Nuiqsut Caribou Subsistence Monitoring Project: Results of Year 8 Hunter Interviews and Household Harvest Surveys

FINAL REPORT, ABRIDGED

Prepared for ConocoPhillips Alaska, Inc.

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ACRONYMS AND ABBREVIATIONS

ABR Inc.—Environmental Research & Services

ADF&G Alaska Department of Fish and Game

COP ConocoPhillips Alaska, Inc. GIS Geographic Information System

KSOPI Kuukpik Subsistence Oversight Panel, Inc.

NSB North Slope Borough

SRB&A Stephen R. Braund & Associates

USGS U.S. Geological Survey

INTRODUCTION

This document represents the eighth annual report of the Nuiqsut Caribou Subsistence Monitoring Project. The purpose of the Nuiqsut Caribou Subsistence Monitoring Project is to document the 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 (KSOP), 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. While previous monitoring reports for this study have included lengthier explanations and analysis of the data supported by harvester observations, the Year 8 and 9 reports are presented as abridged reports which focus on key findings, such as monitoring components which showed change in Year 8. Year 10 will return to the previous format with additional analyses of the 10-year monitoring program, including Year 8 and 9 monitoring components not included in this abridged report.

STUDY AREA

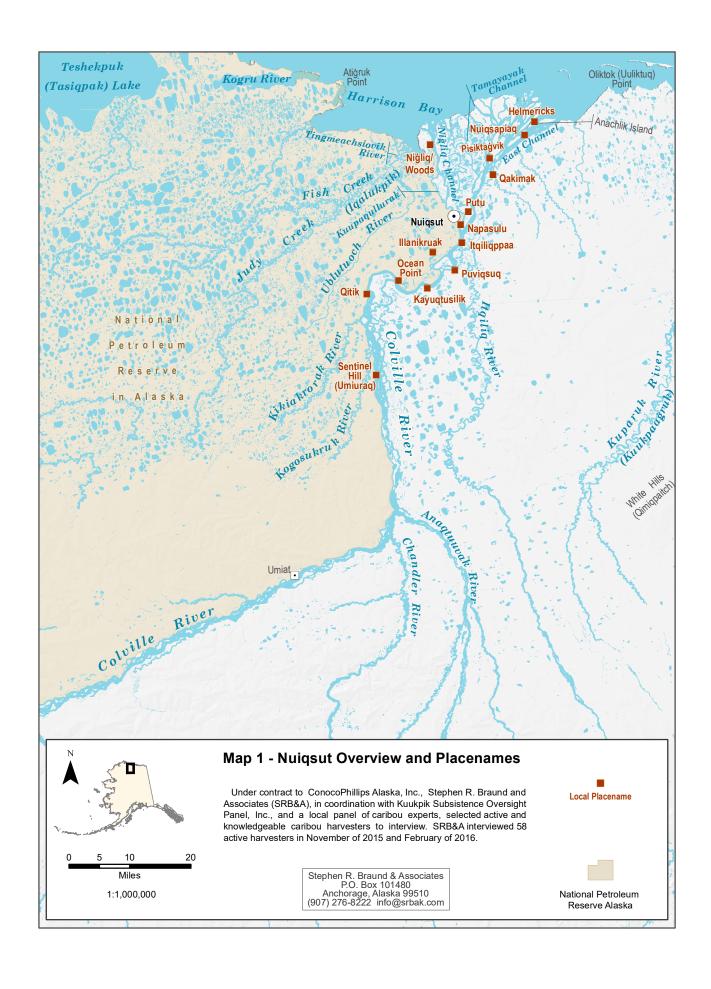
The NSB permit to COP for development of CD4 stipulates that the subsistence study should consider impacts of the CD4 development as well as other COP satellite developments. Impacts related to these developments may occur outside the immediate vicinity of the individual developments. Therefore, for 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 and oil and gas infrastructure in the study area.

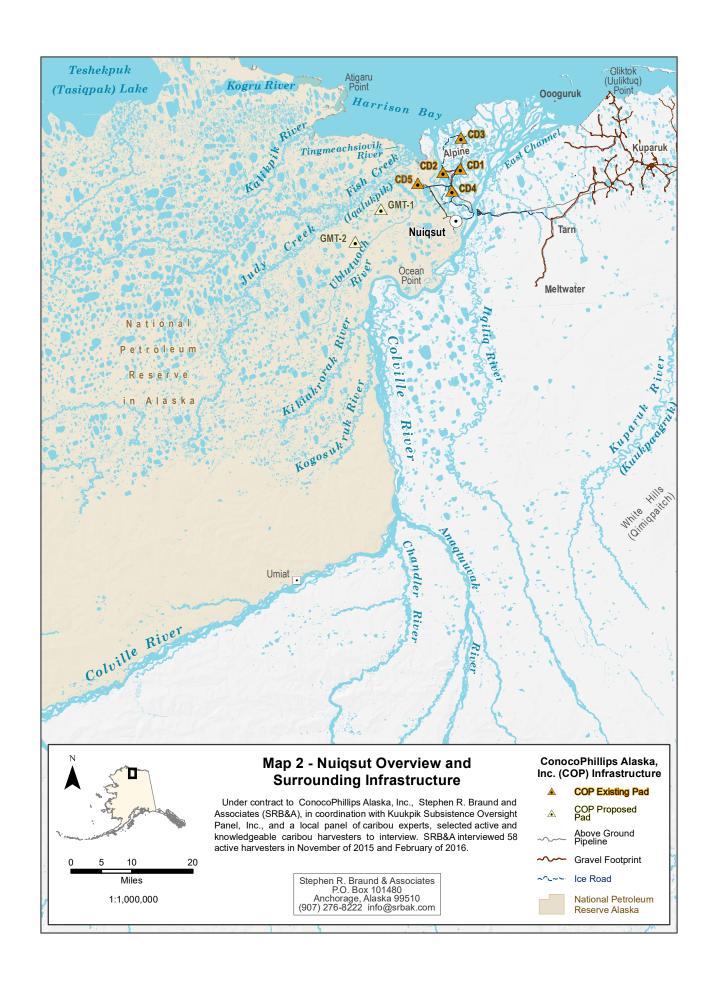
METHODS

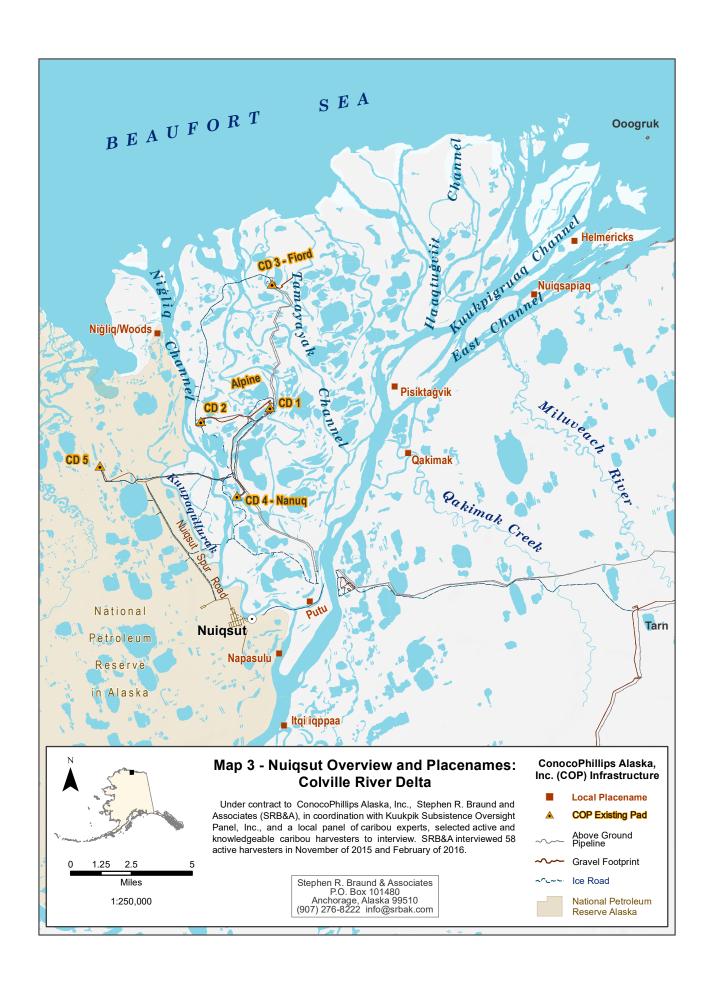
In 2009, SRB&A initiated a program to gather yearly information from local Nuiqsut residents about caribou hunting and harvest activities, observations about harvested caribou, changes in caribou, and impacts on caribou hunting. These data are gathered on a yearly basis in order to monitor impacts on caribou hunting related to CD4 and other Alpine satellite developments over time. Year 8 active harvester interviews gathered information for harvesting activity between November 2014 and October 2015 and household harvest surveys gathered information for the 2015 calendar year (January to December 2015). Interviews, surveys, and meetings (including the NSB meeting in Barrow) for Year 8 took place between November 2015 and May 2016. Thus, the methods describe 2015 and 2016 monitoring program activities, while the results and discussion describe the Year 8 study period caribou harvest amounts, hunting activities, and impacts (spanning from November 2014 to December 2015). This section of the report describes community engagement during Year 8 and provides a fieldwork summary. For more detailed descriptions of study methods, including study design and field preparation, respondent selection process, interview process, and post-field data processing, see previous monitoring reports (SRB&A 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016).

Community Engagement

One of the goals of this project is to promote and facilitate community involvement in the monitoring program. The primary method of facilitating ongoing community involvement for the Year 8 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 9, 2015 to discuss the previous hunting season and upcoming fieldwork. The November 9 meeting was







attended by six panel members and two SRB&A staff members who were in Nuiqsut to conduct Year 8 active harvester interviews. The following is a summary of meeting topics:

- Panel members discussed the purpose of the monitoring study and the strength of the Panel to implement changes. As one panel member observed, "So, the purpose of this study is to see if there are any mishaps. But then, what if that is the case? Are we just the panel that talks into the wind?"
- The panel discussed issues with local access to the recently built Spur Road.¹
- The panel also discussed the CD5 road, noting that the road has decreased the need for helicopter traffic. Several noted that the road can deter caribou due to its general presence and because of the overall height of the road. Another panel member reported observing caribou crossing the road without trouble.
- Panel members stressed the need for daily communications about COP activity from KSOP.
- The panel discussed the possibility of providing GIS data to ADF&G in return for biological data to incorporate into monitoring reports. Panel members were concerned about providing these data before the 10-year monitoring study was complete.
- The panel discussed concerns about decreasing caribou herd sizes.
- One panel member indicated that COP had begun drilling during the summer months (which they had not done in the past), and questioned whether drilling during this time could affect calving caribou.²

SRB&A held a meeting with the Nuiqsut Caribou Panel on May 9, 2016, to review the results of the Year 7 report. Panel members' comments were addressed in the final Year 7 report (SRB&A 2016).

Fieldwork Summary

Active Harvester Interviews

The study team traveled to Nuiqsut twice to conduct Year 8 active harvester interviews in November 2015 and February 2016. As shown in Table 1, SRB&A researchers interviewed 60 Nuiqsut residents (two of whom were elders and not active harvesters). Over the eight study years, SRB&A has developed a list of 114 active caribou harvesters in Nuiqsut (Table 1), which include all residents interviewed and/or identified as active harvesters during Years 1 through 8. The list of active harvesters has evolved over time and changes from year to year. A number of younger hunters have been added to the harvester list in recent years as they have become more active and proficient hunters. Likewise, some older hunters have indicated that they no longer do the majority of hunting for their household and have recommended that the study team interview their sons or daughters who have taken over these duties. A hunter's level of activity may also vary from year to year based on work or personal commitments, or the hunter's access to a working boat, snowmachine, or four-wheeler. Thus, a hunter may be particularly active in one study year and then less active during the following study year.

Table 2 depicts the number of persons eligible for interviews in Year 8. A person was not eligible for an interview if he or she did not go caribou hunting during Year 8, if they had moved or were out of town for an extended period of time, or if they had an illness that precluded them from participating in an interview. An exception was made for elders who could provide traditional knowledge about long-term changes. As noted above, SRB&A developed a list of 114 active harvesters, 108 of whom were assumed eligible for an interview based on the information available to the study team. This includes individuals who had been nominated as active harvesters in the past but who had never participated in an interview. An additional 15 residents had been mentioned once by KSOPI staff as possibly being active harvesters but had never

¹ The Spur Road connecting Nuiqsut with the CD5 Road is owned by Kuukpik Corporation. Access is controlled and managed by Kuukpik per access requirements.

² COP comment: With the exception of CD3, drilling has occurred year-round since Alpine started in 2000.

participated in an interview; thus, the study team has not been able to confirm whether they are active harvesters. They are not included in the count of eligible active harvesters. Of the 128 individuals who had participated in one of the seven previous study years (Table 2), 96 were eligible for an interview. Some individuals had been removed from the active harvester list altogether, either because they were not active caribou hunters, they had moved away from the community, or they were deceased.

The study team attempted to interview respondents from previous study years again in Year 8, with a focus on respondents who have participated in multiple study years or have been highly recommended as active harvesters. SRB&A interviewed 60 individuals, or 56 percent of those eligible for interviews (Table 1). As shown in Table 2, during each previous study year, between 44 percent and 70 percent of respondents also participated in Year 8.

The Year 8 sample included 10 respondents not interviewed in a previous study year. Differences in the makeup of the eight samples could potentially account for observed differences in results between the eight years. In Year 3, to test for sample-related differences, results for 15 principal variables were compared for the entire sample for each year and the subsample of 18 respondents interviewed in all three study years. The pattern of results for the entire sample was similar in the subsample. This indicates that the results shown for the entire sample in each year are representative and comparable across years despite changes in the sample of respondents from year to year. As the study proceeds, the sample is more likely to include respondents who had participated in a previous study year (see Table 2).

Table 1: Fieldwork Summary, Year 8

# of Permanent Occupied Households (2015)1	Population (2015) ²	# of Persons Identified as Active Caribou Harvesters	# of Persons Eligible for Interviews	# (%) of Eligible Respondents Interviewed	Number of Interview Workshops	Number of Interview Trips to Community
101	408	114	108	60 (56%)	57	2

¹Based on eligible households identified during the Year 8 household harvest surveys. Does not include schoolteacher housing, or vacant TNHA (Tagiugmiullu Nunamiullu Housing Authority) or NSB housing.

Stephen R. Braund & Associates, 2017.

Table 2: Respondent Summary, Years 1-8

Respondent	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Number of Active Harvester Respondents	36	53	57	58	57	57	60	58
Number of Respondents also Interviewed in Year 8	16 (44%)	26 (49%)	26 (46%)	31 (53%)	38 (67%)	35 (61%)	42 (70%)	-

Stephen R. Braund & Associates, 2017.

The following tables (Table 3 through Table 6) show descriptive data for the Year 1 through Year 8 respondents. During all eight study years, over 80 percent of respondents were born on the North Slope (Table 3). The percentage of Year 7 respondents born in Nuiqsut stayed within the range of the previous seven study years. The first study year showed the highest percentage of respondents whose birth residence was not Nuiqsut; this corresponds with a larger percentage of respondents born before the community was reestablished in the 1970s. The distribution of decades in which respondents were born remained fairly consistent in Year 8 compared to Year 7 with a slight increase in Year 8 respondents born in the 1960s

²Estimated based on reported household occupants during the Year 8 household harvest surveys. Does not include estimates for schoolteacher housing, NSB housing, or other non-permanent households.

through 1980s and fewer of those born in the 1990s and 2000s (Table 4). Although slightly fewer respondents reported being born in the 1990s (16 percent in Year 8 compared to 25 percent in Year 7), the percentage of respondents from the 1990s still represents a marked increase from three percent in Year 1; this reflects the emergence of younger hunters born during this time frame who are increasingly considered active harvesters in the community as they gain more experience. Years 5, 6, and 7 also had a small percentage of hunters who were born in the 21st century; the study team allowed hunters under the age of 16 to participate in the study if accompanied by their parents. The large majority (between 73 to 82 percent in the various study years) of respondents have resided in Nuiqsut for 20 or more years (Table 5). The majority of active harvester respondents have been male for all study years, although the study team interviewed a somewhat higher percentage of females in Year 6, Year 7, and Year 8 (Table 6).

Table 3: Respondents' Residence at Time of Birth³, Years 1-8

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

Stephen R. Braund & Associates, 2017.

Table 4: Decade Born, Years 1-8

Doods	Percent of Respondents							
Decade	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
1940s	6%	10%	0%	2%	2%	4%	2%	2%
1950s	18%	12%	15%	9%	19%	12%	14%	14%
1960s	32%	17%	27%	16%	17%	20%	24%	26%
1970s	21%	17%	16%	18%	11%	8%	8%	12%
1980s	21%	31%	25%	36%	32%	36%	24%	31%
1990s	3%	13%	16%	20%	17%	18%	25%	16%
2000s	0%	0%	0%	0%	2%	2%	3%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Number of Respondents	34	52	55	56	53	50	59	58

Stephen R. Braund & Associates, 2017.

³ In some tables, percentages may add up to less or more than 100 percent (e.g., 99 percent or 101 percent). This is because the percentages are rounded to the nearest whole number, which occasionally results in percentages that do not total 100 percent. In addition, during each study year some interviews were conducted with elders who were no longer active harvesters, or who were not active harvesters during the study year. In this report, tables reporting data collected from active harvesters are based on the active harvester totals, rather than the total number of interviews conducted during each study year. The total number of active harvester interviews in Year 8 was 58 of 60 interviews.

Table 5: Years of Residence in Nuigsut, Years 1-8

Years of Residence			Percent of Respondents							
rears of Residence	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8		
5 years or less	3%	2%	2%	0%	0%	2%	0%	4%		
6-10 years	3%	6%	5%	2%	2%	4%	7%	2%		
11-19 years	12%	19%	16%	25%	23%	20%	14%	15%		
20 plus years	82%	73%	77%	73%	75%	75%	79%	80%		
Total	100%	100%	100%	100%	100%	100%	100%	100%		
Number of Respondents	34	52	56	55	53	51	58	55		

Table 6: Respondent Gender, Years 1-8

Gender	Percent of Respondents								
Gender	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	
Male	97%	92%	96%	95%	95%	87%	90%	88%	
Female	3%	8%	4%	5%	5%	13%	10%	12%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	
Number of Respondents	36	53	57	58	55	52	60	58	

Stephen R. Braund & Associates, 2017.

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 2015 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented. SRB&A acquired an updated list for 2015 of 111 households from the City of Nuiqsut. Out of the 111 residences on the household list for Year 8, 10 households were either unoccupied or out of town for an extended period of time, or were occupied by seasonal workers. Therefore, the total number of eligible households for the Year 8 household surveys was 101.

The study team aimed to achieve a minimum response rate of 80 percent (80.8 households) in order to provide a representative sample of the community that could be expanded to estimate for the community as a whole. SRB&A completed a total of 83 (82.1 percent) household surveys in the community of Nuiqsut (Table 7). Of the eligible households not surveyed, seven declined to participate, and the remaining 11 households were otherwise unavailable.

Table 7: Nuigsut List of Occupied Households, 2015

Type of Household	Number of Households
Original Household List	111
Unoccupied or empty at time of survey	10
Total Eligible Households	101
Surveyed Households (Percent of Eligible Households)	83 (82.1%)

Stephen R. Braund & Associates, 2017.

Caribou Subsistence Use Areas and Harvest Sites

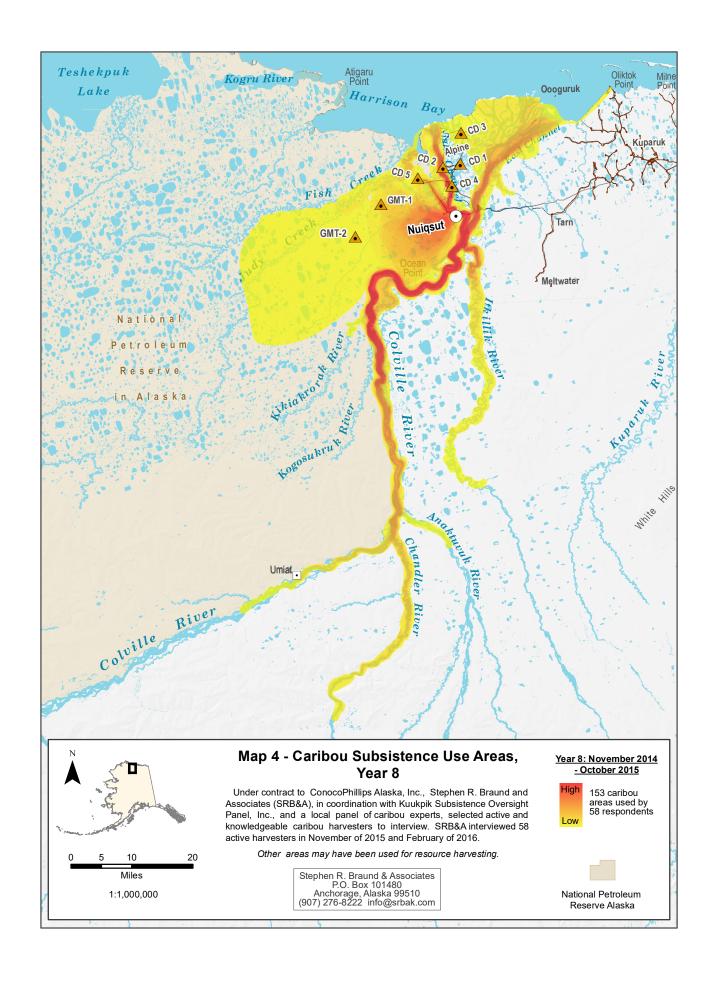
Nuique respondents reported 153 caribou subsistence use areas for the Year 8 study period. In addition to providing the location of their Year 8 caribou hunting areas, respondents identified the location of the 173 harvest sites within the use areas. The locations and characteristics of Year 8 caribou use areas and harvest sites are described below.

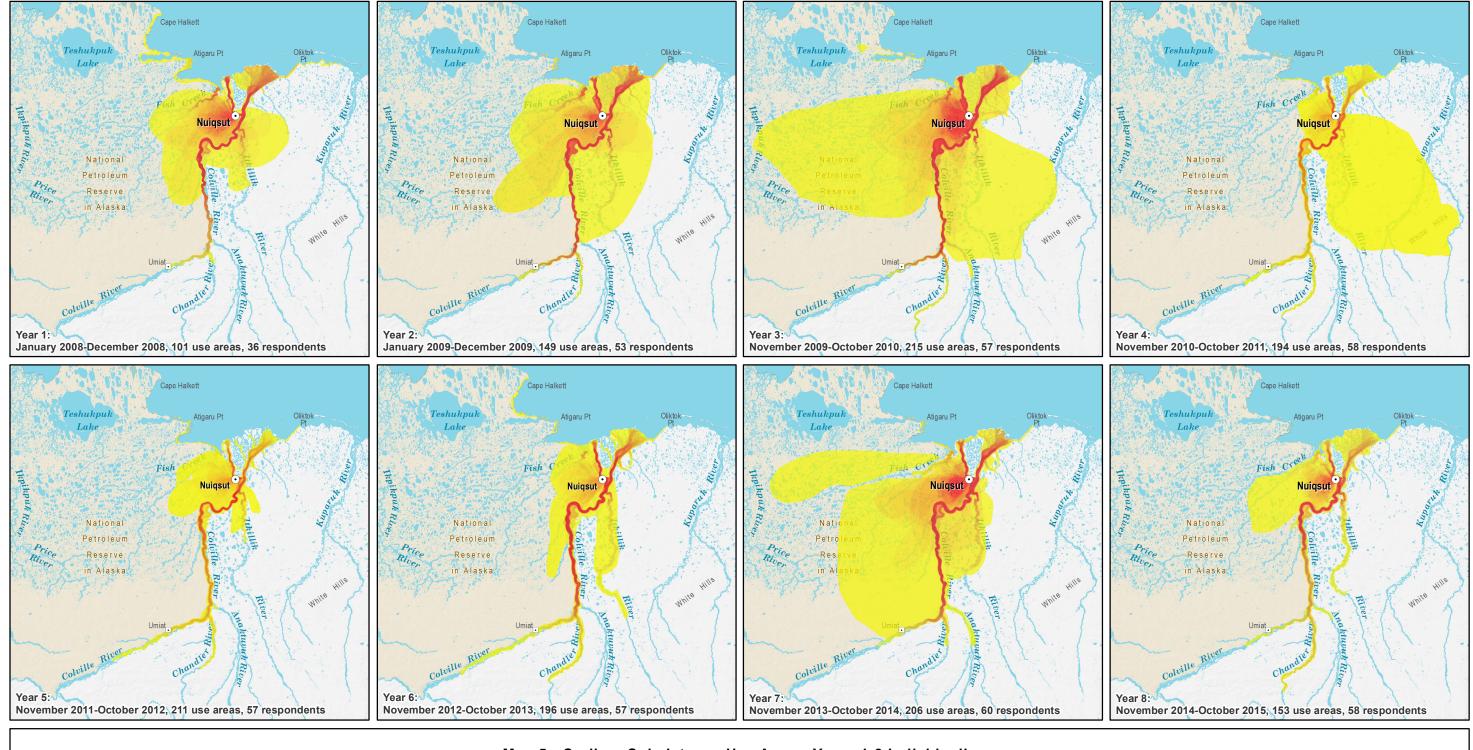
Location of Caribou Use Areas and Harvest Sites

Nuiqsut Year 8 caribou use areas, as reported by 58 Nuiqsut respondents, are depicted on Map 4. Year 1 through Year 8 caribou use areas are depicted side by side on Map 5. During the Year 8 time period (November 2014 through October 2015), caribou study participants reported traveling along local rivers, in the ocean 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, in search of caribou. Residents' riverine travel extended along Nigliq Channel and the East Channel of the Colville River, along Fish Creek, upriver along the Colville River beyond Umiat, and along the Itkillik, Chandler and Anaktuvuk rivers. Overland travel extended west to the Fish and Judy creeks area, in addition to south and west of the community in an area surrounding the Ublutuoch River and near Ocean Point. The highest numbers of overlapping caribou use areas in Year 8 occurred along the Nigliq Channel, the upper portions of the East Channel of the Colville River and Itkillik River, upriver along the Colville River to Sentinel Hill, and in an overland area west and south of the community in an area between the community, Ublutuoch River, and Ocean Point. A moderate number of overlapping use areas extended overland farther toward Judy Creek and the mouth of Kikikakrorak River, farther upriver along the Colville River, and near the mouths of the East Channel of the Colville River and Fish Creek.

Compared to all previous study years, Year 8 marked the first year that Nuiqsut harvesters did not travel west of the Colville River along the Beaufort Sea coast toward areas such as Atigaru Point. In addition, the overall extent of overland travel in Year 8 was similar to Years 4 through 6. Residents' riverine travel was similar to previous study years. While coastal hunting decreased, a new hunting pattern emerged in Year 8—the presence of subsistence use areas concentrated along the Spur Road north of the community, and, to a lesser extent, along the CD5 road as well. The change in overall extent from year to year is often associated with a subset of hunters who hunt by snowmachine during the winter; in years where these hunters are not available for an interview, the overall extent may be smaller. A smaller extent may also reflect distribution patterns of caribou, indicating that the herd is available closer to the community and long distance travel is therefore unnecessary.

Map 6 and Map 7 depict caribou use areas for all eight study years, using two different methods. Map 6 shows overlapping use areas for all 1,497 polygons provided over the eight study years combined, while Map 7 shows overlapping use areas for eight polygons—one merged polygon for each study year. The highest numbers of overlapping use areas during all study years (Map 6) occur along the Colville River, including the Nigliq Channel and East Channel, and as far upriver as Umiat; along the lower portion of the Itkillik River; along the lower portion of Fish Creek; and in an overland area between the community, Fish Creek, and Ocean Point. The high use of the Colville River corresponds with the predominance of boat travel for caribou hunting activities. Over the course of the eight study years, use areas have extended as far as Ikpikpuk River in the west and beyond Kuparuk River in the east to Toolik River. Riverine use areas have extended along the Colville, Itkillik, Chandler, and Anaktuvuk rivers as well as along Fish Creek. Respondents identified coastal subsistence use areas extending from Cape Halkett to beyond Oliktok Point (Map 6). Year 8 (Map 4) differs from the cumulative Year 1 through 8 use areas (Map 6 and Map 7) in that during Year 8 use areas do not extend as far east overland as they have some other years, nor do they extend as far upriver along the Colville River as they have in previous years.







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Map 5 - Caribou Subsistence Use Areas, Years 1-8 Individually

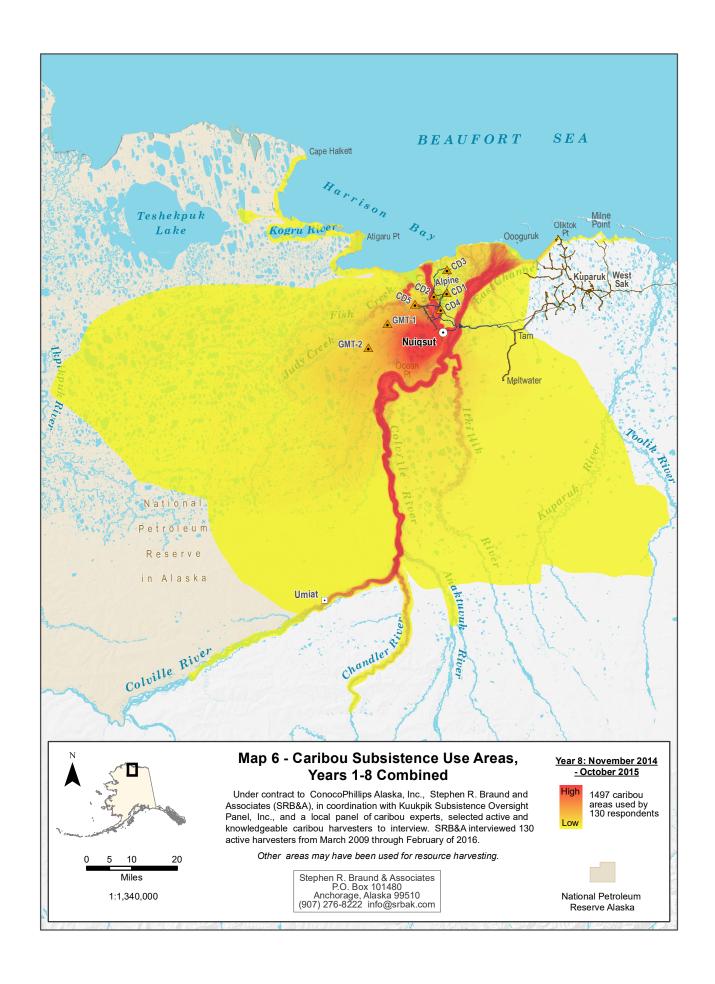
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 130 active harvesters from March 2009 through February of 2016.

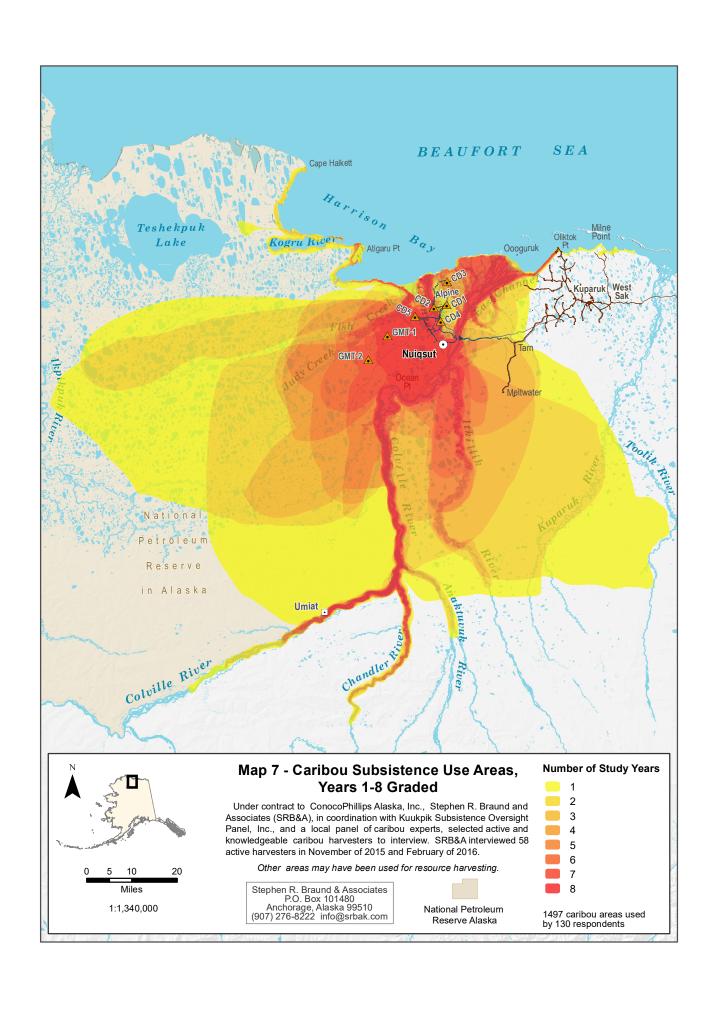
Other areas may have been used for resource harvesting.



National Petroleum Reserve Alaska





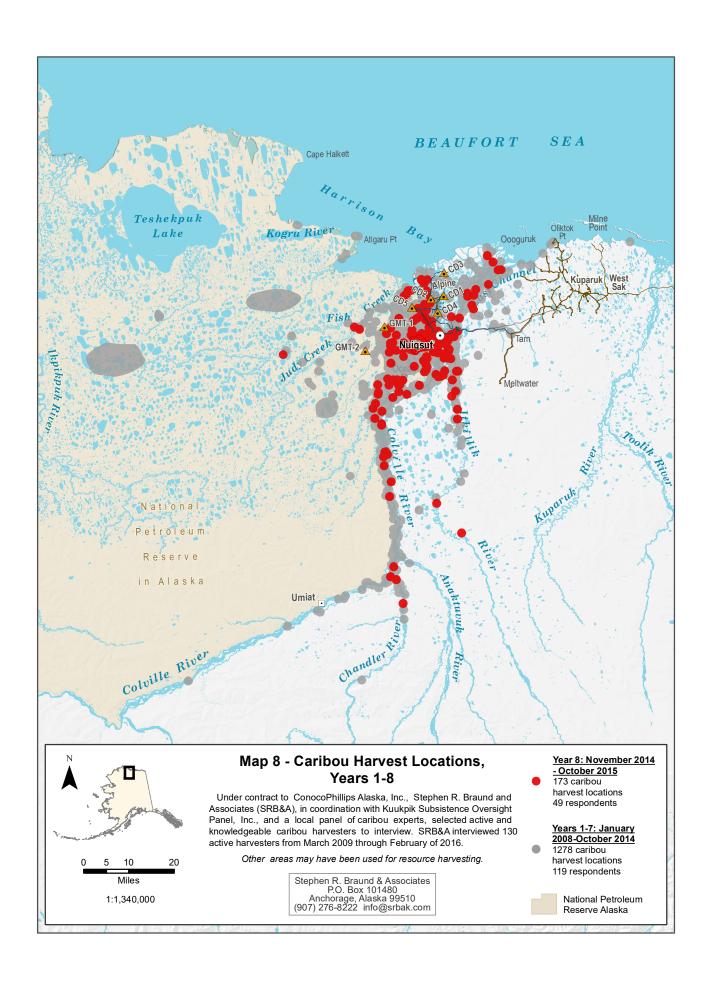


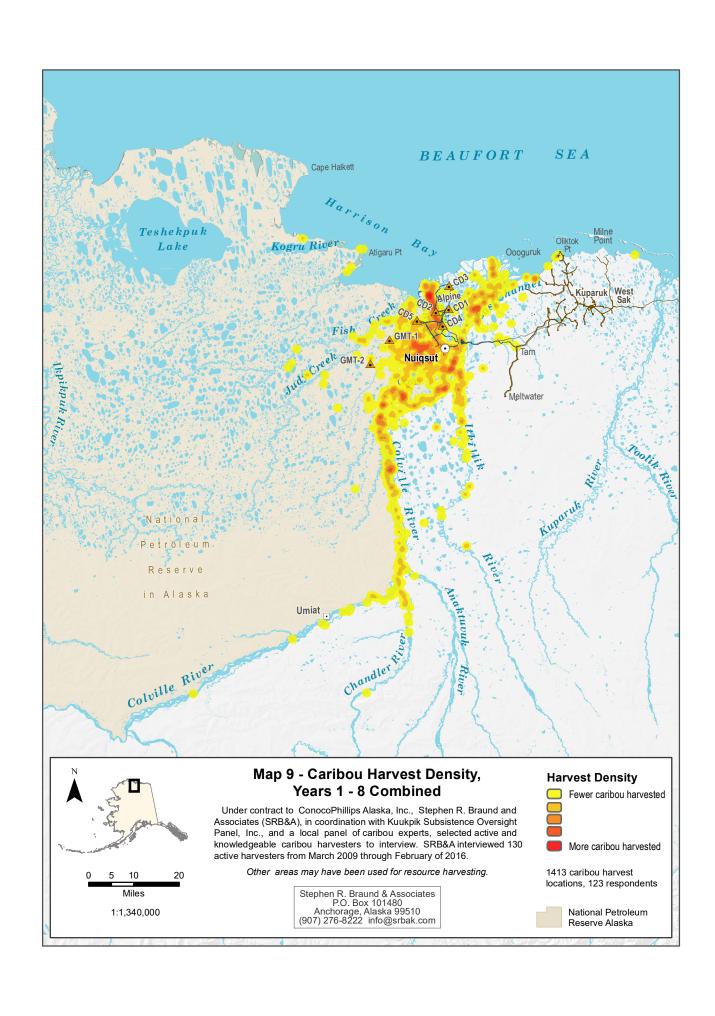
As noted above, coastal use areas were also less extensive in Year 8 than in some previous years. Similarities between Map 4 (Year 8 use areas) and Map 6 (representing all years cumulatively) are that the Nigliq and East Channel of the Colville remain highly used, as does the Colville River extending upriver from Nuiqsut.

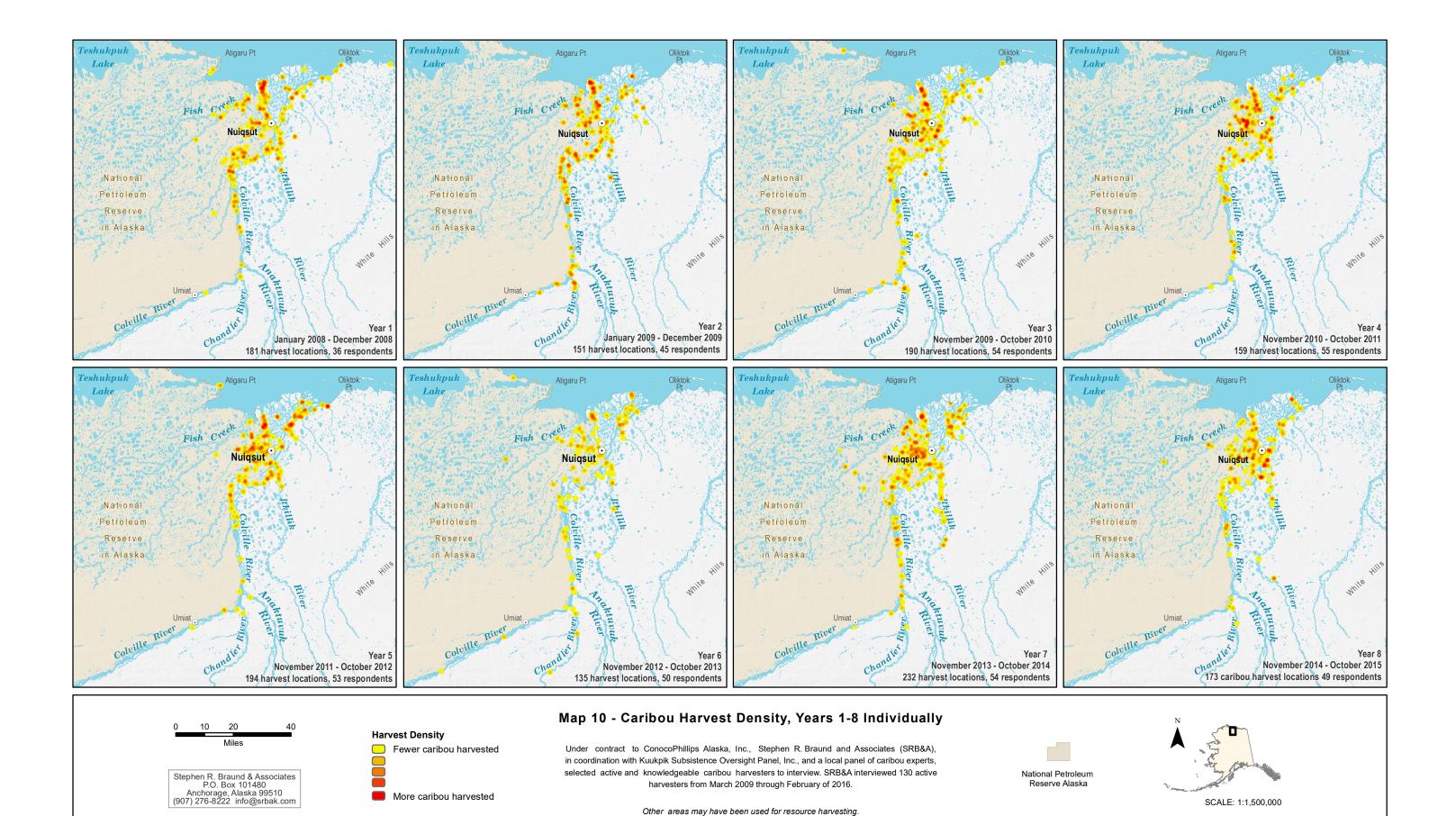
Map 7 depicts overlapping use areas for all eight years, but instead of portraying all 1,497 polygons individually, this map includes only one polygon per study year. Areas that were used during all eight study years are portrayed in dark red, while areas that were used during only one study year are shown in lightest yellow. Areas used during two to seven study years are shown in various shades of red, orange and yellow. Areas used during a majority (five to eight) of the study years include the Colville River (including the Nigliq Channel, East Channel, and portions of the middle Colville River delta) to Umiat; the Chandler and Itkillik rivers; Fish Creek; coastal areas to Oliktok Point and Atigaru Point; an overland area west of the community between Nuigsut, Ocean Point, and Fish Creek; and an overland area to the southeast of the community near the Itkillik River. Map 8 shows the geographic locations of Nuiqsut caribou harvest sites, as noted by respondents during interviews using a 1:250,000 scale USGS map. Year 8 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-nine respondents reported harvesting caribou at 173 harvest locations in Year 8. Respondents reported successful harvests in the Colville River Delta; upriver to the confluence of the Chandler and Colville rivers, Itkillik River, and Fish Creek; and in overland areas to the west of Nigliq Channel and the community. A high concentration of caribou harvests took place in the area to the west between the village of Nuigsut and Fish Creek, around Ocean Point, and along the Nigliq Channel and East Channel of the Colville River.

Map 9 shows harvest density for all study years combined, with areas of higher harvest concentration shown in red. SRB&A determined harvest density through the use of the 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 8) that fall within a one mile radius of each cell. SRB&A chose the one mile radius in order to account for variation in accuracy due to recording harvest locations on a 1:250,000 USGS map (see discussion above). The map accounts for all reported caribou harvests from all eight study years. Over the course of the eight study years, 123 respondents have noted 1,413 caribou harvest locations, most of which are shown on Map 9 (Map 9 does not include harvest locations that were reported as polygons). The highest concentrations of harvest locations over the eight study years have occurred along the Nigliq Channel to the north of the community—particularly at Nigliq camp—along the East Channel near *Pisiktagvik*, within a few miles of Nuiqsut overland to the west, along the Colville to the south, near the mouth of Itkillik River, in the area of Ocean Point, near the mouth of Kikiakrorak River, and near Sentinel Hill.

Map 10 shows the same data for individual study years using the method described above. The concentration of harvests in Year 8 are similar to those from Year 6, which showed few areas of concentrated harvests, but with Year 8 showing somewhat more areas of moderate (orange) to high (red) concentration. Year 8 also represented a higher number of harvest locations compared to Year 6. Other years showed a greater number of locations with high concentrations of caribou harvests. In Year 8, harvests were most concentrated directly east and west of the community with additional high concentrations near the mouth of the Itkillik River and mouth of the East Channel Colville Delta. For the first time, there were







no areas of high harvest concentration located on the Nigliq Channel. Areas of more moderate harvest density occurred along the along the Nigliq Channel, along the East channel near *Pisiktaġvik*, at Ocean Point, near Sentinel Hill/*Umiuraq*, and at various locations west of the community and along the Spur Road. Two other areas of moderate concentration were located along Fish Creek and the farther up Itkillik River.

Characteristics of Caribou Use Areas and Harvest Sites

Study participants characterized their Year 8 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.

Timing

Figure 1 shows that caribou hunting activities over the eight study years have occurred during every month of the year with the most use areas reported between July and August. For Year 8, respondents reported traveling to over 50 percent of their caribou use areas during the month of July (53 percent) and August (51 percent). Figure 2 shows the percentage of caribou harvested by respondents, by month. In most years, July and August have accounted for a majority of the harvest. July and August are usually the peak months for caribou harvest activity because caribou are migrating into the area in large numbers, the rivers have opened which allow for boat travel (many residents' preferred method to hunt caribou), and most other major subsistence activities are not occurring (e.g., moose hunting, bowhead whaling, arctic cisco fishing). Year 8 marked the first year of the eight study years where September accounted for the greatest percentage of the harvest (29 percent). July and August were nearly equal, at 22 and 21 percent of harvest, respectively. January also had a higher percentage of harvests in Year 8 (six percent) compared to previous study years. Other months were relatively consistent compared to the past.

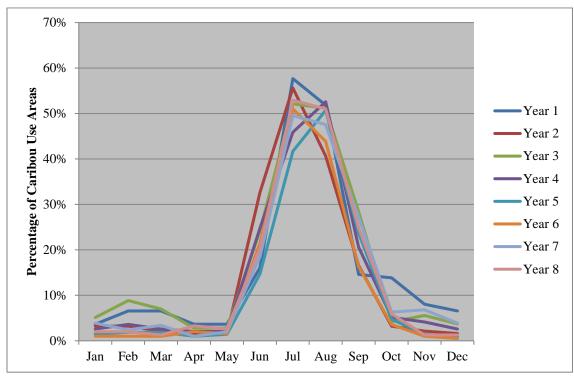


Figure 1: Nuiqsut Percentage of Caribou Use Areas by Month, Years 1-8

Stephen R. Braund & Associates, 2017.

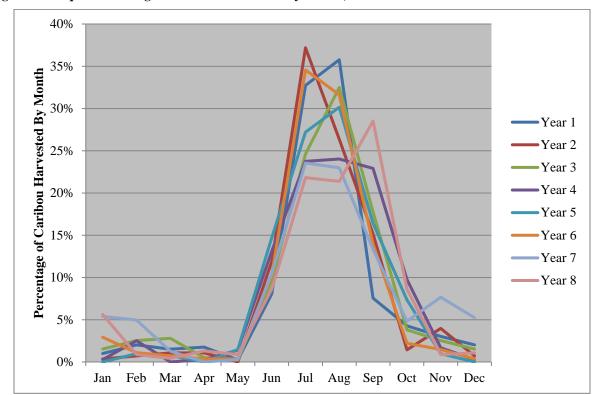


Figure 2: Nuiqsut Percentage of Caribou Harvested by Month, Years 1-8

Previous monitoring reports have provided maps showing use areas by month (SRB&A 2009-2016). In Year 8, respondents' monthly travel did not vary substantially from previous years, although travel during certain months (e.g., May) was more limited than in some previous years. Maps showing Year 8 use areas by month will be provided in the final Year 10 report.

Travel Method

Several new trends in travel method occurred during Year 8. Although boat remained the principle travel method to caribou use areas, the past two years have shown a decrease in boat reliance to harvest caribou, with Year 8 representing an all-time low, with 65 percent of use areas accessed by boat. Snowmachine use areas also matched an all-time low at eight percent of use areas (same as Year 5), while both four-wheeler and truck increased in use at 18 percent and eight percent of use areas respectively (Table 8). The increased use of truck, and possibly also four-wheeler, is likely due to respondents' increased use of the recently constructed Spur Road. Year 8 marked the first year that snowmachine and truck were used at an equal percentage of use areas, compared to Year 1 where 22 percent of use areas were accessed by snowmachine compared to only two percent by truck.

Figures showing travel method by month and maps showing use areas by travel method are provided in previous monitoring reports. In Year 8, the primary differences seen in these figures and maps are an increase in truck use during the summer months (due to use of the Spur Road) and increased use of the area along the Spur Road by four-wheeler and truck. These Year 8 maps and figures will be provided in the final Year 10 report.

Table 8: Travel Method to Caribou Use Areas, Years 1-8

Travel	Percentage of Caribou Use Areas												
Method	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8					
Boat	74%	80%	74%	80%	74%	77%	70%	65%					
Snowmachine	22%	9%	16%	12%	8%	10%	15%	8%					
Four-wheeler	4%	9%	9%	9%	17%	11%	14%	18%					
Truck	2%	2%	<1%	0%	1%	1%	1%	8%					
Total	100%	100%	100%	100%	100%	100%	100%	100%					

Harvest Success

Table 9 shows the percentage of caribou use areas in which respondents reported successful harvests. During Year 1 respondents reported the highest percent of successful use areas (78 percent); the percentage of successful use areas subsequently declined to 61 percent in Year 2 and ranged from 54 percent (Year 6) to 64 percent (Year 5) during the following study years. Year 8 (65 percent of areas successful) marked the highest percent of successful use areas since Year 1.

Table 9: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests, Years 1-8

Success Response			Percent	tage of Ca	ribou Us	e Areas		
Success Response	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Yes (successful)	78%	61%	58%	55%	64%	54%	61%	65%
No (unsuccessful)	22%	39%	42%	45%	36%	46%	39%	35%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Number of Use Areas	137	187	215	194	211	196	206	153

Stephen R. Braund & Associates, 2017.

In Year 8, the average number of caribou harvested per use area (2.6) was the third highest of all study years after Year 1 and 7 (2.7) (Error! Not a valid bookmark self-reference.). In the other five study years, the average number of caribou harvested per use area ranged from 1.4 (Year 6) to 1.7 (Years 3 and 4). The average number of caribou harvested at each individual harvest location was highest in Year 8, at 2.3 caribou per location compared to between 1.7 and 2.2 caribou during previous study years. 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 Table 9 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.

Table 10: Mean Number of Caribou Harvested Per Harvest Location and Subsistence Use Area, Years 1-8

Mean Number	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Mean Number Caribou Harvested Per Harvest Location	2	1.8	1.9	2	1.8	1.9	2.2	2.3
Number of Harvest Locations	182	152	196	162	195	143	248	173
Mean Number Caribou Harvested by Use Area	2.7	1.5	1.7	1.7	1.6	1.4	2.7	2.6
Number of Use Areas	137	187	215	194	211	196	206	153

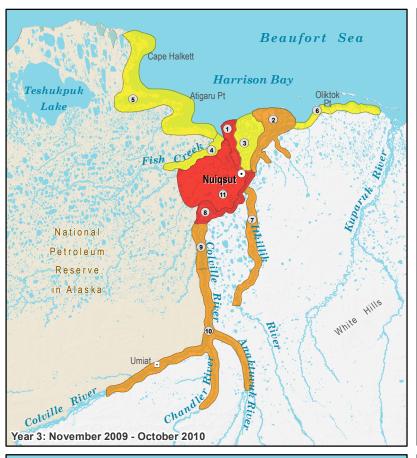
Table 11 reports the percentage of caribou harvest locations and the percentage of caribou harvested for each study year by 12 caribou hunting areas. The study team identified these 12 geographic caribou hunting areas based on residents' descriptions of those areas as separate hunting activities (e.g., Nigliq, Fish Creek, coastal area west of Nuigsut, upriver to Sentinel Hill, upriver to Umiat); the defined areas were reviewed by the Nuiqsut Caribou Panel for accuracy and appropriateness (see Map 11). Map 11 depicts the geographic boundary of each hunting area group for Years 3 through 8, and categorizes each area as yellow, orange, or red. The yellow areas represent the smallest percentage of the total caribou harvest (less than two percent), the orange areas represent the next largest percentage of the total caribou harvest (between two and 15 percent), and the red areas represent the largest percentage of the total caribou harvest (15 percent or more). The Coastal West area (Area 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 15 percent of the harvest. Areas along the Upper Colville River (Sentinel Hill, Colville River South, Itkillik River), have consistently provided between two and 15 percent of the harvest. The only area that has consistently provided more than 15 percent of the harvest during all eight study years is West of Nuiqsut (Area 11); Nigliq Channel provided more than 15 percent of the harvest during the previous six study years, but not in Year 7 or 8, when it provided nine and 10 percent of the harvest.

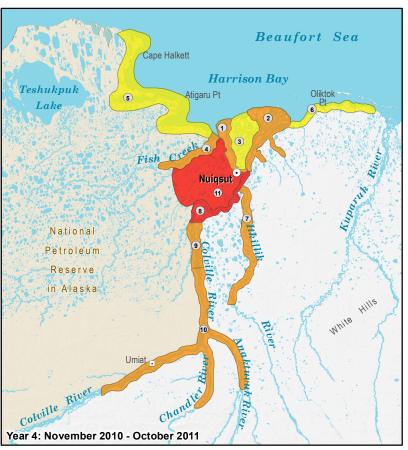
Table 11 shows that during Year 8 the area West of Nuiqsut (Area 11) accounted for the highest portion (43 percent) of caribou harvested, higher than in any previous year. The area West of Nuiqsut and Ocean Point were the only areas contributing more than 15 percent of the harvest in Year 8 (see Map 11). Nigliq Channel and East Channel Colville contributed 10 and nine percent respectively in Year 8. All other areas contributed five percent or less. The area "Other" is not shown on the map, as it is defined as any area falling outside the 11 areas depicted on Map 11. This area accounted for three percent of the harvest in Year 8. Table 11 shows that, unlike the recent Year 6 and 7, harvests at Ocean Point returned to levels higher than those of the first five years of the study, accounting for the highest percent of harvest ever reported from that area (21 percent). While Nigliq Channel harvests peaked in Year 6, they returned to lower levels in Years 7 and 8.

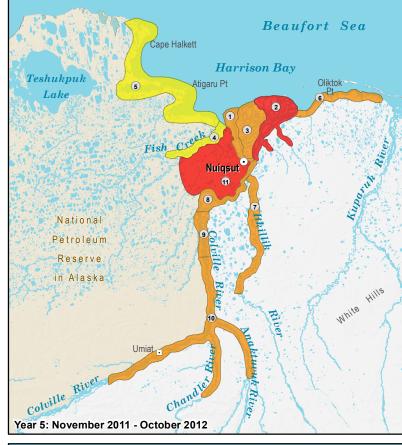
It is important to note that while the percentage of harvests in certain areas has changed from year to year, these percentages are relative to the total reported amount harvested within a given year. Thus, while the percentage of harvest in a certain area may decrease from the previous year, it is possible that the number harvested within that area actually increased. In the case of Year 8, overall reported harvests were lower than in the previous year (Year 7). Thus, while the percentage of harvests in the area West of Nuiqsut were slightly higher in Year 8 than they were in Year 7, the actual number reportedly harvested from that area was in fact somewhat lower (173 versus 216 in Year 7). In most other cases, the change in percentages corresponded to the change in number harvested (e.g., the percentage of caribou harvested at Ocean Point rose from seven percent to 21 percent and the number harvested rose from 41 to 83.

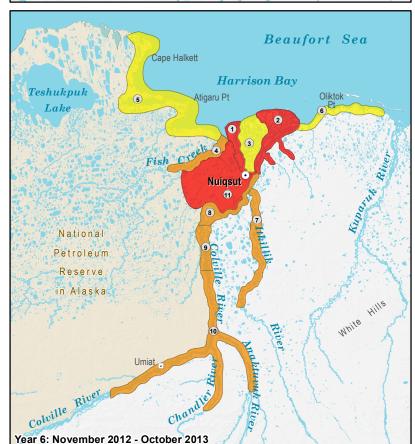
Table 11: Percentage of Caribou Harvest Locations and Caribou Harvests by Caribou Hunting Area, Years 1-8

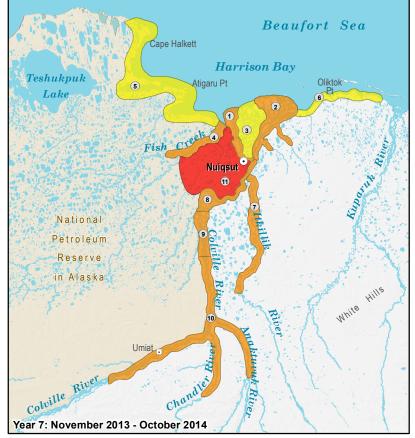
C	aribou Hunting		Pe	rcentage	of Caribo	ou Harves	st Locatio	ons]	Percentag	e of Tota	l Caribou	ı Harvest	s	
	Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
1	Nigliq Channel	19%	18%	16%	17%	15%	23%	8%	9%	23%	22%	18%	15%	15%	27%	9%	10%
2	East Channel Colville	8%	8%	8%	12%	17%	14%	9%	8%	8%	8%	7%	10%	20%	18%	11%	9%
3	Other Colville Delta	2%	1%	2%	1%	1%	1%	0%	1%	2%	1%	1%	1%	2%	1%	0%	0.3%
4	Fish Creek	8%	7%	1%	1%	1%	3%	4%	3%	7%	7%	1%	2%	0%	3%	5%	3%
5	Coastal West	1%	0%	1%	0%	2%	1%	0%	0%	1%	0%	1%	0%	1%	1%	0%	0%
6	Coastal East	3%	0%	1%	1%	1%	0%	0%	0%	3%	0%	1%	1%	4%	0%	0%	0%
7	Itkillik River	7%	4%	5%	7%	5%	7%	8%	6%	6%	4%	5%	4%	4%	6%	7%	5%
8	Ocean Point	22%	23%	21%	19%	16%	5%	13%	17%	17%	20%	15%	17%	11%	4%	7%	21%
9	Sentinel Hill	9%	10%	8%	8%	6%	9%	6%	6%	9%	9%	7%	5%	3%	6%	7%	4%
10	Colville River South	4%	11%	10%	4%	6%	11%	8%	4%	3%	11%	7%	4%	3%	9%	7%	3%
11	West of Nuiqsut	14%	17%	23%	30%	30%	21%	37%	43%	18%	17%	30%	40%	34%	20%	39%	43%
12	Other	3%	1%	6%	1%	1%	4%	8%	2%	3%	1%	6%	1%	1%	4%	8%	3%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

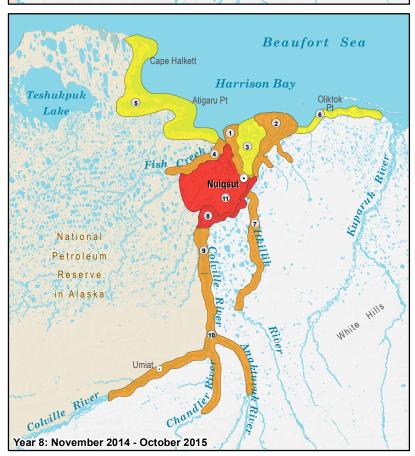












Map 11 **Nuiqsut Caribou Hunting** Area Groups, Years 3 - 8

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

> Other areas may have been used for resource harvesting.

LEGEND



Greater than

15 percent of total harvest

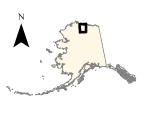


Between two and 15 percent of total harvest

Less than two percent of total harvest

Areas categorized as follows:

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



SCALE: 1:1,800,000

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Duration and Frequency of Trips

The duration and frequency 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 (Table 12). The percentage of use areas typically visited during same day trips was the highest during Year 8, at 93 percent, but not substantially higher than previous years. The distribution of the number of trips taken to caribou use areas remained relatively consistent over the first four study years, with about 50 percent of use areas visited between one and three times, and the other 50 percent of use areas visited four or more times per year (Table 13). Nuiqsut active harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 8 (between four and nine percent of use areas) compared to Years 1 and 2 (zero percent) (Table 13).

Table 12: Caribou Hunting Typical Trip Duration, Nuiqsut, Years 1-8

Typical Duration		Percentage of Caribou Use Areas											
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8					
More than 2 weeks	0%	1%	0%	0%	<1%	2%	1%	0%					
1-2 Weeks	1%	1%	1%	1%	1%	1%	0%	0%					
2-6 Nights	7%	15%	7%	8%	9%	10%	6%	6%					
1 Night	5%	2%	2%	1%	2%	4%	3%	1%					
Same Day	87%	81%	90%	90%	88%	84%	91%	93%					
Total	100%	100%	100%	100%	100%	100%	100%	100%					
Number of Use Areas	135	176	212	193	209	196	190	153					

Stephen R. Braund & Associates, 2017.

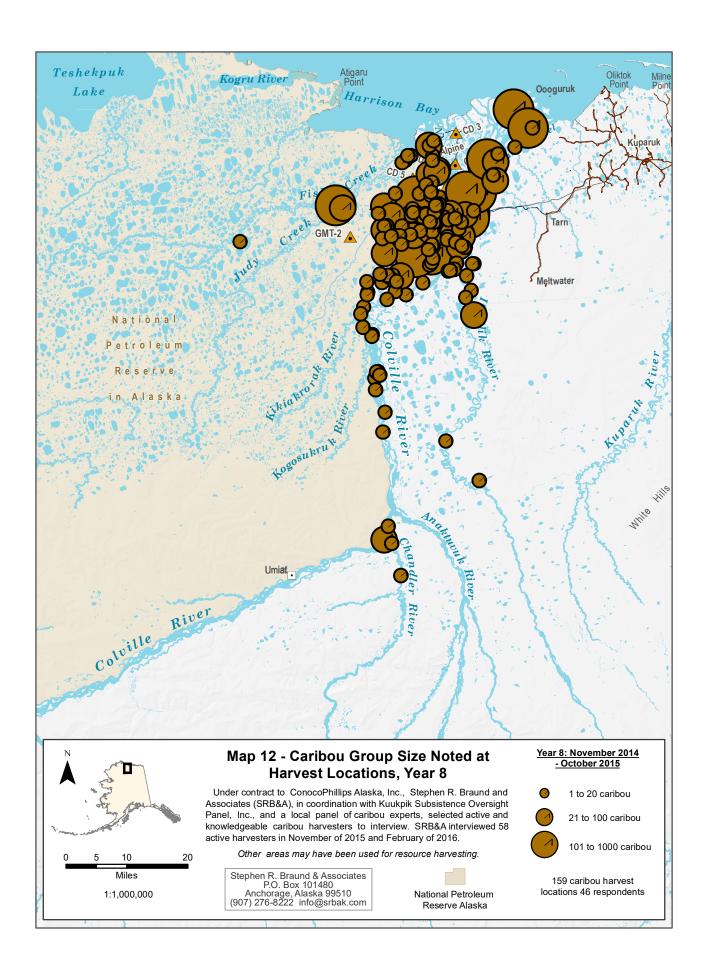
Table 13: Caribou Hunting Number of Trips, Nuiqsut, Years 1-8

Number of Trips			Percent	tage of Ca	aribou Us	e Areas		
Number of Trips	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
20+	0%	0%	9%	7%	4%	7%	7%	8%
6-20 trips	30%	28%	21%	28%	16%	19%	21%	20%
4-5 trips	23%	21%	19%	15%	15%	13%	17%	15%
2-3 trips	27%	26%	27%	29%	34%	28%	26%	28%
1	20%	24%	24%	21%	32%	33%	28%	29%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Number of Use Areas	121	174	212	193	210	196	204	153

Stephen R. Braund & Associates, 2017.

Herd Size

In response to a request from a member of the Nuiqsut Caribou Panel, in Year 5 the study team began asking respondents to estimate how many caribou were present at each harvest location they reported. 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. The distribution of herd sizes reported at harvest locations is similar between Years 5 through 8. Map 12 depicts the herd size noted at reported harvest locations in Year



8, more than 100 caribou depicted by large symbols, between 21 and 100 caribou depicted by medium symbols, and 1 to 20 caribou depicted by small symbols. As shown on the map, herds of over 100 caribou were most frequently reported to be observed along the East Channel, in addition to south and west of the community. A number of herds sized 21-100 were observed along the Nigliq Channel, and farther to the west and southwest of the community toward Ublutuoch River and Judy Creek. In general, respondents reported observing groups of 20 or fewer caribou directly to the west and north of the community and upriver from the community to Umiat. More detailed data on the percentage of caribou harvests and harvest locations by herd size will be provided in the final Year 10 report.

Harvest Amounts (Household Harvest Surveys)

This section presents the caribou harvest data from the 2015 household caribou harvest surveys in Nuiqsut alongside harvest data available from ADF&G and NSB harvest studies from previous years. Table 14 compares harvest information over time. The percentage of households using caribou has remained at or above 90 percent during every available study year since 1985 and was 96 percent in 2015. The percentage of households attempting to harvest caribou has varied over time, with the percentage in Year 8 (84 percent) the second highest of all eight study years and the percentage harvesting (78 percent) the highest of the eight study years. The difference between the percentage of households attempting to harvest and successfully harvesting caribou (six percent) was within the range of successful households compared to previous study years. In addition, the estimated number of caribou harvested in 2015 (628) was third highest of all study years, with higher harvests only reported in 1993 and 2014. Similarly, the estimated per capita harvest (180 pounds) was also third highest of all previous study years. For the 2014 study year, ADF&G used a higher conversion rate to estimate pounds than they used in the past (136 versus 117). SRB&A applied a conversion rate of 117 to facilitate comparison with previous study years.

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. Table 15 summarizes the percentage of respondents reporting a given type of change. Overall, the percentages of respondents reporting changes in hunting area, frequency, duration, and harvest amount in Year 8 were within the range of previous years. Hunting Area Changed (38 percent) and Months Changed (20 percent) were on the high end of the range of previous years while Harvest Amount Changed (57 percent) was near the low end of the range of previous years. As shown in Table 16, respondents also indicated whether they harvested enough caribou. In Year 8, 22 percent of respondents indicated that they did not harvest enough caribou, showing a continued decline of those who were unable to harvest enough in the previous three years and approaching the lows seen in Year 3 and Year 4. In Years 1 through 7, the percentage of respondents not harvesting enough caribou ranged from 16 percent (Year 4) to 54 percent (Year 6).

Tables detailing the reasons cited for changes in harvest patterns have been provided in previous monitoring reports. Year 8 showed some variation in responses, but generally within the range of previous years. Notable differences were a slightly smaller percentage of respondents who reported harvesting less caribou; and a slightly higher percentage taking shorter trips. More detailed tables showing responses will be provided in the final Year 10 report.

Table 14: Nuigsut Caribou Harvests 1985-2015

Year	Percent Using	Percent Attempting to Harvest	Percent Harvesting	Percent Giving	Percent Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per Household	Per Capita Lbs	Source
1985	98%	90%	90%	80%	60%	513	60,021	790	150	ADF&G 2011
1992		81%				278	32,551	310	78	Fuller and George 1999
1993	98%	74%	74%	79%	79%	672	82,169	903	228	Fall and Utermohle Unpublished
1994-95						258	30,186	364	73*	Brower and Hepa 1998; Braem et al. 2011
1995-96						362	42,354	455	99*	Bacon et al. 2009; Braem et al. 2011
1999-00						413			112	Pedersen and Taalak Unpublished as cited in Braem et al. 2011
2000-01						496	57,985	453	134*	Bacon et al. 2009; Braem et al. 2011
2002-03	95%	47%	45%	80%	49%	397	46,449	442	118	Braem et al. 2011
2003-04	97%	74%	70%	81%	81%	564	65,988	617	157	Braem et al. 2011
2004-05	99%	62%	61%	81%	96%	546	63,882	597	147	Braem et al. 2011
2005-06	100%	60%	59%	97%	96%	363	42,471	442	102	Braem et al. 2011
2006-07	97%	77%	74%	66%	69%	475	55,575	579	143	Braem et al. 2011
2010	94%	86%	76%	67%	63%	562	65,754	707	_**	SRB&A 2012
2011	92%	70%	57%	49%	58%	437	51,129	544	134	SRB&A 2013
2012	99%	68%	62%	65%	79%	501	58,617	598***	147	SRB&A 2014
2013	95%	79%	63%	62%	75%	586	68,534	692	166	SRB&A 2015
2014	90%	66%	64%	67%	59%	773	90,441****	837	218	ADF&G 2016 DRAFT
2015	96%	84%	78%	74%	72%	628	73,527	728	180	Year 8 HH Surveys
Mean of observed values	96%	73%	67%	73%	72%	490	58,096	592	140	

Blank cells indicate data not available

Stephen R. Braund & Associates, 2017.

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

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

^{***}The estimates for Years 2010, 2011, 2012, 2013, and 2015 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, 2013, and 2015 may be skewed upward due to the participation of this high-harvesting household in the harvest survey. Likewise, changes in community harvest estimates in future surveys could be due to this high-harvesting household not being interviewed.

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

Table 15: Percentage of Respondents Reporting Changes in Harvest Activities, Years 1-8

Type of Change			Perc	entage of	Respond	ents		
Type of Change	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Hunting Area Changed	31%	28%	39%	34%	36%	40%	28%	38%
Frequency Changed	50%	77%	65%	60%	63%	67%	70%	67%
Duration Changed	39%	32%	21%	21%	23%	26%	39%	28%
Months Changed	19%	15%	12%	21%	21%	18%	11%	20%
Harvest Amount Changed	75%	85%	68%	72%	54%	63%	82%	57%

Table 16: Percentage of Respondents Reporting Not Harvesting Enough Caribou, Years 1-8

Not Howasting Enough	Percentage of Respondents										
Not Harvesting Enough	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8			
Reported Did Not Harvest Enough	47%	53%	21%	16%	41%	54%	32%	22%			

Stephen R. Braund & Associates, 2017.

Respondents discussed a variety of reasons for not harvesting enough caribou or harvesting less caribou during the Year 8 study period. Reasons discussed included the following general observations:

- There was an overall lack of caribou and not enough gas to pursue those that were present
- Work commitments limited ability to harvest
- Winter weather conditions were harsh
- Several gave away portions of their caribou harvest to families in need, including other communities such as Anaktuvuk Pass and Barrow
- Equipment failures
- Large family to feed

Observations of Harvested Caribou Health and Condition

The percent of respondents reporting one or more "abnormalities" in caribou has ranged from 22 percent to 64 percent over the previous seven study years; by a margin of one percent, Year 8 had the lowest percent of respondents observing abnormalities, at 21 percent (Table 17). The percentage of respondents observing caribou abnormalities in Year 8, at 21 percent, continued a trend of decreasing observations since Year 6. However, while the percentage of respondents decreased, the total number of caribou with abnormalities in Year 8 (35), was higher than the numbers observed in Year 6 (14) and Year 7 (23) (Table 17).

Table 17: Respondent Observations of Abnormalities in Harvested Caribou, Nuiqsut, Years 1-8

Type of Abnormality			Pe	rcentage	of Respon	dents		
Type of Abnormality	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Health	47%	26%	18%	26%	33%	16%	15%	16%
Other	3%	4%	0%	0%	4%	4%	5%	2%
Parasites	22%	2%	5%	3%	4%	0%	2%	0%
Quality	8%	4%	4%	10%	14%	4%	0%	10%
Size	28%	11%	18%	16%	26%	12%	8%	5%
One or More Abnormalities	64%	38%	40%	29%	44%	25%	22%	21%
Number of Active Harvester Respondents	36	53	57	58	57	57	60	58

Stephen R. Braund & Associates, 2017.

Health problems were the primary type of observation in caribou in Year 8, followed by abnormal size and quality. In Year 8, health-related abnormalities were reported in 51 percent of abnormal caribou (18 caribou), and size-related abnormalities were reported in 40 percent of abnormal caribou (14 caribou). In Year 8, respondents reported using only a small portion (11 percent) of caribou with health-related abnormalities (two of 18); this was similar to Year 7 but lower than previous years when respondents used between 15 percent and 67 percent of caribou with health-related abnormalities (Table 18). Year 8 respondents used 86 percent of abnormal caribou with size-related abnormalities, a sharp contrast to the 20 percent used in Year 7. For all types of abnormalities, respondents reported using 18 of the 35 caribou with reported abnormalities in Year 8, or 51 percent, well within the range of previous years, which ranged from 26 percent to 70 percent. Detailed causes of observed abnormalities have been provided in previous monitoring reports; in Year 8, these detailed causes were similar to previous years. Detailed response tables for all study years will be provided in the final Year 10 report.

The locations where Year 8 respondents reported harvesting caribou they perceived to be abnormal are depicted in red on Map 13, and locations identified during previous study years are shown in gray. For the Year 8 time period, respondents reported harvesting "abnormal" caribou primarily to the overland area west of the community and north along the Spur Road. Other locations where abnormal caribou were harvested occurred near Fish Creek, in the Colville Delta, and at several locations along the Colville River upriver from the community to Sentinel Hill. As shown on Map 14, over all study years, the locations where respondents have harvested abnormal caribou are similar to the locations where they have harvested healthy caribou.

Impacts on Harvesting Activities

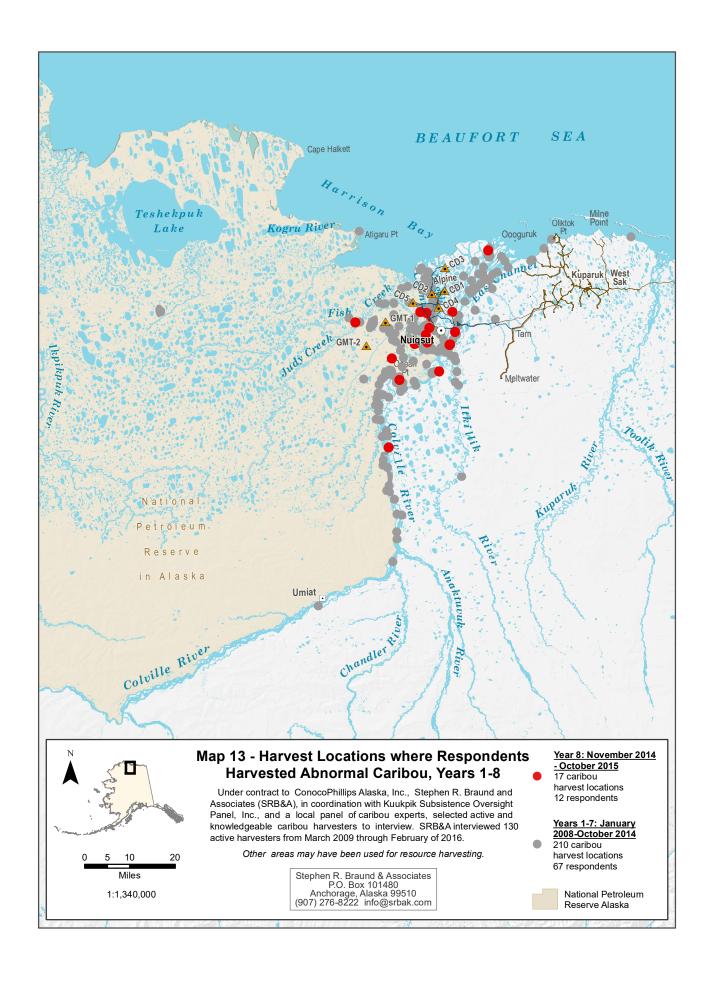
In Year 8, 41 percent of respondents reported one or more perceived Alpine-related impacts on their caribou hunting⁴, lower than all other years except Year 4 (Figure 3, Table 19). The substantially higher percentage of study participants (72 percent) reporting impacts in 2008 (Year 1) is due in part to Year 1 respondents including impacts that had occurred since the Alpine development had begun.

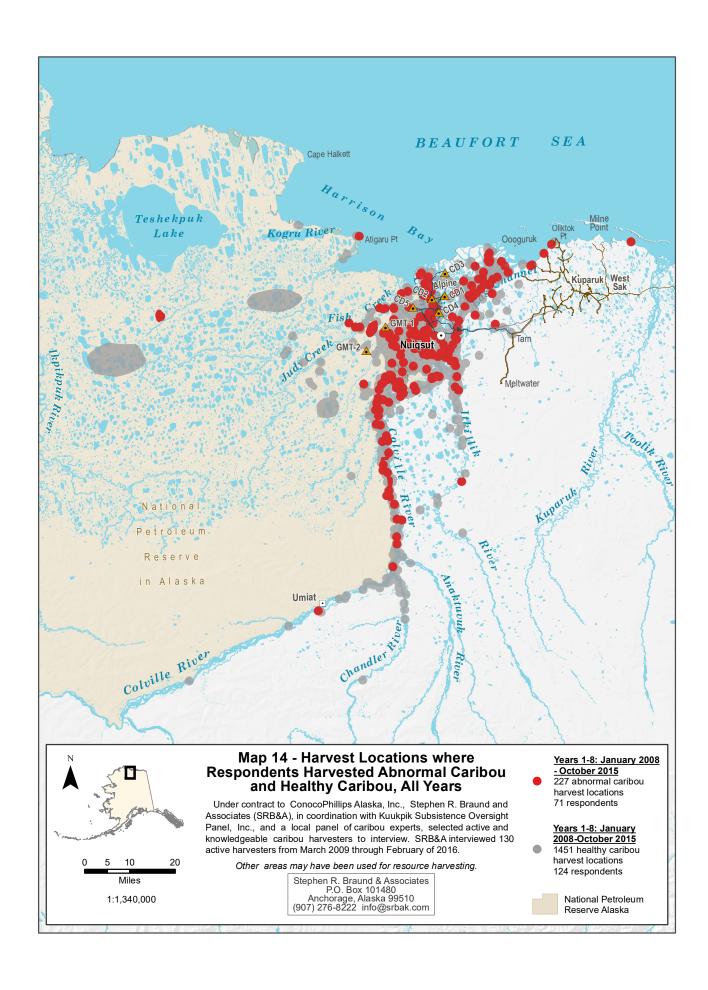
As in the case of Years 1 through 7, the most commonly reported Alpine-related impact in Year 8 was associated with helicopter traffic, with 22 percent of harvester respondents reporting helicopter traffic impacts, which along with Year 4 was the lowest percentage of harvesters reporting helicopter associated impacts. These observations accounted for just over half of all impact observations in Year 8 (Table 19). The second most commonly reported impact in Year 8 was related to man-made infrastructure (16 percent of respondents). Impacts related to man-made structures were highest in Year 1 (61 percent of respondents), decreased substantially in Year 3 (nine percent of respondents) and then increased to between 12 and 22 percent in the following study years. While residents and Nuiqsut Caribou Panel members continue to express concerns about the impacts of pipelines and other infrastructure on caribou migration, they are less likely to report pipelines as direct impacts on their caribou hunting (i.e., impacts that occurred while they hunted) in recent years than they were at the beginning of this study. Other impacts reported by Nuiqsut harvesters in Year 8 were impacts related to other traffic (five percent), "other" impacts (three percent), and plane traffic (two percent). The percentage of respondents reporting impacts related to plane traffic was the lowest of all study years, which ranged from nine percent to 16 percent. Reported plane impacts were highest in Years 1 and 2.

⁴ 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.

Table 18: Number and Percent of Abnormal Caribou by Type of Abnormality, Nuiqsut, Years 1-8

Type of Abnormality	Number (%) of Abnormal Caribou								Number (%) of Abnormal Caribou Used							
Type of Abnormality	Year 1	1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Y				Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8			
Health	24 (32%)	16 (47%)	13 (35%)	23 (85%)	30 (60%)	9 (64%)	19 (83%)	18 (51%)	4 (17%)	4 (25%)	2 (15%)	10 (43%)	7 (23%)	6 (67%)	2 (11%)	2 (11%)
Other	1 (1%)	2 (6%)	0 (0%)	0 (0%)	2 (4%)	2 (14%)	3 (13%)	4 (11%)	0 (0%)	2 (100%)	-	-	0 (0%)	1 (50%)	2 (67%)	4 (100%)
Parasites	13 (18%)	5 (15%)	8 (22%)	3 (11%)	2 (4%)	0 (0%)	1 (4%)	0 (0%)	11 (85%)	5 (100%)	7 (88%)	0 (0%)	0 (0%)	-	0 (0%)	-
Quality	3 (4%)	2 (6%)	2 (5%)	6 (22%)	11 (22%)	2 (14%)	0 (0%)	8 (23%)	2 (67%)	1 (50%)	2 (100%)	1 (17%)	1 (9%)	1 (50%)	1	0 (0%)
Size	43 (58%)	9 (26%)	16 (43%)	12 (44%)	33 (66%)	7 (50%)	10 (43%)	14 (40%)	38 (88%)	8 (89%)	14 (88%)	1 (8%)	20 (61%)	3 (43%)	2 (20%)	12 (86%)
One or More Abnormalities	74	34	37	27	50	14	23	35	52 (70%)	20 (59%)	25 (68%)	11 (41%)	25 (50%)	9 (64%)	6 (26%)	18 (51%)





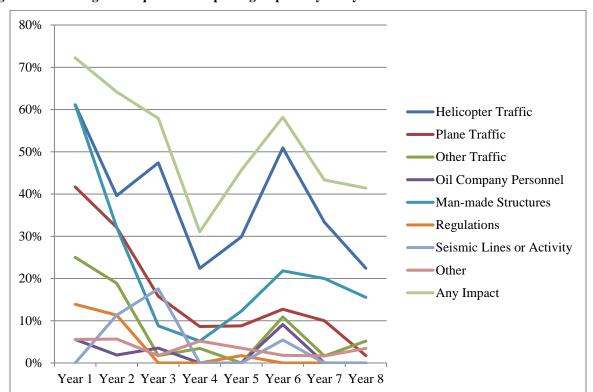


Figure 3: Percentage of Respondents Reporting Impacts by Study Year

Table 19: Respondent Reported Alpine-Related Impacts on Caribou Hunting, Nuiqsut, Years 1-8

Type of Alpine-			Perc	ent of F	Respond	lents					Perc	ent of (Observa	tions		
Related Impact	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Helicopter Traffic	61%	40%	47%	22%	30%	51%	33%	22%	28%	26%	49%	54%	55%	46%	48%	52%
Plane Traffic	42%	32%	16%	9%	9%	13%	10%	2%	22%	21%	16%	18%	18%	12%	14%	3%
Other Traffic	25%	19%	2%	3%	0%	11%	2%	5%	10%	12%	2%	7%	0%	9%	2%	10%
Oil Company Personnel	6%	2%	4%	0%	0%	9%	0%	0%	2%	1%	4%	0%	0%	7%	0%	0%
Man-made Structures	61%	32%	9%	5%	12%	22%	20%	16%	30%	22%	9%	11%	18%	19%	33%	29%
Regulations	14%	11%	0%	0%	2%	0%	0%	0%	6%	7%	0%	0%	3%	0%	0%	0%
Seismic Lines or Activity	0%	11%	18%	0%	0%	5%	0%	0%	0%	7%	18%	0%	0%	4%	0%	0%
Other	6%	6%	2%	5%	4%	2%	2%	3%	2%	4%	2%	11%	5%	1%	2%	6%
Any Impact	72%	64%	58%	31%	46%	58%	43%	41%								
Number of Respondents/ Observations	36	53	57	58	57	55	60	58	87	82	55	28	38	67	42	58

Figure 4 shows the number of reported impacts on caribou hunting of all types by month for the eight study years, and Figure 5 shows helicopter impact reports by month for the eight study years. The timing of other impact types have been provided in previous monitoring reports and will be provided in the Year 10 report for all study years. The timing of these "other" impacts in Year 8 did not differ substantially from previous years. The peak months for reported impacts in all eight years are June, July, and August, the same months as peak caribou hunting activity (Figure 4, Figure 1). While most other study years show a peak in reported impacts in July, impacts in Year 8 were most commonly reported to occur during the month of June. Helicopter impacts peaked in June with nine observations of impacts, with additional observations in July, August, and September (Figure 5).



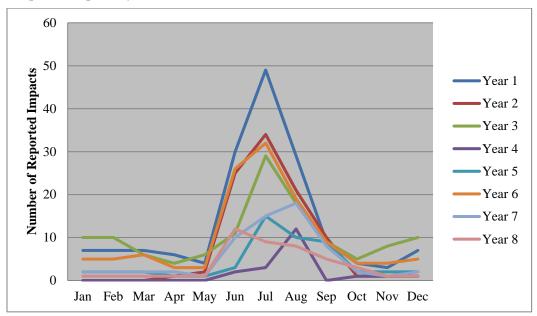
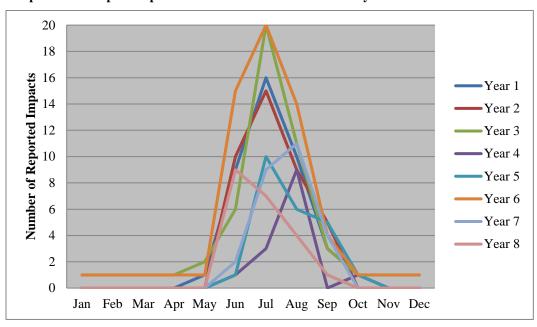


Figure 5: Reported Helicopter Impacts on Caribou Harvest Activities by Month: Years 1-8



Map 15 shows the locations of Alpine-related impacts reported by Year 8 respondents. In some cases, respondents could not identify the location of an impact or indicated that the impact occurred multiple times over a longer time period (and therefore did not point out each location). The study team generally recorded impact locations only when the respondent could identify the specific (i.e., point) locations where they were when the impact occurred; however, in some cases, when residents indicated that the impact occurred over a larger area, these impact locations were documented as a polygon instead of a point. As shown on Map 15, many Alpine-related impacts were reported to occur along the Spur Road from the crossing of the Nigliq Channel to CD5 and south to Nuiqsut. The types of impacts occurring in and around the Spur Road (where impact locations were provided) included five impacts related to manmade structures, two impacts from other traffic, one plane impact, and one helicopter impact (Map 15). Impacts were also reported along the Nigliq Channel and to the south and west of the community. Helicopter traffic impacts occurred in all directions surrounding the community with the greatest number occurring to west (3) and south (3) compared to north (2) and east (1).

Impacts of Helicopter Traffic

As shown in Table 19, 22 percent of respondents reported helicopter impacts in Year 8, a smaller percentage than all previous years alongside Year 4. Helicopter impacts accounted for 52 percent of the reported impacts during the Year 8 study period (Table 19). Several individuals in Year 8 suggested that construction of the CD5 road has decreased (although not eliminated) the need for helicopter traffic associated with development, which may have led to the lower reports of impacts in Year 8. While the overall frequency helicopter impacts observations was at its lowest in Year 8, those who reported impacts described similar effects as those discussed in past study years with caribou dispersing from the area being flown over by helicopters (particularly when at low altitudes) and the resulting skittish behavior of the caribou that in some cases led to an unsuccessful hunting trip. Observations by respondents of the types of helicopter activities associated with impacts included garbage clean-up, general flying, and unspecified surveying/monitoring studies along river channels. As in past years, several also simply described the presence of helicopters as an impact to their overall subsistence experience.

Impacts of Airplane Traffic

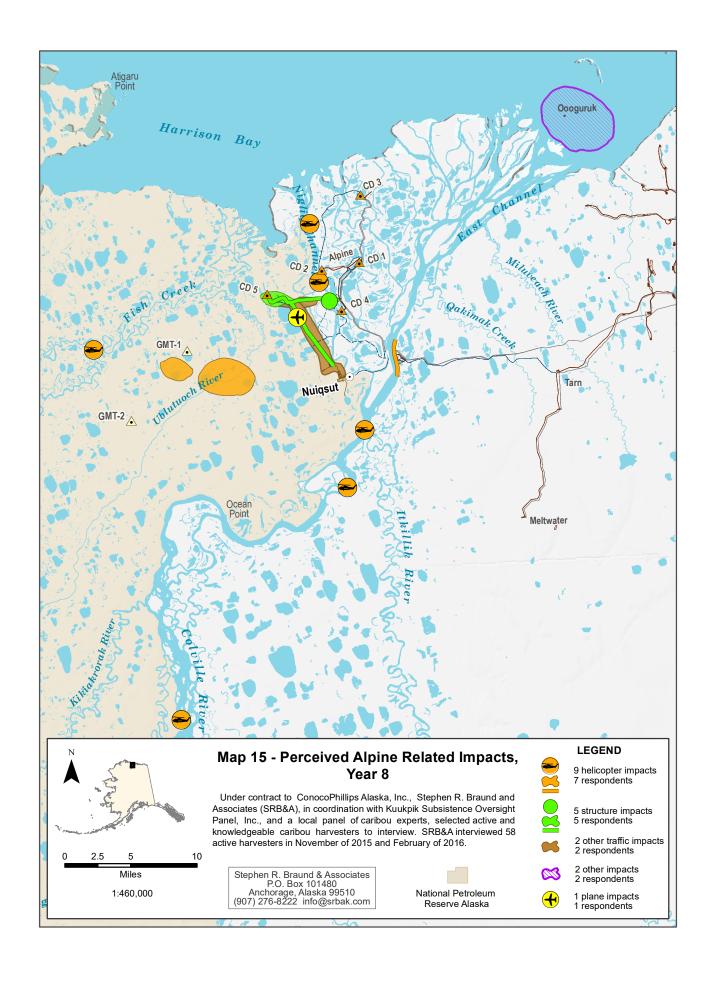
Airplane traffic (two percent of respondents) was the lowest reported impact in Year 8 and the least in terms of airplane impacts across all other study years, which ranged from nine to 42 percent of respondents (Table 19). As discussed in previous years, airplane traffic is generally less of a concern to hunters as residents indicate that the noise levels are less disruptive to caribou, particularly when planes are flying at higher altitudes. However, a number of respondents expressed the view that despite being less disruptive than helicopter traffic, airplane traffic still contributes to impacts on caribou movement near Nuiqsut.

Impacts of Other Traffic

Three respondents reported impacts related to other traffic (i.e., not helicopters or airplanes) in Year 8. These observations accounted for 10 percent of Alpine impact observations (Table 19), and in all cases, participants noted that road traffic on the new road to CD5 continued to disrupt caribou migration paths (as was also observed in Year 7).

Impacts of Oil Company Personnel

No respondents reported experiencing impacts related to oil company personnel in Year 8 (Table 19).



Impacts of Man-made Structures

Impacts related to man-made structures were reported by 16 percent of Year 8 respondents, which was within the range of Years 3 to 7 (five to 22 percent) (Table 19). During Years 1 and 2, respondents reported much higher numbers, which is likely because researchers in Year 1 collected data on 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. As shown in Table 20, roads and bridges accounted for six of nine man-made structure observations. In addition, three individuals cited pipelines and infrastructure in general.

Impacts associated with man-made structures as reported by Year 8 respondents included the overall increasing presence of permanent infrastructure (e.g., CD5, roads) and avoidance of these areas by some hunters, shiny pipelines diverting caribou, and the bridge over the Colville River and associated roads deflecting caribou to a new path. As in Year 7, while this section focuses on the impacts of man-made structures on caribou hunting activities, several hunters reported continued use of the newly built Spur Road for caribou hunting.

Table 20: Descriptions of Sources of Man-Made Structures Associated with Impacts, Nuiqsut, Years 3-8

Man Mada Stanatura Descriptions		Number of Observations									
Man-Made Structure Descriptions	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	All Years				
Pipeline	2	1	6	7	3	1	20				
Infrastructure	1	1	1	6	1	2	12				
Roads and Bridges	0	0	0	0	3	6	9				
Ice Roads and Bridges	2	0	0	0	5	0	7				
Trucks	0	0	0	0	1	0	1				
Seismic Lines	0	0	0	0	1	0	1				
Waste	0	1	0	0	0	0	1				
Total	5	3	7	13	14	9	51				

Stephen R. Braund & Associates, 2017.

While impacts related to man-made infrastructure have occurred over the study years, Nuiqsut hunters continue to harvest caribou in proximity to these areas. As shown in Table 21, over the eight study years, between three and 22 percent of reported caribou harvests have occurred within 2.5 miles of infrastructure, and between 12 and 44 percent of respondents have reported harvesting caribou within 2.5 miles of infrastructure. Year 8 showed a slight uptick in the number and percentage of caribou harvested within 2.5 miles of infrastructure, which may reflect use of the Spur Road by some residents to hunt caribou.

Table 21: Nuiqsut Caribou Harvested Within 2.5 Miles of Infrastructure

	Within 2.5 Mile	es of Infrastructure
Study Year	Number (%) Caribou Harvested	Number (%) Respondents Harvesting Caribou
Year 1	32 (8%)	16 (44%)
Year 2	39 (14%)	13 (29%)
Year 3	46 (13%)	19 (35%)
Year 4	56 (17%)	23 (42%)
Year 5	57 (16%)	20 (38%)
Year 6	7 (3%)	6 (12%)
Year 7	71 (13%)	21 (38%)
Year 8	88 (22%)	26 (44%)

Impacts of Regulations

No respondents reported experiencing impacts related to regulations in Year 8 (Table 19).

Impacts of Seismic Lines

No respondents reported experiencing impacts under the impact category of seismic lines in Year 8 (Table 19).

Impacts of Other

Two respondents described an impact that did not readily fit into the other impact categories. As mentioned above, these respondents encountered debris from ice road construction that had floated down river and accumulated in the ocean.⁵

Non-Alpine Impacts

In addition to impacts attributed to the Alpine or Alpine Satellites developments, the study team also documented non-Alpine impacts when volunteered by respondents. In these cases, respondents indicated that the impact was from a different source, or they were unsure of the source of the impact and the study team assigned the impact as "non-Alpine" due to its location (i.e., outside of the general area of current or planned Alpine Satellites developments). As shown in Table 22, 31 percent of Nuiqsut respondents reported at least one type of non-Alpine impact in Year 8. A majority of these reported impacts were related to airplane traffic (42 percent of observations) or helicopter traffic (35 percent of observations). The percentage of respondents reporting non-Alpine impacts in Year 8 was within the range of all previous years, which ranged from five percent of respondents (Year 3) to 54 percent (Year 5). Non-Alpine impacts in Year 8 focused on two primary types of plane activities: sport hunters and people searching for dinosaur fossils along the Colville River. A few also discussed having been impacted by a Coast Guard plane, commercial plane, or unidentified small planes.

Changes in Caribou Hunting Areas Over Time

As shown in Table 23, the percentage of Year 8 respondents who reported no longer using or avoiding certain areas was identical to Year 7 (58 percent) and similar to the Year 6 (61 percent). The remaining 42 percent of respondents indicated there had been no change in their hunting area over time. The most commonly mentioned places avoided were Alpine/Alpine Satellites (eight observations), followed by Nanuq (four observations); then Nigliq Channel, Colville Delta, East Channel, *Kuupaqullurak*, and Upper Colville River (three observations each); the Nuiqsut Spur Road (two observations); and several other locations with one observation each (see Maps 1 and 2 for placename locations) (Table 24).

Respondents who reported avoiding or no longer hunting in certain areas sometimes cited multiple different causes for a change; hence, there are a total of 50 cause observations, compared to 39 location observations. As shown in Table 25, development-related causes were most commonly cited (36 observations), followed by environmental causes (12 observations), and personal reasons (two observations). Year 8 had the highest percentage of avoidance due to development (72 percent) while environmental causes were within the range of the two previous years, and personal reasons were at the lowest alongside Year 6. Development-related causes included activities associated with development (e.g., air traffic), development infrastructure, general development causes, security restrictions, and safety concerns (see Table 25). Environmental causes were also commonly reported decreased availability of caribou (without a cause given), or environmental factors (such as shallow waters). A couple of individuals cited personal reasons for no longer hunting in a certain area (Table 25).

⁵ COP Comment: This incident was not reported to COP.

Table 22: Non-Alpine Impacts on Caribou Hunting, Nuiqsut, Years 1-8

Toma of Non-Almino Immost	Percent of Respondents								Percent of Observations							
Type of Non-Alpine Impact	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Helicopter traffic	11%	9%	2%	7%	32%	13%	13%	16%	22%	45%	33%	40%	43%	32%	45%	35%
Plane traffic	17%	6%	4%	5%	28%	15%	13%	16%	39%	27%	67%	40%	34%	36%	40%	42%
Other traffic	3%	0%	0%	0%	4%	4%	2%	2%	6%	0%	0%	0%	4%	9%	5%	4%
Oil company personnel	0%	0%	0%	0%	5%	0%	2%	0%	0%	0%	0%	0%	6%	0%	5%	0%
Man-made structures	6%	4%	0%	0%	2%	2%	0%	2%	11%	18%	0%	0%	2%	5%	0%	4%
Regulations	3%	0%	0%	0%	4%	2%	0%	0%	6%	0%	0%	0%	4%	5%	0%	0%
Seismic lines or activity	0%	2%	0%	2%	0%	0%	0%	0%	0%	9%	0%	10%	0%	0%	0%	0%
Other	8%	0%	0%	2%	5%	5%	2%	7%	17%	0%	0%	10%	6%	14%	5%	15%
Any impact	31%	15%	5%	16%	54%	29%	27%	31%								

Table 23: Respondents Reporting Avoidance of Previously Used Hunting Areas

Avoid Areas?	Year 6	Year 7	Year 8
No	39%	42%	42%
Yes	61%	58%	58%
Total	100%	100%	100%

Table 24: Places of Avoidance

DI		Number (%	6) of Obse	rvations
Place	Year 6	Year 7	Year 8	Total (Years 6-8)
Alpine/Alpine Satellites	13 (29%)	11 (30%)	8 (21%)	32 (26%)
Fish Creek	4 (9%)	3 (8%)	1 (3%)	8 (7%)
Nigliq Channel	4 (9%)	1 (3%)	3 (8%)	8 (7%)
Colville Delta	2 (4%)	2 (5%)	3 (8%)	7 (6%)
Tamayayak Channel	3 (7%)	3 (8%)	1 (3%)	7 (6%)
East Channel	3 (7%)	0 (0%)	3 (8%)	6 (5%)
Kuupaqullurak	0 (0%)	3 (8%)	3 (8%)	6 (5%)
Upper Colville River	1 (2%)	2 (5%)	3 (8%)	6 (5%)
West of Nuiqsut	2 (4%)	2 (5%)	1 (3%)	5 (4%)
Nanuq	0 (0%)	0 (0%)	4 (10%)	4 (3%)
Itkillik River	1 (2%)	3 (8%)	0 (0%)	4 (3%)
Shallow Areas	3 (7%)	0 (0%)	0 (0%)	3 (2%)
Spur Road	0 (0%)	1 (3%)	2 (5%)	3 (2%)
Anaktuvuk River	0 (0%)	2 (5%)	0 (0%)	2 (2%)
East of Colville Delta	0 (0%)	1 (3%)	1 (3%)	2 (2%)
East of Nigliq Channel	1 (2%)	0 (0%)	1 (3%)	2 (2%)
Puviksuk	2 (4%)	0 (0%)	0 (0%)	2 (2%)
Various Areas	0 (0%)	2 (5%)	0 (0%)	2 (2%)
Atigaru Point	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Chandler River	0 (0%)	1 (3%)	0 (0%)	1 (1%)
Oliktok Point	0 (0%)	0 (0%)	1 (3%)	1 (1%)
East of Colville River	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Kachemach River	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Kuparuk River	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Lake near Kachemak	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Nuiqsupiaq	0 (0%)	0 (0%)	1 (3%)	1 (1%)
Teshekpuk Lake	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Tingmeachsiovik	0 (0%)	0 (0%)	1 (3%)	1 (1%)
Eskimo Island	0 (0%)	0 (0%)	1 (3%)	1 (1%)
Location Not Captured	0 (0%)	0 (0%)	1 (3%)	1 (1%)
Total Observations	45	37	39	121

Table 25: Causes of Avoidance

Common		Number of (Observations	
Causes	Year 6	Year 7	Year 8	All Years
Development Causes	32 (60%)	28 (60%)	36 (72%)	96 (64%)
Development Activities	8	5	12	31
Development Infrastructure	7	12	14	27
Development-General	4	0	6	10
Contamination Concerns	6	4	0	10
Security Restrictions	4	3	3	10
Safety Concerns	3	4	1	8
Environmental Causes	18 (34%)	9 (19%)	12 (24%)	39 (26%)
Resource Availability	6	6	9	21
Environmental Factors	12	3	3	18
Personal Reasons	2 (4%)	10 (21%)	2 (4%)	14 (9%)
Don't Know	1 (2%)	0 (0%)	0 (0%)	1 (1%)
Total Observations	53	47	50	150

As shown in Table 26, the causes cited for avoiding the area near Alpine/Alpine Satellites included development activities (e.g., traffic), infrastructure (e.g., the presence of pipelines/buildings/roads), security restrictions (e.g., concerns about being confronted by oil company personnel or not understanding hunting policies in developed areas), and general development. In addition to mentioning Alpine/Alpine Satellites directly, respondents also reported avoiding areas such as Nanuq, Colville Delta, East channel, Kuupaqullurak, Niqliq Channel, Nuiqsupiaq, East of Nigliq Channel, Oliktok Point, East of Colville Delta, West of Nuiqsut, Tingmeachsiovik, and Tamayayak Channel due to development related causes. Two individuals also mentioned avoiding the newly constructed Spur Road area.

In general, respondents' observations addressed the following development related reasons for avoidance of these areas:

- Avoidance of activity, infrastructure, and traffic
 - o Discussed that even though they are allowed to hunt near development, they no longer go to these areas because of development infrastructure and activity such as bridges and traffic
 - o Prefer hunting in areas of quiet and no traffic
- Feeling forced out from traditional areas
 - o Respondents identified no longer using traditional areas where Alpine and the newly created CD5 are now located; expressed that the same effect will happen with GMT1 and GMT2.
 - o Locals have had to move more and more hunting activities upriver away from development
- Shrinking hunting area from expanding development
- Security watching local harvesters
- Regulations regarding use of roads
- Concerns of shooting towards people and infrastructure
- Development changing caribou migration and availability

Table 26: Causes Cited for Avoidance by Place - Year 8

		nmental uses		Develop	ment Ca	auses			
Place	Environmental Factors	Resource Availability	Development Activities	Development Infrastructure	Security Restrictions	Safety Concerns	Development- General	Personal Reasons	Total
Alpine/Alpine Satellites	0	1	4	1	1	0	2	0	9
Nanuq	0	3	1	3	0	0	1	0	8
Colville Delta	0		1	2	1	0	0	0	4
East channel	0	2	1	1	0	0	0	0	4
Kuupaqullurak	0	0	1	3	0	0	0	0	4
Nigliq Channel	0	0	1	0	1	0	0	1	3
Upper Colville River	1	1	0	0	0	0	0	1	3
Nuiqsupiaq	0	1	1	1	0	0	0	0	3
East of Nigliq Channel	0	0	0	1	0	1	0	0	2
Spur Road	0	0	2	0	0	0	0	0	2
Oliktok Point	0	0	0	0	0	0	1	0	1
East of Colville Delta	0	0	1	0	0	0	0	0	1
West of Nuiqsut	0	0	1	0	0	0	0	0	1
Tingmeachsiovik	0	0	0	0	0	0	1	0	1
Eskimo Island	1	0	0	0	0	0	0	0	1
Fish Creek	1	0	0	0	0	0	0	0	1
Tamayayak Channel	0	0	0	0	0	0	1	0	1
Total	3	8	14	12	3	1	6	2	49

Summary

SRB&A, with the Nuiqsut Caribou Panel, has completed eight years of monitoring of impacts of CD4 and other COP satellite developments on Nuiqsut residents' caribou hunting activities. The monitoring data are based on interviews with a sample of active Nuiqsut caribou harvesters as well as household harvest surveys. Sixty respondents were interviewed in Year 8 (including 58 active harvesters).

These respondents reported 153 caribou use areas for the Year 8 time period (November 2014 to October 2015). They also identified 173 successful harvest locations, within the range of previous study years (between 143 [Year 6] and 248 [Year 7] harvest locations). The majority of caribou hunting and harvesting activities occurred along the Nigliq Channel, the lower portions of the East Channel of the Colville River and Itkillik River, upriver along the Colville River to Sentinel Hill, and in an overland area west and south of the community in an area between the community, Ublutuoch River, and Ocean Point. Compared to all previous study years, Year 8 marked the first year that Nuiqsut harvesters did not travel west of the Colville River in the Beaufort Sea towards areas such as Atigaru Point in search of caribou. In addition, the overall extent of overland travel in Year 8 was smaller than in some years, but similar to that seen in Years 4 through 6. Residents' riverine travel was similar to previous study years.

The concentration of harvests in Year 8 was similar to that from Year 6, which showed fewer areas of concentrated harvests. Other years showed a greater number of harvest locations where higher numbers of

caribou were harvested. In Year 8, harvests were most concentrated directly east and west of the community with additional high concentrations near the mouth of the Itkillik River and mouth of the East Channel Colville Delta. Overall, harvest locations during the summer months occurred in similar locations for all eight years of the study, with the majority of harvests occurring close to the community and fewer harvests occurring with increasing distance from the community.

July and/or August have been the peak hunting months during all previous seven study years, and Year 8 showed a similar pattern in terms of the number of use areas reported by month. However, Year 8 was the first year in which the number of caribou harvested peaked in September. 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. Boat travel, as measured by the percentage of use areas accessed by that travel method, was lowest in Year 8 compared to the previous seven study years. Snowmachine use was also lower than most other study years. Conversely, both four-wheeler and truck increased in frequency of use, likely due to respondents' use of the new Spur Road constructed as part of CD5 project efforts.⁶ Following an ongoing trend, respondents took primarily same day trips to a majority (86 percent) of use areas. The frequency of hunting trips to use areas was also similar to previous study years, although Nuigsut harvesters were more likely to take more than 20 trips to caribou use areas in Years 3 through 8 compared to Years 1 and 2. A number of factors affect harvest timing and success, including weather and ice conditions, the timing of caribou migration into traditional hunting areas, and outside factors such as industrial or other activities that potentially affect caribou behavior. Harvest success in terms of the percentage of successful hunting areas has varied from between 54 percent of areas (in Year 6) to 78 percent of areas (in Year 1). Year 8 marked the highest percent of successful use areas (65 percent) since Year 1.

The percentages of active harvester respondents reporting changes from the previous year in hunting areas, hunting months, trip frequency, trip duration, and harvest amounts are somewhat similar over all study years. The percentage of Year 8 respondents reporting a change in hunting area and months were on the high end of the range of previous years, and the percentage reporting a change in harvest amount was on the low end. Year 8 showed a continued decline in the number of those who were unable to harvest enough, approaching the lows seen in Year 3 and Year 4. Year 8 marked the first year that causes related to Personal Factors were the most frequently cited causes for harvesting less caribou for all study years combined, whereas in the previous seven years the most frequently cited causes were related to Resource Distribution or Migration causes. Personal Factors remained the primary cause for harvesting more caribou, followed by Resource Distribution or Migration.

The percentage of respondents observing caribou abnormalities in Year 8 was lower than all previous years, continuing a trend of decreasing observations since Year 6. However, the total number of caribou with abnormalities in Year 8 was higher than the numbers observed in Year 6 and Year 7. The two principle types of abnormalities observed in Year 8 were Health and Quality. Disease/Infection was the most common abnormality observation, followed by Decrease in Resource Size.

Forty-one percent of harvesters in Year 8 reported one or more Alpine-related impacts on caribou hunting, lower than all other years except Year 4. As in the case of Years 1 through 7, the most commonly reported Alpine-related impact in Year 8 was associated with helicopter traffic. These observations accounted for over half of all impact observations in Year 8. The percentage of respondents reporting impacts related to plane traffic was the lowest of all study years. Impacts related to man-made structures were the second most commonly reported impact observation in Year 8. The presence of new infrastructure in areas previously undeveloped (i.e., the Spur Road and CD5 road and bridge) was a new source of impacts to some hunters in Year 8. Nuiqsut harvesters also reported impacts from other (non-Alpine) sources, as exploration,

⁶ The Spur Road connecting Nuiqsut with the CD5 Road is owned by Kuukpik Corporation. Access is controlled and managed by Kuukpik per access requirements.

development, and research activities have increased within the region. The percentage of respondents reporting non-Alpine impacts in Year 8 was within the range of all previous study years.

Fifty-eight percent of respondents indicated that they no longer hunted in or generally avoided certain areas they previously used. The Alpine/Alpine Satellites areas were the most frequently mentioned for reasons related to development infrastructure and activities, as well as security restrictions. Other areas avoided due to development-related causes included Nanuq, Colville Delta, East channel, Kuupaqullurak, Niqliq Channel, Nuiqsapiaq, East of Nigliq Channel, Oliktok Point, East of Colville Delta, West of Nuiqsut, Tingmeachsiovik, and Tamayayak Channel. Other areas where residents reported decreased use for personal or environmental reasons included Colville River, waters around Eskimo Island, Fish Creek, Alpine/Alpine Satellites, Nanuq, East channel, upper Colville River, Nuiqsupiaq, and Nigliq Channel.

A general observation made by a number of Nuiqsut respondents in Year 8 was that the caribou were closer to town in 2015, with many attributing their closeness to a large number of predators in the area. Several residents discussed that the population of wolves and wolverine in the area were high and their presence was driving the caribou closer to town where the predators are more reluctant to approach. Several mentioned the presence of the Porcupine Herd (or Central Arctic Herd as biologists generally refer to it) near Nuiqsut in Year 8.

In addition to effects related to development discussed above (see Impacts on Harvesting Activities), Nuiqsut caribou harvesters made general observations regarding the relationship between development, human activity, and caribou. Those who provided comments on development and caribou remarked on both the benefits and impacts the Spur Road has had on caribou and caribou harvesters. Many harvesters reported use of the road for caribou hunting without any additional observations regarding benefits or impacts on their hunting activities or caribou behavior. Others reported incidences where they had noticed the caribou turning around or acting unpredictable and cited the road or traffic as potential causes. As noted above, some respondents offered that the road has lessened the need for air traffic west of the community, which has resulted in more caribou in the area, and a couple of individuals commented that the road was a benefit to community hunters.

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