact on the caribou on the new development going on. Ever since GMT 1 and GMT2 caribous are kind of, their migration patterns are shifting every year.

Just the height of the bridge if they could lower it and change the color, the caribou skin sees a long ways, the yellow orange they can see a long ways, the silver of the pipeline, that's what we noticed they avoid, when we couldn't get caribous in Anaktuvuk they were only on this side, but they weren't on this side. They should change the color of the bridge. Maybe they could do brown or green? You could see orange and yellow for a long ways. (SRB&A Nuiqsut Interview November 2018)

And I don't know if it was just me who noticed, but I noticed that going out for drives on GMT 1 the caribou don't come into this area very often any more. I hardly see any in this area at all. Year round [they are staying to that other side]. (SRB&A Nuiqsut Interview November 2018)

And you know that ice road that they built towards Stony Hill. That was impacting our hunting. Puviusuq. Right by the south side of us. That new road by Conoco. Ice road they made an ice road all the way there. And kind of swept away our caribous. It goes right past Pingo Beach. It is a new well that they built. (SRB&A Nuiqsut Interview November 2018)

Respondents also noted that the roads and associated infrastructure create more situations where hunters have to take human safety into account. Several individuals described the difficulties associated with hunting near human activity and man-made infrastructure, indicating that when caribou are situated between hunters and infrastructure, hunters must either relocate themselves (if possible) or abandon the hunt. One individual noted that hunting near development presents a new set of challenges which must be taught to younger hunters. Active harvesters described the impacts of man-made structures on hunting safety as follows:

I did go out there [GMT1] but there was hardly anything out there. The caribous that were out there stayed right by the pipeline. I really wanted to shoot some caribous that were right by the pipeline, but I didn't want to shoot towards the pipeline. (SRB&A Nuiqsut Interview November 2018)

When I brought [other resident] out, I was going to teach her how to cut a tuttu by herself. She already knows how to shoot a gun. I teach her that, to look before shooting: 'Now see this oil rig, that oil rig, and that oil rig, and that's where town is, and we can't shoot in any of those directions.' So, yeah, I had to teach her about that. That's kind of why she learned on the GMT1 road because she could shoot this way [south]. But the thing is this little area, they like that. Right before, the first oilrig that you hit, it's before that one. Yeah, KPAD, right before that.... The workers were right here, Nuiqsut was right here, the oil rig you could see on the other side of the river, [you have] CD5, KPAD—so it's hard. After KPAD the tuttu really like the swampy [vegetation], I don't know what you call it, it's swampy when you get off the road, but they are always over there. (SRB&A Nuiqsut Interview November 2018)

The worst is when they are by the pipeline, we can't shoot toward the pipeline. Workers had to stop and wait 'til we're done, I tried to scare them [away from] the pipeline; they just looked at me. My brother was mad, it was that damn pipeline, we couldn't shoot it because we'd hit it and go to jail. I hate that pipeline. (SRB&A Nuiqsut Interview November 2018)

Well, it was kind of hard hunting over here. I was out here where I saw them, and I had to go around where I saw them to avoid shooting at the oil fields. (SRB&A Nuiqsut Interview November 2018)

While this section focuses on the negative impacts of man-made structures on caribou hunting activities, hunters acknowledged in 2018 that they continue to use roads for caribou hunting, and for many, roads provided access to hunting areas that they would not otherwise be able to access. During the 2018 household harvest surveys, the study team added questions regarding road use in order to better characterize use of the road system for the community as a whole. As shown in Table 8, just over half of households (54 percent) reported using the road system to hunt caribou in 2018. Use of roads lessened somewhat with distance from the community (e.g., 40 percent of households used the road between Alpine CD5 and GMT-1 versus 52 percent of households who used the Spur Road). In addition, the percentage of households using the road east of the Spur Road toward Alpine was substantially lower than other road sections. It is unknown why fewer households use certain portions of the road system; however, possible reasons for decreased use include distance from the community, more concentrated nature of drill sites and roads in certain areas, or the relative lack of caribou in certain areas (e.g., in the middle Colville River Delta). In order to access the roads connecting Alpine, CD5, and GMT-1 by vehicle, one must travel along the Spur Road; hence, use of this area is naturally higher than use of other road areas.

Table 8: Nuiqsut Household Use of Roads for Caribou Hunting, by Road Area, 2018

Road Area	Percentage of Households Using ^a
Any roads	54%
Spur Road (Area 1)	52%
East of Spur Road toward Alpine (Area 2)	10%
West of Spur Road to CD5 (Area 3)	45%
Between CD5 and GMT-1 (Area 4)	40%
Note: CD5 (Colville Delta 5); GMT-1 (Greater Mooses Tooth 1)	
^a Total number of households was 70.	

Stephen R. Braund & Associates, 2020

Of the households who used roads in 2018, 50 percent cited the ease of access to hunting areas as their reason for using the road, while around one-quarter mentioned the lack of access to non-road methods of transportation (i.e., did not have a boat or snowmachine) (Table 9). A total of 18 percent of households reported using roads due to the availability of caribou along the road system. Of those households who did not use roads in 2018, 38 percent cited a preference for non-road modes of transportation (e.g., boats), while 25 percent indicated that they avoided roads due to industry. A total of 13 percent cited a general preference for other forms of (non-road) hunting. In summary, 46 percent of households reported not using roads, and a majority of those households indicated they did not use roads due to personal preferences, including preferred or available transportation methods, or general avoidance of industry.

Table 9: Reasons for Using or Not Using Roads for Caribou Hunting, 2018

Reason	Percentage of Households Using Roads ^a	Percentage of Households Not Using Roads ^b
Ease of use	50%	–
Transportation method	26%	38%
Avoid industry	–	25%
Resource availability	18%	9%
Personal preference	–	13%
Security restrictions	–	3%
Funds	3%	–
No reason specified	16%	16%
^a Total number of households using roads was 38.		
^b Total number of households not using roads was 32.		

Stephen R. Braund & Associates, 2020

While impacts related to man-made infrastructure, including hunter avoidance, have occurred over the study years, Nuiqsut hunters continue to harvest caribou in proximity to these areas. As shown in Table 10, over the 11 study years, between three and 36 percent of reported caribou harvests have occurred within 2.5 miles of infrastructure, and between 12 and 61 percent of respondents have reported harvesting caribou within 2.5 miles of infrastructure. Years 2015 through 2018 show an uptick in the number and percentage of caribou harvested within 2.5 miles of infrastructure, which likely reflects use of the Spur Road, CD5 road, and GMT1 road by residents to hunt caribou, as well as the increasing presence of infrastructure within previously used harvesting areas. The percentage of caribou harvested within 2.5 miles of infrastructure in 2018 (36 percent) was higher than previous study years, and the percentage of respondents harvesting caribou in those areas (59 percent) was on the high end of previous years. It is important to note that the percentage of harvests occurring within 2.5 miles of infrastructure will naturally increase as infrastructure moves closer into the community's core hunting area.

Table 10: Nuiqsut Caribou Harvested Within 2.5 Miles of Infrastructure

Study Year	Within 2.5 Miles of Infrastructure ¹	
	Number (%) Caribou Harvested	Number (%) Respondents Harvesting Caribou ²
2008	28 (8%)	15 (42%)
2009	32 (11%)	11 (24%)
2010	45 (12%)	18 (33%)
2011	56 (17%)	23 (42%)
2012	57 (16%)	20 (38%)
2013	7 (3%)	6 (12%)
2014	58 (11%)	20 (36%)
2015	88 (22%)	26 (53%)
2016	87 (28%)	24 (44%)
2017	88 (28%)	38 (61%)
2018	93 (36%)	27 (59%)

1 Each year is analyzed based on permanent infrastructure present during that year. In 2017, infrastructure related to the CD5 and GMT 1 project was added to the analysis for those years.
2 Percentages are based on the number of respondents who reported successful harvests during the study year, not the total number of active harvester respondents.

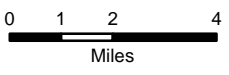
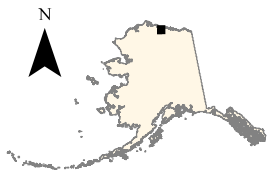
Stephen R. Braund & Associates, 2020.

Because the Nuiqsut Caribou Subsistence Monitoring Project and associated data collection did not begin until after construction of Alpine Satellites CD1 through CD4 was complete, pre-development data on caribou harvest levels in those areas are not available. Thus, it is not possible to provide pre- and post-development comparisons – such as number of caribou harvested by harvest location - for those (CD1 through CD4) developments. However, it is possible to provide such pre- and post-development comparisons for areas west of Nigliq Channel, including areas surrounding the Nigliq Channel bridge, Spur Road, CD5 road and pad, and GMT1 road, which were all constructed at least six years after data collection began. Such comparisons can help understand whether harvests or harvest activity has decreased or increased within project vicinities from baseline conditions. As shown in Table 11, harvests in the area of infrastructure built after the monitoring study began (Map 26) have varied on annual basis with an increase in 2018 over previous years (35 percent of caribou harvested compared to between 11 and 26 percent in previous years). The percentage of respondents harvesting caribou within the infrastructure area (54 percent) was on the high end of previous years. Thus, the data indicate that while caribou have always been harvested in substantial numbers within the currently developed area, recent road construction has possibly increased the amount harvested within that area.



△ GMT1

National
Petroleum
Reserve
in Alaska



Map 26 - 2014 to 2018 Infrastructure Analysis Area

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 121 active harvesters from November 2013 through February 2019.

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ConocoPhillips Alaska, Inc. (COP) Infrastructure

- Infrastructure Analysis Area (2.5 mile buffer of infrastructure)
- Local Placename
- COP Existing Pad
- Above Ground Pipeline
- Gravel Footprint
- National Petroleum Reserve Alaska

Table 11: Percentage of Caribou Harvesters and Harvests within 2.5 Miles of Nigliq Bridge, Spur Road, CD5 Road and Pad, and GMT1 Road

Study Year	Number (%) of Caribou Harvested	Number (%) of Respondents Harvesting Caribou	Development Action/ Infrastructure
2008	41 (11%)	15 (42%)	
2009	45 (16%)	16 (36%)	
2010	64 (18%)	25 (46%)	
2011	62 (19%)	26 (47%)	
2012	75 (22%)	25 (47%)	
2013	72 (26%)	26 (52%)	
2014	60 (11%)	20 (36%)	Construction of CD5, Nigliq Channel bridge, and Spur Road
2015	55 (14%)	22 (45%)	CD5, Nigliq Channel bridge, and Spur Road completed
2016	71 (23%)	23 (43%)	
2017	79 (25%)	34 (55%)	Construction of GMT1 road and operational (3 months)
2018	90 (35%)	25 (54%)	Construction of GMT1 pipelines and begin GMT1 drilling and operation.

Stephen R. Braund & Associates, 2020.

Impacts of Other

A higher than usual percentage of respondents in 2018 (14 percent) reported impacts which did not fit under the seven impact categories discussed above. In previous study years, less than five percent of observations were categorized as “other” impacts. “Other” impacts which were reported by active caribou harvesters in 2018 included blasting associated with gravel mining, brightly colored infrastructure deflecting caribou, noise from construction activities and equipment, noise from drilling, and cumulative impacts of development:

Too much activities there. there is always construction on something. Right where we went, right over here, there was some construction going on on the shore. That is what they call the state side. That inside of Colville River is the state side. [Near Nuiqsupiaq] we were right on it, right on Nuiqsapiaq. (SRB&A Nuiqsut Interview November 2018)

Respondent 1: There was concerns about the GMT1 road that there was a big green pumphouse and it was a long distance from the road and a lot of resources. It was bright green, fluorescent waterline.

Respondent 2: From the lake to the water house.

Respondent 1: By this big lake right here [near GMT1]. It was during the summer season during the migration. They reported their concerns and it was acknowledged. (SRB&A Nuiqsut Interview November 2018)

I have seen whole big herds startle from the oil rigs. I was a flagger. There is that impact of the human activity. Any time you have human activity it affects all of the wildlife in that area. If you guys were Conoco people, trust me you guys would get an earful. (SRB&A Nuiqsut Interview November 2018)

The caribous are not totally eradicated from there [Nigliq and East Channel] but they are affected. When you have an extreme amount of activity within a vicinity of a lot of caribou, no matter what, you are going to deflect them. Whenever you have a large percent of human

activity: trucks, helicopters, movement, all of the above. These animals see them from a long distance and a lot of them turn when they see them from a long ways. Wherever the activity is, they are diverted. It doesn't have to be where a facility or a structure is in place, but the traffic. These caribous don't know that this is a drill rig. Animals have a tendency to just be themselves and go away. I can't say compared to my time living here since '73, the deflection of caribou is really evident now. When you think about how a large percent of the caribou has died off or mingled with other herds. There is concerns that the population is slow here, but in addition to that all of these oil activities, these animals all of them, we seem to go through this over the last ten years, talking about this but I try to put what I am looking at—trying to paint a picture of what I am looking at out there. (SRB&A Nuiqsut Interview November 2018)

The explosions [from gravel mining and blasting] and the fires, they're going to do it again. This is the third year again. They're doing gravel mining just right over here. That's going to affect our caribou again. They say one more year; so next year [they'll be finished at the gravel site]. But then it's going to be another year.... They didn't make no promise about lower explosions, we don't know what we are going to get this year. We are still waiting for them to fix, it shook the houses, and how many got cracks like this, our walls, nobody came or anything, it's the third year, nobody came and talked to us about damages to the windows and houses, our caribous are dropped off. Oil Search said they are going to get their gravel [from the Arctic Slope Regional Corporation [ASRC] mine]. Yeah, that's ASRC. We try to appeal to them during the meetings, but it's probably financially motivated. (SRB&A Nuiqsut Interview November 2018)

Non-Alpine Impacts

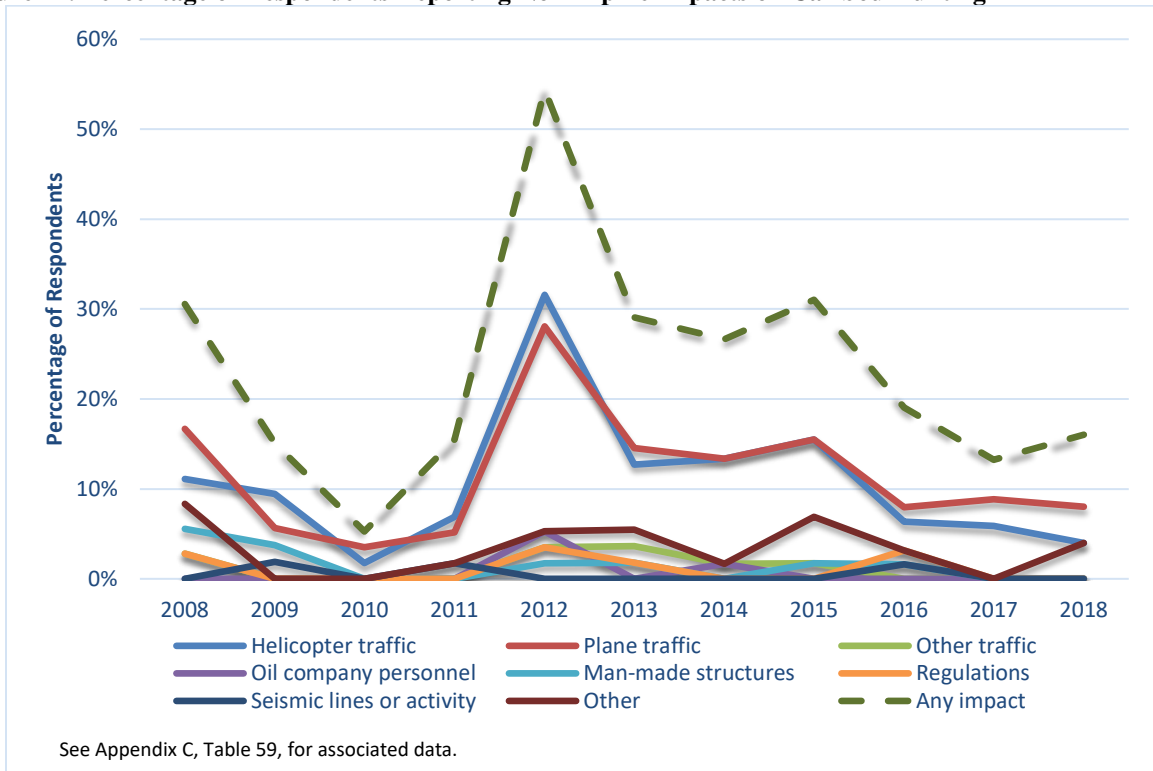
In addition to impacts attributed to the Alpine or Alpine Satellites developments, the study team also documented non-Alpine impacts when volunteered by respondents. In these cases, respondents indicated that the impact was from a different source, or they were unsure of the source of the impact and 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 Figure 47, 16 percent of Nuiqsut respondents reported at least one type of non-Alpine impact in 2018, lower than but within the range of previous study years (from five percent of respondents [2010] to 54 percent [2012]). Similar to previous study years, a majority of non-Alpine impact observations pertained to plane traffic (42 percent of observations) and helicopter traffic (33 percent) (Figure 48). Non-Alpine impacts in 2018 focused on general air traffic, including commercial flights, sport hunting guides, and surveys conducted by government agencies and other oil companies; increased pressure on search and rescue resulting from increased road use; and impacts of sport hunters along the Dalton Highway:

The only thing I can think of is that plane that was flying really low this way towards fish creek. It was a little cubby plane. We were at the cabin, Nigliq cabin. In July, the middle of July. (SRB&A Nuiqsut Interview November 2018)

Armstrong, I think, USGS, they were doing a survey, couple years now, white geese, surveying, yeah. (SRB&A Nuiqsut Interview November 2018)

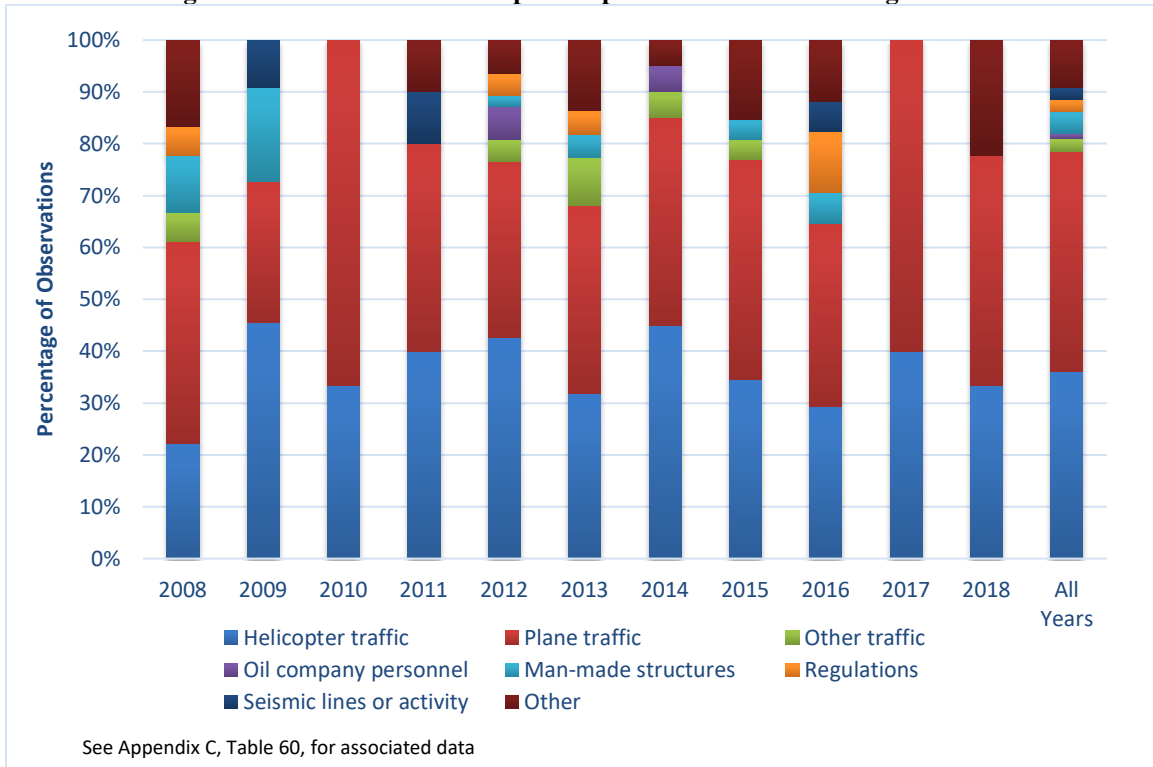
Yeah, there was airplanes that we kept hearing and helicopters. It was more during June, I think. Planes and helicopters. Those planes towards Umiat those were probably guide hunters, I don't know. But there was a lot that just kept going by. (SRB&A Nuiqsut Interview November 2018)

Figure 47: Percentage of Respondents Reporting Non-Alpine Impacts on Caribou Hunting



Stephen R. Braund & Associates, 2020.

Figure 48: Percentage of Observations of Non-Alpine Impacts on Caribou Hunting



Stephen R. Braund & Associates, 2020.

We seem to have an increase of rescuing people. During the wintertime, a lot of rescues towards the mouth of the Colville because of the trucks. That is part of the effects of this—that's part of the big picture. It seems to me that the people involved want assistance from the oil people to recover these vehicles. They keep asking for their help. I noticed that. As if they are responsible. I have seen it to where we have to go out there in December when there is really no road. They have to go out there and rescue them. But when there is a road and there is a convoy, they help each other get out of the mess. Those people who go shopping to Fairbanks and Anchorage will go all together. (SRB&A Nuiqsut Interview November 2018)

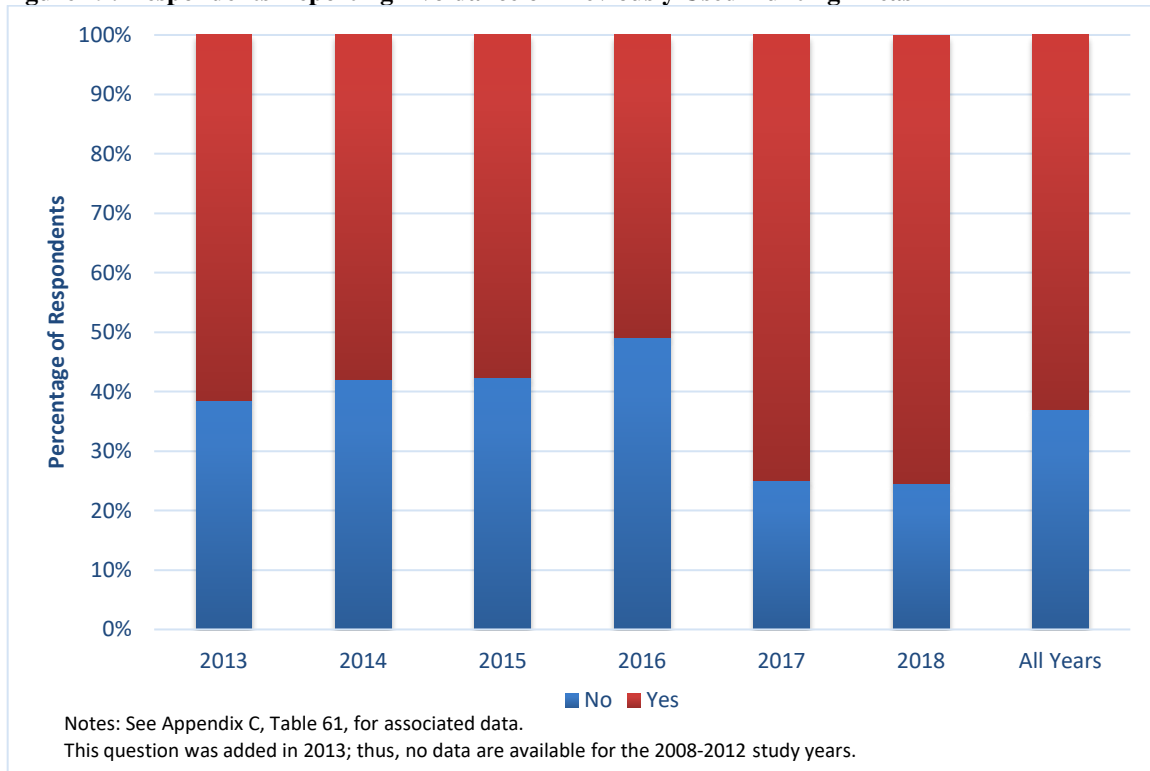
When I'm not hunting, I travel, and I travel on the Dalton Highway. And the worst are the bow and arrow people hunting... they don't let the caribous cross! You're heading home and the caribous, when they first start coming they are trying to go across, so they can come this [western] way. They are trying to cross, but the bow and arrow people don't let them cross. And that's what really gets into my way. Err [makes angry face]. Yeah, I see it every year. I like to travel a lot. I just don't do my hunting all the time... but that's the worst part I see on the Dalton Highway. It's from Atigun Pass, coming this [western] way. Atigun Pass, Toolik Lake, Happy Valley, and Toolik: Those are the main ones we go through and there's always lots of caribou hunters and they' don't let them cross. It's terrible. I've seen it many many times. Mmm hmm, even close to Prudhoe. For tourism, the plane goes down [low] on the caribou; it's terrible. It scares them. I don't like that, it hurts me. That's not just me, it's the people from here, Anaktuvuk [Pass] and Kaktovik. That's why we had people from Anaktuvuk [Pass] come here to go caribou hunting because they are getting so impacted by those crazy people. I don't know what to say... it hurts me. (SRB&A Nuiqsut Interview November 2018)

Reported Avoidance of Use Areas

As shown in Figure 49, the percentage of respondents who reported no longer using or avoiding certain areas in 2018 (76 percent) was higher than all previous years for which data are available, but only slightly higher than the previous year (Appendix C, Table 61). The increase in reported avoidance during the active harvester interviews is consistent with an increase in the percent of households who volunteered they avoided the Alpine area during the 2018 household harvest surveys (see Figure 43). In 2018, the most commonly mentioned places avoided were the Nigliq Channel (21 percent of observations), followed by Alpine/Alpine Satellites and Fish Creek (13 percent of observations); East Channel and Upper Colville River (eight percent); and Nanuq (six percent) (Figure 50 and Figure 51). Other areas mentioned less frequently included Nigliq, “Various Areas,” *Kuupaqullurak*, the area West of Nuiqsut, Itqiliq River, East of Nigliq Channel, Teshekpuk Lake, Atigaru Point, the area West of Colville River, and Judy Creek (Appendix C, Table 62 and 63). Reports of avoidance of Nigliq Channel in 2018 were higher than previous years (Figure 50, Figure 51; Appendix C, Table 62 and 63).

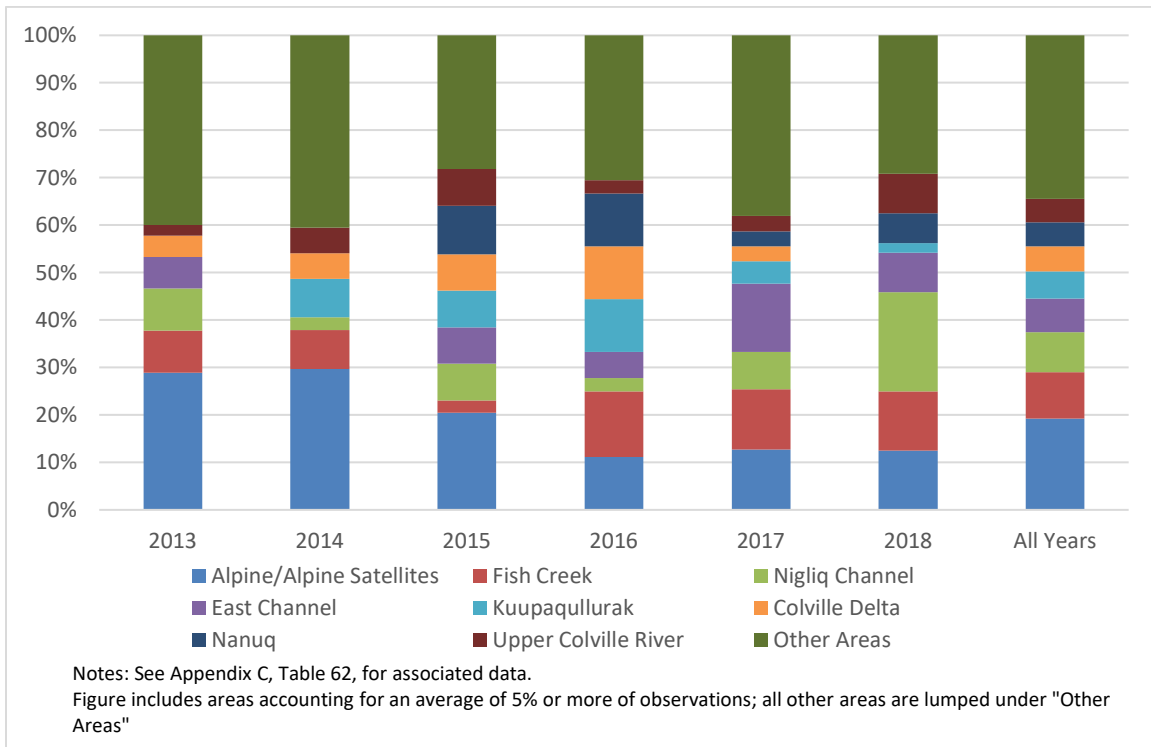
The causes cited for avoiding certain areas (in terms of percentage of observations and percentage of respondents) are shown in Figure 52 and Figure 53. Similar to previous study years, in 2018, Development Causes were most commonly cited (56 percent of observations), followed by Environmental Causes (27 percent), and Personal Reasons (15 percent). The percentage of observations attributed to development causes, environmental causes, and personal reasons were within the range of all individual study years (Figure 52; Appendix C, Table 64). However, the percentage of respondents citing development causes in 2018 (47 percent) was on the high end of previous individual study years, which ranged from between 31 and 46 percent of respondents (Figure 53; Appendix C, Table 65). Specifically, in 2018 respondents most frequently cited development infrastructure (33 percent), followed by development activities (22 percent of respondents). Other commonly cited causes included resource availability (22 percent of respondents) and environmental factors (14 percent).

Figure 49: Respondents Reporting Avoidance of Previously Used Hunting Areas



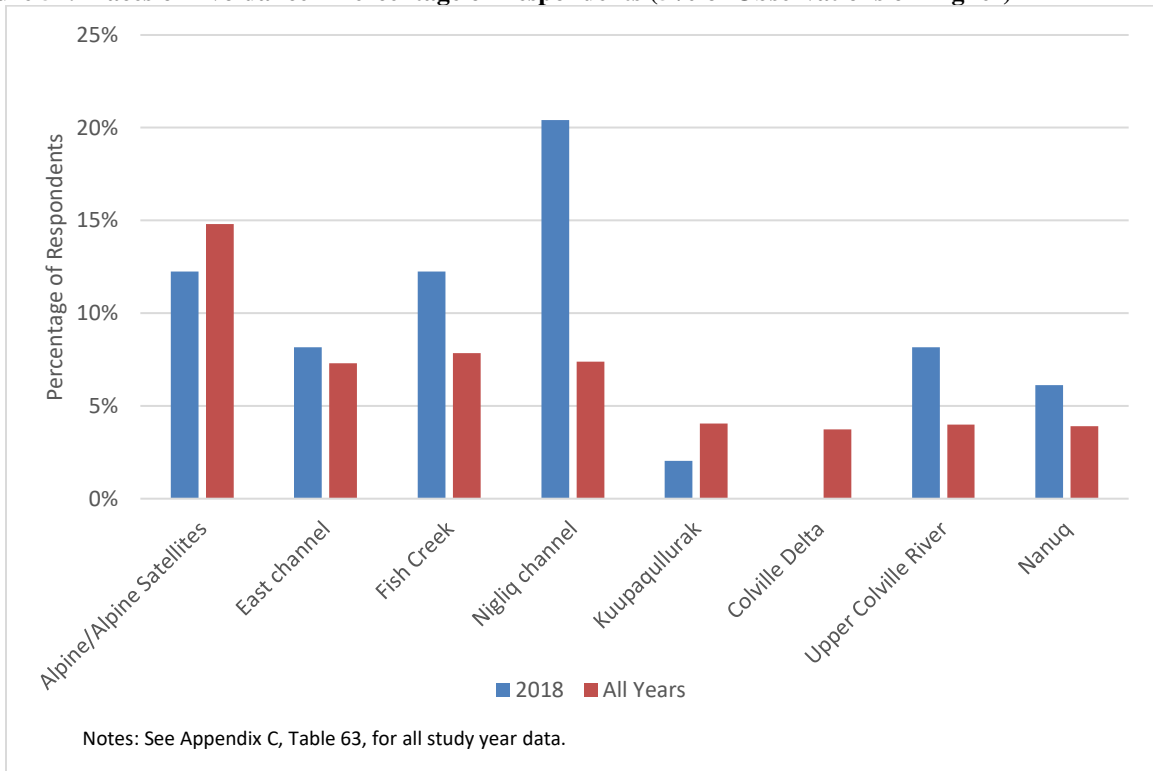
Stephen R. Braund & Associates, 2020.

Figure 50: Places of Avoidance – Percentage of Observations (5% or Higher)



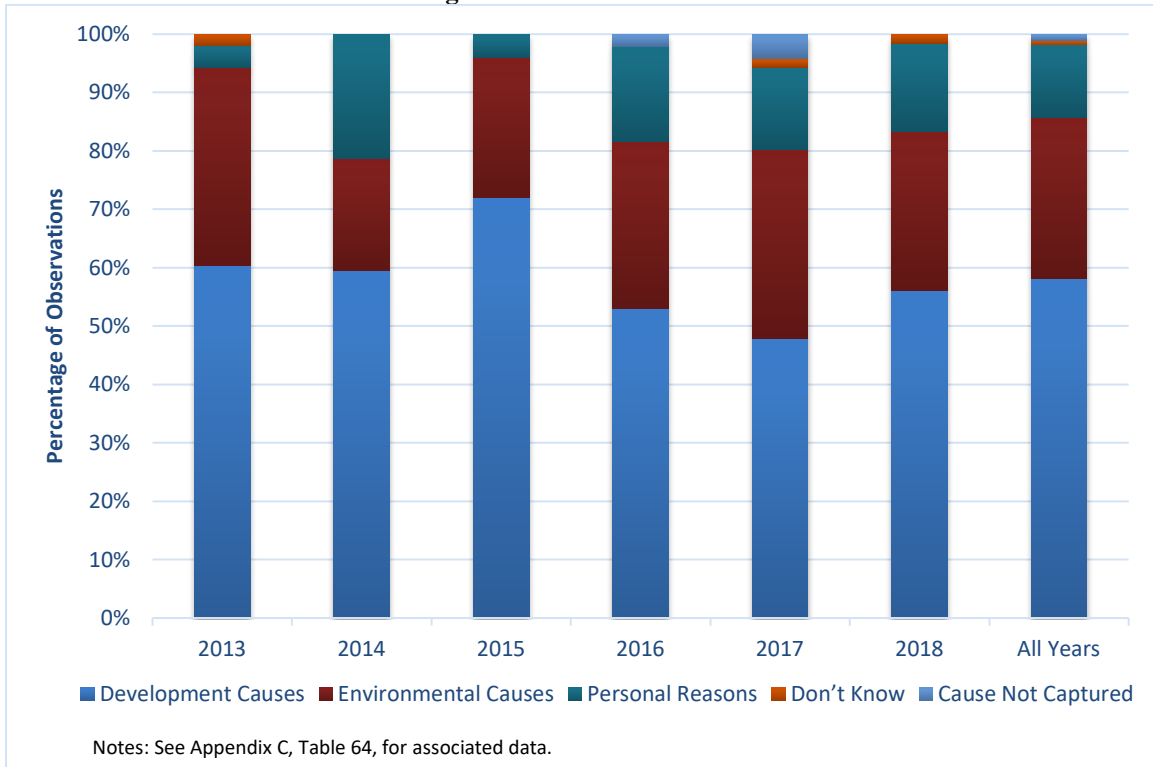
Stephen R. Braund & Associates, 2020.

Figure 51: Places of Avoidance – Percentage of Respondents (5% of Observations or Higher)



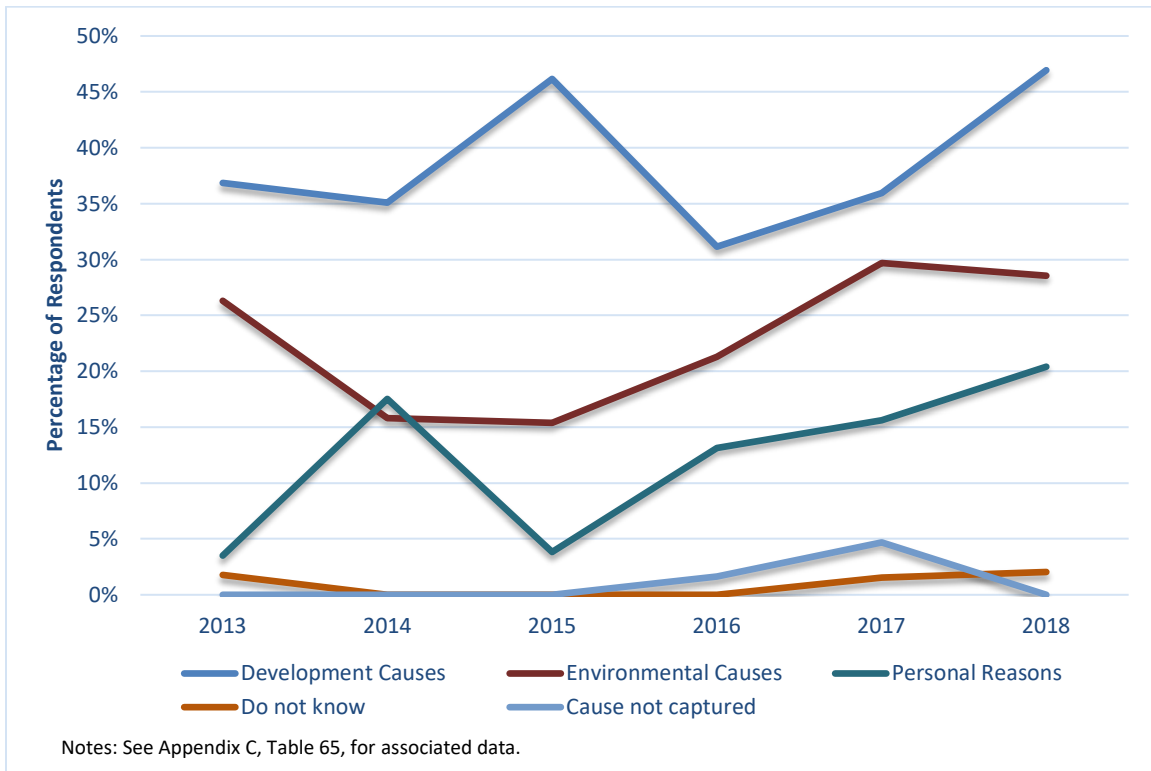
Stephen R. Braund & Associates, 2020.

Figure 52: Causes of Avoidance – Percentage of Observations



Stephen R. Braund & Associates, 2020.

Figure 53: Causes of Avoidance – Percentage of Respondents



Stephen R. Braund & Associates, 2020.

As shown in Appendix C, Table 66, the causes cited for avoiding the Nigliq Channel area included development infrastructure, followed by resource availability (e.g., a lack of caribou in that area), and safety concerns. When citing direct avoidance of the Alpine/Alpine Satellites areas, residents most commonly cited development activities, followed by development infrastructure. Development infrastructure was also frequently cited for avoidance of Nanuq. Areas where resource availability was cited for the cause of avoidance (more than one observation) included Nigliq Channel, East Channel, and upper Colville River.

As noted above, a higher than average percentage of respondents reported avoiding the Nigliq Channel area in 2018, consistent with a gradual decline in the use of this area since the beginning of the study (Figure 4, Figure 5). In 2018, residents’ comments about the Nigliq Channel indicated that some residents view the area as the center of Alpine development and therefore avoid the area due to high development activity/disturbance, the presence of infrastructure alongside the channel, and concerns about safety when hunting. Several individuals also observed that caribou are less available along Nigliq Channel as they once were, as a result of development. Active harvesters provided the following observations regarding decreased use or avoidance of Nigliq Channel:

[I avoid] Fish Creek and Nigliq. [There has been a] decline of caribou in that area. When Kuparuk first set up their pipelines, that was their first real incident of caribou deflecting their migration paths. [That was] after the Kuparuk pipelines went up, [in the] ‘80s, maybe the later part of the ‘80s. That is when it became a reality. (SRB&A Nuiqsut Interview November 2018)

We usually go camping to Nigliq over there but too much traffic. It does not feel like camping when there’s too much noise. But that’s where I used to go camping for a few days. (SRB&A Nuiqsut Interview November 2018)

Yes, [I avoid] here [Nigliq Channel area]. Because of safety. (SRB&A Nuiqsut Interview November 2018)

Just along the river going down river [Nigliq] because there is so many of those oil fields you can't even shoot without worrying about that bullet shooting someone and security personnel are really keeping an eye on us hunting on the river. They are even telling us that we can't hunt on some of the parts that are our own land. We were specifically told about that at a meeting. I got pretty mad at that meeting. They were worried about someone getting hit with a bullet. I don't know what they are thinking. We are not going out to get them. (SRB&A Nuiqsut Interview November 2018)

Well, there is just so much activity, that I try to avoid, around Niqliq, and on this side. I just try to avoid that. We kind of like avoid going in that Alpine area because there is just too much activities. You see the caribou hanging around there, though. (SRB&A Nuiqsut Interview November 2018)

Up Nigliq, if I see one I'd probably get it but there is not as much as there was in the early 2000s and the '90s because of Alpines and 1, 2, 3, 4... seems like the more they put a structure there, they're so blocked off.. (SRB&A Nuiqsut Interview November 2018)

We don't go over there [to Nigliq] anymore. Not as much, yeah. What I think is that because I seen more caribou on this road—GMT Road. My guess is they are probably following this road along the Spine [Spur] Road and kind of corralling them to stay underneath the pipeline or not going past the road or traffic. So yeah, we are seeing them a lot more [near the road]. Yeah, [toward GMT1].... Niqliq is the main one [I avoid], because that's a waste of gas just to go looking over there to find nothing each time. (SRB&A Nuiqsut Interview November 2018)

Right where the bridge [on Nigliq] is. CD4 and 2 is too close [and the bridge]. I used to spend my summers over there, all summer long. That bridge is right there and the CD4 and CD2 are so close, we haven't been there in so long. My grandfather still has some relics out there, a few things left behind. (SRB&A Nuiqsut Interview November 2018)

Several individuals specifically cited avoidance of COP developments or associated infrastructure (e.g., roads), noting a lack of caribou in those areas or general discomfort hunting near development:

Alpine, towards the Alpine side. That area is no more. There is no more that area. But we could because we know that there are hunters that show me. Probably it's too much activity, and there is just too many what you call those rigs? You have to pass by those. (SRB&A Nuiqsut Interview November 2018)

Over by Alpine we used to go out there a lot years and years ago but it feels wrong to take them out there. Too dangerous. There was a couple of guys out there shooting from the road. They didn't understand that the road has a big u-turn and they were shooting at the road. (SRB&A Nuiqsut Interview November 2018)

I stay away from the roads and the oil field area. I just I don't know, I don't like to. They say we can use the roads and whatnot but I don't think that's the right way to go hunting. It is not right to hunt from a road. (SRB&A Nuiqsut Interview November 2018)

In addition to reporting avoidance of Nigliq Channel and the Alpine/Alpine Satellites areas, a number of individuals reported avoiding certain geographic areas, such as Fish Creek, Atigaru Point, Nanuq, and

Kuupaqullurak, for primarily development-related reasons, many of which are related to Alpine/Alpine Satellites or other COP development or exploration activities. Reasons for avoiding these areas included the traffic/noise associated with these areas, a lack of caribou due to development activities or infrastructure, concerns about shooting near infrastructure and human activity, and a general desire not to hunt near development infrastructure:

Fish Creek, Atiguru area, Atiguru Point. It is just so much activities and summer studies going on. Summer studies in Harrison Bay and going way beyond. It doesn't matter which way you go, there is going to be interference. (SRB&A Nuiqsut Interview November 2018)

Kind of. This area [Fish Creek area] because I have noticed that the helicopter—the biologist helicopter swoops down a lot and the animals have been going there less and they are more jumpy over there. (SRB&A Nuiqsut Interview November 2018)

My cabin. That is basically land lost. There is a drill site five miles from my cabin. There is no animals to be seen. They just disappeared. Now I have to go to Price River. Go make my wolf trails over there. It's basically like all those lights [from development] are just changing the whole route. And this road is not going to stop. It's gradually making its way to Teshekpuk. And Barrow wants those roads. (SRB&A Nuiqsut Interview November 2018)

That Nanuq [area]. Too much activity. Caribou use to go right through where that Nigliq bridge was, there use to be hundreds of caribou there every year, and now there's nothing, zero. (SRB&A Nuiqsut Interview November 2018)

On our allotment, that Nanuq is considered a historical land site and they built that bridge right frickin' by it. The security came up to their bridge with the lights on and came down to our boat along the river and those guys went over there and said you can't hunt around there and they said this is not your land. I went off on that guy and got that guy's truck number and his name and his badge number and everything. I think they fired that guy. It got pretty bad. People really, really love their land, and they are telling us we can't hunt on our own land. We are being regulated around here so bad. That is one of the reasons I [want to] move to Barrow. It is actually getting kind of bad. I will go hunt somewhere else. There are a lot more regulations. (SRB&A Nuiqsut Interview November 2018)

I never went in there [Kuupaqullurak] since they built that bridge. There's just no caribou in there. (SRB&A Nuiqsut Interview November 2018)

Respondents also reported avoiding certain areas, such as the East Channel, due to other (non-COP) development activities. Several residents noted a general lack of caribou and too much development activity along the East Channel:

That area [East Channel]. There is always people doing surveys. So if I shoot that way, I could end up shooting them instead of caribou. Yeah [they are doing surveys on the Pisiktagivik side]. They hardly doing survey on the other side. Over there on that side they are doing survey. (SRB&A Nuiqsut Interview November 2018)

We used to go out on the east [of the Colville Delta] all the time, but we are not allowed to go out on the east side with all the regulations, with all the pipelines and oil safety. (SRB&A Nuiqsut Interview November 2018)

In addition to avoiding areas for development reasons, a number of active harvesters indicated that they no longer used certain places due to a general lack of caribou in those areas. In these cases, respondents did

not elaborate as to why they believed caribou were no longer in those areas. Residents cited resource availability as a cause for avoiding the Nigliq Channel, East Channel, Upper Colville River, *Kuupaqullurak*, Nanuq, and Fish Creek. One individual described a general decline in caribou in the area surrounding the Colville River Delta:

These past couple of years, I have kind of—it has just changed all over the Colville River delta. When you know there is no caribou out there, why go out there. You talk to the hunters and they say they haven't seen anything, why even bother. It is five dollars a gallon here. I know years back, me and my buddy used to go up the Nigliq Channel and if caribou numbers were thin there we would go to the East Channel to see if they were fatter on that side. That is all gone now. When you talk about herds and the caribou and the insect relief. There is no such thing as insect relief when you have only 20 to 30 in a group. I know that you guys know that scientific proof says the bigger the herd, the healthier the herd because they swap from the outside to the middle. These caribou just keep going, running to get away.... If you talk to the people who were camping at the Nigliq this past summer you will see that they hardly saw anything. It is becoming more and more of seeing nothing on the Nigliq channel. (SRB&A Nuiqsut Interview November 2018)

Finally, Personal Reasons, including a lack of funds to buy gas, a lack of equipment such as snowmachines, and personal preference, were cited for avoidance of areas such as Fish Creek, Ocean Point, and Upriver areas:

I used to love to go to Fish Creek all the time and now I haven't gone there this year. Caribou were close enough I didn't have to travel far. We used to do netting all the time with fish at Fish Creek, now we just go there anymore. There's no need to travel that far, burns a lot of fuel. It's 40 gallons to make in back home and that's \$200. That's just right here. You have to coast down a little ways to make sure you can make it home. (SRB&A Nuiqsut Interview November 2018)

I used to go up to past Ocean Point but it has been so long since I have been up there. My cousins keep running out of gas and taking all of their time [closer]. [Because of] gas, and my cousins are taking too much time and wasting the day light. (SRB&A Nuiqsut Interview November 2018)

I used to go to Chandler, Anaktuvuk River, but I don't because I can't spend that much on gas anymore.... Fish Creek, I never been there in five or six years now.... Maybe the gas, it takes a lot of gas to get over there. (SRB&A Nuiqsut Interview November 2018)

One individual reported a decline in their use of the Teshekpuk Lake area due to environmental factors, saying, “Out towards Teshekpuk area. It is hardly any snow nowadays. Too hard to travel. Nowadays anything close to the village now because there is hardly any snow” (SRB&A Nuiqsut Interview November 2018).

General Observations Regarding Status of Caribou Herds in 2018

This section summarizes residents' general observations regarding caribou behavior, migration, and distribution for the 2018 study year. While previous sections discussed caribou herd distribution, migration, health, and behavior in the context of the 2018 hunting season and impacts on hunting, this section captures more general herd characteristics that were observed during the active harvester interviews and are not addressed elsewhere in this report. At the conclusion of each interview, residents were asked, “Was there anything else abnormal about the behavior distribution, or migration of caribou in 2018?” The primary observations were as follows:

- Abnormal distribution of caribou
- Abnormal migration routes
- Abnormal behavior of caribou
- Caribou hunting/harvesting patterns or concerns
- Impacts on Caribou movement/behavior/health

Observations regarding the abnormal distribution of caribou during the 2018 hunting season reflected low caribou availability in residents' hunting areas. Several respondents noted that when they did find caribou, they were generally in small groups rather than large herds:

The herds were smaller. They were more in little patches, not any huge herds. I didn't see any huge herds at all this year—a huge herd being more than 20. (SRB&A Nuiqsut Interview November 2018)

No caribou. The only time they would really catch caribou was in the end of July and some residents from the village were getting them too and some of them were really fat and the other, yeah, they were pretty good, they had fat about this big [maybe two inches], on the hind shoulder. (SRB&A Nuiqsut Interview November 2018)

A vast majority of my caribou sightings have been on the north side of GMT1. I see quite a bit. Not a large group, but sometimes there might be one, sometimes four or five. It's sporadic. (SRB&A Nuiqsut Interview November 2018)

One individual noted a general lack of female caribou in their hunting area in 2018, saying,

Where are all the female tuttu at? All summer, even before summer I didn't see one female tuttu, just that one herd we saw those females, but the rest of them, usually when I first came we would go up here, I told you about those little creeks, we would see six bulls and maybe three females, but there was not female. I want to say they're just standing around. I don't know. (SRB&A Nuiqsut Interview November 2018)

In contrast to the harvesters who said there was lack of caribou in 2018, one respondent was satisfied with the amount of caribou in the area, but indicated a lack of hunting success due to poor timing:

Not that I know of because I didn't go out as much. But from what I noticed it was good. I saw how many out there, but I was at the wrong spot at the time. (SRB&A Nuiqsut Interview November 2018)

While a majority of general observations pertained to caribou distribution within the community's hunting area, harvesters also observed abnormal migration routes in 2018 which resulted in overall changes to the location of caribou. Nuiqsut residents reported that few caribou migrated through their hunting area, instead taking alternate routes. One individual noted that the lack of large herds of caribou near Nuiqsut resulted in pressure on Nuiqsut people to find alternate sources of food:

Caribou are hard to find this year. They are all in Wainwright. (SRB&A Nuiqsut Interview November 2018)

Usually there are some around the village and there weren't any around the village this year except for the one on the Spur Road. (SRB&A Nuiqsut Interview November 2018)

Every year we don't get Porcupine caribou, but ever since that Alpine and oil development going around in that area we notice that Porcupine Caribou [goes up Itqiliq]. (SRB&A Nuiqsut Interview November 2018)

Because of the deflection of animals and our having hard time to eat caribou, Nuiqsut people are pressing the state of Alaska to make a road to Fairbanks and Anchorage so that we can have access to cheap food. (SRB&A Nuiqsut Interview November 2018)

Another common observation during the 2018 active harvester interviews was abnormal behavior of caribou. Harvesters noticed several different behaviors in caribou such as late migration, habituation to noises, and habituation to infrastructure such as roads. One individual attributed the abnormal behavior to contamination of food and water sources, noting it may be making the caribou sick:

[The caribou were] just late. The rutting season was late and they were here too late. We only had one week of summer. The grass never turned green. The akpiks never grew the blueberries never grew. (SRB&A Nuiqsut Interview November 2018)

I notice they are more comfortable around all the noise. [That is] good, considering all the development that is going on. (SRB&A Nuiqsut Interview November 2018)

I really want to know what's causing these caribous to do that. It has to be something that they're eating to get sick like that. They drink water out of these lakes, and they utilize these lakes to pump water to create these ice roads, and or they do containing? This is the part where caribous eat the ground. The more I notice, the more they are staying right there. The caribous are sticking around the road where we cannot shoot. ... I want to know why these caribous are sick. There has to be something going on. Where they eat, where they sleep, all their daily areas... What comes out, what comes in the air when they burn that? Do they know that? Have you ever tested the air that comes out of that flame? For our subsistence and our village, air monitor the flame, what it does? What's in it? Not only that, they eat right here. They stay this area, now they stay just right here. They're not this way anymore. The channel, Pisiktagvik, this is where we used to get a lot. (SRB&A Nuiqsut Interview November 2018)

Additional observations about the health and distribution of caribou included less caribou fat content. One individual reported that the caribou they received in 2018 were healthy and were distributed near the community for protection from wolves:

They seem skinner this year. Less fat. I remember there use to be a lot of fat on the caribou actually... I'm not sure [why], just something that I noticed. (SRB&A Nuiqsut Interview November 2018)

My relative gave me one caribou and it was nice and healthy. They live here. This summer there was quite a few caribous this time. Even right here in town, they came through here. Nobody bothers them, that's why they get so close. They know these wolves won't come into town. Two weeks ago, I saw some down here just right across from the airport. They were moving fast, probably running from a wolf maybe. This was like two weeks ago. (SRB&A Nuiqsut Interview November 2018)

A number of respondents commented on overall impacts to caribou movement, health, and behavior, including decreased hunting success and reduced caribou availability in the region, and attributed these changes to increasing oil and gas activities and development in the region. Their comments are as follows:

Yeah, since the development going on we have less caribou in the area than we used to. They used to come in by the herds, and nowadays they just come in just one a time at or sometimes five to 15, that's it. They changed to the west side rather than coming through this way [east]. Since the oil development has been developed in 2000. And we have to [go] way farther out there sometimes just to go out hunting to catch them nowadays. I wish they could come closer

than farther away from our area and we would have more meat to provide for our families and our community. (SRB&A Nuiqsut Interview November 2018)

When you get out [away from Nuiqsut], it's safer. A lot of times you have to go farther and farther to find a caribou. You know, all this development is happening and then this whole [GMT2] area will be active in the next four and five years. All this development, [will impact the caribou and caribou hunting]. Everything has to come in through Prudhoe and the ice road. There's not a road yet. But once they get NPR-A and CD5, then it's all open. It was a small footprint with Alpine, but then it all blew up. (SRB&A Nuiqsut Interview November 2018).

What is these caribou eating off these ice roads? Leaks? Tire things? It's everything! Exhaust is not [just air], you can see it on the ground when it's black. The nuna [land] is the ground. What is causing these caribous to be so far? This is not the first year either, this is like the third year in a row. No, these caribou, when I was smaller, when I was 10, when my dad made me go out, they were fat. My mom used to cut [caribou fat] off and store it. Now, we have a Ziploc bag full of fat from like five caribou.... I really want to know [why the animals get sick]. CP [ConocoPhillips] needs to give me an answers. I asked the CEO when they came for their meetings. I said, 'What do you think they're eating? All the oil spills, and the anti-freeze, they eat and eat and eat in these areas. I blame the industry. They said you wouldn't be able to see Alpine. Yeah right, there's like a whole new city out there. [Elder] looked at me [before Alpine] and said, 'When you're in your 20s, you'll look around and see nothing but oil fields.' He passed away, he's [dead now]. He pretty much died right after. But he was right. Just to see so little caribou in this area, it's hurting us as a people. My household, we have caribou every other day. But to have them sick and wasting [is sad]. If it's green, it's in its bloodstream. We were like, 'Crap, we have to bring them to the dumps and burn them.' (SRB&A Nuiqsut Interview November 2018)

Additional themes that harvesters brought up for the 2018 caribou hunting season pertained to caribou hunting or harvesting patterns and related concerns. These included the benefits of road access during the hunting season, not having access to certain transportation vehicles, and a lack of mitigation funds for the season. Some comments also included how other hunters affect caribou migration routes, which affect others' hunting success. Detailed discussion of caribou hunting and harvesting patterns are provided above under "Caribou Subsistence Use Areas and Harvest Locations" and "Observations of Changes in Harvest Patterns."

Summary – 2018

SRB&A, with the Nuiqsut Caribou Panel, has completed 11 years of monitoring of impacts of CD4 and other COP satellite developments on Nuiqsut residents' caribou hunting activities, the 11th year representing the 2018 study year. The monitoring data are based on interviews with a sample of active Nuiqsut caribou harvesters as well as household harvest surveys. Fifty active harvesters were interviewed for the 2018 study year and household harvest surveys were conducted with 80 percent of households. The 2018 study year included a smaller number of active harvester participants than most recent years; however, these respondents represented between a third and one half of respondents interviewed in all individual previous years (similar to previous years), and therefore the drop in respondents likely did not affect overall study conclusions.

During the active harvester interviews, respondents reported 177 caribou use areas for the 2018 time period (November 2017 to October 2018). They also identified 150 successful harvest locations, within the range of previous study years (between 143 [2013] and 248 [2014] harvest locations). The majority of caribou hunting and harvesting activities occurred along the Colville River (including Nigliq Channel), along the

lower portion of the Itqiliq River, and along the Spur Road and CD5/GMT1 roads north and northwest of the community. Compared to all previous study years, 2018 was relatively similar. 2018 showed decreased use of Nigliq Channel when compared to most previous years. A hunting pattern, which emerged in 2015 and continued through 2018, was the use of the Spur Road and CD5/GMT1 roads to hunt caribou. The road system showed substantial overlapping use in 2018. The road was used by a majority of active harvesters and, in particular, provided access to individuals without access to overland (e.g., snowmachine/four-wheelers) or riverine (i.e., boats) forms of transportation. The road also provided access to overland hunting areas during “shoulder seasons” (e.g., spring, late fall) when conditions are not suitable for overland travel.

The concentration of harvests in 2018 were somewhat similar to recent years (Years 2012 through 2017). Years 2012 through 2018 differ from the first five study years in that they show fewer areas of high harvest density along Nigliq Channel, with the exception of the camp at Nigliq. In 2018, the camp at Nigliq showed less harvest concentration than most previous years but still showed moderate harvest concentrations. Overall, a large number of caribou harvests took place along the Spur Road and GMT1 roads north and northwest of the community, and to the south and southeast of the community near Itqiliq.

July and/or August have been the peak hunting months during almost every study year, including 2018. In 2018, while July and August continued to be the peak harvest months, there was comparatively less activity during the month of August. 2018 showed a somewhat lower percentage of use areas during the winter months, despite the road access which in recent years has resulted in increased winter hunting activity. Although boat remained the principle travel method to caribou use areas, recent study years have shown a decrease in the use of boat relative to other travel methods. In 2018, respondents used boat to access 66 percent of caribou use areas. Snowmachine use was slightly higher than the last several years, at nine percent of use areas, while truck use increased substantially from two percent or less of use areas between 2008 and 2014 to between eight and 14 percent in Years 2015 through 2018. The increased use of truck is due to respondents’ increased use of the recently constructed Spur Road and connected CD5/GMT1 roads. Similar to previous years, respondents took primarily same day trips to a majority of use areas, although the percentage of use areas visited only during day trips was somewhat higher than previous years. The frequency of hunting trips to use areas was also similar to previous study years, but varies by hunting area, with the average number of trips increasing in the area West of Nuiqsut and decreasing in the Nigliq Channel area. 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 was on the low end of previous years, at 52 percent of use areas reported as successful. The mean number of caribou harvested by harvest location and use area were also on the low end of previous years.

Based on household caribou harvest surveys for the 2018 study year, the estimated number of caribou harvested in 2018 (608 caribou; 157 pounds per capita) was within the range of previous study years, as was the percentage of households using caribou. The percentage of Nuiqsut households who gave and received caribou (88 percent) was the highest since the 2005-06 time period.

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, with 2018 on the higher end for changes in harvest amounts and duration. In 2018, 43 percent of respondents indicated that they did not harvest enough caribou, an increase from the previous four years but within the range of previous years (between 16 and 54 percent). The percentage of respondents observing caribou abnormalities in 2018 was also within the range of previous years, at 20 percent, while the number of caribou harvested with abnormalities was within the range of previous years.

Sixty-eight percent of harvesters in 2018 reported one or more Alpine-related impacts on caribou hunting, the highest since the first year of the study (2008). In 2018, helicopter traffic (42 percent of respondents) and man-made structures (40 percent of respondents) were the most commonly reported impact source.

Active harvesters also reported impacts related to plane traffic, “other” impacts, oil company personnel, and other traffic (e.g., trucks). The increase in reported impacts in 2018 was also seen in the household harvest surveys, where the percentage of households reporting Alpine-related impacts (53 percent) was the highest of any individual study year.

Seventy-six percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previously used, similar to the 2017 study year but higher than other previous study years. Nigliq Channel, Alpine/Alpine Satellites, and Fish Creek areas were the most frequently mentioned, with Nigliq Channel mentioned more frequently than in the past. A majority of avoidance observations were related to development causes, followed by environmental causes.

Similar to recent years, a general observation made by a number of Nuiqsut respondents in 2018 was that there were few caribou around throughout the study year and hunters had to work harder, stay out longer, or go out more frequently to find caribou. Residents observed that the caribou seemed more dispersed and did not follow their usual migration patterns. A number of individuals attributed the changes to increasing development activities including air and road traffic and the presence of infrastructure (e.g., roads) to the north and west of the community.

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**APPENDIX A: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE
HARVESTER INTERVIEW 2018**

NUIQSUT CARIBOU MONITORING PROTOCOL, 2018

Date _____
 Respondent Name _____
 Respondent Birth date _____
 Residence at Birth _____
 Years in Community _____

SECTION A: CARIBOU HUNTING ACTIVITIES, NOVEMBER 2017 – OCTOBER 2018

1. Did you go caribou hunting between November 2017 and October 2018? YES ___ NO ___ (IF NO, INTERVIEW OVER OR CONDUCT TRADITIONAL KNOWLEDGE INTERVIEW)
2. Where did you hunt for caribou between November 2017 and October 2018? (Draw caribou hunting areas on map)

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

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

3. In 2018, did you hunt in different areas than in 2017 ? YES _____ NO _____

3a. [IF YES], HOW? _____

3b. [IF YES], WHY? _____

4. Compared to 2017, was the # of hunting trips in 2018 the same, less, or more? LESS ___ SAME ___ MORE ___

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

5. Compared to 2017, was the duration of trips in 2018 the same, less, or more? LESS _____ SAME ___ MORE ___

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

6. Compared to 2017, were the months you hunted for and harvested caribou in 2018 different? YES ___ NO ___

6a. [IF YES], HOW? _____

6B. [IF YES], WHY? _____

7. Compared to 2017, was the # of caribou you harvested in 2018 the same, less, or more? LESS ___ SAME ___ MORE ___

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

8. Did your household harvest enough caribou in 2018 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], WHERE? _____

9b [IF YES], WHY? _____

SECTION B: ASSESSMENT OF HARVESTED CARIBOU, 2018

1. Thinking about the caribou you shot or harvested in 2018, were any of them abnormal in the following ways? (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 each caribou with the above observations (or multiple caribou with the same observations), complete the following (Use additional sheets if necessary):

Location [Record Associated Harvest Location Point]: _____

Abnormal Caribou at Location [if different types of abnormality or location, record in a separate form]: _____

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

Please describe the abnormality: _____

Please describe why you think the abnormality occurred: _____

Did you use this caribou? YES _____ NO _____

SECTION C: IMPACTS ON CARIBOU HUNTING, 2018

1. In 2018, 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 2018, 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, 2018

Stephen R. Braund & Associates

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srba@alaska.net

**Nuiqsut Caribou Subsistence Monitoring Project - Year 11
November 2018**

Informed Consent Form

Description of the Study

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

While in your community, we would like to interview knowledgeable subsistence harvesters about their caribou subsistence use between November 2017 and October 2018. 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.

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

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Table 1: Respondents' Residence at Time of Birth

Residence	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nuiqsut	25%	40%	32%	41%	44%	47%	44%	40%	52%	43%	40%	41%
Other North Slope Community	64%	46%	51%	48%	42%	42%	44%	48%	34%	37%	42%	45%
Elsewhere in Alaska	8%	10%	14%	9%	11%	11%	12%	10%	13%	19%	18%	12%
Outside Alaska	3%	4%	4%	2%	4%	0%	0%	2%	0%	0%	0%	2%
Number of Respondents	36	52	57	58	57	55	59	58	61	67	50	

Stephen R. Braund & Associates, 2020.

Table 2: Decade Born

Decade	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
1940s	6%	10%	0%	2%	2%	4%	2%	2%	3%	1%	0%	3%
1950s	17%	12%	16%	10%	16%	11%	14%	14%	15%	13%	12%	13%
1960s	33%	19%	26%	19%	19%	22%	24%	26%	19%	25%	28%	24%
1970s	19%	15%	16%	16%	11%	9%	8%	12%	5%	6%	8%	11%
1980s	22%	31%	25%	33%	32%	35%	24%	31%	37%	29%	30%	30%
1990s	3%	13%	18%	21%	19%	18%	25%	16%	21%	25%	22%	18%
2000s	0%	0%	0%	0%	2%	2%	3%	0%	0%	0%	0%	1%
Number of Respondents	36	52	57	58	57	55	59	58	62	68	50	

Stephen R. Braund & Associates, 2020.

Table 3: Respondent Gender

Gender	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Male	97%	91%	96%	95%	95%	86%	90%	88%	71%	69%	70%	86%
Female	3%	9%	4%	5%	5%	14%	10%	12%	29%	31%	30%	14%
Number of Respondents	36	53	57	58	57	57	60	58	63	68	50	

Stephen R. Braund & Associates, 2020.

Table 4: Percentage of Use Areas by Hunting Areas

Hunting Area	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nigliq Channel	20%	22%	18%	23%	19%	21%	16%	16%	18%	16%	11%	18%
East Channel Colville	12%	14%	16%	14%	16%	16%	16%	12%	15%	10%	15%	14%
Other Colville Delta	1%	2%	2%	1%	1%	2%	0%	0%	0%	0%	3%	1%
Fish Creek	11%	10%	7%	6%	2%	10%	6%	5%	4%	3%	4%	6%
Coastal West	4%	3%	3%	3%	2%	2%	3%	0%	1%	0%	1%	2%
Coastal East	3%	3%	2%	1%	1%	1%	1%	1%	4%	1%	1%	2%
Itkillik River	11%	12%	13%	11%	12%	9%	10%	12%	14%	14%	15%	12%
Ocean Point	18%	25%	24%	27%	27%	27%	29%	31%	27%	28%	27%	26%
Sentinel Hill	15%	21%	20%	14%	20%	20%	17%	19%	15%	15%	17%	18%
Colville River South	7%	13%	14%	11%	13%	17%	12%	10%	6%	7%	8%	11%
West of Nuiqsut	23%	17%	21%	18%	22%	21%	27%	35%	28%	26%	32%	24%
Other	1%	5%	6%	2%	1%	3%	6%	1%	1%	3%	6%	3%
Number of Use Areas	137	187	215	194	211	196	206	153	195	233	177	

Stephen R. Braund & Associates, 2020.

Table 5: Percentage of Use Areas by Roads

Hunting Area	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Roads								13%	17%	15%	20%	16%
Number of Use Areas								153	195	233	177	

Stephen R. Braund & Associates, 2020.

Table 6: Percentage of Respondents by Hunting Areas

Hunting Area	Percentage of Respondents												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	At Least One Year
Nigliq Channel	75%	72%	63%	74%	68%	65%	53%	41%	52%	54%	40%	60%	83%
East Channel Colville	47%	47%	53%	47%	54%	51%	48%	31%	46%	34%	48%	46%	65%
Other Colville Delta	3%	8%	7%	2%	4%	5%	2%	0%	0%	1%	8%	4%	10%
Fish Creek	42%	34%	23%	19%	7%	32%	18%	14%	13%	9%	14%	20%	38%
Coastal West	14%	6%	5%	3%	9%	7%	8%	0%	2%	0%	2%	5%	8%
Coastal East	11%	9%	9%	3%	4%	4%	5%	3%	11%	4%	4%	6%	14%
Itkillik River	42%	40%	42%	38%	42%	30%	30%	33%	43%	43%	48%	39%	56%
Ocean Point	67%	85%	79%	90%	79%	75%	82%	76%	75%	85%	72%	79%	92%
Sentinel Hill	58%	74%	67%	48%	60%	63%	53%	47%	44%	46%	48%	55%	70%

Hunting Area	Percentage of Respondents												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	At Least One Year
Colville River South	28%	45%	54%	36%	42%	53%	38%	28%	17%	25%	24%	36%	58%
West of Nuiqsut	69%	53%	65%	53%	60%	53%	60%	64%	57%	62%	74%	61%	72%
Other	6%	17%	19%	3%	5%	7%	20%	2%	2%	6%	14%	9%	21%
Number of Harvesters	36	53	57	58	57	57	60	58	63	68	50		162

Stephen R. Braund & Associates, 2020.

Table 7: Percentage of Respondents Reporting Use of Roads

Hunting Area	Percentage of Respondents												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	At Least One Year
Roads								33%	46%	43%	62%	46%	57%
Number of Harvesters								58	63	68	50		114

Stephen R. Braund & Associates, 2020.

Table 8: Nuiqsut Percentage of Caribou Use Areas by Month

Month	Study Year											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	4%	3%	5%	3%	1%	1%	4%	2%	5%	2%	3%	3%
Feb	7%	3%	9%	4%	2%	1%	2%	2%	8%	4%	3%	4%
Mar	7%	2%	7%	3%	2%	1%	3%	1%	7%	3%	1%	3%
Apr	4%	2%	3%	2%	0%	2%	0%	3%	6%	3%	1%	2%
May	4%	2%	3%	2%	1%	2%	1%	3%	4%	3%	2%	2%
Jun	16%	33%	24%	25%	15%	21%	18%	20%	20%	21%	24%	22%
Jul	58%	56%	52%	46%	42%	51%	50%	53%	55%	53%	53%	52%
Aug	52%	41%	51%	53%	51%	44%	48%	51%	49%	45%	41%	48%
Sep	15%	17%	28%	21%	24%	16%	27%	25%	19%	26%	19%	22%
Oct	14%	3%	4%	5%	5%	4%	6%	6%	8%	7%	6%	6%
Nov	8%	2%	6%	4%	1%	1%	7%	1%	6%	2%	3%	4%
Dec	7%	2%	4%	3%	1%	1%	4%	1%	4%	2%	1%	3%
Total	137	187	215	194	211	196	206	153	195	233	177	

Stephen R. Braund & Associates, 2020.

Table 9: Nuiqsut Percentage of Caribou Harvested by Month

Month	Study Year											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	1%	0%	2%	0%	0%	3%	5%	6%	5%	1%	1%	2%
Feb	2%	1%	3%	3%	1%	1%	5%	1%	2%	5%	1%	2%
Mar	2%	1%	3%	0%	1%	1%	1%	0%	5%	0%	0%	1%
Apr	2%	1%	1%	0%	0%	0%	0%	1%	3%	1%	0%	1%
May	0%	0%	0%	1%	1%	0%	0%	1%	0%	1%	9%	1%
Jun	8%	12%	10%	13%	15%	10%	10%	9%	10%	9%	9%	10%
Jul	33%	37%	25%	24%	27%	35%	24%	22%	27%	29%	31%	28%
Aug	36%	26%	32%	24%	30%	32%	23%	21%	28%	25%	28%	28%
Sep	8%	15%	18%	23%	16%	14%	13%	29%	12%	17%	14%	16%
Oct	4%	1%	4%	10%	7%	2%	5%	9%	5%	6%	2%	5%
Nov	3%	4%	3%	2%	1%	1%	8%	1%	3%	0%	5%	3%
Dec	2%	1%	2%	0%	0%	0%	5%	1%	1%	4%	0%	1%
Total	397	277	394	358	408	272	705	463	263	281	262	

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Table 10: Nuiqsut Travel Method to Caribou Use Areas

Travel Method	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Boat	74%	80%	74%	80%	74%	77%	70%	65%	69%	70%	66%	73%
Snowmachine	22%	9%	16%	12%	8%	10%	15%	8%	6%	6%	9%	11%
Four-wheeler	4%	9%	9%	9%	17%	11%	14%	18%	13%	16%	13%	12%
Truck	2%	2%	<1%	0%	1%	1%	1%	8%	14%	11%	14%	5%
Total	137	187	215	194	211	196	206	153	195	233	177	

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Table 11: Nuiqsut Travel Method by Percentage of Trips

Travel Method	Percentage of Trips											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Boat	85%	84%	74%	78%	78%	85%	70%	65%	58%	59%	59%	72%
Snowmachine	10%	7%	18%	18%	10%	6%	18%	6%	12%	10%	7%	11%
Four-wheeler	3%	6%	13%	9%	14%	8%	11%	14%	18%	16%	11%	11%
Truck	3%	2%	0%	0%	0%	0%	0%	16%	28%	25%	24%	9%
Foot	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	1%
Total Trips	1,008	1,005	1,211	1,139	1,019	1,014	1,190	970	1,049	1,439	961	

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Table 12: Boat Use by Month

Months	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan												
Feb												
Mar												
Apr												
May	2%	2%	2%	2%	1%	1%	0.5%	1%	1%	2%	0%	1%
Jun	16%	32%	22%	23%	13%	19%	17%	17%	15%	18%	19%	19%
Jul	56%	53%	49%	44%	39%	48%	47%	44%	45%	47%	42%	47%
Aug	50%	38%	46%	47%	43%	39%	42%	39%	41%	35%	30%	41%
Sep	10%	11%	21%	13%	16%	10%	19%	12%	12%	12%	8%	13%
Oct	3%	0%	1%	0%	1%	0%	0.5%	1%	2%	1%	1%	1%
Nov												
Dec												
Total	137	187	215	194	211	196	206	153	195	233	177	

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Table 13: Snowmachine Use by Month

Months	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	2%	2%	5%	3%	1%	1%	3%	2%	2%	1%	2%	2.2%
Feb	5%	3%	8%	4%	1%	1%	2%	2%	2%	3%	2%	2.9%
Mar	5%	1%	7%	3%	1%	1%	3%	1%	2%	2%	1%	2.5%
Apr	2%	1%	3%	2%	0.5%	2%	0%	2%	2%	1%	1%	1.4%
May	1%	0%	1%	0%	0%	1%	0.5%	0%	0%	0.4%	1%	0.4%
Jun												
Jul												
Aug	0%	0%	0%	0%	0.5%	0%	0%	1%	%	0.4%	0.0%	0.1%
Sep	4%	1%	1%	4%	1%	2%	2%	3%	2%	1%	1.7%	2.1%
Oct	11%	3%	2%	4%	2%	3%	2%	1%	1%	1%	1.1%	2.8%
Nov	8%	2%	5%	4%	1%	1%	6%	1%	1%	0%	2.3%	2.9%
Dec	5%	2%	4%	3%	1%	1%	4%	1%	1%	1%	0.0%	2.0%
Total	137	187	215	194	211	196	206	153	195	233	177	

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Table 14: Four-wheeler Use by Month

Months	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0.2%
Feb	0%	0%	0%	0%	0.5%	0%	0%	0%	2%	0%	0%	0.2%
Mar	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.1%
Apr	0%	0%	0%	0%	0%	1%	0.5%	1%	2%	0%	0%	0.3%
May	0%	0%	0%	1%	0.5%	0%	0%	1%	2%	0%	1%	0.4%
Jun	0%	1%	2%	2%	1%	3%	1%	3%	2%	1%	2%	1.5%

Months	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jul	1%	2%	2%	1%	3%	4%	3%	7%	3%	3%	4%	3.0%
Aug	1%	3%	5%	6%	8%	5%	5%	9%	4%	5%	5%	5.0%
Sep	1%	5%	6%	4%	6%	4%	6%	7%	5%	8%	5%	5.1%
Oct	0%	1%	1%	1%	2%	1%	4%	2%	3%	3%	1%	1.6%
Nov	0%	0%	1%	0%	0%	0%	1%	0%	4%	0%	0%	0.5%
Dec	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0.1%
Total	137	187	215	194	211	196	206	153	195	233	177	

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Table 15: Truck Use by Month

Months	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	1%	1%	0%	0%	0%	0%	0.5%	0%	3%	1%	2%	1%
Feb	2%	1%	0.5%	0%	0%	1%	0%	0%	5%	2%	2%	1%
Mar	2%	1%	0%	0%	0.5%	0%	0%	0%	4%	2%	1%	1%
Apr	1%	1%	0%	0%	0%	0%	0%	1%	4%	2%	1%	1%
May	1%	0%	0%	0%	0%	0%	0%	0%	2%	2%	1%	0.5%
Jun	0%	0%	0%	0%	0%	0%	0%	1%	4%	3%	4%	1%
Jul	0%	0%	0%	0%	0.5%	1%	0%	3%	7%	3%	6%	2%
Aug	0%	0%	0%	0%	0%	0%	0.5%	3%	5%	6%	6%	2%
Sep	0%	0%	0%	0%	0%	0%	0%	2%	2%	6%	5%	1%
Oct	0%	0%	0%	0%	0%	0%	0%	2%	2%	4%	4%	1%
Nov	0%	0%	0%	0%	0%	0%	0%	0%	3%	1%	1%	0.4%
Dec	1%	0%	0%	0%	0%	0%	0%	0%	2%	1%	1%	0.5%
Total	137	187	215	194	211	196	206	153	195	233	177	

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Table 16: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests

Success Response	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Yes (successful)	78%	61%	58%	55%	64%	54%	61%	65%	53%	57%	52%	60%
No (unsuccessful)	22%	39%	42%	45%	36%	46%	39%	35%	47%	43%	48%	40%
Number of Use Areas	137	187	215	194	211	196	206	153	195	233	177	

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Table 17: Mean Number of Caribou Harvested Per Harvest Location and Subsistence Area

Mean Number	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Mean Number Caribou Harvested Per Harvest Location	2	1.8	1.9	2	1.8	1.9	2.2	2.3	1.9	1.6	1.7	1.9
Number of Harvest Locations	182	152	196	162	195	143	248	173	163	190	149	1,953
Mean Number Caribou Harvested by Use Area	2.7	1.5	1.7	1.7	1.6	1.4	2.7	2.6	1.6	1.3	1.4	1.8
Number of Use Areas	137	187	215	194	211	196	206	153	195	233	177	2,104

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Table 18: Percentage of Caribou Harvest Locations by Caribou Hunting Area

Caribou Hunting Area		Percentage of Caribou Harvest Locations											
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
1	Nigliq Channel	19%	18%	16%	17%	15%	22%	8%	9%	12%	18%	9%	15%
2	East Channel Colville	8%	7%	8%	10%	17%	13%	9%	8%	9%	5%	10%	9%
3	Other Colville Delta	2%	1%	2%	1%	1%	1%	0%	1%	1%	0%	2%	1%
4	Fish Creek	8%	5%	1%	2%	1%	3%	4%	3%	7%	2%	3%	4%
5	Coastal West	1%	0%	1%	0%	2%	1%	0%	0%	0%	0%	0%	0%
6	Coastal East	3%	0%	1%	1%	1%	0%	0%	0%	1%	0%	0%	1%
7	Itkillik River	7%	3%	4%	7%	5%	6%	8%	6%	11%	12%	11%	7%
8	Ocean Point	22%	19%	21%	19%	16%	6%	13%	17%	17%	15%	10%	16%
9	Sentinel Hill	9%	8%	8%	8%	6%	8%	6%	6%	9%	7%	5%	7%
10	Colville River South	4%	9%	10%	4%	6%	10%	8%	4%	2%	7%	7%	6%
11	West of Nuiqsut	14%	15%	22%	30%	31%	26%	37%	43%	30%	28%	41%	29%
12	Other	3%	1%	6%	1%	1%	3%	8%	2%	2%	6%	3%	3%
Total Harvest Locations		182	152	196	162	195	143	248	173	163	190	150	

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Table 19: Percentage of Caribou Harvests by Caribou Hunting Area

Caribou Hunting Area		Percentage of Total Caribou Harvests											
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
1	Nigliq Channel	23%	21%	19%	15%	15%	25%	9%	10%	12%	17%	10%	16%
2	East Channel Colville	8%	8%	7%	10%	20%	17%	11%	9%	10%	4%	8%	10%
3	Other Colville Delta	2%	1%	2%	1%	2%	1%	0%	0%	0%	0%	2%	1%
4	Fish Creek	7%	6%	1%	2%	1%	3%	5%	3%	5%	2%	3%	3%
5	Coastal West	1%	0%	1%	0%	1%	1%	0%	0%	0%	0%	0%	0%
6	Coastal East	3%	0%	1%	1%	4%	0%	0%	0%	1%	0%	0%	1%
7	Itkillik River	6%	4%	3%	4%	4%	6%	7%	5%	11%	15%	10%	7%
8	Ocean Point	17%	20%	17%	17%	12%	4%	7%	21%	12%	12%	9%	13%
9	Sentinel Hill	9%	9%	7%	5%	3%	5%	4%	4%	8%	5%	5%	6%

Caribou Hunting Area		Percentage of Total Caribou Harvests											
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
10	Colville River South	3%	11%	7%	4%	3%	8%	10%	3%	2%	6%	5%	6%
11	West of Nuiqsut	18%	17%	30%	40%	35%	27%	39%	43%	36%	30%	45%	33%
12	Other	3%	1%	6%	1%	0%	4%	8%	3%	3%	9%	3%	4%
Total Harvested		368	277	365	331	348	272	552	398	309	310	256	

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Table 20: Percentage of Successful Use Areas by Hunting Area

Hunting Area	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nigliq Channel	89%	38%	55%	53%	61%	54%	45%	52%	40%	53%	35%	52%
East Channel Colville	76%	70%	59%	54%	74%	53%	59%	79%	47%	38%	50%	60%
Other Colville Delta	0%	50%	100%	100%	100%	100%	0%	-	-	0%	60%	57%
Fish Creek	60%	61%	27%	27%	50%	35%	58%	63%	75%	50%	71%	52%
Coastal West	50%	-	14%	-	60%	25%	-	-	-	-	-	37%
Coastal East	50%	100%	40%	50%	100%	-	33%	50%	29%	-	-	56%
Itkillik River	80%	43%	34%	55%	35%	50%	55%	74%	61%	64%	52%	55%
Ocean Point	96%	85%	76%	65%	68%	60%	71%	66%	62%	56%	58%	69%
Sentinel Hill	95%	88%	81%	64%	70%	58%	79%	72%	66%	68%	70%	74%
Colville River South	90%	88%	84%	52%	71%	52%	83%	75%	73%	59%	73%	73%
West of Nuiqsut	74%	77%	70%	71%	70%	69%	76%	70%	63%	69%	59%	70%
Other	100%	56%	83%	33%	0%	80%	83%	100%	100%	100%	40%	71%
Any Area	78%	61%	58%	55%	64%	54%	61%	65%	53%	57%	52%	60%

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Table 21: Percentage of Successful Use Areas, Roads

Hunting Area	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Roads								55%	67%	65%	56%	60%
Total Road Use Areas								20	33	34	36	

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Table 22: Average Number of Trips Per Caribou Harvested by Hunting Area

Hunting Area	Average Number of Trips Per Harvester											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nigliq Channel	3.3	5.1	5.3	7.2	6.0	4.3	4.4	5.9	3.2	5.4	2.4	4.8
East Channel Colville	2.8	6.0	6.0	3.2	1.5	2.9	3.2	2.1	4.1	6.0	6.7	4.0
Other Colville Delta	0.1	5.0	5.2	3.0	1.0	2.0	0.5	0.0	0.0	-	2.5	1.9
Fish Creek	2.5	3.3	12.3	10.5	4.0	11.4	2.3	0.9	0.9	1.2	3.4	4.8
Coastal West	6.7	-	15.0	-	2.7	2.0	-	-	-	-	-	6.6
Coastal East	0.8	-	3.8	2.0	0.2	-	-	-	21.5	-	-	5.7
Itkillik River	2.0	8.8	10.5	5.4	5.1	2.9	2.3	3.1	3.8	4.0	5.0	4.8
Ocean Point	5.6	5.9	5.5	6.2	6.5	30.6	9.4	3.7	8.5	8.8	13.2	9.5
Sentinel Hill	9.1	10.7	13.0	13.2	19.6	18.6	11.3	12.5	7.6	11.7	20.5	13.4
Colville River South	6.0	6.5	9.6	13.2	13.0	8.8	4.4	11.4	15.2	4.6	10.7	9.4
West of Nuiqsut	2.2	2.7	2.5	1.7	1.7	1.9	1.5	2.0	3.8	5.7	3.2	2.6
Other	1.8	32.5	2.7	22.5	14.0	1.9	2.8	0.6	2.0	1.7	7.6	8.2
Any Area	2.7	3.6	3.3	3.4	2.9	3.7	2.2	2.4	3.4	4.6	3.8	3.3
Number of Harvesters	36	53	57	58	57	57	60	58	63	68	50	

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Table 23: Number of Caribou Harvested by Number of Harvest Locations

Number of Caribou Harvested	Percentage of Harvest Locations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
1	52%	49%	51%	52%	62%	46%	42%	50%	58%	61%	54%	52.4%
2	24%	32%	31%	25%	21%	29%	31%	27%	25%	25%	28%	27.0%
3	10%	11%	11%	7%	8%	17%	9%	8%	10%	8%	12%	10.1%
4	4%	5%	4%	9%	5%	6%	10%	7%	2%	3%	4%	5.3%
5	7%	3%	3%	2%	2%	1%	2%	3%	2%	1%	2%	2.6%
6	1%	1%	1%	1%	2%	1%	2%	1%	1%	1%	0%	1.0%
7	1%	0%	0%	1%	0%	1%	0%	1%	1%	1%	0%	0.5%
8	0%	0%	0%	1%	0%	0%	1%	1%	1%	0%	0%	0.3%
9	0%	0%	0%	1%	1%	0%	0%	1%	0%	0%	0%	0.2%
10	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	0%	0.1%
11	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0.2%
12	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
13	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0.1%
15	1%	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0.2%
20	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0.1%
Total	182	152	196	162	195	143	248	173	163	190	149	

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Table 24: Caribou Hunting Typical Trip Duration

Typical Duration	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
More than 2 weeks	0%	1%	0%	0%	0%	2%	1%	0%	0%	0%	0%	0%
1-2 Weeks	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
2-6 Nights	7%	15%	7%	8%	9%	10%	6%	6%	2%	6%	2%	7%
1 Night	5%	2%	2%	1%	2%	4%	3%	1%	2%	2%	1%	2%
Same Day	87%	81%	90%	90%	88%	84%	91%	93%	96%	91%	95%	90%
Number of Use Areas	135	176	212	193	209	196	190	153	190	233	176	

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Table 25: Caribou Hunting Longest Trip Duration

Typical Duration	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
More than 2 weeks	1%	2%	0%	0%	1%	2%	1%	0%	0%	0%	0%	1%
1-2 Weeks	3%	6%	4%	3%	2%	2%	2%	2%	1%	1%	1%	2%
2-6 Nights	20%	24%	12%	12%	11%	14%	9%	10%	7%	6%	4%	12%
1 Night	6%	5%	4%	4%	2%	8%	4%	3%	4%	5%	2%	4%
Same Day	70%	63%	80%	81%	85%	74%	85%	86%	88%	88%	93%	81%
Number of Use Areas	97	163	211	193	208	196	188	153	190	233	177	

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Table 26: Caribou Hunting Number of Trips

Number of Trips	Percentage of Caribou Use Areas											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
20+ trips	8%	5%	9%	7%	4%	7%	7%	8%	5%	8%	5%	7%
6-20 trips	27%	27%	21%	28%	16%	19%	21%	20%	23%	19%	22%	22%
4-5 trips	21%	20%	19%	15%	15%	13%	17%	15%	21%	12%	13%	16%
2-3 trips	25%	26%	27%	29%	34%	28%	27%	28%	29%	31%	29%	28%
1 trip	18%	23%	24%	21%	32%	33%	28%	29%	21%	30%	31%	26%
Number of Use Areas	132	183	212	193	210	196	204	153	192	230	170	

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Table 27: Percentage of Trips by Hunting Area

Hunting Area	Percentage of Trips											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nigliq Channel	28%	30%	30%	32%	31%	29%	19%	23%	11%	19%	6%	24%
East Channel Colville	8%	14%	12%	9%	10%	13%	16%	8%	12%	5%	14%	11%

Hunting Area	Percentage of Trips											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Other Colville Delta	0%	2%	3%	1%	1%	0%	0%	0%	0%	0%	1%	1%
Fish Creek	6%	6%	3%	6%	1%	8%	6%	1%	1%	0%	3%	4%
Coastal West	2%	2%	2%	2%	1%	0%	1%	0%	0%	0%	0%	1%
Coastal East	1%	6%	1%	0%	0%	1%	2%	1%	4%	2%	1%	2%
Itkillik River	4%	10%	9%	7%	7%	4%	7%	6%	12%	13%	13%	9%
Ocean Point	35%	32%	29%	30%	27%	33%	33%	32%	30%	23%	33%	30%
Sentinel Hill	30%	28%	27%	21%	23%	26%	23%	22%	18%	14%	26%	23%
Colville River South	7%	19%	21%	15%	14%	20%	19%	12%	9%	6%	13%	14%
West of Nuiqsut	14%	13%	22%	19%	21%	14%	27%	35%	41%	37%	39%	26%
Other	2%	6%	5%	4%	1%	2%	10%	1%	2%	3%	6%	4%
Total Trips	1,008	1,005	1,211	1,139	1,019	1,014	1,190	970	1,049	1,439	961	

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Table 28: Percentage of Trips by Roads

Hunting Area	Percentage of Trips											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Roads								16%	30%	28%	28%	25%
Total Trips								970	1,049	1,439	961	

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Table 29: Average # of Trips Reported by Harvesters by Hunting Area

Hunting Area	Average Number of Trips Per Harvester											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Nigliq Channel	7.9	5.6	6.4	6.3	5.5	5.2	3.7	3.9	1.9	4.1	1.2	4.7
East Channel Colville	2.2	2.6	2.5	1.9	1.9	2.3	3.1	1.3	2.0	1.1	2.7	2.1
Other Colville Delta	0.0	0.4	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1
Fish Creek	1.8	1.1	0.6	1.1	0.1	1.4	1.1	0.2	0.2	0.1	0.5	0.8
Coastal West	0.6	0.3	0.5	0.5	0.1	0.1	0.2	0.0	0.1	0.0	0.0	0.2
Coastal East	0.2	1.1	0.3	0.1	0.1	0.2	0.3	0.2	0.7	0.3	0.2	0.3
Itkillik River	1.2	2.0	2.0	1.3	1.3	0.8	1.4	1.1	2.0	2.6	2.6	1.7
Ocean Point	9.8	6.1	6.1	5.9	4.8	5.9	6.5	5.3	5.0	4.8	6.3	6.1
Sentinel Hill	8.3	5.2	5.7	4.1	4.1	4.6	4.5	3.7	3.0	2.9	4.9	4.6
Colville River South	2.0	3.7	4.5	2.9	2.5	3.6	3.9	2.0	1.4	1.3	2.6	2.8
West of Nuiqsut	4.1	2.4	4.7	3.8	3.7	2.5	5.3	5.8	6.7	7.9	7.5	5.0

Other	0.6	1.2	1.1	0.8	0.2	0.3	2.0	0.1	0.3	0.7	1.2	0.8
Any Area	28.0	19.0	21.2	19.6	17.9	17.8	19.8	16.7	16.7	21.2	19.2	19.7
Number of Harvesters	36	53	57	58	57	57	60	58	63	68	50	

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Table 30: Caribou Group Size Noted at Caribou Harvest Locations

Estimated Herd Size	Percentage of Harvest Locations							
	2012	2013	2014	2015	2016	2017	2018	All Years
1000-2000	2%	1%	1%	1%	3%	0%	0%	1%
500-999	1%	3%	1%	4%	0%	0%	0%	1%
100-499	3%	10%	9%	9%	8%	4%	4%	7%
81-99	0%	0%	0.4%	0%	0%	0%	0%	0%
71-80	1%	0%	1%	1%	0%	1%	1%	1%
61-70	1%	0%	0.4%	0%	0%	0%	0%	0%
51-60	2%	1%	2%	2%	1%	0%	1%	1%
41-50	2%	2%	3%	1%	1%	1%	2%	2%
31-40	1%	2%	2%	3%	1%	1%	1%	2%
21-30	1%	3%	4%	4%	5%	3%	2%	3%
11-20	13%	11%	14%	11%	15%	13%	7%	12%
2-10	41%	38%	42%	44%	36%	46%	51%	43%
1	34%	29%	20%	20%	31%	33%	31%	28%
Total Number	176	138	234	160	156	166	142	

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Table 31: Percentage of Respondents Reporting Changes in Harvest Activities

Type of Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Hunting Area Changed	31%	28%	39%	34%	36%	40%	28%	38%	38%	42%	37%	36%
Frequency Changed	50%	77%	65%	60%	63%	67%	70%	67%	73%	71%	63%	66%
Duration Changed	39%	32%	21%	21%	23%	26%	39%	28%	40%	47%	45%	33%
Months Changed	19%	15%	12%	21%	21%	18%	11%	20%	22%	16%	17%	17%
Harvest Amount Changed	75%	85%	68%	72%	54%	63%	82%	57%	81%	76%	78%	72%

Note: Denominators are the number of respondents for which responses were ascertained, and vary by type of change. Denominators for each study year and type of change are provided in subsequent tables.

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Table 32: Percentage of Respondents Reporting Not Harvesting Enough Caribou

Not Harvesting Enough	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Reported Did Not Harvest Enough	47%	53%	21%	16%	41%	54%	32%	22%	40%	41%	43%	37%

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Table 33: Type of Change in Harvest Amount

Type of Harvest Amount Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Harvest More	11%	15%	21%	17%	9%	9%	30%	16%	23%	15%	16%	17%
Harvest Less	64%	70%	47%	55%	45%	54%	53%	41%	58%	61%	61%	55%
Harvest the same	25%	15%	32%	28%	46%	37%	18%	43%	19%	24%	22%	28%
Number of Respondents	36	53	57	58	56	57	57	51	52	62	49	

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Table 34: Reasons for Decrease in Harvest Amount

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Resource Distribution or Migration Total	12	18	10	8	15	15	16	5	16	21	13	149
	35%	46%	29%	19%	43%	41%	41%	20%	42%	51%	33%	37%
Resource Availability	8	9	2	4	9	10	7	5	12	13	5	84
Migration Changed or Diverted	3	5			1	2	4			1	4	20
Farther from Riversides/Farther Inland		2	4		2	2	3		2	2	2	19
Change in Distribution / Migration		1		3	1					3		8

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Farther from Community		1					2		1	2		6
Moved Out of Area			3	1								4
Timing of Migration						1			1			2
Earlier Migration/Arrival			1									1
Later Migration/Arrival					1						1	2
Move to Different Areas					1							1
Resource in Smaller Groups	1										1	2
Personal Factors Total	9	10	16	22	6	14	14	17	13	10	16	147
	26%	26%	47%	52%	17%	38%	36%	68%	34%	24%	40%	36%
Personal Reasons		3	3	7	1	6	2	3	4	2	7	38
Lack of Transportation/Equipment	2	1	3	4		3	3	3	4	1	4	28
Take Fewer Trips		1	6	1	2		4	3	1	4	2	24
Employment/Lack of Time	1	2	2	4		2		2	1	2	1	17
Change in Subsistence Providers	1	1	2	4	2	1	1	2		1	1	16
Change in Subsistence Dependents	3	2		2				1				8
Need Less	2						2	2				6
Smaller Hunting Area					1				2			3
Increased Cost of Living/Expenses							1		1		1	3
Use Area Changed						2						2
Change in Transportation Method							1					1
Sharing Less								1				1
Development Activities Total	9	3	2	3	9	3	3	0	0	4	6	42
	26%	8%	6%	7%	26%	8%	8%	0%	0%	10%	15%	10%
Helicopter Traffic Disturbance	4			2	5	2	2					15
Development	2	1	2				1				4	10
Airplane Traffic Disturbance	2	1		1	1							5
Air Traffic	1				2						1	4
Traffic Disturbance						1				1	1	3
Oil Drilling		1								1		2
Off Road Vehicles Disturbance					1							1
Disturbance										1		1
Noise related to mining activities										1		1
Don't Know Total	0	2	1	5	1	0	0	0	2	2	2	15
	0%	5%	3%	12%	3%	0%	0%	0%	5%	5%	5%	4%
I do not know		2	1	5	1				2	2	2	15
Environmental Factors Total	0	3	2	1	1	1	0	0	2	0	0	10
	0%	8%	6%	2%	3%	3%	0%	0%	5%	0%	0%	2%
Change in Food Availability		2										2
Predators			1						1			2
Wind			1									1
More Rain					1							1
Climate Affecting Travel				1								1
Increase in Predators		1										1
New Species in Region						1						1

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Climate Affecting Harvest									1			1
Hunting Success - General Total	3	0	2	0	0	1	2	0	0	1	0	9
	9%	0%	6%	0%	0%	3%	5%	0%	0%	2%	0%	2%
Worse success			1			1	2			1		5
More difficult	2											2
Reduced harvest opportunities			1									1
Travel farther to harvest resource	1											1
Competition or Hunting Pressure Total	0	1	0	1	0	3	0	1	1	1	0	8
	0%	3%	0%	2%	0%	8%	0%	4%	3%	2%	0%	2%
Sport Hunting Methods Disturbing Migration Routes		1							1	1		3
Competition with Sport Hunters						2						2
Sport Hunting and Fishing				1								1
Hunting Pressure						1						1
Overharvesting by Sport Hunters / Fishermen								1				1
Resource Behavior Total	0	0	1	0	2	0	0	1	0	0	1	5
	0%	0%	3%	0%	6%	0%	0%	4%	0%	0%	3%	1%
Skittish Behavior in Species			1		2			1			1	5
Development Infrastructure Total	1	1	0	0	1	0	0	0	0	0	0	3
	3%	3%	0%	0%	3%	0%	0%	0%	0%	0%	0%	1%
Pipeline	1	1										2
Oil Field Infrastructure					1							1
Resource Abundance Total	0	0	0	0	0	0	2	1	3	2	1	9
	0%	0%	0%	0%	0%	0%	5%	4%	8%	5%	3%	2%
Fewer Males									3	2	1	6
Decrease in Species Number							2	1				3
Contamination Concerns Total	0	1	0	0	0	0	1	0	1	0	0	3
	0%	3%	0%	0%	0%	0%	3%	0%	3%	0%	0%	1%
Contamination from Air Pollution		1					1					2
Contamination									1			1
Resource Health Total	0	0	0	1	0	0	1	0	0	0	1	3
	0%	0%	0%	2%	0%	0%	3%	0%	0%	0%	3%	1%
Disease/Infection							1				1	2
Concern of Disease/Infection				1								1
Other Total	0	0	0	1	0	0	0	0	0	0	0	1
	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Miscellaneous				1								1
Grand Total	34	39	34	42	35	37	39	25	38	41	40	404

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Table 35: Reasons for Increase in Harvest Amount

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Personal Factors Total	4	6	6	7	2	1	10	3	6	5	6	56
	80%	75%	50%	58%	50%	33%	59%	38%	55%	56%	86%	58%
Take More Trips	1	3	2				4	2	1	2	3	18
Personal Reasons	2	2	1	5			2		3	1	1	17
Better Transportation/Equipment			1			1	2	1	2		1	8
Change in Subsistence Dependents	1		1	1	1					1	1	6
Change in Subsistence Providers			1	1	1							3
Sharing More							2					2
Need More		1								1		2
Resource Distribution or Migration Total	1	2	5	4	2	2	3	3	3	1	1	27
	20%	25%	42%	33%	50%	67%	18%	38%	27%	11%	14%	28%
Resource Availability		2	2	4	2	1	2	1	3		1	18
Closer to Community	1						1	2				4
Moved into Area			2									2
Travel Farther to Harvest Resource						1						1
Migration Changed or Diverted			1									1
Change in distribution/migration										1		1
Hunting Success - General Total	0	0	1	0	0	0	1	2	0	3	0	7
	0%	0%	8%	0%	0%	0%	6%	25%	0%	33%	0%	7%
Better Success			1				1	2		3		7
Don't Know Total	0	0	0	1	0	0	2	0	1	0	0	4
	0%	0%	0%	8%	0%	0%	12%	0%	9%	0%	0%	4%
I Do Not Know				1			2		1			4
Environmental Factors Total	0	0	0	0	0	0	0	0	1	0	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	1%
Decrease in Predators									1			1
Resource Health Total	0	0	0	0	0	0	1	0	0	0	0	1
	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	1%
Increase in Resource Size							1					1
Grand Total	5	8	12	12	4	3	17	8	11	9	7	96

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Table 36: Type of Change in Trip Frequency

Type of Trip Frequency Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Take More Trips	25%	36%	32%	24%	27%	25%	30%	25%	37%	26%	29%	29%
Take Fewer Trips	25%	42%	33%	34%	36%	42%	40%	42%	37%	45%	33%	37%
Take Same # of Trips	50%	23%	35%	41%	38%	33%	30%	33%	27%	29%	38%	34%
Number of Respondents	36	53	57	58	56	57	57	52	52	62	48	

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Table 37: Reasons for Decrease in Trip Frequency

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Personal Factors Total	9	16	19	22	17	21	18	20	14	25	13	194
	90%	80%	95%	88%	71%	75%	67%	83%	58%	71%	68%	76%
Personal Reasons	2	2	8	10	8	10	4	6	7	9	6	72
Employment/Lack of Time	3	3	5	7	4	6	9	4	5	9	1	56
Lack of Transportation/Equipment	4	10	6	5	4	2	2	7	2	5	6	53
Change in Subsistence Providers					1	1	1	2				5
Better Transportation/Equipment						1	1					2
Change in Harvest Methods										2		2
Change in Subsistence Dependents						1		1				2
Change in Transportation Method							1					1
Need Less		1										1
Resource Distribution or Migration Total	0	4	1	1	3	3	4	1	5	4	3	29
	0%	20%	5%	4%	13%	11%	15%	4%	21%	11%	16%	11%
Resource Availability		4			2	3	2	1	4	3	2	21
Change in Distribution/Migration					1					1		2
Farther from Community							1				1	2
Closer to Community							1					1
Moved into Area				1								1
Moved out of Area			1									1
Resource in Smaller Groups									1			1
Economic Factors Total	0	0	0	0	1	4	2	2	4	4	3	20
	0%	0%	0%	0%	4%	14%	7%	8%	17%	11%	16%	8%
Increased Cost of Living/Expenses					1	4	2	2	4	4	3	20
Don't Know Total	0	0	0	2	1	0	1	0	0	0	0	4
	0%	0%	0%	8%	4%	0%	4%	0%	0%	0%	0%	2%
I Do Not Know				2	1		1					4
Environmental Factors Total	1	0	0	0	0	0	2	0	1	0	0	4
	10%	0%	0%	0%	0%	0%	7%	0%	4%	0%	0%	2%
Shallower Rivers/Lakes							1					1
Wind							1					1
Less Snow	1											1
Weather									1			1
Development Activities Total	0	0	0	0	1	0	0	1	0	1	0	3
	0%	0%	0%	0%	4%	0%	0%	4%	0%	3%	0%	1%
Development					1							1
Disturbance								1				1
Traffic Disturbance										1		1
Hunting Success - General	0	0	0	0	0	0	0	0	0	1	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0.4%
Better Success										1		1

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Development Infrastructure Total	0	0	0	0	1	0	0	0	0	0	0	1
	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0.4%
Oil Field Infrastructure					1							1
Grand Total	10	20	20	25	24	28	27	24	24	35	19	256

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Table 38: Reasons for Increase in Trip Frequency

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Personal Factors Total	1	6	16	9	10	8	13	5	10	6	11	95
	8%	35%	80%	60%	63%	47%	76%	50%	56%	43%	85%	56%
Personal Reasons		6	7	7	5	3	6	3	6	4	6	53
Better Transportation/Equipment			7	2	1	2	5	1	2		4	24
Need More			2		1		1		2	2		8
Sharing More	1					2						3
Change in Subsistence Providers					2							2
Change in Transportation Method							1	1				2
Change in Subsistence Dependents						1					1	2
Use Area Changed					1							1
Resource Distribution or Migration Total	6	7	4	4	4	7	2	3	5	7	2	51
	50%	41%	20%	27%	25%	41%	12%	30%	28%	50%	15%	30%
Resource Availability	4	7	2	4	3	6	2	2	5	6	2	43
Migration Changed or Diverted	2											2
Moved out of Area			1		1							2
Farther from Riversides/Farther Inland						1				1		2
Moved into Area			1									1
Farther from Community								1				1
Development Activities Total	3	2	0	0	2	1	1	0	0	0	0	9
	25%	12%	0%	0%	13%	6%	6%	0%	0%	0%	0%	5%
Traffic Disturbance	1	1				1						3
Development	2	1										3
Helicopter Traffic Disturbance					1		1					2
Airplane Traffic Disturbance					1							1
Environmental Factors Total	0	0	0	1	0	1	0	0	1	0	0	3
	0%	0%	0%	7%	0%	6%	0%	0%	6%	0%	0%	2%
Increase in predators						1			1			2
Weather				1								1

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Don't Know Total	0	1	0	1	0	0	0	0	0	0	0	2
	0%	6%	0%	7%	0%	0%	0%	0%	0%	0%	0%	1%
I Do Not Know		1		1								2
Development Infrastructure Total	1	0	0	0	0	0	0	0	1	0	0	2
	8%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	1%
Roads/Ice Roads									1			1
Pipeline	1											1
Economic Factors Total	1	0	0	0	0	0	0	1	0	0	0	2
	8%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	1%
Mitigation Funds	1							1				2
Resource Behavior Total	0	0	0	0	0	0	1	0	0	0	0	1
	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	1%
Skittish Behavior in Species							1					1
Hunting Success - General	0	0	0	0	0	0	0	1	1	0	0	2
	0%	0%	0%	0%	0%	0%	0%	10%	6%	0%	0%	1%
Worse Success									1			1
Reduced Harvest Opportunities								1				1
Competition or Hunting Pressure Total	0	1	0	0	0	0	0	0	0	0	0	1
	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Competition with Sport Hunters		1										1
Other Total	0	0	0	0	0	0	0	0	0	1	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	1%
Miscellaneous										1		1
Grand Total	12	17	20	15	16	17	17	10	18	14	13	169

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Table 39: Type of Change in Trip Duration

Type of Trip Duration Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Take Longer Trips	33%	25%	9%	12%	13%	16%	19%	8%	29%	35%	29%	21%
Take Shorter Trips	6%	8%	12%	7%	11%	11%	19%	20%	12%	11%	16%	12%
Take Same Duration Trips	61%	68%	79%	81%	77%	74%	61%	72%	60%	53%	55%	67%
Number of Respondents	36	53	57	58	56	57	57	50	52	62	49	

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Table 40: Reasons for Taking Longer Trips

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Resource Distribution or Migration Total	10	5	1	4	5	8	8	1	2	19	4	67
	63%	56%	20%	57%	63%	73%	73%	25%	17%	68%	36%	55%
Resource Availability	4	3		3	2	6	4		2	7	3	34
Farther from Riversides/Farther Inland		1			1	2	4			2		10
Travel Farther to Harvest Resource	1	1	1	1	1			1		5	1	12
Migration Changed or Diverted	5											5
Farther from Community										2		2
Change in Distribution/Migration										2		2
Later Migration/Arrival					1					1		2
Personal Factors Total	0	3	3	3	3	3	3	2	8	5	6	39
	0%	33%	60%	43%	38%	27%	27%	50%	67%	18%	55%	32%
Personal Reasons		3	3	3	1	1	3	2	7	3	4	30
Better Transportation/Equipment					1	1					2	4
Change in Transportation Method					1				1			2
Take Fewer Trips										2		2
Sharing More						1						1
Development Activities Total	5	0	0	0	0	0	0	0	0	1	0	6
	31%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	5%
Helicopter Traffic Disturbance	2											2
Airplane Traffic Disturbance	2											2
Development	1									1		2
Hunting Success - General Total	1	0	1	0	0	0	0	0	0	0	0	2
	6%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	2%
More Difficult	1											1
Worse Success			1									1
Economic Factors Total	0	1	0	0	0	0	0	1	0	2	0	4
	0%	11%	0%	0%	0%	0%	0%	25%	0%	7%	0%	3%
Increased Cost of Living/Expenses		1						1		2		4
Development Infrastructure Total	0	0	0	0	0	0	0	0	1	1	1	3
	0%	0%	0%	0%	0%	0%	0%	0%	8%	4%	9%	2%
Roads/Ice Roads								1	1	1		3
Environmental Factors Total	0	0	0	0	0	0	0	0	1	0	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	0%	1%
Weather								1				1
Grand Total	16	9	5	7	8	11	11	4	12	28	11	122

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Table 41: Reasons for Taking Shorter Trips

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Personal Factors Total	2	2	6	3	5	3	2	2	6	4	2	37
	100%	100%	86%	60%	56%	50%	22%	20%	86%	50%	29%	51%
Personal Reasons	1		5	2	4	1		1	3	2	1	20
Employment/Lack of Time	1	1			1	1	1		2		1	8
Lack of Transportation/Equipment		1	1	1		1			1	2		7
Change in Transportation Method							1					1
Better Transportation/Equipment								1				1
Resource Distribution or Migration Total	0	0	1	1	2	1	3	5	0	2	2	17
	0%	0%	14%	20%	22%	17%	33%	50%	0%	25%	29%	24%
Resource Availability			1	1	2	1	2	3		1	2	13
Farther from Riversides/Farther Inland							1					1
Harvest Resource Closer to Community								1				1
Closer to Shore								1				1
Closer to Community										1		1
Economic Factors Total	0	0	0	0	1	2	2	2	0	1	0	8
	0%	0%	0%	0%	11%	33%	22%	20%	0%	13%	0%	11%
Increased Cost of Living/Expenses					1	2	2	2		1		8
Environmental Factors Total	0	0	0	0	1	0	1	1	0	0	2	5
	0%	0%	0%	0%	11%	0%	11%	10%	0%	0%	29%	7%
Weather							1				2	3
More Rain					1							1
Rain								1				1
Hunting Success - General	0	0	0	0	0	0	1	0	0	1	0	2
	0%	0%	0%	0%	0%	0%	11%	0%	0%	13%	0%	3%
Better Success							1			1		2
Development Infrastructure Total	0	0	0	0	0	0	0	0	1	0	1	2
	0%	0%	0%	0%	0%	0%	0%	0%	14%	0%	14%	3%
Roads/Ice Roads									1		1	2
Don't Know Total	0	0	0	1	0	0	0	0	0	0	0	1
	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	1%
I Do Not Know				1								1
Grand Total	2	2	7	5	9	6	9	10	7	8	7	72

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Table 42: Type of Change in Use Areas

Type of Use Area Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Use Area Changed	6%	19%	14%	29%	29%	28%	16%	15%	7%	2%	9%	16%
Smaller Hunting Area	11%	0%	11%	0%	4%	0%	4%	8%	5%	5%	2%	4%
Expanded Use Area	0%	0%	7%	0%	4%	11%	7%	2%	7%	0%	0%	3%
Travel Farther to Harvest Resource	14%	4%	5%	2%	0%	0%	0%	6%	0%	6%	2%	4%
Utilizing New or Different Areas	0%	0%	2%	0%	0%	0%	2%	6%	19%	29%	13%	6%
Changing of Timing of Hunt	0%	2%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
Personal Reasons	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Take Fewer Trips	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Change in Harvest Methods	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%
Move to Different Areas	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
No Change in Use Area	69%	70%	61%	67%	64%	60%	72%	63%	62%	58%	63%	65%
Number of Respondents	36	53	57	58	56	57	57	52	42	62	46	

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Table 43: Reasons for a Change in Use Area

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Personal Factors Total	4	4	19	15	13	12	8	7	8	3	8	101
	24	25	83	68	46	44	40	37	47	11	40	43%
	%	%	%	%	%	%	%	%	%	%	%	
Personal Reasons	1	1	10	11	6	3	2	4	1	3	3	45
Lack of Transportation/Equipment	2	2	5	4	3	4	2	2	2		2	28
Better Transportation/Equipment			4		1	3	1	1	3		2	15
Employment/Lack of Time	1	1				2			1			5
Change in Transportation Method					1		3				1	5
Change in Subsistence Providers					1							1
Smaller Hunting Area					1							1
Need More									1			1
Resource Distribution or Migration Total	6	7	2	2	12	8	4	4	2	9	2	58
	35	44	9%	9%	43	30	20	21	12	32	10	24%
	%	%			%	%	%	%	%	%	%	
Resource Availability	1	2		1	4	8	3	3	2	6	2	32
Migration Changed or Diverted	4	2			1							7
Change in Distribution/Migration		1		1	3			1		2		8
Farther from Community		1			1					1		3
Moved Out of Area			2									2
Closer to Community							1					1
Harvest Resource Closer to Community					1							1
Move to Different Areas		1										1

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Farther from Shore					1							1
Moved into Area					1							1
Farther from Riversides/Farther Inland	1											1
Environmental Factors Total	1	3	2	4	2	2	3	4	4	6	2	33
	6%	19%	9%	18%	7%	7%	15%	21%	24%	21%	10%	14%
Shallower Rivers/Lakes			1	3		1	2	1	1	2		11
River Channel Changed						1		3	3	4	2	13
Wind		1					1					2
Climate Affecting Travel		2										2
Climate					1							1
Less Snow	1											1
Warmer Temperatures					1							1
Water Quality				1								1
Weather			1									1
Development Activities Total	4	1	0	1	1	5	3	2	0	0	1	18
	24%	6%	0%	5%	4%	19%	15%	11%	0%	0%	5%	8%
Development	1	1		1	1	1	2				1	8
Helicopter Traffic Disturbance	1					1	1					3
Traffic Disturbance	1					2						3
Disturbance								2				2
Airplane Traffic Disturbance	1											1
Air Traffic						1						1
Development Infrastructure Total	2	0	0	0	0	0	0	0	3	8	4	17
	12%	0%	0%	0%	0%	0%	0%	0%	18%	29%	20%	7%
Roads/Ice Roads	1								3	8	4	16
Pipeline	1											1
Don't Know	0	0	0	0	0	0	1	2	0	0	3	6
	0%	0%	0%	0%	0%	0%	5%	11%	0%	0%	15%	3%
I Do Not Know							1	2			3	6
Economic Factors Total	0	1	0	0	0	0	1	0	0	1	0	3
	0%	6%	0%	0%	0%	0%	5%	0%	0%	4%	0%	1%
Increased Cost of Living/Expenses		1					1			1		3
Competition or Hunting Pressure Total	0	0	0	0	0	0	0	0	0	1	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%
Sport Hunting and Fishing										1		1
Grand Total	17	16	23	22	28	27	20	19	17	28	20	237

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Table 44: Type of Change in Months of Harvest by Type of Change

Type of Hunting Month Change	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Later Hunting Season	11%	0%	5%	0%	0%	0%	2%	2%	2%	0%	0%	2%
Earlier Hunting Season	0%	0%	0%	0%	2%	2%	2%	2%	0%	0%	0%	1%
Harvest Season Changed	8%	15%	7%	21%	20%	16%	7%	14%	20%	16%	17%	15%
Harvest Season Same	81%	85%	88%	79%	79%	82%	89%	82%	78%	84%	83%	83%
Number of Respondents	36	53	57	58	56	57	57	50	51	61	48	

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Table 45: Reasons Given for a Change in Harvest Season

Causes	Number and Percentage of Observations												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	
Personal Factors Total	4	5	5	12	8	7	4	7	3	5	6	66	
	57%	63%	71%	86%	67%	70%	67%	88%	38%	50%	75%	67%	
Lack of Transportation/Equipment	2	2	2	3	6	3	1			1	2	22	
Personal Reasons		2		7	1	1	2	4	2	1	3	23	
Employment/Lack of Time	2		1	2		1				1		7	
Better Transportation/Equipment			2		1					1		4	
Need More						1	1	1		1		4	
Change in Subsistence Dependents		1						1				2	
Change in Subsistence Providers						1						1	
Need Less								1			1	2	
Change in transportation method									1			1	
Resource Distribution or Migration Total	3	2	2	1	2	1	1	0	2	3	1	18	
	43%	25%	29%	7%	17%	10%	17%	0%	25%	30%	13%	18%	
Resource Availability		2	1		2	1	1		2			9	
Later Migration/Arrival	3										1	4	
Earlier Migration/Arrival										2		2	
Change in Distribution/Migration				1						1		2	
Moved Out of Area			1									1	
Environmental Factors Total	0	0	0	0	2	1	0	0	2	0	0	5	
	0%	0%	0%	0%	17%	10%	0%	0%	25%	0%	0%	5%	
Climate					1							1	
Harsh Winter					1							1	
Weather						1			1			2	
Less Snow									1			1	
Development Activities Total	0	1	0	0	0	0	0	0	0	0	0	1	
	0%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	
Airplane Traffic Disturbance		1										1	
Don't Know Total	0	0	0	1	0	0	1	0	0	0		2	
	0%	0%	0%	7%	0%	0%	17%	0%	0%	0%		2%	

Causes	Number and Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
I Do Not Know				1			1					2
Hunting Success - General Total	0	0	0	0	0	1	0	0	0	0	0	1
	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	1%
Better Success						1						1
Development Infrastructure	0	0	0	0	0	0	0	1	0	2	1	4
	0%	0%	0%	0%	0%	0%	0%	13%	0%	20%	13%	4%
Roads/Ice Roads								1		2	1	4
Economic Factors	0	0	0	0	0	0	0	0	1	0	0	1
	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	1%
Increased cost of living/expenses									1			1
Grand Total	7	8	7	14	12	10	6	8	8	10	8	98

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Table 46: Respondent Observations of Abnormalities in Harvested Caribou

Type of Abnormality	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Health	47%	26%	18%	26%	33%	16%	15%	16%	14%	22%	14%	22%
Other	3%	4%	0%	0%	4%	4%	5%	2%	2%	3%	0%	2%
Parasites	22%	2%	5%	3%	4%	0%	2%	0%	0%	1%	2%	4%
Quality	8%	4%	4%	10%	14%	4%	0%	10%	2%	3%	0%	5%
Size	28%	11%	18%	16%	26%	12%	8%	5%	5%	10%	8%	13%
One or More Abnormalities	64%	38%	40%	29%	44%	25%	22%	21%	19%	29%	20%	32%
Number of Active Harvester Respondents	36	53	57	58	57	57	60	58	63	68	50	

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Table 47: Percentage of Abnormal Caribou by Type of Abnormality

Type of Abnormality	Percentage of Abnormal Caribou											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Health	32%	47%	35%	85%	60%	64%	83%	51%	69%	68%	47%	58%
Other	1%	6%	0%	0%	4%	14%	13%	11%	6%	7%	0%	6%
Parasites	18%	15%	22%	11%	4%	0%	4%	0%	0%	4%	12%	8%
Quality	4%	6%	5%	22%	22%	14%	0%	23%	6%	7%	0%	10%
Size	58%	26%	43%	44%	66%	50%	43%	40%	25%	39%	53%	44%
One or More Abnormalities	74	34	37	27	50	14	23	35	16	28	17	32

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Table 48: Percentage of Abnormal Caribou Used by Type of Abnormality

Type of Abnormality	Percentage of Abnormal Caribou Used											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Health	17%	25%	15%	43%	23%	67%	11%	11%	18%	11%	13%	23%
Other	0%	100%	-	-	0%	50%	67%	100%	100%	0%	-	52%
Parasites	85%	100%	88%	0%	0%	-	0%	-	-	0%	0%	34%
Quality	67%	50%	100%	17%	9%	50%	-	0%	100%	0%	-	44%
Size	88%	89%	88%	8%	61%	43%	20%	86%	100%	64%	67%	65%
One or More Abnormalities	70%	59%	68%	41%	50%	64%	26%	51%	44%	32%	41%	50%

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Table 49: Type of Observed Abnormalities

Observed Abnormality	Percentage of Observations												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	
Disease/Infection	29%	35%	33%	45%	36%	33%	57%	38%	33%	45%	30%	38%	
Decrease in Resource Size	43%	26%	31%	27%	41%	29%	33%	33%	22%	35%	45%	33%	
Change in Texture of Meat	0%	9%	0%	9%	10%	5%	0%	7%	33%	8%	15%	9%	
Change in Smell of Meat	2%	3%	0%	11%	8%	5%	0%	12%	6%	5%	0%	5%	
Fewer Parasites	12%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	3%	
Increase in Resource Size	6%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	1%	
Physical Abnormalities	0%	9%	0%	0%	1%	0%	0%	10%	0%	3%	0%	2%	
More Parasites	4%	0%	3%	7%	1%	0%	0%	0%	0%	3%	0%	2%	
Parasites	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	10%	2%	
Injured Resource	0%	0%	0%	0%	0%	19%	0%	0%	6%	0%	0%	2%	
Taste	1%	0%	0%	0%	1%	5%	0%	0%	0%	0%	0%	1%	
Resource Injury	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	1%	
Change in Resource Quality	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Resource Appears Unhealthy	0%	0%	0%	0%	1%	5%	0%	0%	0%	0%	0%	1%	
Fur Less Thick	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%	1%	
New Species in Region	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Abnormal Resource Death	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Less Fat	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Total	83	34	39	44	80	21	30	42	18	40	20		

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Table 50: Respondent Reported Alpine-Related Impacts on Caribou Hunting

Type of Alpine-Related Impact	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Helicopter Traffic	61%	40%	47%	22%	30%	51%	33%	22%	13%	21%	42%	35%
Plane Traffic	42%	32%	16%	9%	9%	13%	10%	2%	11%	12%	20%	16%
Other Traffic	25%	19%	2%	3%	0%	11%	2%	5%	8%	15%	8%	9%
Oil Company Personnel	6%	2%	4%	0%	0%	9%	0%	0%	0%	3%	12%	3%
Man-made Structures	61%	32%	9%	5%	12%	22%	20%	16%	13%	26%	40%	23%
Regulations	14%	11%	0%	0%	2%	0%	0%	0%	0%	1%	0%	3%
Seismic Lines or Activity	0%	11%	18%	0%	0%	5%	0%	0%	0%	3%	0%	3%
Other	6%	6%	2%	5%	4%	2%	2%	3%	2%	10%	14%	5%
Any Impact	72%	64%	58%	31%	46%	58%	43%	41%	27%	51%	68%	51%
No Impact	28%	36%	42%	69%	54%	42%	57%	59%	73%	49%	32%	49%
Number of Respondents	36	53	57	58	57	55	60	58	63	68	50	

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Table 51: Observations of Reported Alpine-Related Impacts on Caribou Hunting

Type of Alpine-Related Impact	Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Helicopter Traffic	28%	26%	49%	54%	55%	46%	48%	52%	28%	22%	30%	40%
Plane Traffic	22%	21%	16%	18%	18%	12%	14%	3%	24%	13%	13%	16%
Other Traffic	10%	12%	2%	7%	0%	9%	2%	10%	17%	16%	6%	8%
Oil Company Personnel	2%	1%	4%	0%	0%	7%	0%	0%	0%	3%	8%	2%
Man-made Structures	30%	22%	9%	11%	18%	19%	33%	29%	28%	29%	34%	24%
Regulations	6%	7%	0%	0%	3%	0%	0%	0%	0%	2%	0%	2%
Seismic Lines or Activity	0%	7%	18%	0%	0%	4%	0%	0%	0%	3%	0%	3%
Other	2%	4%	2%	11%	5%	1%	2%	6%	3%	13%	10%	5%
Average Number Impacts Per Respondent	2.4	1.5	1.0	0.5	0.7	1.2	0.7	0.5	0.5	0.9	1.6	
Number of Observations	87	82	55	28	38	67	42	31	29	63	80	

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Table 52: Household Observations of Alpine-Related Impacts on Caribou Hunting

Impacts	Percentage of Nuiqsut Households								
	2010	2011	2012	2013	2015	2016	2017	2018	All Years
Alpine-related Impacts	39%	21%	32%	33%	43%	41%	31%	53%	37%
Other Impacts	0%	9%	18%	8%	4%	1%	3%	0%	6%
Avoiding Alpine Area	8%	9%	4%	10%	2%	3%	12%	18%	8%
Total Households	78	77	82	84	82	79	78	79	

Notes: ADF&G data for 2014 (Year 7) not reported due to low response rate.

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Table 53: Household Observations of Alpine-Related Impacts by Impact Type

Impact Type	Percentage of Households										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	At Least One Year
Helicopter Traffic	18%	14%	15%	15%		21%	19%	9%	15%	16%	41%
Airplane Traffic	9%	6%	9%	8%		10%	6%	5%	5%	7%	23%
Other Traffic	3%	0%	0%	4%		5%	10%	7%	8%	5%	17%
Oil Company Personnel	0%	0%	0%	0%		0%	0%	0%	2%	0%	1%
Man-Made Structures	6%	0%	4%	6%		10%	8%	12%	15%	8%	29%
Regulations	0%	0%	0%	2%		1%	3%	1%	1%	1%	5%
Seismic Lines Activity	1%	0%	0%	0%		0%	4%	0%	2%	1%	4%
Other	9%	3%	13%	4%		12%	13%	9%	24%	11%	38%
Any Impact	38%	21%	28%	30%		41%	42%	30%	49%	35%	69%
Number of Households	78	77	82	84		82	79	78	79		135

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Table 54: Respondents Reporting Alpine Impact Types, At Least One Year

Impact Type	At Least One Year
Helicopter Traffic	58%
Plane Traffic	31%
Other Traffic	22%
Oil Company Personnel	10%
Man-made Structures	44%
Regulations	7%
Seismic Lines or Activity	15%
Other	12%
Any Impact	75%
No Impact	25%
Number of Respondents	162

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Table 55: Percentage of Reported Impacts by Month

Months	Percentage of Reported Impacts											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Jan	8%	0%	18%	0%	5%	7%	5%	3%	3%	11%	15%	7%
Feb	8%	0%	18%	0%	5%	7%	5%	3%	10%	11%	15%	8%
Mar	8%	0%	11%	0%	5%	9%	5%	3%	3%	11%	15%	6%
Apr	7%	1%	7%	0%	3%	4%	5%	3%	3%	8%	16%	5%
May	5%	2%	11%	0%	3%	4%	2%	3%	3%	13%	16%	6%
Jun	34%	30%	20%	7%	8%	39%	24%	39%	38%	22%	40%	27%
Jul	56%	41%	53%	11%	39%	48%	36%	29%	52%	25%	46%	40%
Aug	33%	26%	33%	43%	26%	28%	43%	26%	17%	21%	28%	29%
Sep	10%	12%	16%	0%	24%	13%	19%	16%	14%	25%	21%	16%
Oct	5%	1%	9%	4%	5%	6%	5%	10%	10%	13%	16%	8%
Nov	3%	1%	15%	4%	5%	6%	2%	3%	7%	8%	15%	6%
Dec	8%	1%	18%	4%	5%	7%	5%	3%	3%	10%	15%	7%
Total	87	82	55	28	38	67	42	31	29	63	80	

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Table 56: Respondent Descriptions of Helicopters Associated with Impact

Helicopter Descriptions	Percentage of Observations										
	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years	
Helicopters - Unknown Owner	33%	47%	19%	29%	30%	25%	63%	57%	42%	38%	
Blue and White Helicopter	30%	40%	48%	29%	25%	6%	25%	7%	4%	24%	
Alpine Helicopter	15%	0%	24%	19%	25%	38%	0%	7%	0%	14%	
Air Logistics Helicopter	15%	0%	10%	10%	0%	6%	0%	0%	0%	4%	
Conoco Phillips Helicopter	4%	0%	0%	0%	5%	13%	0%	7%	25%	6%	
Helicopter, Blue	0%	7%	0%	0%	5%	13%	0%	0%	4%	3%	
Helicopter, Blue and Orange	0%	7%	0%	3%	0%	0%	0%	0%	0%	1%	
Red Helicopter	4%	0%	0%	0%	0%	0%	13%	0%	13%	3%	
Blue and Red Helicopter	0%	0%	0%	0%	0%	0%	0%	14%	0%	2%	
Red and Black Helicopter	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	
Yellow Helicopter	0%	0%	0%	0%	5%	0%	0%	0%	0%	1%	
Other Oil Company Helicopter	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	
Airplane - Unknown Owner	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	
Green and Yellow Helicopter	0%	0%	0%	0%	0%	0%	0%	7%	0%	1%	
Green and White Helicopter	0%	0%	0%	0%	5%	0%	0%	0%	0%	1%	
Helicopter for Scientific Activity	0%	0%	0%	0%	0%	0%	0%	0%	8%	1%	
Black Helicopter	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	
Total	27	15	21	31	20	16	8	14	24		

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Table 57: Descriptions of Airplanes Associated with Airplane Traffic Impacts

Airplane Descriptions	Percentage of Observations									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Airplane - Unknown Owner	22%	60%	0%	38%	33%	0%	43%	38%	50%	31%
Alpine Airplane	0%	20%	29%	25%	67%	0%	29%	25%	20%	24%
Cargo Airplane	44%	20%	14%	25%	0%	100%	0%	0%	0%	23%
Twin Otter	11%	0%	29%	0%	0%	0%	0%	25%	10%	8%
Shared Services Airplane	0%	0%	29%	0%	0%	0%	0%	0%	0%	3%
White Airplane	0%	0%	0%	0%	0%	0%	29%	13%	10%	6%
Supercub	0%	0%	0%	13%	0%	0%	0%	0%	0%	1%
Cessna	11%	0%	0%	0%	0%	0%	0%	0%	10%	2%
Yellow Airplane	11%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Total	9	5	7	8	6	1	7	8	10	

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Table 58: Descriptions of Man-Made Structures Associated with Impacts

Man-Made Structure Descriptions	Percentage of Observations									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Pipeline	40%	33%	86%	54%	21%	11%	50%	22%	19%	37%
Roads and Bridges	0%	0%	0%	0%	21%	67%	50%	56%	41%	26%
Infrastructure	20%	33%	14%	46%	7%	22%	0%	22%	30%	22%
Ice Roads and Bridges	40%	0%	0%	0%	36%	0%	0%	0%	7%	9%
Trucks	0%	0%	0%	0%	7%	0%	0%	0%	0%	1%
Seismic Lines	0%	0%	0%	0%	7%	0%	0%	0%	0%	1%
Waste	0%	33%	0%	0%	0%	0%	0%	0%	0%	4%
Safety Risks	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Total	5	3	7	13	14	9	8	18	27	

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Table 59: Respondent Non-Alpine Impacts on Caribou Hunting

Type of Non-Alpine Impact	Percentage of Respondents											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Helicopter traffic	11%	9%	2%	7%	32%	13%	13%	16%	6%	6%	4%	11%
Plane traffic	17%	6%	4%	5%	28%	15%	13%	16%	8%	9%	8%	12%
Other traffic	3%	0%	0%	0%	4%	4%	2%	2%	0%	0%	0%	1%
Oil company personnel	0%	0%	0%	0%	5%	0%	2%	0%	0%	0%	0%	1%
Man-made structures	6%	4%	0%	0%	2%	2%	0%	2%	2%	0%	0%	1%
Regulations	3%	0%	0%	0%	4%	2%	0%	0%	3%	0%	0%	1%
Seismic lines or activity	0%	2%	0%	2%	0%	0%	0%	0%	2%	0%	0%	0%
Other	8%	0%	0%	2%	5%	5%	2%	7%	3%	0%	4%	3%
Any impact	31%	15%	5%	16%	54%	29%	27%	31%	19%	13%	16%	23%
Total Number of Respondents	36	53	57	58	57	55	60	58	63	68	50	

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Table 60: Observations of Non-Alpine Impacts on Caribou Hunting

Type of Non-Alpine Impact	Percentage of Observations											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Helicopter traffic	22%	45%	33%	40%	43%	32%	45%	35%	29%	40%	33%	36%
Plane traffic	39%	27%	67%	40%	34%	36%	40%	42%	35%	60%	44%	42%
Other traffic	6%	0%	0%	0%	4%	9%	5%	4%	0%	0%	0%	3%
Oil company personnel	0%	0%	0%	0%	6%	0%	5%	0%	0%	0%	0%	1%
Man-made structures	11%	18%	0%	0%	2%	5%	0%	4%	6%	0%	0%	4%
Regulations	6%	0%	0%	0%	4%	5%	0%	0%	12%	0%	0%	2%
Seismic lines or activity	0%	9%	0%	10%	0%	0%	0%	0%	6%	0%	0%	2%
Other	17%	0%	0%	10%	6%	14%	5%	15%	12%	0%	22%	9%
Total	18	11	3	10	47	22	20	26	17	10	9	

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Table 61: Respondents Reporting Avoidance of Previously Used Hunting Areas

Avoid Areas?	Percentage of Respondents						
	2013	2014	2015	2016	2017	2018	All Years
No	39%	42%	42%	49%	25%	24%	37%
Yes	61%	58%	58%	51%	75%	76%	63%
Total	57	57	52	61	64	49	

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Table 62: Places of Avoidance by Percentage of Observations

Place	Percentage of Observations						
	2013	2014	2015	2016	2017	2018	All Years
Alpine/Alpine Satellites	29%	30%	21%	11%	13%	13%	19%
Fish Creek	9%	8%	3%	14%	13%	13%	10%
Nigliq Channel	9%	3%	8%	3%	8%	21%	8%
East Channel	7%	0%	8%	6%	14%	8%	7%
<i>Kuupaqullurak</i>	0%	8%	8%	11%	5%	2%	6%
Colville Delta	4%	5%	8%	11%	3%	0%	5%
Nanuq	0%	0%	10%	11%	3%	6%	5%
Upper Colville River	2%	5%	8%	3%	3%	8%	5%
Tamayyak Channel	7%	8%	3%	0%	3%	0%	3%
West of Nuiqsut	4%	5%	3%	3%	3%	2%	3%
Itkillik River	2%	8%	0%	6%	2%	2%	3%
Spur Road	0%	3%	5%	3%	3%	0%	2%
<i>Pisiktagvik</i>	0%	0%	3%	3%	5%	0%	2%
Various Areas	0%	5%	0%	0%	0%	6%	2%
<i>Nigliq</i>	0%	0%	0%	6%	0%	4%	2%
<i>Puviksuk</i>	4%	0%	0%	0%	2%	2%	1%

Place	Percentage of Observations						
	2013	2014	2015	2016	2017	2018	All Years
Shallow Areas	7%	0%	0%	0%	0%	0%	1%
East of Colville Delta	0%	3%	3%	0%	2%	0%	1%
Kachemach River	2%	0%	0%	3%	2%	0%	1%
East of Nigliq Channel	2%	0%	3%	0%	0%	2%	1%
Teshkepuk Lake	2%	0%	0%	3%	0%	2%	1%
Anaktuvuk River	0%	5%	0%	0%	0%	0%	1%
East of Colville River	2%	0%	0%	3%	0%	0%	1%
Oliktok Point	0%	0%	3%	0%	2%	0%	1%
<i>Nuiqsupiaq</i>	0%	0%	3%	0%	2%	0%	1%
Umiraq	0%	0%	0%	0%	3%	0%	1%
Atigaru Point	2%	0%	0%	0%	0%	2%	1%
West of Colville River	0%	0%	0%	0%	2%	2%	1%
Chandler River	0%	3%	0%	0%	0%	0%	0.5%
Kuparuk River	2%	0%	0%	0%	0%	0%	0.4%
Lake near Kachemak	2%	0%	0%	0%	0%	0%	0.4%
<i>Tingmeachsiovik</i>	0%	0%	3%	0%	0%	0%	0.4%
Eskimo Island	0%	0%	3%	0%	0%	0%	0.4%
Ikpikpuk River	0%	0%	0%	3%	0%	0%	0.5%
Niglivik	0%	0%	0%	0%	2%	0%	0.3%
Kayuktisiluk	0%	0%	0%	0%	2%	0%	0.3%
Ulusrak	0%	0%	0%	0%	2%	0%	0.3%
Miluveach River	0%	0%	0%	0%	2%	0%	0.3%
Nuiqsut	0%	0%	0%	0%	2%	0%	0.3%
Judy Creek	0%	0%	0%	0%	0%	2%	0.3%
Lake 17	0%	0%	0%	0%	0%	2%	0.3%
Location not captured	0%	0%	0%	0%	2%	0%	0.3%
Total	45	37	40	37	63	48	268

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Table 63: Places of Avoidance by Percentage of Respondents

Places	Percentage of Respondents							All Years	At Least One Year
	2013	2014	2015	2016	2017	2018			
Alpine/Alpine Satellites	23%	19%	15%	7%	13%	12%	15%	29%	
East channel	5%		6%	3%	14%	8%	7%	16%	
Fish Creek	7%	5%	2%	8%	13%	12%	8%	15%	
Nigliq channel	7%	2%	6%	2%	8%	20%	7%	16%	
Kuupaquillurak	0%	5%	6%	7%	5%	2%	4%	9%	
Colville Delta	4%	4%	6%	7%	3%	0%	4%	6%	

Places	Percentage of Respondents							
	2013	2014	2015	2016	2017	2018	All Years	At Least One Year
Upper Colville River	2%	4%	6%	2%	3%	8%	4%	9%
Nanuq	0%	0%	8%	7%	3%	6%	4%	6%
West of Nuiqsut	4%	4%	2%	2%	3%	2%	3%	5%
Itkillik river	2%	5%	0%	3%	2%	2%	2%	5%
Spur Road	0%	2%	4%	2%	3%	0%	2%	4%
Tamayayak Channel	5%	5%	2%	0%	3%	0%	3%	4%
Pisiktagvik	0%	0%	2%	2%	5%	0%	1%	3%
East of Colville Delta	0%	2%	2%	0%	2%	0%	1%	2%
Kachemach River	2%	0%	0%	2%	2%	0%	1%	2%
Puviksuk	4%	0%	0%	0%	2%	2%	1%	3%
Shallow areas	5%	0%	0%	0%	0%	0%	1%	2%
Anaktuvuk River	0%	4%	0%	0%	0%	0%	1%	2%
Oliktok Point	0%	0%	2%	0%	2%	0%	1%	2%
East of Colville River	2%	0%	0%	2%	0%	0%	1%	2%
Nuiqsupiaq	0%	0%	2%	0%	2%	0%	1%	2%
Teshepkuk Lake	2%	0%	0%	2%	0%	2%	1%	2%
Various Areas	0%	4%	0%	0%	0%	6%	2%	2%
Nigliq	0%	0%	0%	3%	0%	4%	1%	2%
Umiraq	0%	0%	0%	0%	3%	0%	1%	2%
Atigaru Point	2%	0%	0%	0%	0%	2%	1%	2%
Chandler River	0%	2%	0%	0%	0%	0%	0%	1%
East of Nigliq channel	2%	0%	2%	0%	0%	2%	1%	2%
Kuparuk River	2%	0%	0%	0%	0%	0%	0%	1%
Lake near Kachemak	2%	0%	0%	0%	0%	0%	0%	1%
Tingmeachsiovik	0%	0%	2%	0%	0%	0%	0%	1%
Eskimo Island	0%	0%	2%	0%	0%	0%	0%	1%
Ikpikpuk River	0%	0%	0%	2%	0%	0%	0%	1%
Niglivik	0%	0%	0%	0%	2%	0%	0%	1%
Kayuktisiluk	0%	0%	0%	0%	2%	0%	0%	1%
Ulusrak	0%	0%	0%	0%	2%	0%	0%	1%
West of Colville River	0%	0%	0%	0%	2%	2%	1%	2%
Miluveach River	0%	0%	0%	0%	2%	0%	0%	1%
Nuiqsut	0%	0%	0%	0%	2%	0%	0%	1%
Judy Creek	0%	0%	0%	0%	0%	2%	0%	1%
Lake 17	0%	0%	0%	0%	0%	2%	0%	1%
Location not captured	0%	0%	0%	0%	2%	0%	0%	1%
Total Number of Respondents	57	57	52	61	64	49		128

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Table 64: Causes of Avoidance, Percentage of Observations

Causes	Number of Observations						
	2013	2014	2015	2016	2017	2018	All Years
Development Causes	60%	60%	72%	53%	48%	56%	58%
Development Activities	8	5	14	13	16	11	67
Development Infrastructure	7	12	12	4	13	16	64
Development-General	4		6	5	3	1	19
Security Restrictions	4	3	3	3	2	4	19
Contamination Concerns	6	4				0	10
Safety Concerns	3	4	1	1		5	14
Environmental Causes	34%	19%	24%	29%	32%	27%	28%
Resource Availability	6	6	9	13	17	11	62
Environmental Factors	12	3	3	1	6	7	32
Personal Reasons	4%	21%	4%	16%	14%	15%	12%
Don't Know	2%	0%	0%	0%	1%	2%	1%
Cause Not Captured	0%	0%	0%	2%	4%	0%	1%
Total Observations	53	47	50	49	71	66	336

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Table 65: Causes of Avoidance, Percentage of Respondents

Causes	Percentage of Respondents							All Years	At Least One Year
	2013	2014	2015	2016	2017	2018			
Development Causes	37%	35%	46%	31%	36%	47%	39%	48%	
Development Activities	14%	9%	27%	21%	25%	22%	20%	27%	
Development Infrastructure	12%	21%	23%	7%	20%	33%	19%	28%	
Contamination Concerns	11%	7%	0%	0%	0%	0%	3%	5%	
Security Restrictions	7%	5%	6%	5%	3%	8%	6%	9%	
Safety Concerns	5%	7%	2%	2%	0%	10%	4%	7%	
Development-General	7%	0%	12%	8%	5%	2%	6%	13%	
Environmental Causes	26%	16%	15%	21%	30%	29%	23%	41%	
Resource Availability	11%	11%	17%	21%	27%	22%	18%	30%	
Environmental Factors	21%	5%	6%	2%	9%	14%	10%	14%	
Personal Reasons	4%	18%	4%	13%	16%	20%	12%	23%	
Do not know	2%	0%	0%	0%	2%	2%	1%	2%	
Cause not captured	0%	0%	0%	2%	5%	0%	1%	2%	
Total Respondents	57	57	52	61	64	49		128	

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Table 66: Causes of Avoidance by Place

Place	Environmental Causes		Development Causes					Personal Reasons	Do Not Know	Total
	Environmental Factors	Resource Availability	Development Activities	Development Infrastructure	Development - General	Security Restrictions	Safety Concerns			
Nigliq channel	1	3	1	5		1	2	1		14
Alpine/Alpine Satellites			3	2	1	1	1	1		9
Nanuq		1	1	3		2				7
Fish Creek		1	2	1				3		7
East channel	1	2	1	1			1			6
Upper Colville River		2	1					2		5
East of Nigliq channel				1		1	1			3
Various Areas	1	1						1		3
Nigliq	1		1	1						3
Kuupaqullurak		1		1						2
Itkillik river	1									1
Puviksuk								1		1
West of Nuiqsut								1		1
West of Colville River									1	1
Judy Creek				1						1
Lake 17	1									1
Atigaru Point			1							1
Teshekpuk Lake	1									1

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**APPENDIX D: HARVEST ACTIVITY AND HARVESTED RESOURCE ASSESSMENT
CODES**

Table D-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	Change in Timing of Hunt	Respondent reported a change in the timing of their caribou hunting activities.
340	Use Area Changed	The respondent did not travel to usual caribou hunting areas.
341	Harvest Season Changed	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.
400	Change in Harvest Methods	Respondent used a new or different method or approach to harvest 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	Respondent had a need for caribou which necessitated harvesting more caribou, hunting at a different time of year, etc., or which was the result of not harvest enough caribou
120	Better Transportation/Equipment	Respondent reported acquiring new or improved transportation or other harvesting equipment (e.g., new snowmachine, fixed outboard motor). Often used in response to why respondent took more trips, had a change in harvesting timing, or traveled to new areas.

Numeric Code	Code Name	Notes
150	Take More Trips	Respondent took more hunting trips in study year. Often 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	Respondent harvested less than usual or less than the previous year. Often used in response to why a respondent did not harvest enough caribou during the study year ("I didn't get enough because I harvested less than usual").
210	Need Less	Respondent had less of a need for caribou, often because they had fewer people to feed, they received caribou from others, or because they harvested more of another resource. Often used in response to why respondent harvested or used less caribou.
211	Sharing Less	Respondent either shared less or commented that fewer people are sharing caribou with them. Used in response to why respondent harvested less caribou or did not have enough caribou ("I usually share with my brother's family but they didn't need any this year").
212	Sharing More	Respondent either shared more or commented that more people were sharing caribou with them. Often 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	Respondent took more hunting trips in study year. Often 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	Respondent had fewer opportunities to harvest caribou when out hunting, or had fewer opportunities to go hunting. Often 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	Respondent had fewer or more people depending on them for caribou. Often 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	Respondent had fewer or more people providing caribou for them. Often 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	Respondent had a high work load or had less time available to them. Often 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").

Numeric Code	Code Name	Notes
270	Increased Cost of Living/Expenses	Respondent cited a high cost of living or increased expenses such as gas. Often 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	Respondent reported the loss of a transportation method or equipment. Often 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").
292	Change in Transportation Method	Respondent reported using a transportation method they had not previously used. Often used when respondent reports a different transportation method to pursue caribou (e.g., purchased a truck).
296	Mitigation Funds	Respondent cited mitigation funds (or a lack thereof) for an increase or decrease in hunting or harvesting. Often used in response to why respondent's frequency of trips changed (i.e., "I went out more last year because the mitigation funds helped with gas costs").
300	More Difficult	General term referring to increased difficulty accessing use areas or caribou. Often used in response to why respondent's harvest or duration of trips changed (i.e., "My trips are longer because it is more difficult to travel with the shallow water").
301	Worse Success	General term referring to poor harvesting success. Often 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	Respondent traveled farther than usual to local or harvest caribou. Often used in response to why respondent took longer trips (i.e., "I stayed out longer because we had to go farther to find caribou").
311	Harvest Resource Closer to Community	Caribou were harvested closer to the community than usual. Often used in response to why respondent's area or duration of trips changed (i.e., "I take shorter trips because the caribou are closer to the community").
321	Competition with Sport Hunters	Respondent cited increased sport hunting competition in relation to their own harvest success. Often used in response to why respondents harvested less caribou or took more trips.
351	Better Success	General term referring to improved harvesting success. Often used in response to why respondent harvested more caribou (e.g., "I was more successful this year").
500	Climate	Respondent cited climate-related changes or conditions which affected harvesting activities. Often used in response to why respondents' use area or month changed without specific reference to the changes in climate or environment (e.g., shallow rivers, less rain)
501	Less Snow	Respondents cited a lack of snow. Often used in response to why respondent's use area, transportation method, or frequency of trips has changed due to lack of snow

Numeric Code	Code Name	Notes
503	Shallower Rivers/Lakes	Respondent cited shallower rivers and lakes for a change in harvest activity. Often 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	Respondent cited climate-related changes or conditions specifically affecting their ability to travel to use areas. Often 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	Respondent cited unusual wind strengths or conditions which affect travel or other harvesting conditions. Often 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").
518	More Rain	Respondent cited high rain levels in study year. Often used in response to why respondent's harvest or duration has changed due to greater amounts of rain than usual
523	Rain	Respondent cited rainy conditions in general, which is often used in response to why respondent's duration has changed ("We didn't do as much camping as usual because of the rain").
526	Water Quality	Respondent cited a change in water quality or condition (e.g., higher or murkier waters). Often used in response to why respondent's harvest area has changed due to changing water quality conditions.
530	Harsh Winter	Respondent cited a particularly harsh winter. Often used in response to why respondents' months changed due to cold winter weather or a decreased frequency of trips.
531	Climate Affecting Harvest	Respondent cited changes in weather or climate change for affecting their harvesting activities or harvest success (e.g., "It's really weird—right now it should be cold, but it's raining and it's foggy. They [caribou] are confused because of the weather").
532	Weather	Respondent cited weather conditions in general as affecting harvesting activities. Often 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").
599	Disturbance	Respondent cited disturbance as a general response to why their area had changed or they took fewer trips, without further specifying the type of disturbance (e.g., "I went out less last year. Just all the disturbance").
600	Traffic Disturbance	Various development-related impact sources, which are 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").
601	Off Road Vehicles Disturbance	

Numeric Code	Code Name	Notes
602	Helicopter Traffic Disturbance	
603	Airplane Traffic Disturbance	
650	Development	
659	Oil Drilling	
661	Pipeline	
662	Ice Roads	
663	Contamination from Air Pollution	
664	Oil Field Infrastructure	
700	Sport Hunting and Fishing	Respondent cited the presence of sport hunting and fishing as affecting harvesting activities in general. Often used in response to respondent harvesting less caribou due to sport hunting activity without specifying whether the activity is disturbing migration or leading to overharvesting (see codes 701 and 704).
701	Sport Hunting Methods Disturbing Migration Routes	Respondent cited the presence of sport hunting and fishing as specifically affecting caribou migration. Often used to describe a diversion of caribou migration specifically attributed to sport hunting activity, including associated hunting pressure, airplane traffic, and hunting methods (e.g., “The hunters along the Dalton Highway are really diverting the caribou from our community so we’re harvesting less.”).
704	Overharvesting by Sport Hunters/Fishermen	Respondent cited a decrease in caribou availability or population related to sport hunting. Often used in response to respondent harvesting less caribou and specifies sport hunters as the cause (i.e., “I harvested less this year because there are just too many sport hunters on the Dalton Highway”).
713	River Channel Changed	Respondent cited a change in river channels affecting harvesting activities. Often used in response to why respondent’s harvest area changed due to changes in river channels
718	Fewer Males	Respondent cited a decrease in harvests due to fewer harvestable males during the hunting season (e.g., “I harvested less – there were no bulls around, only females with calves”).
802	Decrease in Species Number	Respondent cited an overall decrease in caribou as affecting harvesting activities. Often used in response to respondent harvesting less caribou because overall population levels have declined (i.e., “I harvested less because the herd population is down and there are fewer around”).

Numeric Code	Code Name	Notes
806	Resource Availability	Respondent cited either a general increase or decrease in the availability of caribou within their use area. 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	Respondent cited skittish behavior in caribou affecting harvesting activities. Often 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	Respondent cited the presence of predators in general. Often used in response to respondent harvesting less caribou (i.e. "I harvested less caribou because there are more wolves killing them").
812	Resource in Smaller Groups	Respondent noted that caribou were scattered, affecting their harvesting activities ("I went hunting less because there weren't many caribou around – they were out there, but just here and there. They don't come in the big herds anymore").
816	Decrease in Predators	Respondent noted an decrease in predators in the area which is affecting harvesting activities. Often used in response to respondent harvesting more caribou (i.e. "I harvested more caribou this year – a lot of people have been hunting wolves this year, so the caribou are around").
818	Increase in Predators	Respondent noted an increase in predators in the area which is affecting harvesting activities. Often used in response to respondent harvesting less caribou (i.e. "I harvested less caribou because there are more wolves killing them") or more caribou (i.e., "There were more caribou around because the wolves are pushing them into our area").
823	Contamination	Respondent believes caribou are less available in their hunting area due to contamination from development or other activities (e.g., "The caribou haven't been around; they can sense the pollution from all the activities—they don't want to eat that").
850	Migration Changed or Diverted	Respondent indicated that the caribou migration has changed or been diverted and is thus affecting harvesting activities; usually attributed to 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	Farther from Village	Respondent noted the caribou were farther from the community than usual. Often used to describe an animal being farther from the community than respondent is accustomed to; specific to the resource's distance from the community.
852	Closer to Community	Respondent noted the caribou were closer to the community. Often used to describe an animal being closer to the community than respondent is accustomed to; specific to the resource's proximity to the community.
853	Earlier Migration/Arrival	Respondent noted an earlier seasonal migration of caribou into the area. Used in response to respondent harvesting less caribou (i.e., "I harvested less this year; I usually harvest some in October, but they came through earlier than usual and I missed them").
854	Later Migration/Arrival	Respondent noted a later arrival or migration of caribou into the area. Used in response to respondent harvesting less caribou or months changed (i.e., "I had to go out in October this year – I usually get them in September but they got here later than usual").

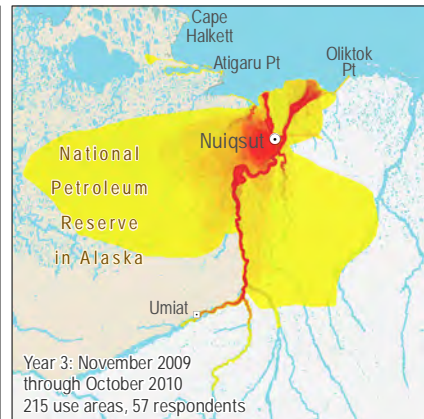
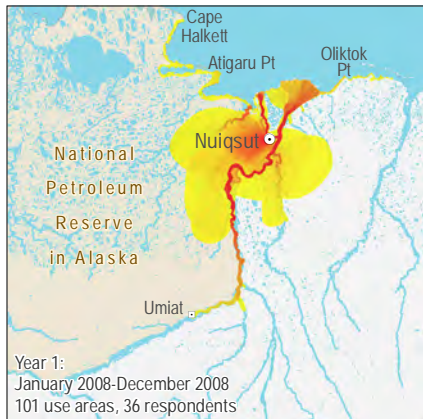
Numeric Code	Code Name	Notes
856	Change in Food Availability	Respondent reported a change in the availability or type of food caribou eat. Used to describe an animal moving to another area in search of better feeding grounds (i.e., "the caribou overgrazed the area and moved west to find better feeding").
857	Move to Different Areas	Used to describe caribou moving to different areas within the study year.
859	Hunting Pressure	Respondent noted a general increase in hunting pressure on caribou. Often used in response to respondent harvesting less caribou without specifying a specific group of harvesters such as sport hunters (i.e., "I harvested less this year because there are just too many people hunting").
865	Change in Distribution/Migration	General change in the distribution or migration of caribou in the area. Often used to describe respondents' general observation that caribou were not in the area, either through a change in distribution or migration.
866	Closer to Shore	Used to describe an animal being closer to coastline than respondent is accustomed; specific to marine environments.
867	Farther from Shore	Used to describe an animal being farther from coastline than respondent is accustomed; specific to marine environments.
869	Timing of Migration	Respondent noted a general change in the timing of the caribou migration. Often used in response to respondent experiencing a change in caribou harvest amount without specifying whether the migration was later or earlier (see codes 853 and 854).
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	Respondent indicated that the caribou were farther inland or farther away from riversides. Often used to describe caribou being less available along riversides, usually due to disturbance from boat or air traffic.
873	Concern of Disease/Infection	Respondent cited a general concern about the health of the caribou. Used in response to respondent harvesting less caribou (i.e., "I heard there was a disease in the caribou, so I didn't harvester as many this year).
900	Miscellaneous	Used when respondent's response does not fit into the categories described above
998	I Do Not Know	Used when a respondent states "I don't know."
999	Not Ascertained	Used when the researcher did not obtain a response to the question.

Table D-2: Harvested Resource Assessment Codes

Numeric Code	Code Name	Notes
<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)
825	Abnormal Resource Death	Used when a respondent reports death of a caribou for unusual or unexplained reasons
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.
833	Less Fat	Reduced fat content on caribou. More commonly entered as Decrease in Resource Size (815).
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").
846	Resource Appears Unhealthy	Respondent harvested a caribou that appeared sick or unhealthy without further description of the cause of the sickness
849	Fur Less Thick	Respondent harvested caribou with thin or patchy fur
876	More Parasites	Respondent observed more parasites than usual in harvested caribou.
877	Fewer Parasites	Respondent observed fewer parasites than usual in harvested caribou.
879	Injured Resource	Respondent observed a caribou with sustained injuries such as wounds from a predator attack or bullet wound
901	Taste	Respondent reported harvested caribou had a different or abnormal taste
<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.
527	Global Warming	Respondent attributed a change in the health or quality of caribou to global warming.
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.
809	Predators	Respondent cited predators as the cause of a caribou abnormality (e.g., "Its leg was injured – I think it had been attacked by a wolf").
812	Resource in Smaller Groups	Used to describe caribou being more sparsely populated and distributed into smaller groups rather than one large herd.
823	Contamination	Used when a respondent cites contamination in general as a cause of an abnormality in caribou.
831	Disease/Infection	Used when a respondent cites disease/infection as the cause of the abnormality (e.g., "This caribou had a lot of parasites, I think because it was sick").
832	Parasites	Used when a respondent believes that parasites are the cause of the abnormality (e.g., sick or diseased looking caribou)
841	Resource Injury	Used when a perceived abnormality is caused by the resource being wounded previously by a bullet or predator.
876	More Parasites	Used when a respondent believes that parasites are the cause of the abnormality (e.g., sick or diseased looking caribou)
879	Reindeer	Used as an explanation for an abnormality in caribou (i.e., "That caribou was much smaller than usual. I think it was a reindeer").
908	Natural Causes	Used when the respondent indicates that the cause of the abnormality is natural (i.e., "There were a lot of flies under the skin, more than I've ever seen. I think it was because of the time of year").
998	I Do Not Know	Used when a respondent states "I don't know."
999	Not Ascertained	Used when the researcher did not obtain a response to the question.

APPENDIX E: MAPS, INDIVIDUAL STUDY YEARS, 2008-2017



Appendix Map 1 - Caribou Subsistence Use Areas: 2008 - 2017 Individually

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 158 active harvesters from March 2009 through November of 2017.

Other areas may have been used for resource harvesting.

Overlapping Polygons

National Petroleum Reserve Alaska

SCALE: 1:1,500,000

0 20 40 80
Miles

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Appendix Map 2 - Caribou Subsistence Use Areas, 2008 - 2017 Combined

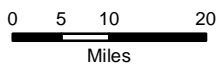
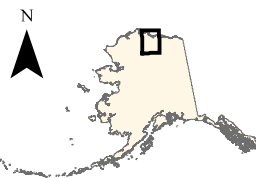
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 158 active harvesters from March 2009 through November 2017.

Other areas may have been used for resource harvesting.

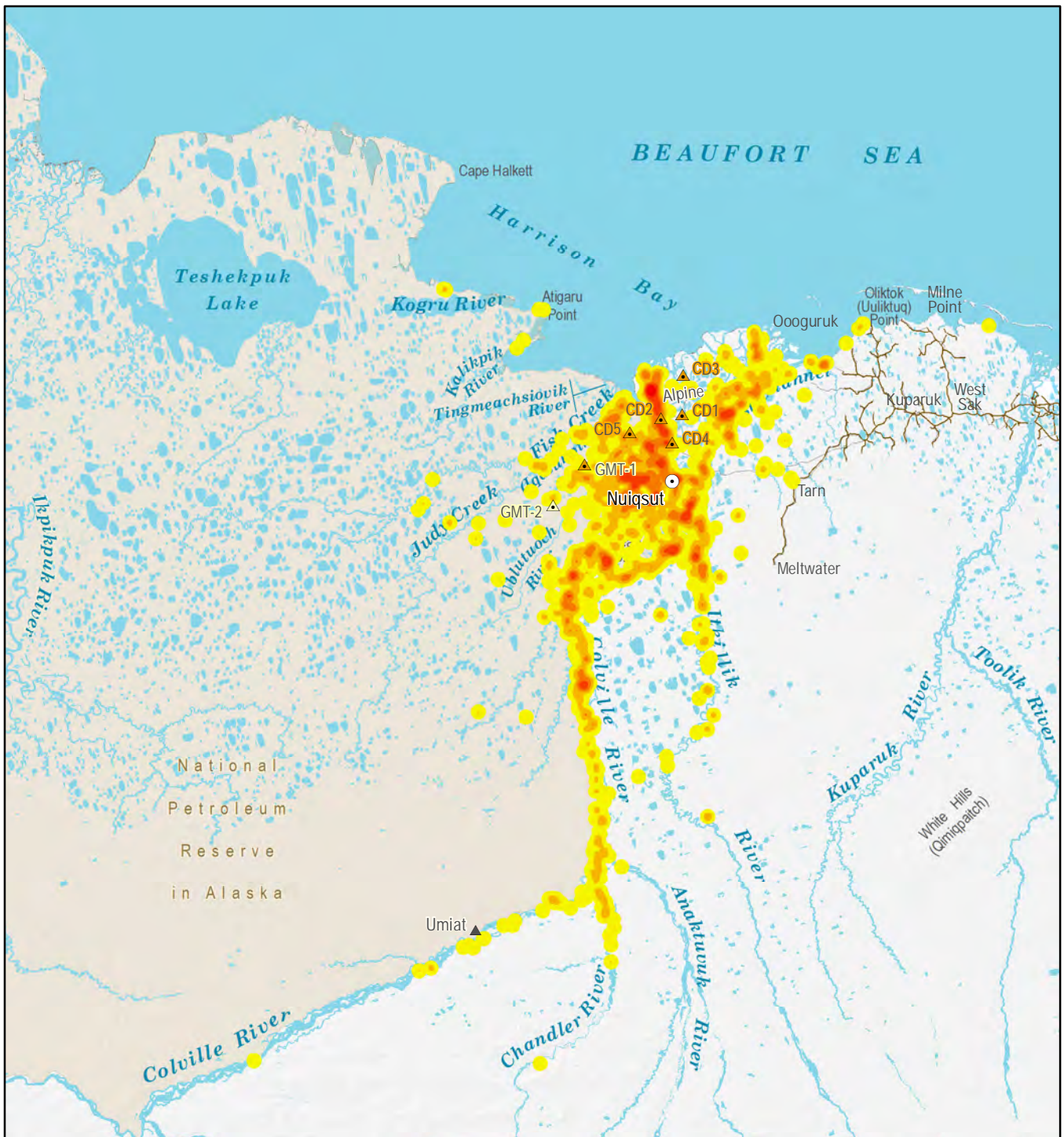
**Years 1 - 10: January 2008
- October 2017**

High 1925 caribou areas used by 158 respondents
Low


National Petroleum Reserve Alaska



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Appendix Map 3 - Caribou Harvest Density, 2008 - 2017




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 158 active harvesters from March 2009 through November 2017.

Other areas may have been used for resource harvesting.

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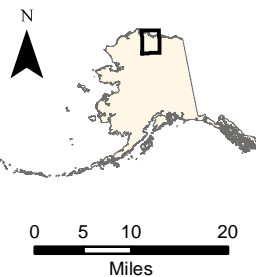
 National Petroleum Reserve Alaska

Harvest Density
 January 2008-October 2017

-  Fewer caribou harvested
-   More caribou harvested

1765 caribou harvest locations, 149 respondents

* This map does not include harvest locations that were reported as polygons



**Appendix Map 4
Caribou Harvest Locations
and Use Areas,
November - April, 2008 - 2017**

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 158 active harvesters from March of 2009 through November of 2017.

Other areas may have been used for resource harvesting.

LEGEND

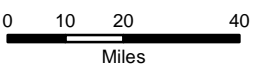
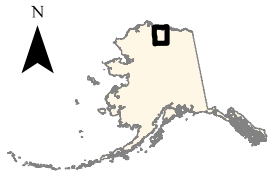
Harvest Locations



Use Areas

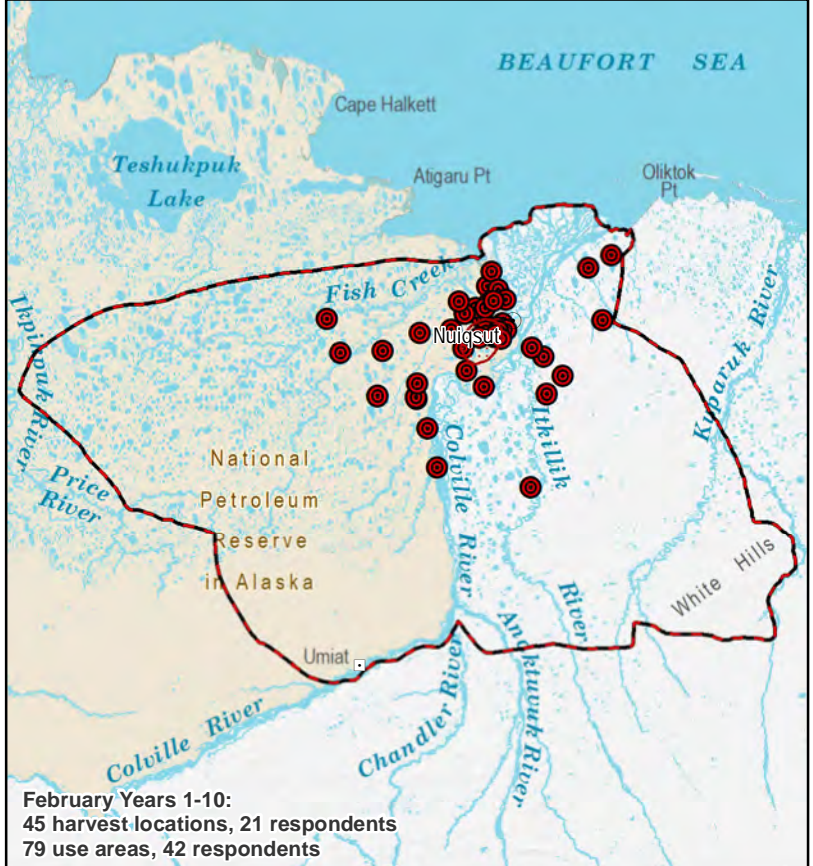
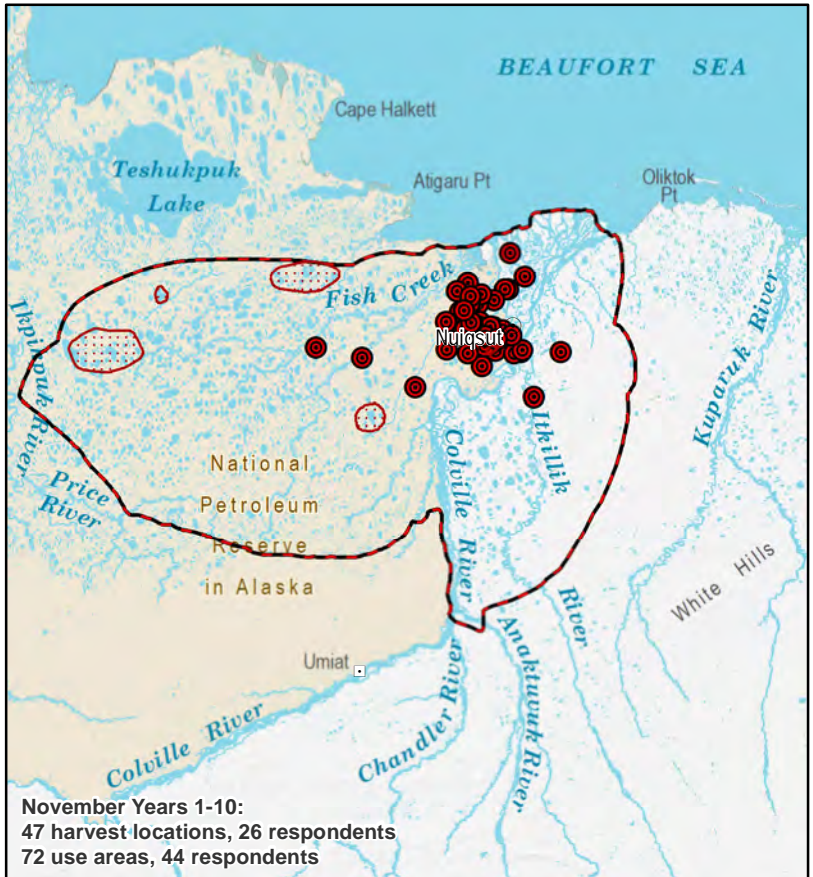
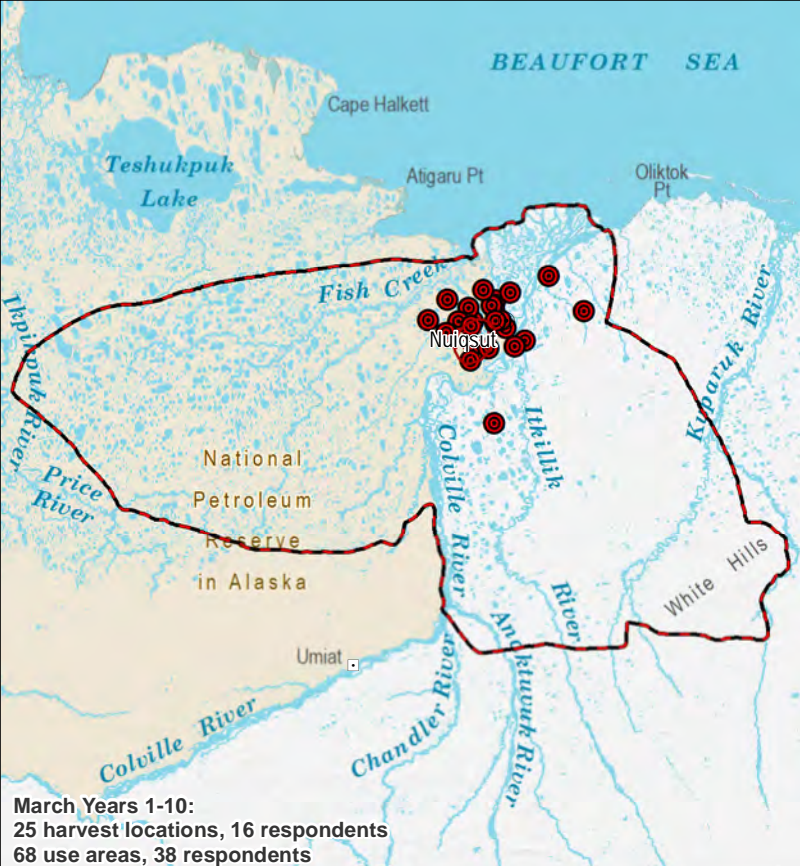
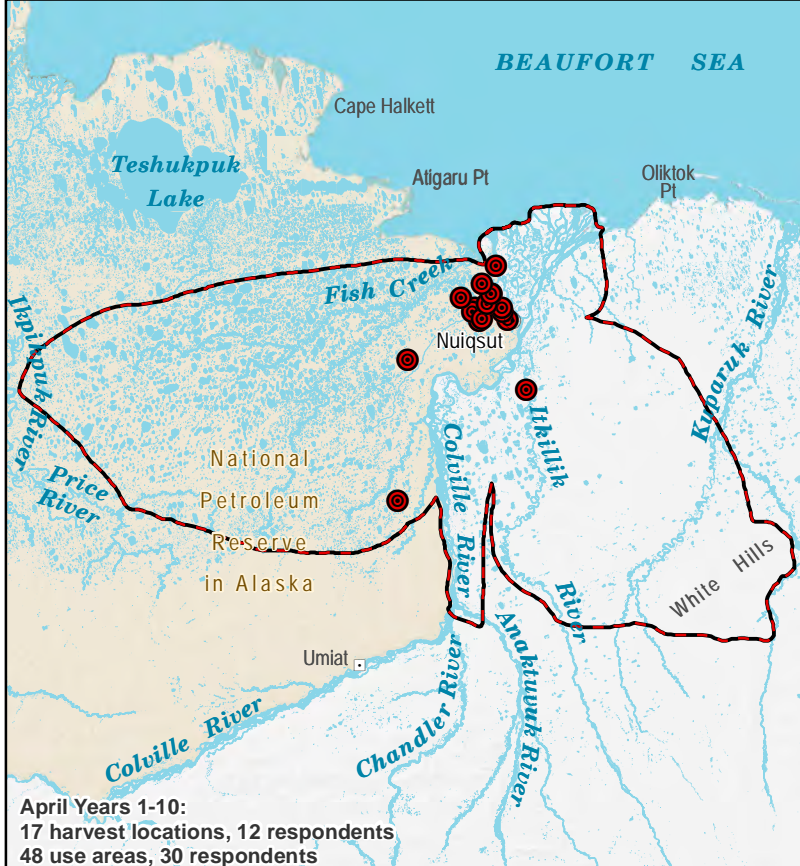
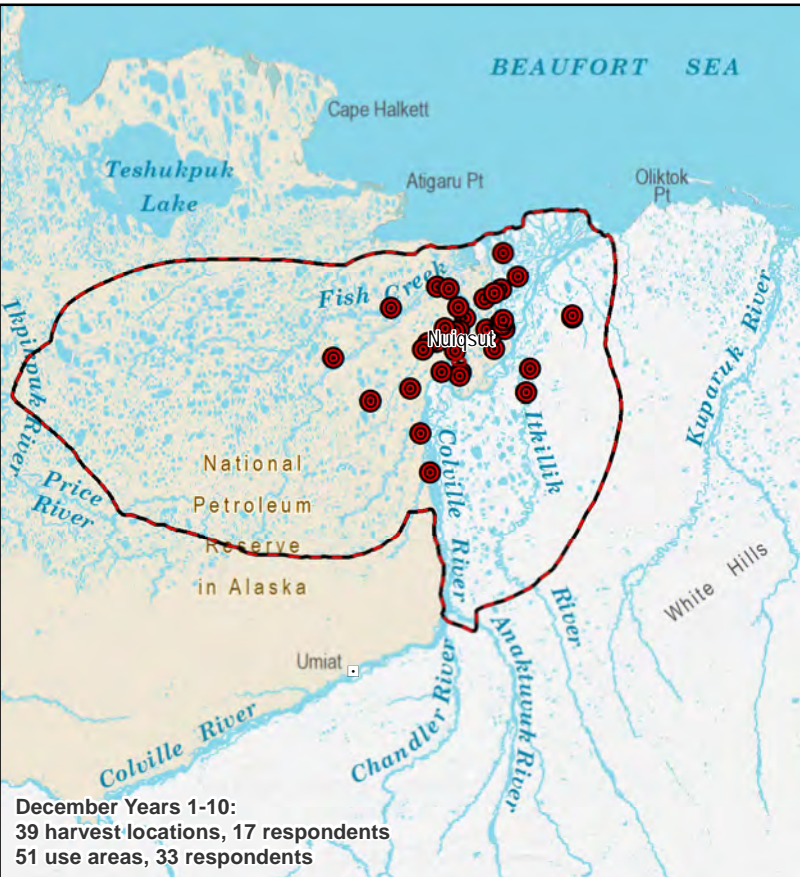
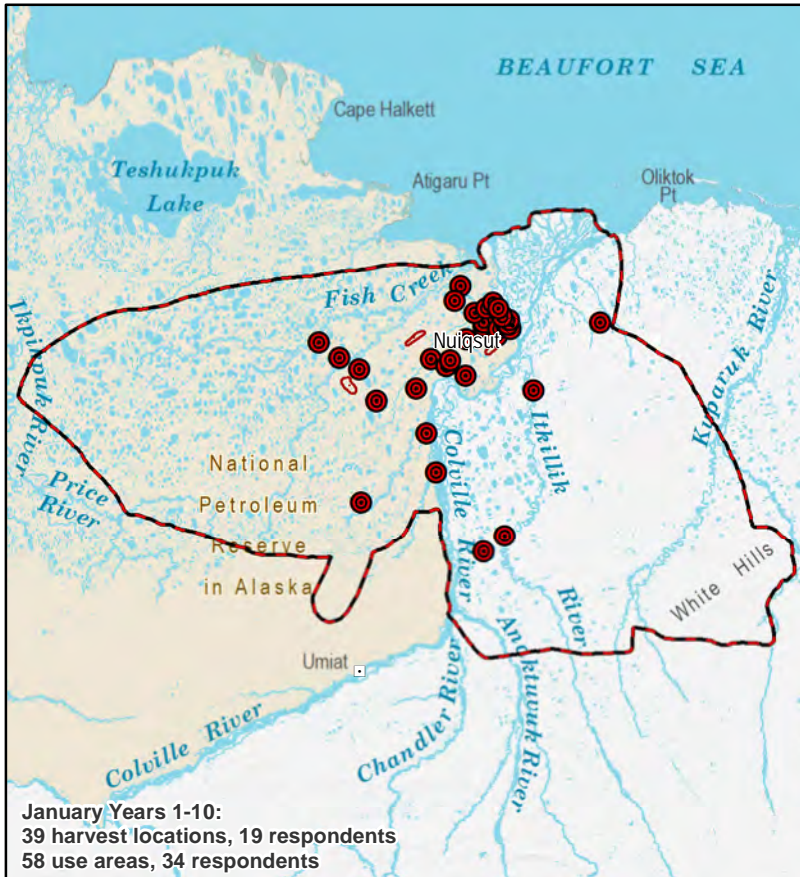


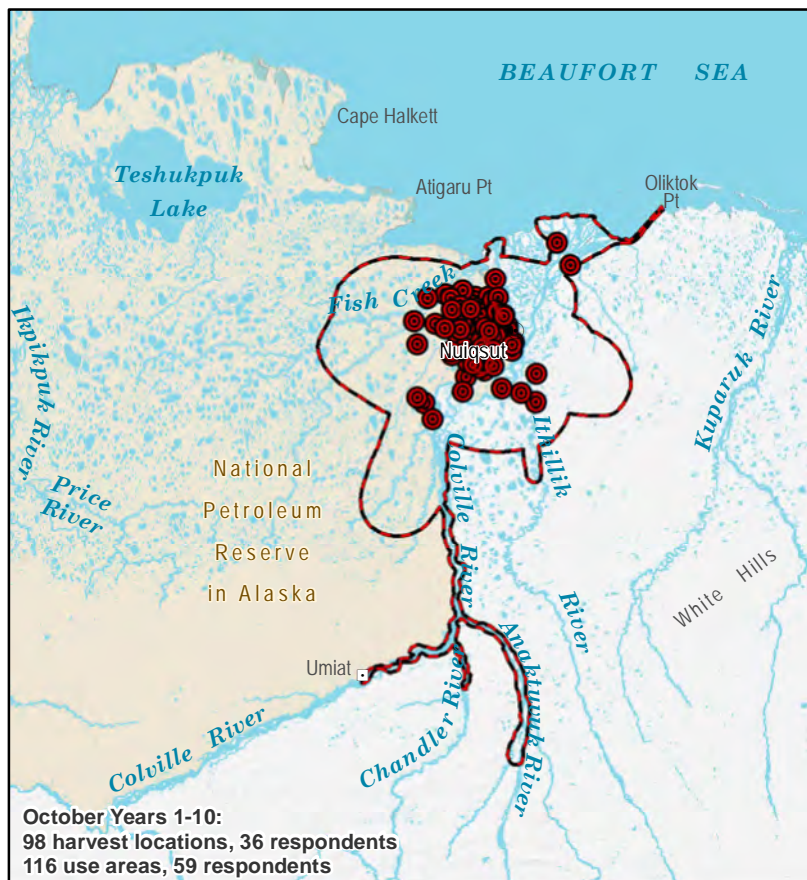
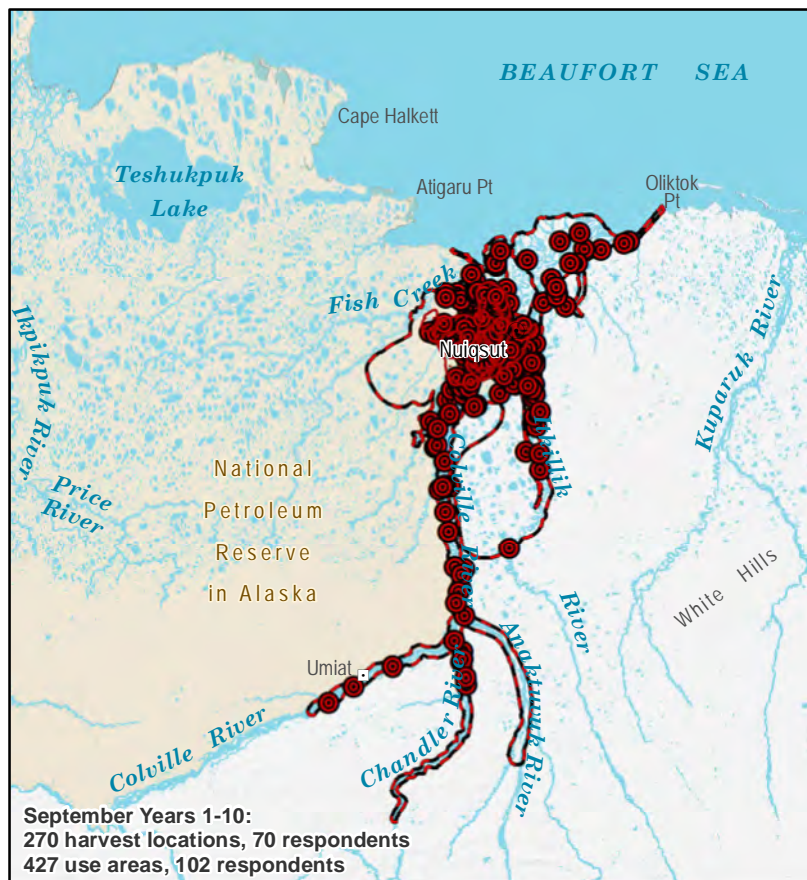
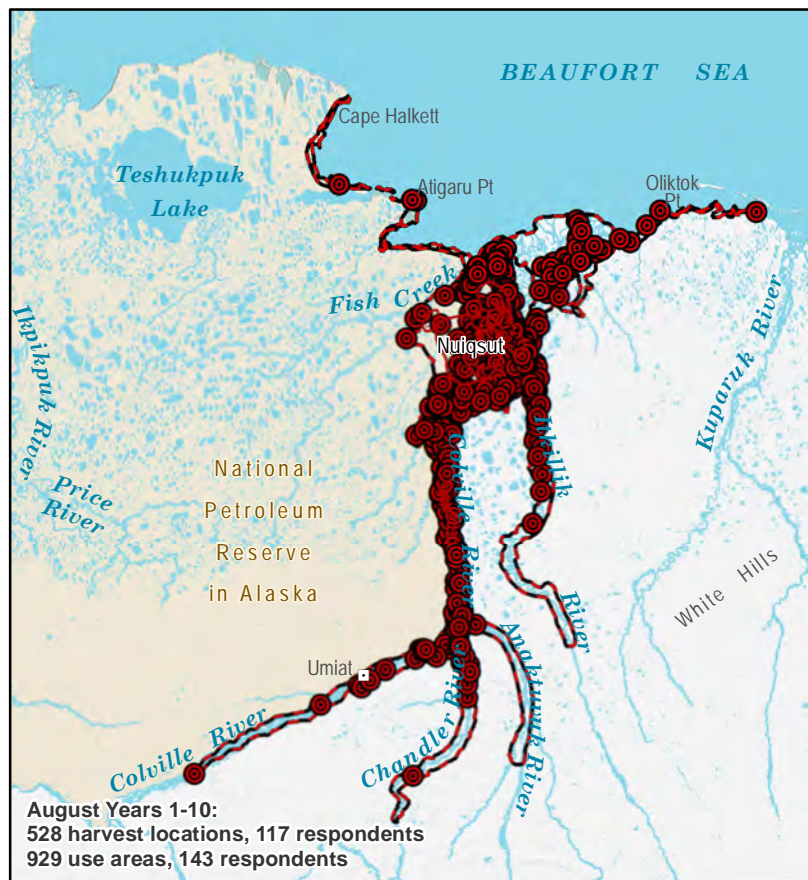
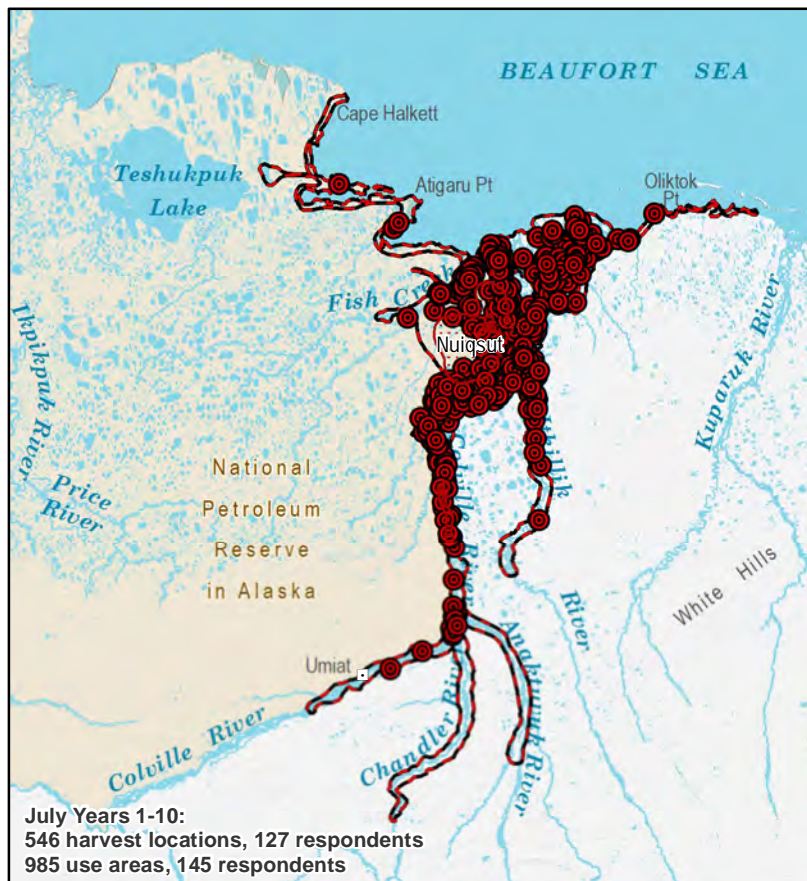
National Petroleum Reserve Alaska



SCALE: 1:1,800,000

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Appendix Map 5 Caribou Harvest Locations and Use Areas, May - October, 2008 - 2017

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 158 active harvesters from March of 2009 through November of 2017.

Other areas may have been used for resource harvesting.

LEGEND

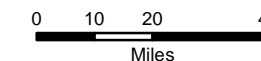
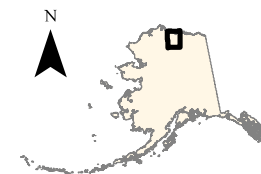
Harvest Locations



Use Areas



National Petroleum Reserve in Alaska



SCALE: 1:1,800,000

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Appendix Map 6 - Method of Transportation to Caribou Use Areas, Boat, 2008 - 2017

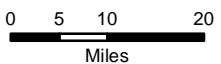
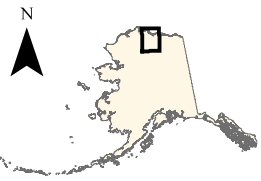
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpiik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 158 active harvesters from March 2009 through November of 2017.

Other areas may have been used for resource harvesting.

Years 1-10: January 2008 - October 2017

 1416 caribou areas used by 155 respondents

 National Petroleum Reserve Alaska



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Appendix Map 7 - Method of Transportation to Caribou Use Areas, Boat, 2008 - 2017

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 158 active harvesters from March 2009 through November of 2017.

Other areas may have been used for resource harvesting.

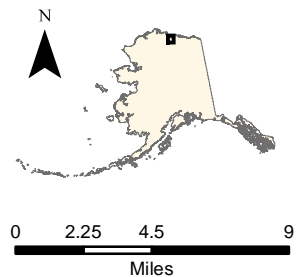
Years 1-10: January 2008 - October 2017



234 caribou areas used by 74 respondents



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Appendix Map 8 - Method of Transportation to Caribou Use Areas, Snowmachine, 2008 - 2017

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 158 active harvesters from March 2009 through November of 2017.

Other areas may have been used for resource harvesting.

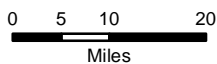
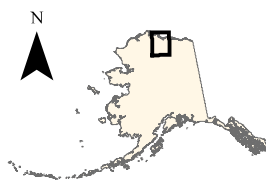
Years 1-10: January 2008 - October 2017



208 caribou areas used by 68 respondents



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Appendix Map 9 - Method of Transportation to Caribou Use Areas, Truck, 2018 - 2017

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 158 active harvesters from March 2009 through November of 2017.

Other areas may have been used for resource harvesting.

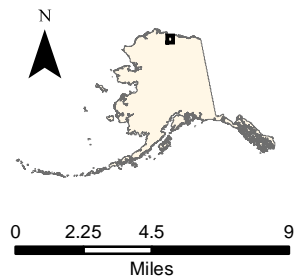
Years 1-10: January 2008 - October 2017



77 caribou areas used by 50 respondents



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