Nuiqsut Caribou Subsistence Monitoring Project: Results of Year 4 Hunter Interviews and Household Harvest Surveys

Prepared for

ConocoPhillips Alaska, Inc.

July 19, 2013

Stephen R. Braund & Associates

P.O. Box 1480

Anchorage, Alaska 99510

(907) 276-8222

(907) 276-6117 (fax)

srba@alaska.net

EXECUTIVE SUMMARY

This Year 4 report presents the first four years of data for the Nuiqsut Caribou Monitoring Project based on research conducted by Stephen R. Braund & Associates (SRB&A) under contract to ConocoPhillips Alaska, Inc. (CPAI). The purpose of the Nuiqsut Caribou Monitoring Project is to document the impacts of CD4 and other CPAI satellite developments on Nuiqsut residents' caribou hunting activities. The monitoring project is an ongoing, multi-year program meant to measure impacts and changes over time. The intent of the project is to assemble data on impacts on caribou subsistence uses in order to work toward a common understanding of these impacts by the community of Nuiqsut, industry, and government oversight agencies. With the assistance of the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI), SRB&A formed a Nuiqsut panel of caribou experts, whose purpose is to assist with developing the monitoring plan, reviewing the results of the monitoring program, suggesting changes to the monitoring program, and identifying active caribou harvesters to interview.

Several types of data are relevant to a common understanding of caribou harvesting impacts: (1) hunter observations; (2) caribou distribution, abundance, herd size, habitat quality; (3) and caribou harvests over time. This fourth annual report is based primarily on hunter observations and a comprehensive household caribou harvest survey.

In November of 2011, SRB&A interviewed 58 active harvesters and one Nuiqsut elder regarding their caribou hunting activities over the previous 12 months (November 2010 to October 2011). SRB&A also completed a total of 77 household harvest surveys (82 percent of households) in the community of Nuiqsut to document community caribou harvests for the 2011 calendar year. Data from the Year 4 active harvester interviews complement similar data on hunting activities collected for Year 1 (2008), Year 2 (2009), and Year 3 (2010). In addition, the Year 4 household harvest survey data complement harvest data collected by the study team for Year 3 (2010) in addition to data collected by the NSB and ADF&G in previous years.

Active harvester interview participants identified 194 caribou subsistence use areas and 163 caribou harvest locations for the Year 4 study year, the majority of which were located along the Colville River (including Nigliq Channel) and west of the community toward Fish Creek. While certain hunting characteristics (e.g., trip frequency, duration, and travel method) have remained similar over the four study years, other characteristics, such as the timing of caribou hunting activities and hunting success within use areas, vary from year to year. For example, September was the peak harvest month in Year 4, August in Years 1 and 3, and July in Year 2. In addition, the percentage of caribou use areas in which respondents reported successful harvests dropped from 78 percent in Year 1 to 55 percent in Year 4. Caribou harvest amounts have remained relatively stable over time. The total estimated harvest and average household harvest in Year 4 was lower than in Year 3 and below the mean of the fourteen available study years from 1985 to 2011; however, per capita pounds were slightly higher than the mean for the 14 study years. The percentage of households harvesting caribou and giving or receiving caribou was lower in Year 4 than in most other years. However, the percentage of households using and attempting to harvest caribou in Year 4 was comparable to other study years.

The percentages of active harvester respondents reporting changes in hunting area, frequency, duration, and harvest amount are somewhat similar over all study years. There are no observed trends in these four variables. The percentage of households reporting a change in months (21 percent) was higher in Year 4 compared to Years 2 and 3. Conversely, the percentage of respondents who reported that they did not harvest enough caribou was lowest in Year 4, at 16 percent of respondents compared with 21, 53, and 47 percent in Years 3, 2, and 1 respectively.

The percentage of harvester respondents reporting one or more Alpine-related impacts on caribou hunting has declined over the four study years. Thirty-one percent of harvester respondents in Year 4 reported one or more Alpine-related impacts on caribou hunting. This compares with 72 percent of respondents in Year

1, 64 percent of respondents in Year 2 and 58 percent of respondents in Year 3. Year 1 observations included impacts that had occurred since the Alpine development began, which likely explains the higher number of observations during that year. The most commonly reported impact during all four study years was associated with helicopter traffic, with 22 percent of harvester respondents reporting helicopter traffic impacts in Year 4. The percentage of respondents reporting helicopter-related Alpine impacts decreased from 47 percent in Year 3 to the 22 percent in Year 4. The percentage of respondents reporting impacts from man-made structures and plane-related impacts shows a continuing downward trend. There were no reports of impacts related to oil company personnel, regulations, or seismic lines or activity in Year 4.

While respondents and Nuiqsut Caribou Panel members have continued to express concerns about the impacts of the Alpine and Alpine Satellites developments on their caribou hunting activities, residents' comments in Years 3 and 4 indicate an increasing number of individuals who report fewer impacts and improved communication with CPAI, particularly related to helicopter and airplane traffic. Review of data from the four study years, as well as comparison to previous study years, indicate possible impacts related to hunter avoidance as well as some decreased rates of hunting success in hunting areas; however the source of these decreased rates of success are unclear.

ACKNOWLEDGEMENTS

Stephen R. Braund & Associates (SRB&A) would like to thank the community of Nuiqsut for their cooperation and assistance in completing the first four years of the Nuiqsut Caribou Monitoring Project. In particular, we would like to give a special thanks to the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI) in helping form a Nuiqsut panel of caribou experts (Nuiqsut Caribou Panel), providing space to conduct interviews, and assisting with contacting local residents. We would also like to thank the Nuiqsut Caribou Panel for assisting with the development of the monitoring plan, identifying active caribou harvesters to interview, and making suggestions to improve the program; and the North Slope Borough Department of Wildlife Management for supporting the project. We would also like to thank ConocoPhillips Alaska, Inc. (CPAI) for providing funding and logistical support. Finally, SRB&A would like to thank the 59 Nuiqsut caribou hunters and elders who provided us with the information for Year 4 of this study, and the 77 Nuiqsut households who participated in the Year 4 household harvest surveys.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

ACRONYMS AND ABBREVIATIONS

ABR	ABR Inc.—Environmental Research & Services
ASDP	Alpine Satellinte Development Plan
BLM	Bureau of Land Management
CAH	Central Arctic Herd
CPAI	ConocoPhillips Alaska, Inc.
GIS	Geographic Information System
KSOPI	Kuukpik Subsistence Oversight Panel, Inc.
NSB	North Slope Borough
PS	Porcupine Herd
SPSS	Statistical Package for the Social Sciences
SRB&A	Stephen R. Braund & Associates
TH	Teshekpuk Herd
TNHA	Tagiugmiullu Nunamiullu Housing Authority
USGS	U.S. Geological Survey
WAH	Western Arctic Herd

INTRODUCTION

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

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

In response to this requirement, CPAI contracted Stephen R. Braund & Associates (SRB&A) to conduct a caribou subsistence monitoring project in Nuiqsut. The Nuiqsut Caribou Monitoring Project is an ongoing, multi-year project meant to measure impacts on caribou hunting related to CD4 and other Alpine satellite developments. The intent of the project is to assemble data on caribou harvesting activities and impacts on caribou harvesting that lead to a common understanding of these impacts by the community of Nuiqsut, industry, and government oversight agencies. Several types of data are relevant to a common understanding of caribou harvesting impacts: (1) hunter observations; (2) caribou distribution, abundance, herd size, habitat quality; (3) industry mitigation activities; and (4) historical subsistence use. This fourth annual report is based primarily on hunter observations and household surveys. An additional section provides an update of 2011 population and distribution trends for the Teshekpuk and Central Arctic herds as provided by the biological consulting firm ABR, Inc. An important function of the report is to identify additional data monitoring components most relevant to developing a common understanding of these impacts.

This report contains the results of the first four years of hunter information derived from face-to-face interviews conducted in Nuiqsut between March 10, 2009 and April 8, 2009 for Year 1; April 19, 2010 and May 28, 2010 for Year 2; November 9 and 19, 2010 for Year 3; and November 14 and 30, 2011 for Year 4. The report also contains the results of the household caribou harvest surveys conducted between January 2012 and May 2012 for the 2011 calendar year.

STUDY OBJECTIVES

The primary objective of this project is to monitor impacts on Nuiqsut caribou hunting related to CD4 and other Alpine satellite developments and, in doing so, to facilitate and maintain communication between the study team, Nuiqsut residents and organizations, the NSB, and CPAI.

STUDY AREA

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

METHODS

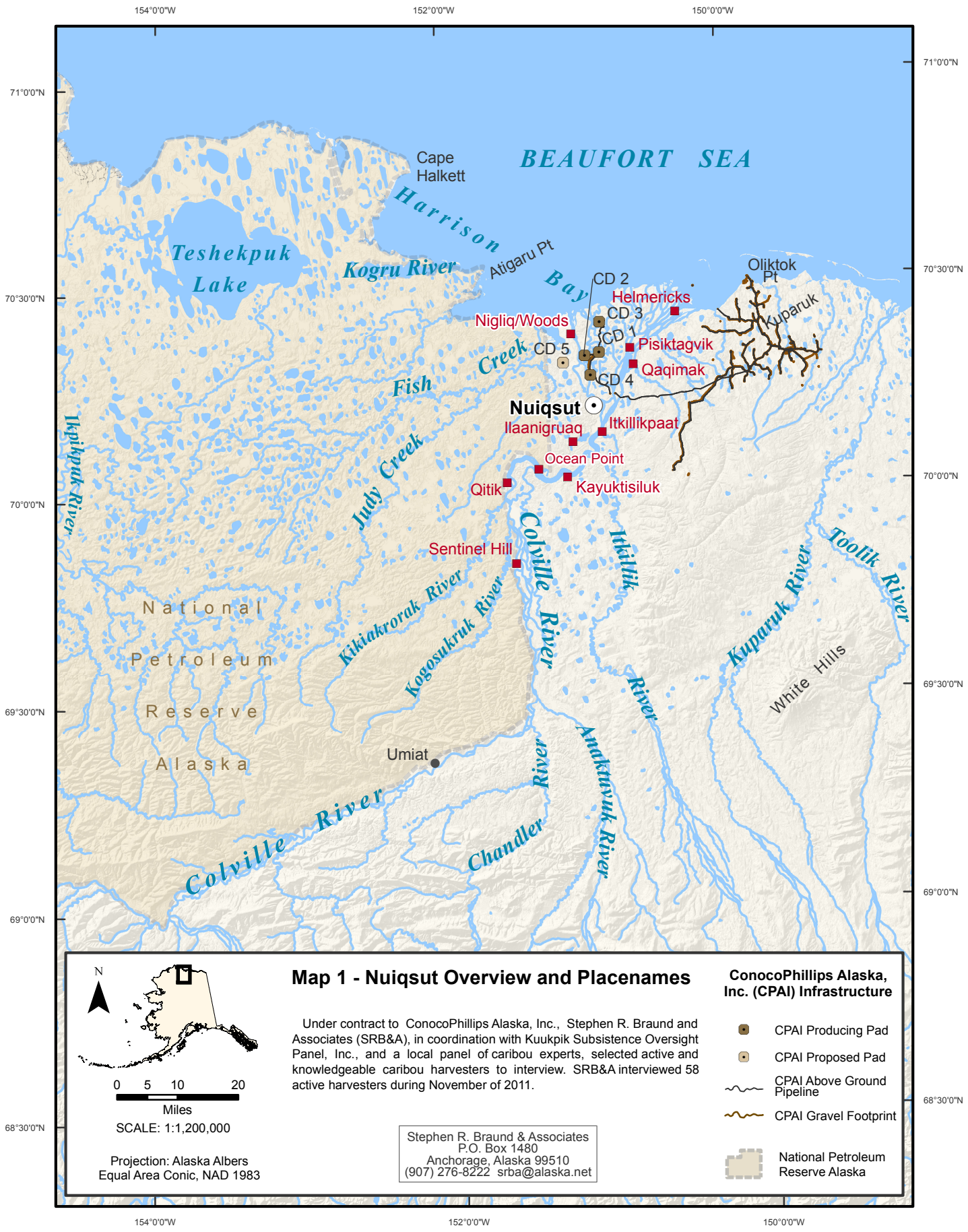
In 2009 SRB&A initiated a program to gather yearly information from local Nuiqsut residents about caribou hunting and harvest activities, observations about harvested caribou, changes in caribou, and impacts on caribou hunting. These data are gathered on a yearly basis in order to monitor impacts on caribou hunting related to CD4 and other Alpine satellite developments over time. This section of the report describes the methods used during Year 4 to design and implement the study. Year 4 active harvester interviews gathered information for harvesting activity between November 2010 and October 2011 and household harvest surveys gathered information for the 2011 calendar year (January to December 2011). Interviews, surveys, and meetings for Year 4 took place between September 2011 and May 2012. Thus, the methods describe 2011 and 2012 monitoring program activities, while the results and discussion describe the Year 4 study period caribou harvest amounts, hunting activities, and impacts (spanning from November 2010 to December 2011).

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 4 monitoring program was through contact with the Kuukpik Subsistence Oversight Panel, Inc. (KSOPI) and the previously formed Nuiqsut Caribou Panel. As discussed in the Year 3 report (SRB&A 2012), SRB&A traveled to Nuiqsut on May 3 and 4, 2011 to review the progress and status of the caribou monitoring project. The May 4 meeting was a KSOPI meeting that was attended by four KSOPI board members, three of whom were also Nuiqsut Caribou Panel members. During these meetings it was recommended by the panel members that the SRB&A study team return to Nuiqsut at a similar time as the previous year (e.g. November) after the peak of the caribou hunting season, to ask hunters about their caribou hunting activities for the previous 12 months. A summary of the May 2011 meetings is provided in SRB&A (2012).

SRB&A returned to Nuiqsut on November 14, 2011and held a meeting with the Nuiqsut Caribou Panel to discuss and coordinate the implementation of Year 4 fieldwork. Four panel members attended the November 14, 2011 meeting. The following is a summary of the Year 4 meeting with the Nuiqsut Caribou Panel members.

- Caribou Panel members emphasized the importance of maintaining traditional knowledge (TK) as a primary component of the monitoring study, and believed that TK about caribou should be the baseline by which changes are monitored. One individual noted that TK from elders “should be considered fact.”



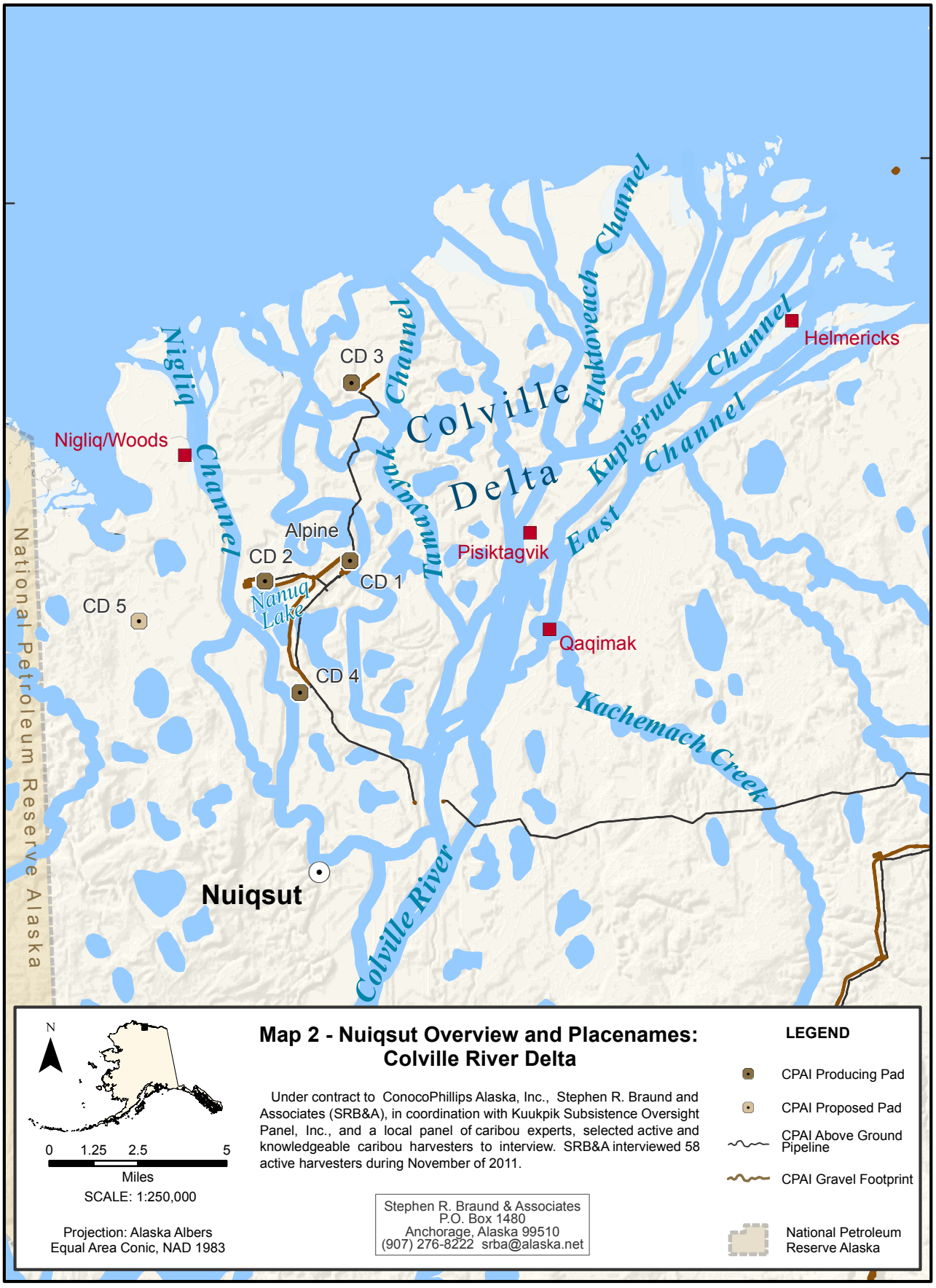
Map 1 - Nuiqsut Overview and Placenames

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 58 active harvesters during November of 2011.

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

ConocoPhillips Alaska, Inc. (CPAI) Infrastructure

- CPAI Producing Pad
- CPAI Proposed Pad
- CPAI Above Ground Pipeline
- CPAI Gravel Footprint
- National Petroleum Reserve Alaska


70°30'0"N
70°30'0"N
Nigliq Channel
Tamayayak Channel
Colville Delta
Elaktoveach Channel
Kupigruak Channel
East Channel
Helmericks
CD 3
Nigliq/Woods
Alpine
CD 2
CD 1
Nanuq Lake
CD 5
CD 4
Pisiktagvik
Qaqimak
Kachemach Creek
National Petroleum Reserve Alaska
Nuiqsut
Colville River
N
0 1.25 2.5 5
Miles
SCALE: 1:250,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983
Map 2 - Nuiqsut Overview and Placenames:
Colville River Delta
Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 58 active harvesters during November of 2011.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
LEGEND
CPAI Producing Pad
CPAI Proposed Pad
CPAI Above Ground Pipeline
CPAI Gravel Footprint
National Petroleum Reserve Alaska

- Caribou Panel members expressed an interest in increased hunting restrictions for non-resident hunters, as well as educating non-resident hunters about traditional hunting methods (i.e. letting the first herd pass before harvesting caribou).
- SRB&A should include the Elders of Nuiqsut in the upcoming panel-biologist workshop with ABR, Inc.
- Panel members noted the added impacts on caribou hunting during the previous year due to increased exploration activities near Umiat.
- Caribou Panel members indicated that SRB&A should deal directly with the Nuiqsut Caribou Panel, rather than coordinating all meetings and contacts through KSOPI.
- One panel member expressed the desire for the study to be coordinated through the Native Village of Nuiqsut

Study Design and Field Preparation

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

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

- Compilation of available caribou data from biological reports and distribution of these data to local hunters.
- Implement work session between hunters and biologists (from Alaska Department of Fish and Game [ADF&G], NSB, or ABR, Inc.) to discuss observations about impacts on caribou.
- Incorporation of additional sources of Nuiqsut caribou harvest and use area data to aid in the comparison of harvests and hunting patterns over time.

The study team addressed the first and third components (compilation of available caribou data and incorporation of additional subsistence data sources) in this Year 4 report and plans to address the second component (work session between hunters and biologists) during Year 5.

Field protocols and maps for the active harvester interviews and household surveys had been developed during Years 1, 2 and 3. The study team updated the active harvester and household survey protocols for Year 4 fieldwork (Appendices A and B). The study team used an informed consent that guaranteed the confidentiality of respondent information, anonymity of persons interviewed, and the reporting of aggregated data only (see Appendix C).

Active Harvester Interviews

SRB&A used the active harvester protocol during annual interviews with Nuiqsut caribou hunters (see Appendix A). The protocol consisted of three sections: 1) Caribou Hunting Activities; 2) Assessment of Harvested Caribou; and 3) Impacts on Caribou Hunting. 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. Gathering these data yearly allows for multi-year comparison and monitoring of subsistence use data, resource observations, and impact experiences over time. For Years 1 and 2, the active harvester interviews collected data on the previous calendar year (i.e., January through December). However, because Year 3 and Year 4 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). Thus, Year 2 and Year 3 study periods overlap by two months, with both study years including November and December 2009. Subsequent study years will cover the same time period (November through October) for the active harvester interviews for each study year.

The first section of the active harvester interviews (Caribou Hunting Activities) included mapping of Year 4 hunting areas and harvest locations. For each hunting area, the study team gathered the following variables:

- Months of use
- Transportation method
- Number of trips
- Duration of trip(s) (including typical duration and longest duration)
- Harvest success (in terms of whether the hunter did or did not harvest caribou in that hunting area in Year 4)
- 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

During Year 4 fieldwork, it became apparent to the study team that hunters were commonly reporting harvest locations for all caribou harvests they had participated in, rather than caribou harvests in which they had been the shooter. The study team began clarifying, for each harvested caribou, whether the respondent had been the shooter or not, to avoid documenting duplicate harvest locations and harvested caribou (i.e., two or more caribou hunters reporting the same harvest). However, in most cases the study team subsequently decided to present all reported caribou harvest location data in the Year 4 report, rather than only those in which the respondent had been the shooter. There were several reasons for this:

1. Only showing harvest locations in which the respondent was the shooter would reduce comparability of Year 4 data to previous study years.
2. The purpose of the active harvester interviews is to document hunter activities and experiences over the previous year. Removing these data would remove data relevant to the active harvester respondents' hunting experiences.
3. Because the study team conducted household harvest surveys in Year 4, which provide a harvest estimate for the community as a whole, it was no longer necessary or appropriate to use the active harvester interview data to report total caribou harvests, and therefore duplication of reported caribou harvests was not an issue.

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).

The second section of the interview (Assessment of Harvested Caribou), gathered data about the following abnormalities in the respondent's harvested caribou in Year 4:

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

- Abnormal quantity of parasites (flies)
- Other abnormalities

Each observation of abnormal caribou was tied to a harvest location on the map. Respondents also indicated whether or not they used the abnormal caribou and reported the number of abnormal caribou by type of abnormality.

The third section of the interview (Impacts on Caribou Hunting) included questions regarding impacts on caribou hunting in Year 4 related to CD4 or other Alpine Satellite developments. If respondents indicated that they had experienced impacts in Year 4, 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

Finally, the study team asked each respondent if they had observed anything else unusual about the behavior, distribution, or migration of caribou during the study year, and recorded their responses.

Household Caribou Harvest Surveys

The study team added the harvest survey component to the monitoring plan during Year 2 as a result of panel members' concerns that the original study design would not adequately capture overall uses and harvests of caribou by the community of Nuiqsut. However, the study team was not successful implementing the harvest survey until Year 3 and again in Year 4 (see SRB&A 2010a, SRB&A 2011 for a description of the previous efforts to complete the household surveys).

The Year 4 household caribou harvest surveys addressed the 2011 calendar year (January 2011 through December 2011) and consisted of eight questions regarding caribou harvests during the Year 4 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 2011?
- 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 2011 make your household's caribou hunting more difficult?

The study team made several changes to the Year 4 household harvest survey. Because residents had difficulty reporting the number of caribou harvested by month, the study team elected to remove this question from the Year 4 survey. 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. In addition, 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 survey between February and May 2012. Surveys were conducted by phone and in person in the community. SRB&A staff coordinated with KSOPI and traveled to Nuiqsut from April 30 to May 3, 2012 to conduct additional surveys in the community in order to reach a minimum 80 percent response rate. SRB&A worked with a local liaison (identified by KSOPI during the Year 3 Household Harvest Surveys) to compile household contact information and conduct remaining surveys.

Respondent Selection Process

Active Harvester Interviews

In order to collect accurate data for the Year 4 caribou hunting season, it was necessary to interview currently active caribou harvesters. All hunters interviewed in Year 1, Year 2 and Year 3 seasons were included in the Year 4 sample. The study team attempted contact with all Year 1, Year 2 and Year 3 respondents with the goal of achieving consistency between study years. As anticipated, not all Year 1, Year 2 and Year 3 respondents were available to participate in Year 4 interviews (e.g., absent from the community for the entire field period, medical issues, or had moved to another community) and therefore in order to maintain a similarly sized sample of Nuiqsut caribou harvesters, the study conducted interviews with additional harvesters who had been identified by others as active (but who had not previously participated in the study), or on a walk-in basis.

Walk-in interviews were conducted only after confirming that the individual had hunted caribou during the Year 4 hunting season; fieldworkers recorded these individuals' names and contact information and agreed to contact them to schedule an interview if time allowed. If the fieldworkers had an opening and had exhausted efforts to schedule interviews with individuals on the list of active harvesters, they often conducted these interviews at that time. Fieldworkers found that these "walk-in" respondents were generally active hunters and harvesters who provided informative and thorough interviews.

Household Caribou Harvest Surveys

SRB&A obtained an updated household list from the City of Nuiqsut in 2012, which reported 106 occupied residences within the city limits. The household list provided by the city did not include schoolteacher housing, or vacant TNHA (Tagiugmiullu Nunamiullu Housing Authority) or NSB housing. 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 (2011), and were occupied year-round, thereby excluding seasonal workers and teachers who left the community during the summer months. The study team worked with a local liaison to review and finalize the household list. Of the 106 residences provided by the City of Nuiqsut, three of the residences were unoccupied, respondents from five households were out of town for extended periods of time, three residences were not occupied during the 2011 study period, and the respondents from one of the households had moved, making the total number of households eligible for the survey 94. The final household list (94 households) that was developed by SRB&A and the local liaison using the City of Nuiqsut 2012 household list included all households that were permanently occupied during the 2011 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 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. 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 30 minutes and one hour, depending on the respondent's age, experience, activity level, and interview participation. The number of participants in each interview also affected the length of the interview. At the conclusion of the interview, each participant received a $50 honorarium for their participation and time and signed a receipt.

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 two times to conduct Year 4 active harvester interviews in November 2011. As shown in Table 1, SRB&A researchers interviewed 58 Nuiqsut residents. Over the four study years, SRB&A developed a list of 133 active caribou harvesters in Nuiqsut (Table 1), who include all residents interviewed and/or identified as active harvesters during Years 1, 2, 3 and 4. The study team generally focused on contacting the 88 individuals who had participated in the study during at least one of the previous three study years. Three individuals were removed from the active harvester list in Year 4; two had passed away and the third requested to be removed from the list. Table 1 depicts the number of persons eligible for interviews in Year 4. A person was not eligible for an interview if he or she did not go caribou hunting during Year 4, 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. During Year 4, 114 of the 133 active harvesters were eligible for an interview. Of the 88 individuals who had participated in one of the three previous study years (Table 2), 76 active harvesters were eligible for an interview.

SRB&A interviewed 59 individuals (58 active harvesters, 1 non-active elder), or 52 percent of those eligible for interviews. Twenty-two percent (13 persons) of the 59 Year 4 respondents had participated in all four study years (Years 1 through 3), 28 percent had participated in three study years (17 persons), and the same number (17 persons) had participated in two study years. Twenty percent of the Year 4 respondents were first-time participants (Table 2).

Table 1: Fieldwork Summary, Year 4

# of Occupied Households (2010) [1]	Population (2010)[1]	# of Persons Identified as Active Caribou Harvesters	# of Persons Eligible for Interviews	# (%) of Eligible Respondents Interviewed	% of Y4 Respondents Interviewed in All Years	Number of Interview Workshops	Number of Interview Trips to Community
114	402	133	114	59 (52%)	22%	55	2
U.S. Census Bureau, 2011							

Stephen R. Braund & Associates, 2013.

Table 2: Respondent Summary, Years 1 – 4

Total Number of Respondents		Number (%) of Year 4 Respondents Participating in…			
Years 1-3	Years 1-4	All Study Years	Three Study Years	Two Study Years	One Study Year
88	100	13 (22 %)	17 (28%)	17 (28%)	12 (20%)

Stephen R. Braund & Associates, 2013.

The following tables (Table 3 through Table 6) show descriptive data for the 59 Year 4 respondents, the 60 Year 3 respondents, the 54 Year 2 respondents and the 40 Year 1 respondents. In some tables, percentages may add up to less or more than 100 percent (e.g., 99 percent or 101 percent). This is because the percentages are rounded to the nearest whole number, which occasionally results in percentages that do not total 100 percent. In addition, during each study year some interviews were conducted with elders who were no longer active harvesters. In this report, tables reporting data collected only 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 conducted by year include 58 (of

59 interviews) from Year 4, 57 (of 60 interviews), 53 for Year 3 (of 54 interviews) and 36 for Year 1 (of 40 interviews).

Table 3: Respondents' Residence at Time of Birth

	% of Respondents			
	Year 1	Year 2	Year 3	Year 4
Nuiqsut	26%	40%	32%	44%
Other North Slope Community	62%	48%	52%	44%
Elsewhere in Alaska	9%	8%	13%	9%
Outside Alaska	3%	4%	4%	2%
Total	100%	100%	100%	100%

Stephen R. Braund & Associates, 2013.

Table 4: Decade Born

	% of Respondents			
	Year 1	Year 2	Year 3	Year 4
1940s	6%	10%		2%
1950s	18%	12%	15%	9%
1960s	32%	17%	27%	16%
1970s	21%	17%	16%	18%
1980s	21%	31%	25%	36%
1990s	3%	13%	16%	20%
Total	100%	100%	100%	100%

Stephen R. Braund & Associates, 2013.

Table 5: Years of Residence in Nuiqsut

	% of Respondents			
	Year 1	Year 2	Year 3	Year 4
5 years or less	3%	2%	2%	0%
6-10 years	3%	6%	5%	2%
11-19 years	12%	19%	16%	25%
20 plus years	82%	73%	77%	73%
Total	100%	100%	100%	100%

Stephen R. Braund & Associates, 2013.

Table 6: Respondent Gender

	% of Respondents			
	Year 1	Year 2	Year 3	Year 4
Female	3%	8%	4%	5%
Male	97%	92%	96%	95%
Total	100%	100%	100%	100%

Stephen R. Braund & Associates, 2013.

Residence at birth, birthdate, and years of residence were gathered for 34, 52, 56 and 54 of the active harvesters interviewed in Year 1, Year 2, Year 3 and Year 4, respectively. During all four study years, over 80 percent of respondents were born on the North Slope (Table 3). A larger percentage of those interviewed in Year 4 were born in the 1980s and 1990s compared with any of the previous study years (Table 4). The percentage of respondents born in the 1990s has risen over each of the four study years, ranging from three percent in Year 1 to 20 percent in Year 4; this reflects the emergence of younger hunters born during this time frame who are increasingly considered active harvesters in the community as they gain more experience. As the percentage of harvesters born in the 1980s and 1990s increased over the four study years, so did the percentage of respondents born in Nuiqsut, as they were born after the establishment of the present-day community in 1973. The large majority (80 percent in Year 1, 74 percent in Year 2, 76 percent in Year 3 and 73 percent in Year 4) 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 (Table 6).

As stated above, the study team attempted to interview all respondents from previous study years again in Year 4. Thirteen Year 4 respondents had been interviewed in all four years of the study, 17 of the Year 4 respondents have been interviewed in three years of the study, and 17 Year 4 participants have been interviewed for two study years (Table 2). The Year 4 sample also included twelve respondents not interviewed in a previous study year. Differences in the makeup of the four samples could potentially account for observed differences in results between the four years. However, the study team determined in Year 3 that, in general, trends observed for the Year 3 respondent sample were also observed in the sample of respondents interviewed during all study years (SRB&A 2011).

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 2011 year by Nuiqsut residents and were still occupied during the period in which the survey was implemented. Out of the 103 occupied residences on the household list for Year 4, three were not occupied in 2011, five were unoccupied (out of town long-term) during the time of the survey, and one was no longer occupied. Therefore, the total number of eligible households for the Year 4 household surveys was 94.

The study team aimed to achieve a minimum response rate of 80 percent (75.2 households) in order to provide a representative sample of the community that could be expanded to estimate for the community as a whole. SRB&A completed a total of 77 (82 percent) household surveys in the community of Nuiqsut (Table 7). Of the households not surveyed, three declined to participate, and the remaining 14 households were otherwise unavailable.

Table 7: Nuiqsut List of Occupied Households, 2011

Type of Household	Number of Households
Original Household List	106
Unoccupied	3
Residents out of Town, Long Term	5
Not In Residence 2011	3
Residents Moved	1
Total Eligible Households	**94**
Surveyed Households (% of Eligible Households)	**77(81.9%)**

Stephen R. Braund & Associates, 2013.

Post-field Data Processing

Editing Notes and Overlays

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

Data Entry

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

- Respondent Table – This table contains each individual's Respondent ID, interview date, birth residence, birth date, gender, and years of residence.
- Harvest Area Table – This table contains one record per hunting area collected in Section A of the field protocol ("Caribou Hunting Activities"), in addition to variables (months, transportation method, number of trips, and duration of trips) for each of those features. Each record also includes the unique feature code assigned to that feature.
- Harvest Location Table – This table contains one record per harvest location collected in Section A of the field protocol ("Caribou Hunting Activities"), in addition to the number harvested and month of harvest for each of those features. Each record also includes the unique feature code assigned to that feature.
- Harvest Activity Assessment Table – This table contains one record per respondent and includes their responses regarding changes to their hunting activities (e.g., hunting area, trip frequency, trip duration, hunting months, and harvest amount) as collected in Section A of the field protocol. The study team coded each response so that the data could later be queried.

- Harvested Caribou Assessment Table – This table contains one record per abnormal caribou reported by respondents, as collected in Section B of the field protocol ("Assessment of Harvested Caribou"). The study team coded each response so that the data could later be queried based on type of abnormality.
- Hunting Impact Table – This table contains one record per impact observation, as collected in Section C of the field protocol ("Impacts on Caribou Hunting"), in addition to the month of impact, associated feature codes, descriptions of the impact, and descriptions of suggested mitigation to lessen the impacts.

The resulting database contains six data sets. The number of records in each data set for the four study years is shown in Table 8. After completion of data entry, SRB&A performed a Quality Control check of all data previously entered. This consisted of a detailed review of maps, notes, and database records and resulted in all data entry being checked for accuracy.

Table 8: Nuiqsut Datasets

Nuiqsut Dataset Component	# of Records			
	Year 1	Year 2	Year 3	Year 4
Active harvester respondent characteristics (age, residence duration, place of birth)	36	53	57	58
Subsistence use areas	137	187	215	194
Harvest locations	182	160	199	163
Observations of changes in harvest patterns	36	53	57	58
Observations of changes in condition of caribou	58	61	66	68
Impacts on harvest activities	111	109	81	72
Number of Respondents	36	53	57	58

Stephen R. Braund & Associates, 2013

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 Year 4 Access database, with examples of the types of responses each code encompasses. The study team conducted a quality control check of the codes to ensure consistency.

Digitizing

To facilitate digitizing, SRB&A first had all the acetate overlays scanned. This step permitted multiple staff to complete the digitizing process by editing scanned images. All digitizing was done using ArcGIS ArcEdit software. Digitized features included polygons associated with subsistence use areas and impact areas; lines associated impacts and other data; and points associated with harvest locations and impact locations. Altogether, SRB&A digitized 194 Year 4 use areas and 163 Year 4 harvest locations. SRB&A checked all digitized records against acetate maps for accuracy and conducted a Quality Control check of each digitized record. Each GIS record was assigned a unique Feature Code.

Analytic File Preparation

The Access Database resulting from entry of field data consists of six related tables, which are described above ("Data Entry"): (1) Respondent; (2) Harvest Area; (3) Harvest Location; (4) Harvest Activity Assessment; (5) Harvested Caribou Assessment and (6) Hunting Impact. SRB&A used Stat Transfer to convert Access tables for analysis with the Statistical Package for the Social Sciences (SPSS). SRB&A created reports within Access to compile quotes for inclusion in this report.

GIS File Preparation

The relevant tables from the Access database were linked to the GIS database so that GIS staff could develop maps querying specific feature information. The SRB&A GIS mapping system consists of three possible methods of presenting mapped information. The first method is represented by Map 3 and is referred to as a "spaghetti map." The spaghetti map as shown is made up of vectors (e.g., a point, line or polygon) and represents overlaying all of the individual respondent outlines of Year 4 caribou hunting areas. Typically, this representation is not used in map production as it presents individual data (e.g., individual polygons). The second method uses a single polygon to depict the extent of subsistence use areas for all respondents, as seen in Map 4. Researchers often use this method to represent subsistence use areas on maps. While this single polygon approach clearly shows the extent of the use area, it does not differentiate between areas that are used by one person from those that are used by multiple persons. In the third method (Map 5), 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

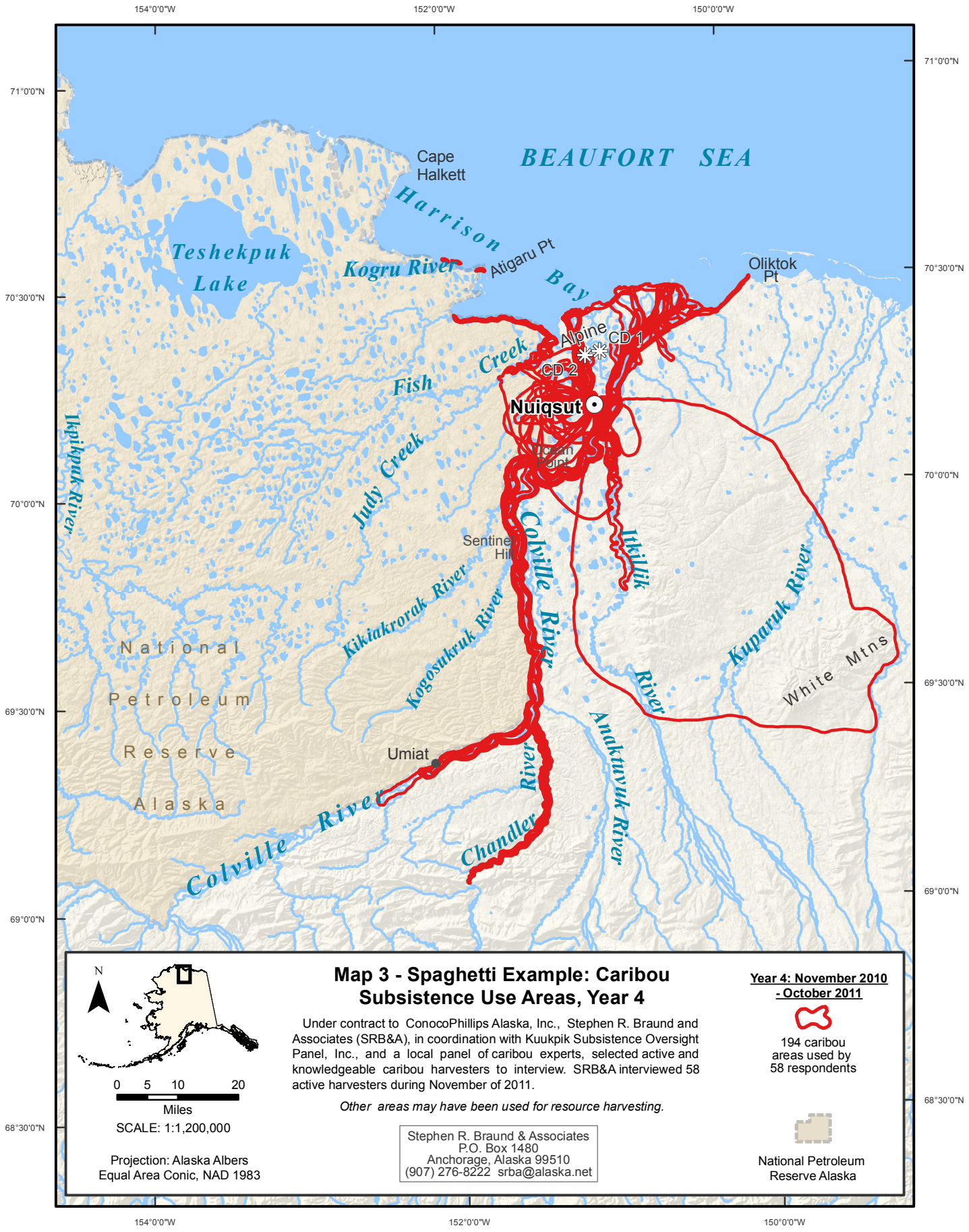
Similar to the data analysis steps for the active harvester interviews, the study team entered the data from each household harvest survey form into an Access database developed by the study team, and used Stat Transfer to convert the Access tables to SPSS for analysis. To create a community harvest 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 (94) by the number of sampled households (77). The study team operated under the assumption that the 17 households who did not participate in the household survey were not substantially more active or less active (in terms of caribou harvesting) than the community as a whole.

To determine the total pounds of caribou harvested, the study team used a conversion factor of 117 pounds per caribou. The study team chose this conversion factor because it was the one most recently used by ADF&G for the North Slope in Braem et al. (2011). During the Year 3 NSB review meeting in Barrow on April 9, 2012, several meeting attendees asked about this conversion factor and expressed concern that 117 pounds seemed high. The study team followed-up on this comment during the May 1, 2011 Caribou Panel meeting in Nuiqsut. Panel members believed that the conversion factor may be low rather than high, and noted that Nuiqsut residents use not only the meat of the caribou, but the heart, head, stomach, brains, bones (for marrow and for use in soups), and skin (for clothing and crafts). They suggested that the study team conduct their own analysis to determine the average pounds per caribou used by Nuiqsut residents. For the purposes of the Year 4 report, the study team retained the conversion rate of 117 pounds per caribou.

Data Review

For each year of the caribou subsistence monitoring study, SRB&A provides CPAI, the Nuiqsut Caribou Panel, KSOPI and the NSB with copies of the draft report for review and comments. Review meetings are scheduled with the NSB and the Nuiqsut Caribou Panel, during which the results of the monitoring project are presented. The study team revises the report based on comments and feedback, and then finalizes the report.

The draft report for Year 4 was submitted to CPAI in March of 2013. The study team sent the draft report to each member of the Nuiqsut Caribou Panel and KSOPI in May for review. CPAI also sent copies of the draft report to the North Slope Borough. SRB&A attended a review meeting with CPAI, ABR, Inc., and the NSB on April 16, 2013 at the North Slope Borough Department of Wildlife in Barrow. At this meeting, SRB&A presented the results of the Year 4 draft report. NSB reviewers provided comments at



Map 3 - Spaghetti Example: Caribou Subsistence Use Areas, Year 4

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 58 active harvesters during November of 2011.

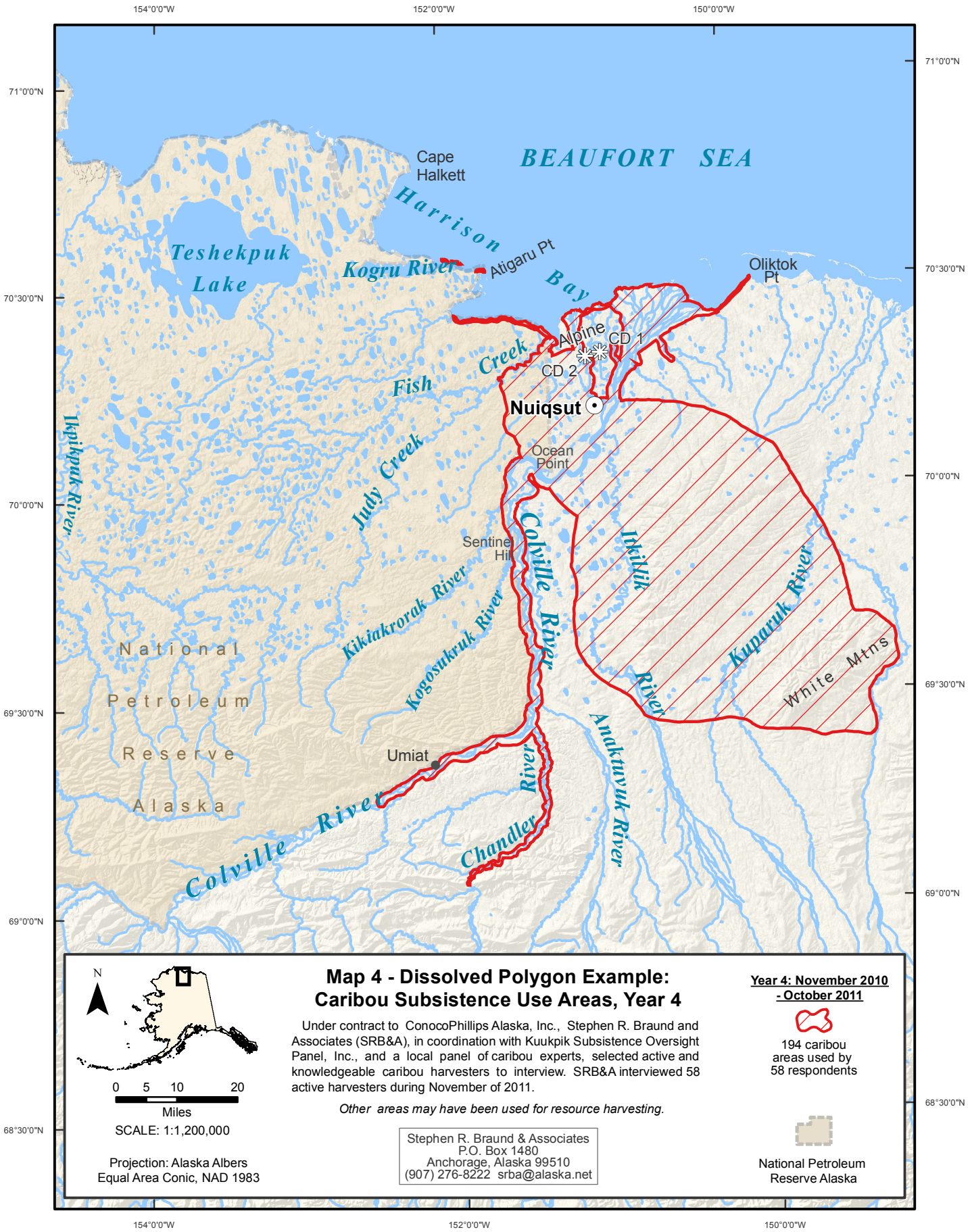
Other areas may have been used for resource harvesting.

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

Year 4: November 2010 - October 2011

194 caribou areas used by 58 respondents

National Petroleum Reserve Alaska



Map 4 - Dissolved Polygon Example: Caribou Subsistence Use Areas, Year 4

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 58 active harvesters during November of 2011.

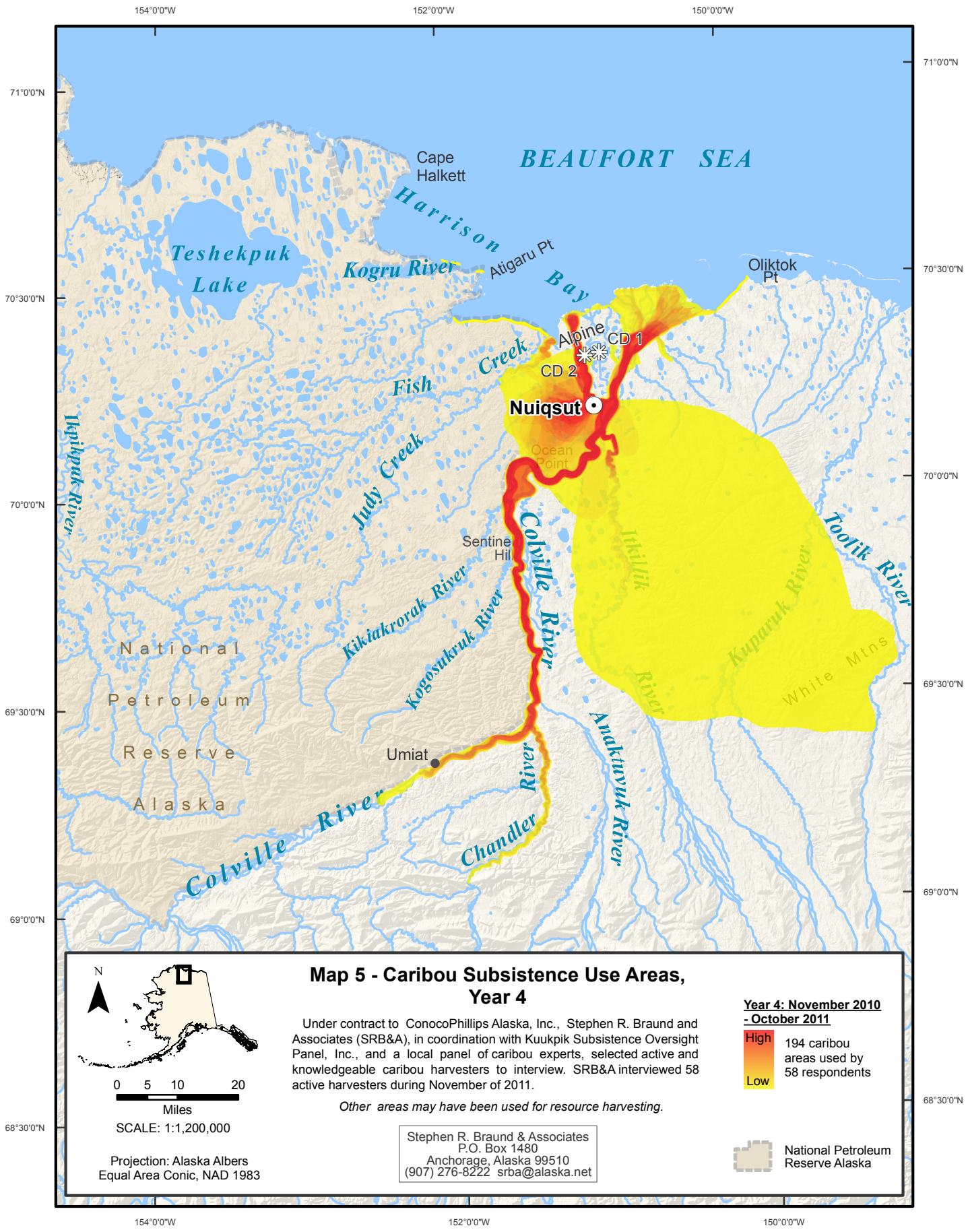
Other areas may have been used for resource harvesting.

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

Year 4: November 2010 - October 2011

194 caribou areas used by 58 respondents

National Petroleum Reserve Alaska



Map 5 - Caribou Subsistence Use Areas, Year 4

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 58 active harvesters during November of 2011.

Other areas may have been used for resource harvesting.

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

Year 4: November 2010 - October 2011

High — Low

194 caribou areas used by 58 respondents

National Petroleum Reserve Alaska

the review meeting, which resulted in edits to the report including the addition of a table providing the sex of harvested caribou. Reviewers also provided suggestions for future monitoring activities, including collecting data about the age of caribou harvested (e.g. adult, sub-adult, calf), and to begin accounting for harvest effort (e.g., costs and time associated with caribou hunting) to better understand changes in hunting activities. The study team will consider both of these recommendations for inclusion in the protocol for future study years.

The study team traveled to Nuiqsut and met with the Nuiqsut Caribou Panel on July 9, 2013. Ten panel members and two additional community members attended the draft review meeting. Panel members provided insight into Year 4 results and suggestions for how the monitoring program could be improved in future study years. In general, panel members' comments included recommendations and suggestions for future study years including focusing more on activities occurring east of the community and expanding the scope of the study to include impacts from a larger group of industrial projects.

One panel member commented that he would like to see numbers and percentages of respondents represented by the data tables, specifically referencing the percentage of respondents reporting unsuccessful use areas. SRB&A revised the table in question to include the percentage of respondents and will consider adding the percentage of respondents to additional tables for future study years.

Presentation of Interview Results

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

RESULTS

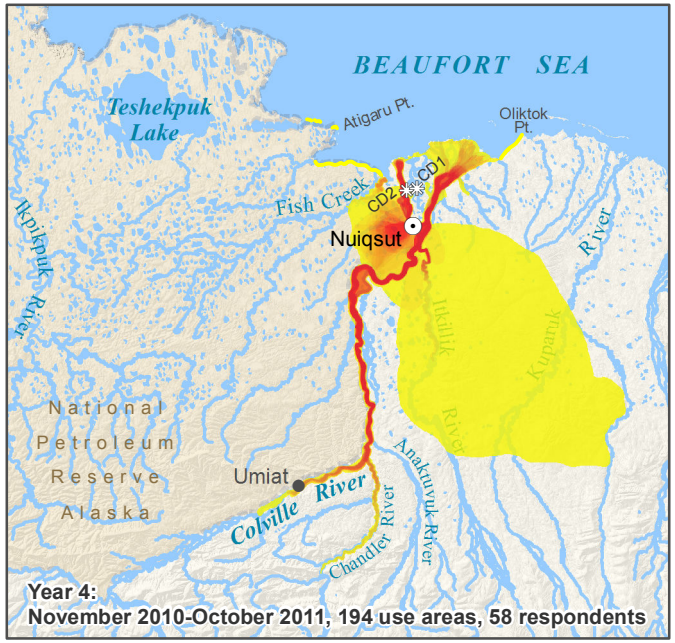
Caribou Use Areas and Harvest Sites

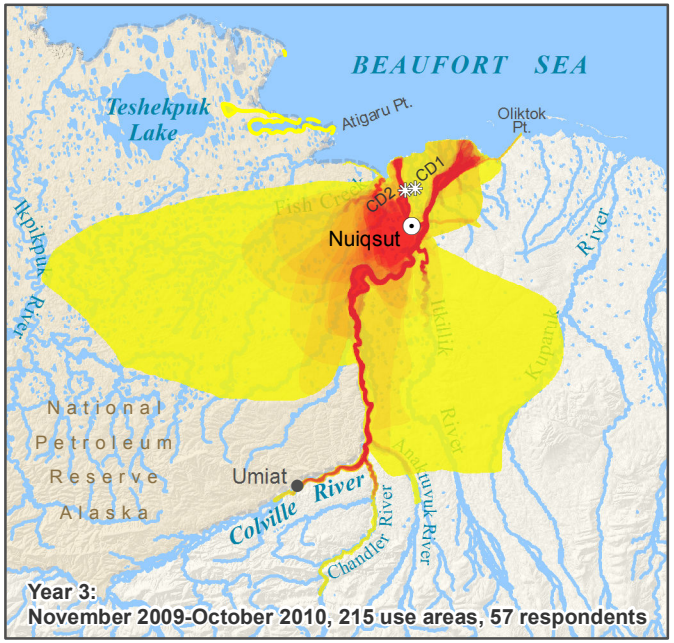
Nuiqsut respondents reported 194 caribou use areas for the Year 4 study period. In addition to providing the location of their Year 4 caribou use areas, respondents identified the location of their harvest sites within each use area. The locations and characteristics of Year 4 caribou use areas and harvest sites are described below.

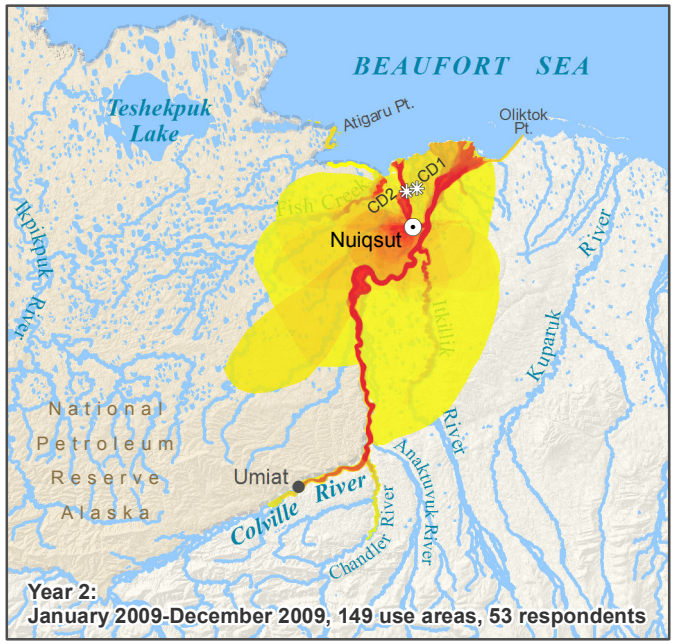
Location of Caribou Use Areas and Harvest Sites

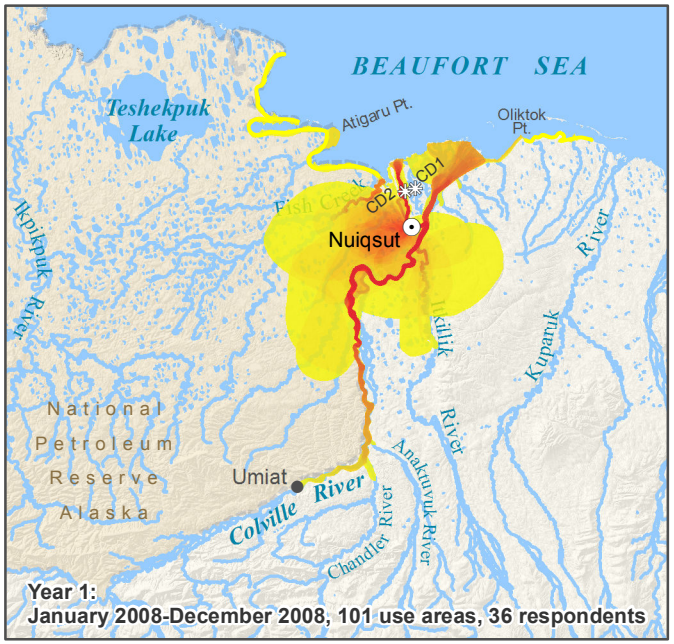
Nuiqsut Year 4 caribou use areas, as reported by 58 Nuiqsut respondents, are depicted on Map 5. Year 1, Year 2, Year 3 and Year 4 caribou use areas are depicted side by side on Map 6. As shown on Map 5, caribou harvester respondents reported traveling along local rivers, along the coast of the Beaufort Sea, and overland both west and east of the community, in search of caribou during the Year 4 time period (November 2010 through October 2011). Residents' riverine travel extended beyond Umiat along the Colville River as well as along Fish Creek, Itkillik River, and substantial distances along the Chandler River. Hunters traveled along the coast east of the community to Oliktok Point and west of the community to Kogru River and Atigaru Point. Overland travel extended west to Fish Creek and east to Toolik River. The highest numbers of overlapping caribou use areas in Year 4 occur along Nigliq Channel, Colville River to the mouth of East Channel, along the lower portions of the Itkillik River, and overland in an area west of the community toward Fish Creek and Ocean Point.

Compared to previous study years, Year 4 use areas extended farther overland to the southeast of the community, and both Year 3 and Year 4 use areas show higher overlaps along the Chandler River. The extent of riverine travel was relatively similar during all study years. In contrast to previous years, active harvesters during Year 4 interviews reported a considerably smaller use area to the west of the









Map 6
Caribou Subsistence Use Areas: Years 1, 2, 3 and 4

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 96 active harvesters from March 2009 through November of 2011.

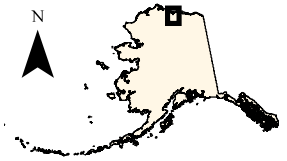
Other areas may have been used for resource harvesting.

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

LEGEND

Overlapping Polygons
High
Low

National Petroleum Reserve Alaska



0 12.5 25 50
Miles

Scale 1:2,800,000

Projection: Alaska Albers Equal Area Conic, NAD 1983

community. Year 4 also shows fewer overlaps near the mouth of the East Channel of the Colville River. A variety of factors can affect the distance traveled each year to hunt caribou; these include water levels, snow conditions, and caribou distribution. For example, residents frequently note that their travel along the Anaktuvuk and Chandler rivers depends on yearly or seasonal changes in water levels. Residents' indicated that winter travel also depends heavily on the availability of caribou; hunters generally will not travel farther than necessary in winter to harvest caribou, so if a herd is close to town the winter use area for the community may appear smaller. In addition, while some residents have noted that they will not hunt by snowmachine if there are no reports of a herd in the area, others will travel farther by snowmachine in search of a herd, especially if they are in need of meat.

Map 7 depicts caribou use areas for all four study years (1, 2, 3 and 4) combined. For all study years, the highest numbers of overlapping use areas occur along the Colville River (including the Nigliq Channel and East Channel) as far as Umiat, along the lower portions of the Iktillik River and Fish Creek, and in an overland area between the community, Fish Creek, and Ocean Point. Over the four 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. Coastal hunting has occurred from Cape Halkett to beyond Oliktok Point (Map 7).

Map 8 shows the locations of Nuiqsut respondents' Year 4 caribou harvest sites with previous study year harvest locations shown in grey. Fifty-five respondents reported harvesting caribou at 163 harvest locations in Year 4. Respondents reported successful harvests throughout the Colville River Delta and upriver to a point between the mouth of Chandler River and Umiat. A high concentration of caribou harvests took place west of the community out to Fish Creek, with fewer harvests occurring east of Nuiqsut. Harvests were also reported in the Itkillik River as well as along the coast towards Oliktok Point.

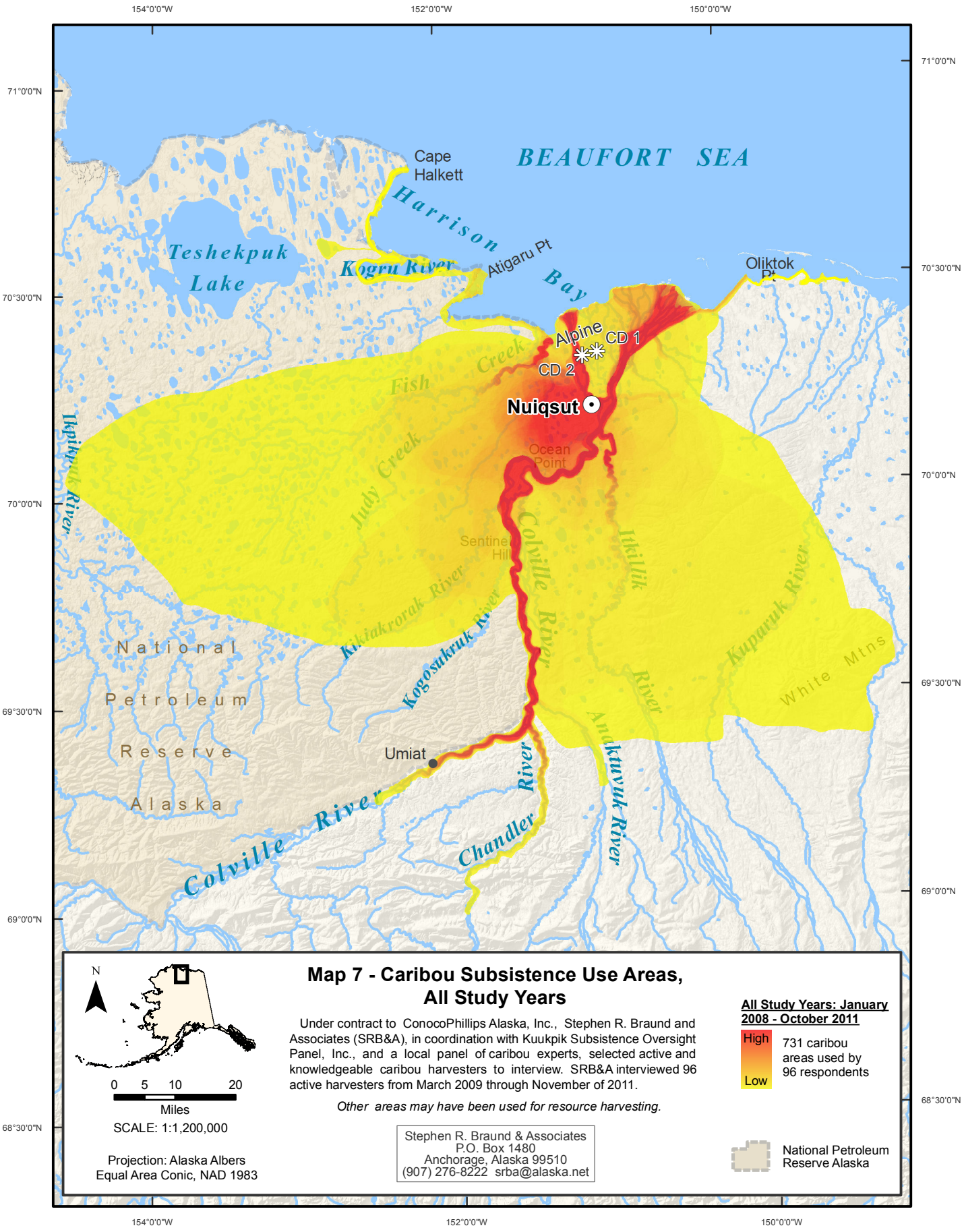
Nuiqsut caribou hunting activities occur primarily during the summer months by boat with residents traveling primarily along the Colville River (including Nigliq Channel and the "East" or Kupigruak Channel). The highest numbers of overlapping river use areas occur along the Nigliq Channel to the Nigliq camp area, and upriver to Sentinel Hill, with moderate overlaps as far as the mouth of the Chandler River and along the lower portion of the East Channel of the Colville River. Compared to previous study years, residents' river hunting activities did not extend as far along Fish Creek, Anaktuvuk River, or along the coast; however, residents traveled farther distances along the Colville River past Umiat.

The distances traveled along the Colville River each year generally depends on hunting success, water levels, available transportation, locations of camps or cabins and coinciding subsistence activities such as moose (which generally takes place farther upriver) and seal hunting (which occurs in the ocean). Nuiqsut residents frequently travel along the Nigliq Channel during the summer months to hunt for caribou at the same time they travel to check fishing nets or camps, and on their way to and from the ocean where they hunt for seals, caribou and eiders:

> *Yep, that's where I got my one caribou. When we were working out here, surveying, we saw all the caribou out here [along the coast of the delta]. Towards Nigliq, that's the only way that I went. I got the caribous somewhere around that first bend somewhere.* (SRB&A Nuiqsut Interview November 2011)

> *I got a cabin right close by Nigliq cabins, right across. I've been going all summer; I was working on my cabins. I saw a lot of caribou.* (SRB&A Nuiqsut Interview November 2011)

> *Just boating [in the summer]. At my mom's camp at Nigliq. Wherever my mom's cabin is, I waited for the caribou to come in. There was one time I waited a whole week without seeing one caribou. Just stay in the main [Nigliq] Channel. This year, I'd say [I went] about 15, 16, 16 times. It's my mom camp; I do a lot of fishing down there and looking for caribou at the same time… [I go] as soon as the river opens, after May until it freezes. Starting to [freeze] in September… mainly freezes right at the end of September. I camp out there. Longest was about a week. Go back home, get supplies, and go back.* (SRB&A Nuiqsut Interview November 2011)



Map 7 - Caribou Subsistence Use Areas, All Study Years

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

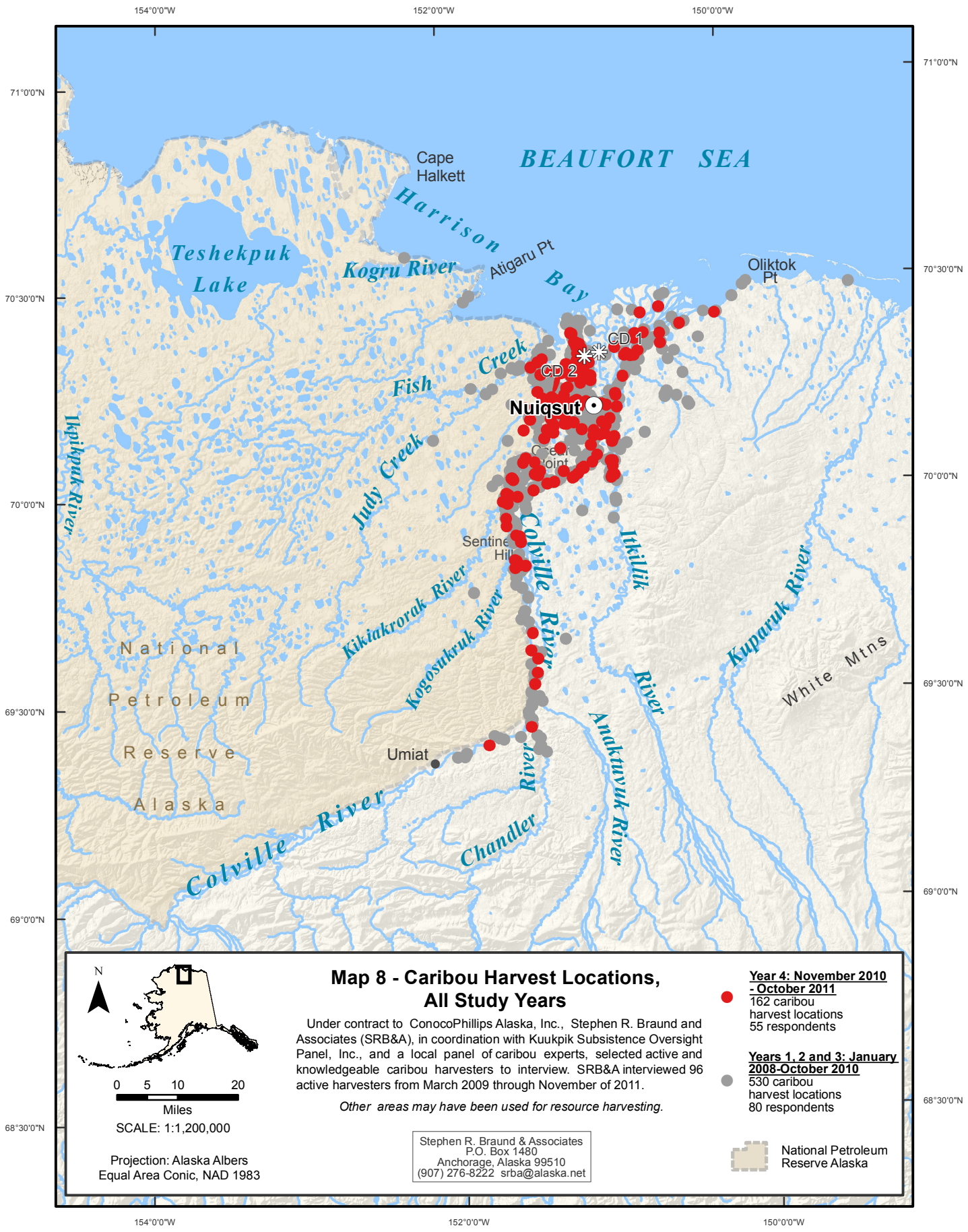
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net

All Study Years: January 2008 - October 2011

High — Low

731 caribou areas used by 96 respondents

National Petroleum Reserve Alaska



Map 8 - Caribou Harvest Locations, All Study Years

Under contract to ConocoPhillips Alaska, Inc., Stephen R. Braund and Associates (SRB&A), in coordination with Kuukpik Subsistence Oversight Panel, Inc., and a local panel of caribou experts, selected active and knowledgeable caribou harvesters to interview. SRB&A interviewed 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

Year 4: November 2010 - October 2011
162 caribou harvest locations
55 respondents

Years 1, 2 and 3: January 2008-October 2010
530 caribou harvest locations
80 respondents

National Petroleum Reserve Alaska

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

We went to Nigliq, we were looking for caribou, all the way to Nigliq, but we didn't find any. We usually go down there when I'm checking my nets to check for caribou. I usually put my nets around here and we check them and then go all the way to Nigliq [looking for caribou]. (SRB&A Nuiqsut Interview November 2011)

The East Channel of the Colville was also a frequently accessed area for subsistence harvesters, with multiple respondents describing hunting activities within that area. Frequently mentioned locations within this area included Pisiktaġvik, Kachemach Creek and Helmerick's (once the site of a commercial fishing operation). Harvesters described their use of the area,

East side, I went down there maybe two or three times only. I went town to Miluveach, Kachemach, right across from Pisiktaġvik. That was end of July, middle of July. Trying to find the herds over there, I didn't hardly see any herds over there. (SRB&A Nuiqsut Interview November 2011)

We went to the Colville River. Towards this way [east channel]. We seen a bunch of caribou, right by the creek Kachemach Creek. They were all in here. It was July. We just look at them. About maybe five caribous. [Name] tried to go in there. It was too shallow. [We went] maybe three times. They come in from the east and they hang around by Pisiktaġvik. (SRB&A Nuiqsut Interview November 2011)

I will mainly focus on the west side, on the west side and then [look] on the east side and then come in [back to Nuiqsut]. There don't seem to be many on this [west] side when I am in the Colville. But I will always see some on the east side. I will look for fresh signs of caribou over there. (SRB&A Nuiqsut Interview November 2011)

I go down to Pisiktaġvik. We have a cabin there that's just about to go into the drink. It's right there. It created a new river by these lakes; we can go out to the Ocean through there... I'm not much of an ocean guy. If I could stay 10 miles away that's where I'd be! (SRB&A Nuiqsut Interview November 2011)

Just the main channel coming through and the shortcuts. This way, we went this way and that's pretty much it. But then we stopped at [the] cabin right across from Helmerick's. There was some across the mainland right across from these islands, but it's too shallow in that area. Maybe just twice. Maybe mid-July I think. We went to go pick up my Auntie. None of us caught any though. (SRB&A Nuiqsut Interview November 2011)

I went up towards Helmerick's, towards Lonely Island, I went in both channels. Went in this way and went back out that way. First trip I brought my granddaughter with me. She loved it! Couldn't stop talking about it … Apaa got a tutu! (SRB&A Nuiqsut Interview November 2011)

Respondents described going upriver in the Colville by boat looking for caribou during the summer months. Generally, harvesters travel to specific areas on the Colville (e.g. Ocean Point, Sentinel Hill) in an attempt to harvest caribou. Multiple residents described,

I went, past Ocean Point up to Sentinel Hill right there. That's as far as I went. Usually I catch a caribou and then go home. But I went out with my buddy [name] and we managed to catch a couple of them out there. Shortcut, yeah, this way. We call that Alavik. There's moose, caribou; it's more like a creek, but when the tide is in you can go in and out. It was higher there and we could go through the main channel. You save on gas through the shortcut. Everybody does that. (SRB&A Nuiqsut Interview November 2011)

We hunt normally in July and August, by boat. Koyuktusuk…Right by Ocean Point, right before you go on Ocean Point. We caught it at Qayuktusuluk… It was right by the river this time. We went a little bit past Ocean Point, that's how far I went. That [shortcut] is really shallow. I did that one time and I had to turn around. (SRB&A Nuiqsut Interview November 2011)

I went upriver to Umiraq. Here's Ocean Point, a couple bends away, right around there [near Sentinel Hill]. Stuck on the main channel... I wanted to go fishing there [at Itkillik], but I didn't' have time to do it. I went once [upriver], I went a couple times boating this year and caught a couple caribou. I went and camped out for a day. (SRB&A Nuiqsut Interview November 2011)

We went up the Colville. Upriver, this is Ocean Point, Itkillik River, I don't think we got any caribou up the river this summer. Ocean Point is the farthest we went… We did a couple of times, but we didn't go very far [into Itkillik] cause I was using my ocean boat, and then it was too shallow for my boat. (SRB&A Nuiqsut Interview November 2011)

A number of respondents reported traveling into Itkillik River during the summer to look for caribou. Respondents have often noted that Itkillik River is too shallow to allow for extensive access, but that caribou are frequently present in the area. Jet boats or fan boats allow greater access to this river. Several active harvesters described,

I went to Itkillik and looked for caribous, but I never see any; it was in late June. We don't go far in because it's too shallow, maybe around there. [We just took] day trips. (SRB&A Nuiqsut Interview November 2011)

Once I went [into Itkillik] about five miles. Not that far since it was shallow. That was in August; end of August. (SRB&A Nuiqsut Interview November 2011)

I got a couple of them inside Itkillik. I don't know how far up Itkillik we went up; we had a jet boat; We went way the heck up [approximately 15 miles]… One was about halfway to the airport…The farthest I went with my boat was right there [on the horseshoe], and it was after that we got a caribou on the sandbar. (SRB&A Nuiqsut Interview November 2011)

We just go to Itkillik River, and usually there's a bunch of caribou around there. This year we didn't even bother going in there. At the beginning of the year this area was real shallow; we didn't even bother going in there because he was worried about his boat. (SRB&A Nuiqsut Interview November 2011)

I did manage to go on Itkillik on a fan boat this summer. We actually did catch a caribou, which was surprising because the fan boat was loud…. That [trip] was just into Itkillik and back out [to Nuiqsut]. That was the farthest I've been in that river, and we drove until there was no water! (SRB&A Nuiqsut Interview November 2011)

Nuiqsut caribou hunters also travel substantial distances upriver during the summer and fall months in search of caribou and, starting in August and September, moose. When water levels allow for access, the Chandler River is a common hunting location. Several respondents described hunting activities taking place within the Chandler River during Year 4. Respondents often paired their caribou hunting with attempts at harvesting moose when traveling to this area. Several respondents described,

The Chandler was deeper this year, last year it was too shallow and you couldn't even get in it. I don't know why the channel has changed, but from the past four years you weren't able to go in there, and then this year I think we had a lot of flash floods on that channel and it got deeper. And then on this side I wasn't able to go much farther because it got too shallow. (SRB&A Nuiqsut Interview November 2011)

Upriver, I don't know what that place is called… We were staying at this one place and went farther up. Around there [near Chandler River] we did [take the shortcut] with a jet boat. I went like three times [upriver]. (SRB&A Nuiqsut Interview November 2011)

I camped out at Chandler about fifteen miles inland… I didn't get any caribou there though. I went about 15-18 miles past Umiat though. I went to the highest part on that other side. Over here

somewhere there's a big turnout here next to this creek. I did my last-minute moose hunting there this year. (SRB&A Nuiqsut Interview November 2011)

I only went out the one time and I got the moose. We were looking for caribou and saw the moose first. We went like five miles inside Chandler… We were looking all along; we would stop every so often and check it out. (SRB&A Nuiqsut Interview November 2011)

In addition to traveling and hunting along rivers by boat, residents also traveled overland by four-wheeler looking for caribou. The majority of four-wheeler travel occurred west of the Colville River and Nigliq Channel toward Fish Creek and Ocean Point.

I go constantly. I want to say eight times. That was around February. It was real cold, I remember that. I went out day trips. I couldn't find nothing out there! I keep asking my dad about where he goes and he just keeps telling me to go this way [straight west]. I do have luck sometimes. Sometimes I think I'm not going far enough. He says they're out there, you just gotta look. (SRB&A Nuiqsut Interview November 2011)

I went somewhere just out [west of the community], it wasn't very far, maybe 10 miles out. That was in November. I believe I head out straight and looped around this way and followed the river [Nigliq] back [to Nuiqsut]. I did go through a couple of big lakes. I just hit the river and came back. I did the same thing with a four-wheeler, but that was during the summer. I just try to stick to this whole side of the river because on the other side of the river it's all flat and there's nothing over there. (SRB&A Nuiqsut Interview November 2011)

Once snow conditions are adequate, some residents hunt caribou by snowmachine. Residents generally travel farther by snowmachine than they do by four-wheeler, and in Year 4 their winter hunting activities extended south to Ocean Point and even farther to the east of Colville River around Itkillik River and beyond. Two individuals described their winter hunting areas as follows:

Pretty much the same [hunting area]. I didn't catch any caribou on this [west] side, and I usually go all the way to White Hills, somewhere over here, 76 miles [from Nuiqsut]. You can go around [the hills] and come back to Anaktuvuk River. I go around and cut them off, depends on what I am going out for. I go around and follow the Anaktuvuk River home. I cross just right there. There's actually a cattrain river that goes all the way down to the river. You can do it that way too. (SRB&A Nuiqsut Interview November 2011)

We come out this way [too], [east of Colville], and then come across. We go right where it starts to get higher [north of Itkillik], then follow it back up [to Nuiqsut]…. We also go farther down here, we do day trips and just travel all over. All the way around, just kind of follow Itkillik back. When we go home we just go straight home. (SRB&A Nuiqsut Interview November 2011)

Characteristics of Caribou Use Areas and Harvest Sites

Study participants characterized their Year 4 caribou use areas for the following variables: success (measured as whether the respondent successfully harvested caribou in the use area or not), number of trips, duration of trips, travel method, and timing of hunting activities. Caribou harvest locations were characterized by month, number of harvested caribou, and sex of harvested caribou. The following sections describe the above characteristics as they pertain to caribou use areas and harvest sites.

Timing

As shown in Figure 1, caribou hunting activities over the four study years occurred in every month with a peak number of use areas reported in July or August. The highest percentage of Year 4 caribou use areas were reported for the month of August, whereas all of the previous study years show peak use areas in July. Figure 2 depicts the percentages of reported caribou harvests by month. Similar to the number of reported use areas, the number of reported caribou harvests also peak in July and August during all study

years. Compared to the previous study years, in Year 4 respondents reported a relatively even distribution of harvests between the months of July, August, and September. Some harvesters cite preferences for caribou harvested at different times of the year, with residents indicating that the caribou are fat during the summer months. However, the timing of harvests and hunting activities also depend on resource availability (i.e., whether caribou are in the area where they are traditionally harvested) and environmental factors (i.e., ice and snow conditions).

Figure 1: Nuiqsut Percentage of Caribou Use Areas by Month, Years 1-4

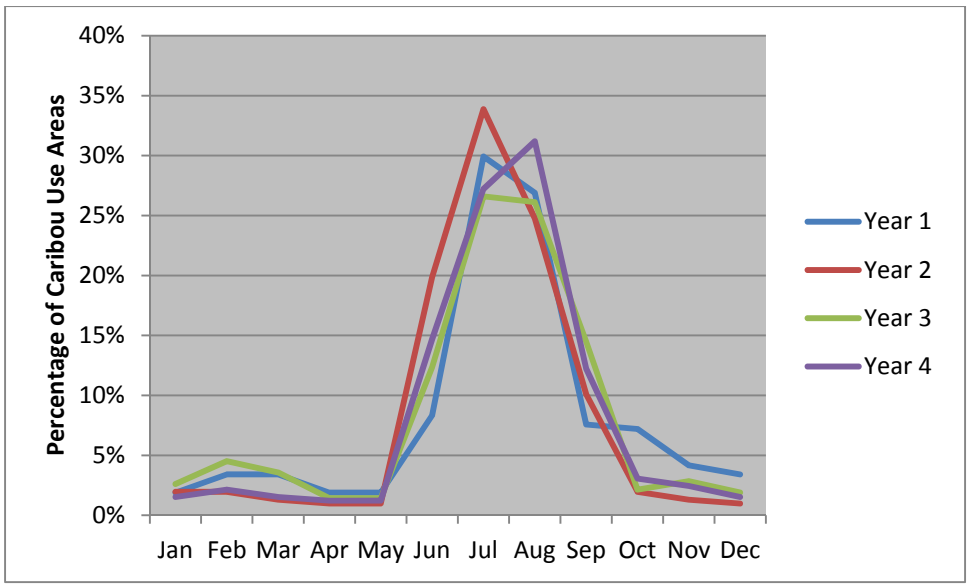


Figure 2: Nuiqsut Percentage of Caribou Harvested by Month, Years 1-4

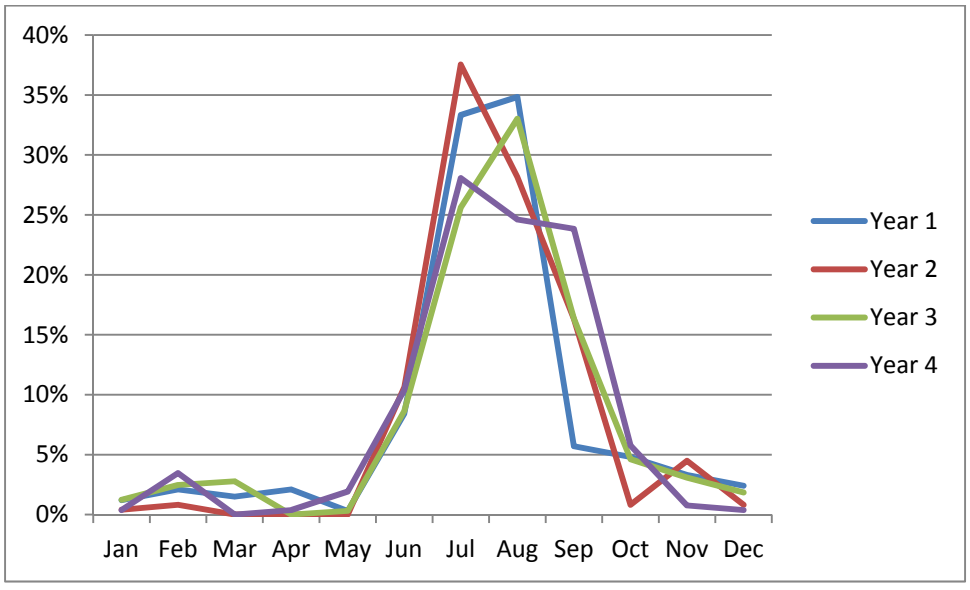


Table 9 results show the number of reported caribou harvests by sex. Similar to the previous study year (sex was not recorded in Year 1), the majority of harvested caribou were males.

Table 9: Number of Caribou Harvested by Sex, Year 2, 3, and 4

	Year 2	Year 3	Year 5
Males	224	310	295
Females	38	45	31
Unknown	15	10	5
Total	277	365	231

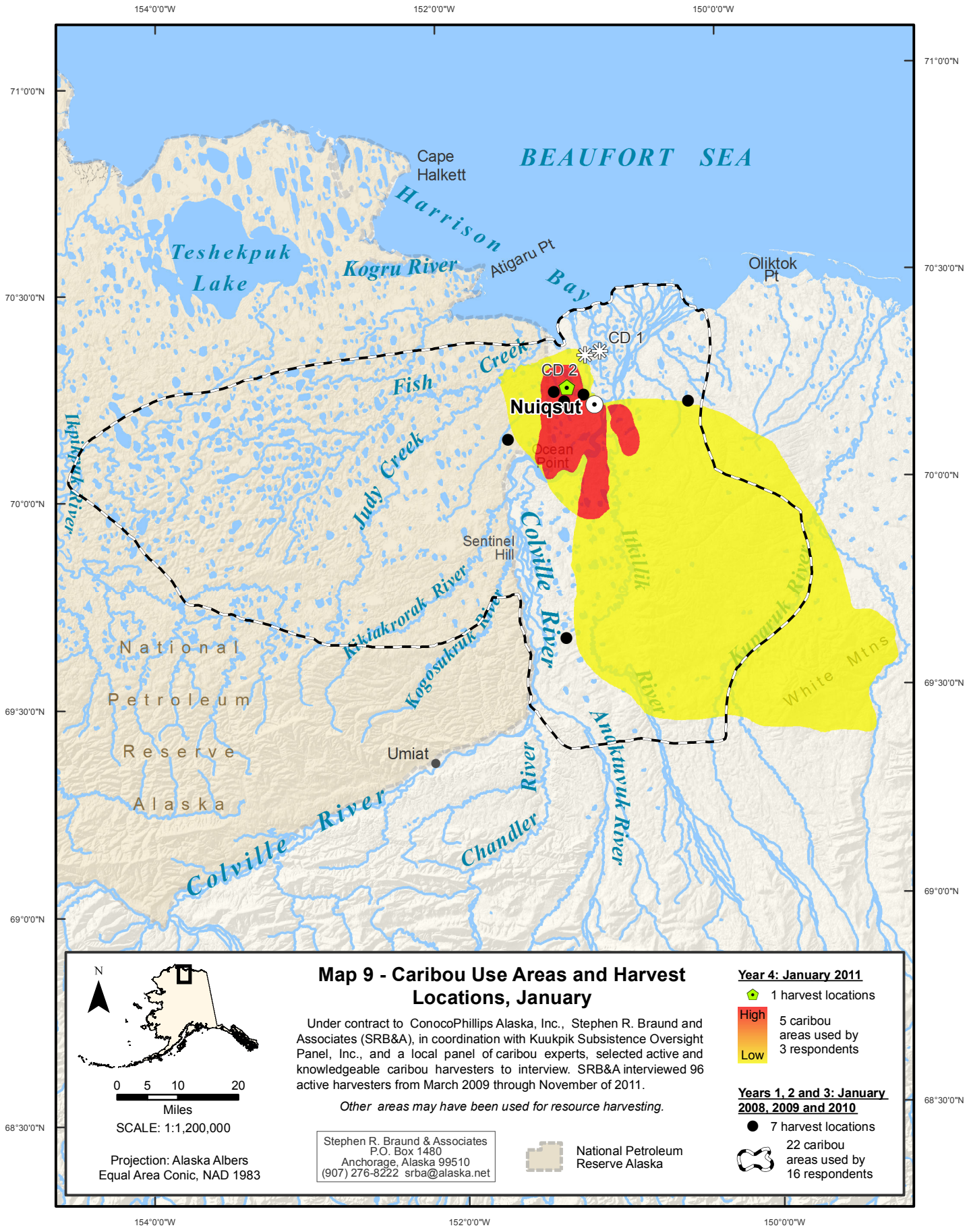
Stephen R. Braund & Associates, 2013.

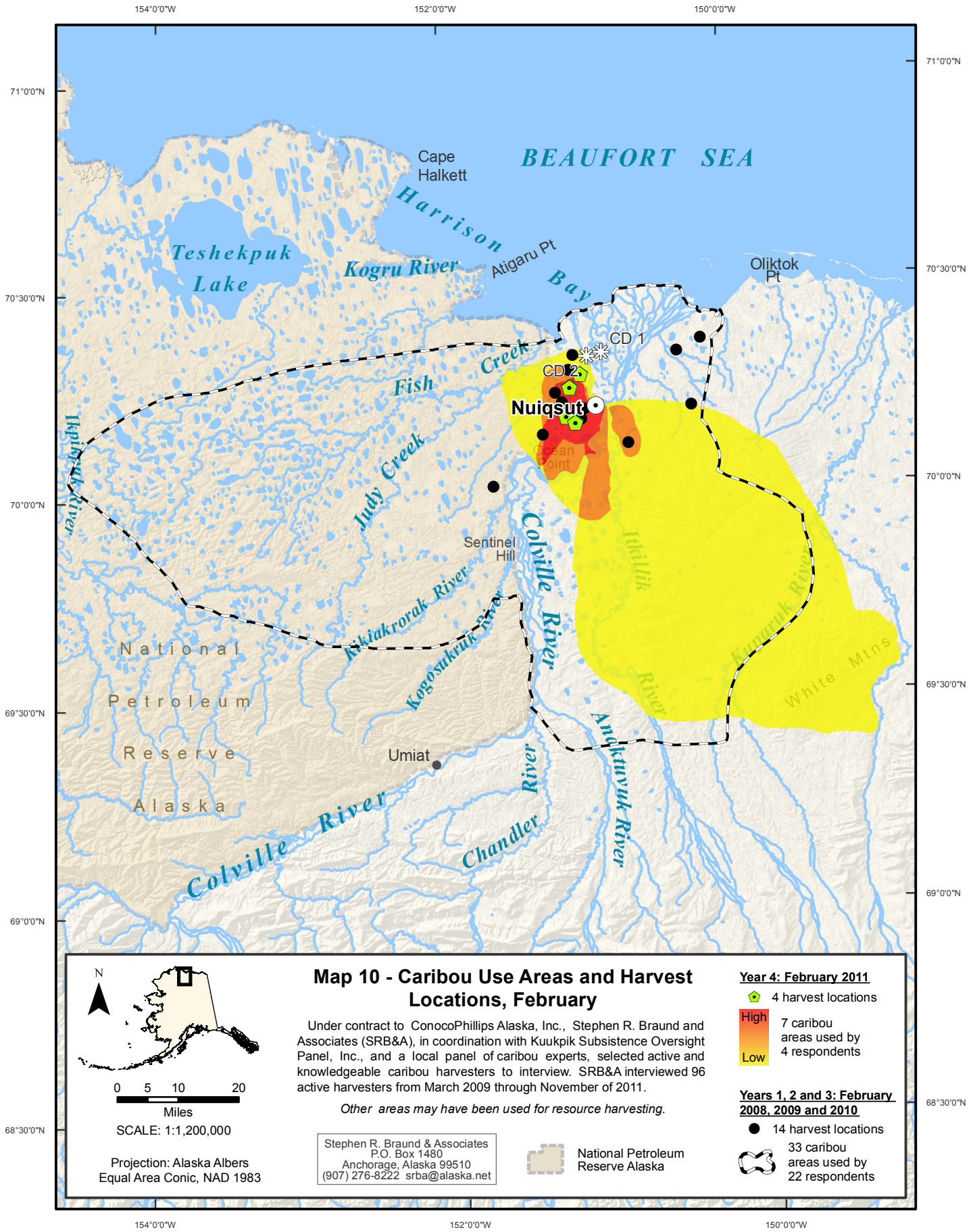
Map 9 through Map 20 show Year 4 caribou subsistence use areas and harvest sites by month, with the extent of previous study years (Year 1, Year 2 and Year 3) shown as a single polygon. According to Year 4 active harvester interviews, during the months of January through April, residents traveled overland by snowmachine primarily in an area south of the community that extends to Ocean Point and into Itkillik River (Map 9 through Map 12). A smaller number of respondents reported traveling southeast of the community in an area that extends south along the Itkillik River and east all the way to Toolik River and the White Mountains. Previous study years show respondents accessing areas farther west of the community to the Ikpikpuk River, an area not utilized by Year 4 harvester respondents during the winter months. One active harvester respondent who often travels large distances west and south of the community by snowmachine was unable to provide his winter hunting area during the Year 4 interviews and also suffered an injury that year, which may have resulted in some of the differences noted. Despite the large area utilized by residents during the winter months, all Year 4 harvest locations were located near the community. Successful harvests were made just west of the community during January, February and April, with no successful harvests reported by active harvesters in March. Residents have noted that their primary targets during winter snowmachine trips are wolf and wolverine, but that caribou are harvested as needed and available during these trips. Because of the focus on caribou in this study, it is likely that not all harvesters report these winter areas when asked to identify their caribou hunting areas.

Year 4 harvesters reported only limited travel during the month of May within the Colville River and Nigliq Channel, with the majority of travel occurring between the community and Ocean Point (Map 13). During previous years respondents have reported overland snowmachine travel west of the community to Ikpikpuk River during the month of May as well farther upriver; travel in May is generally dependent on ice and snow conditions. Year 4 May hunting activities were limited to river channels.

During the summer months of June through September, active harvesters reported a heightened level of activity along the waterways of the Colville (including Nigliq and East Channels), Itkillik, and Chandler rivers (Map 14 through Map 17). The activity that takes place during these four months extends from Umiat in the south to the coast north of the community. There are higher numbers of overlaps along the lower Colville River during the months of June and July, and along the upper Colville River to Sentinel

Hill and beyond during the months of July and August. The majority of this activity takes place along the Colville River near the community, both upriver past the Ocean Point area and downriver on both the East Channel and Nigliq Channel. Previous years have shown additional use areas into Anaktuvuk River during the summer, and more extended use areas into Itkillik River during the first few months of summer. Respondents generally attribute their use of Itkillik and Anaktuvuk Rivers to accessibility based on water levels, and that in general levels, were low during Year 4 with one respondent noting “We went to the mouth [of the Anaktuvuk River] but it was too shallow. They change pretty much every year” (SRB&A Nuiqsut Interview November 2011).


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
CD 1
CD 2
Nuiqsut
Fish Creek
Judy Creek
Ocean Point
Itkillik River
Kungruk River
White Mtns
Sentinel Hill
Colville River
Kikiakrorak River
Kogosukruk River
National Petroleum Reserve Alaska
Umiat
Chandler River
Anaktuvuk River
Colville River
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers Equal Area Conic, NAD 1983
Map 9 - Caribou Use Areas and Harvest Locations, January
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: January 2011
1 harvest locations
High
Low
5 caribou areas used by 3 respondents
Years 1, 2 and 3: January 2008, 2009 and 2010
7 harvest locations
22 caribou areas used by 16 respondents



Map 10 - Caribou Use Areas and Harvest Locations, February

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

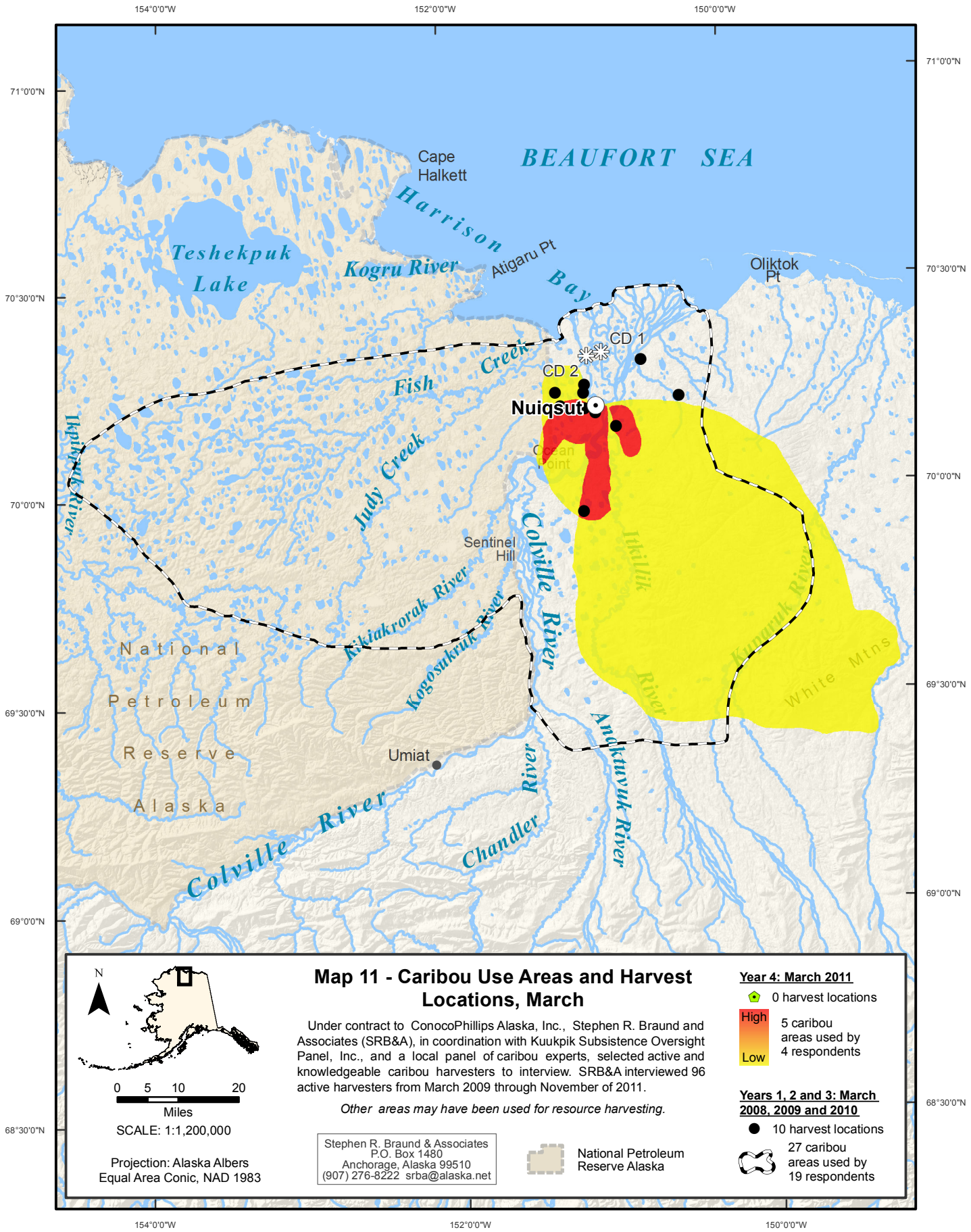
National Petroleum Reserve Alaska

Year 4: February 2011

- 4 harvest locations
- High / Low: 7 caribou areas used by 4 respondents

Years 1, 2 and 3: February 2008, 2009 and 2010

- 14 harvest locations
- 33 caribou areas used by 22 respondents



Map 11 - Caribou Use Areas and Harvest Locations, March

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

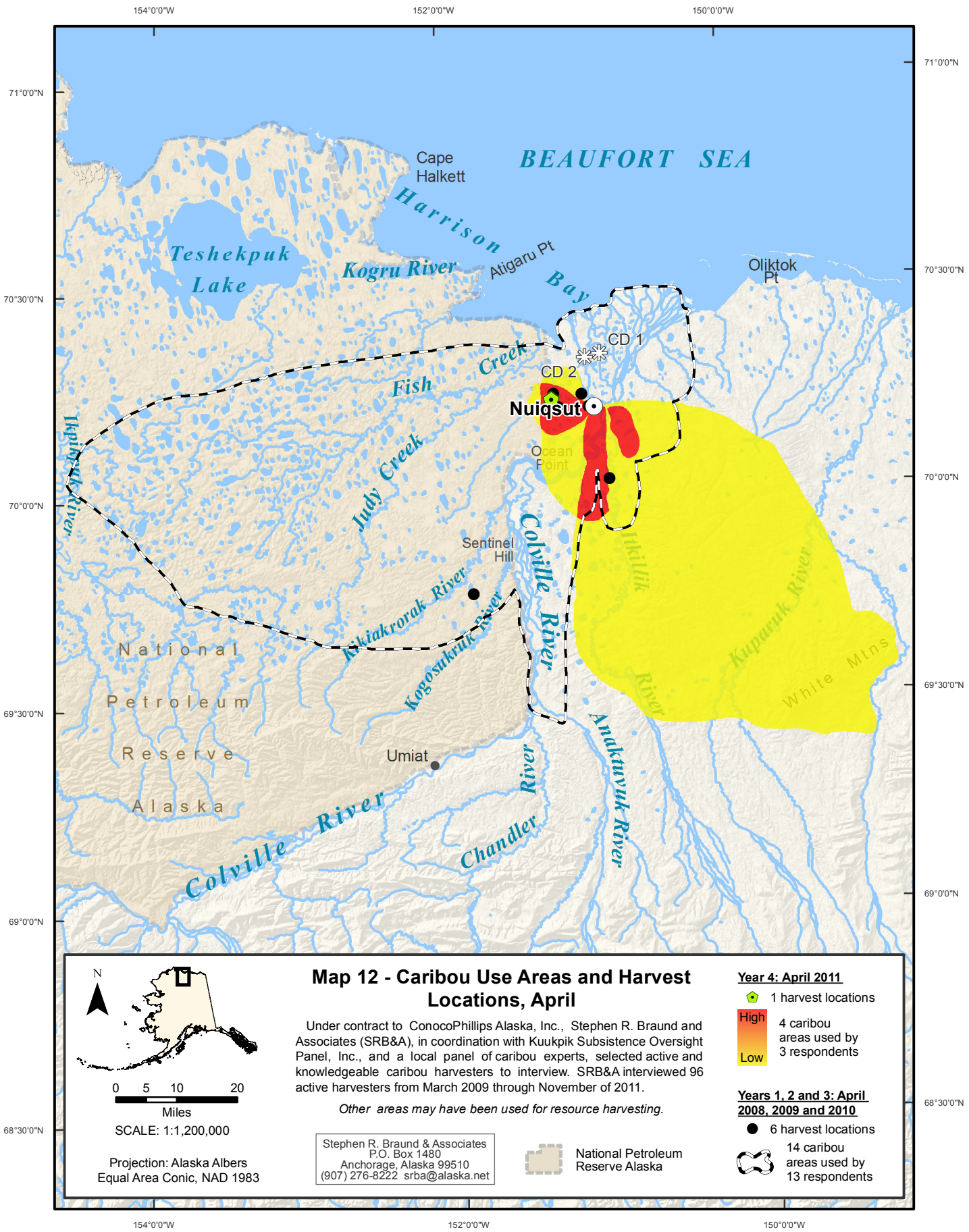
National Petroleum Reserve Alaska

Year 4: March 2011

- 0 harvest locations
- High / Low: 5 caribou areas used by 4 respondents

Years 1, 2 and 3: March 2008, 2009 and 2010

- 10 harvest locations
- 27 caribou areas used by 19 respondents



Map 12 - Caribou Use Areas and Harvest Locations, April

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

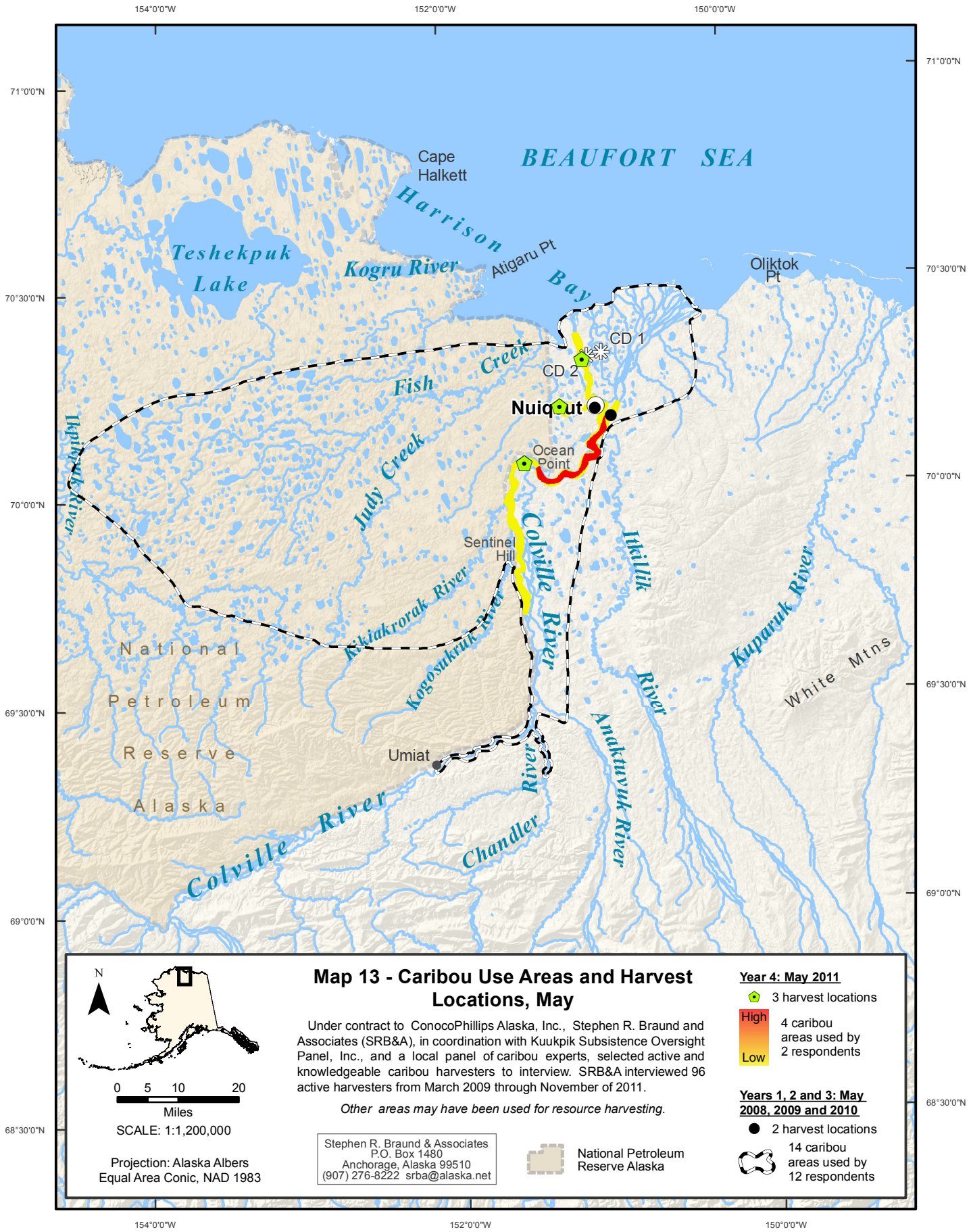
National Petroleum Reserve Alaska

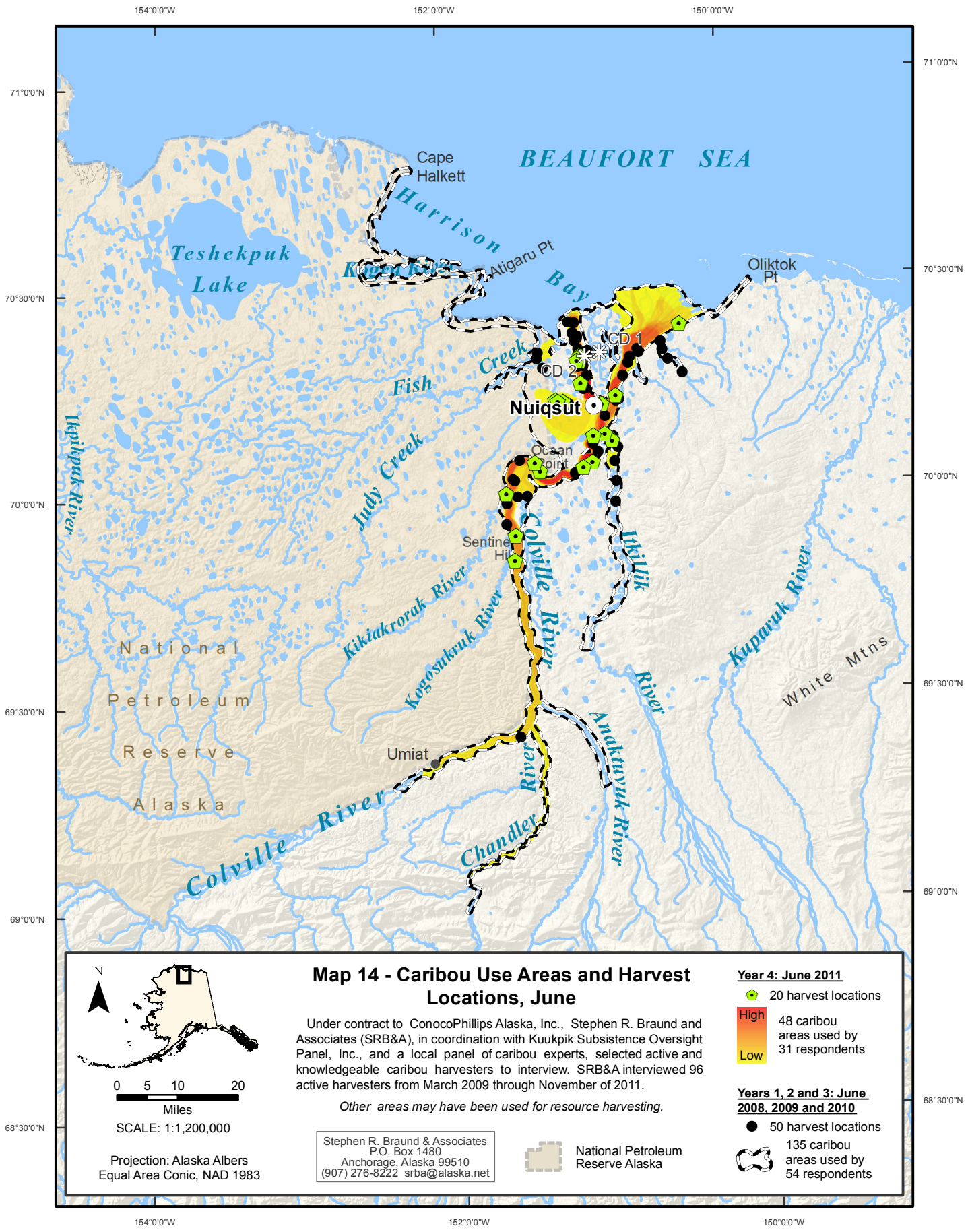
Year 4: April 2011

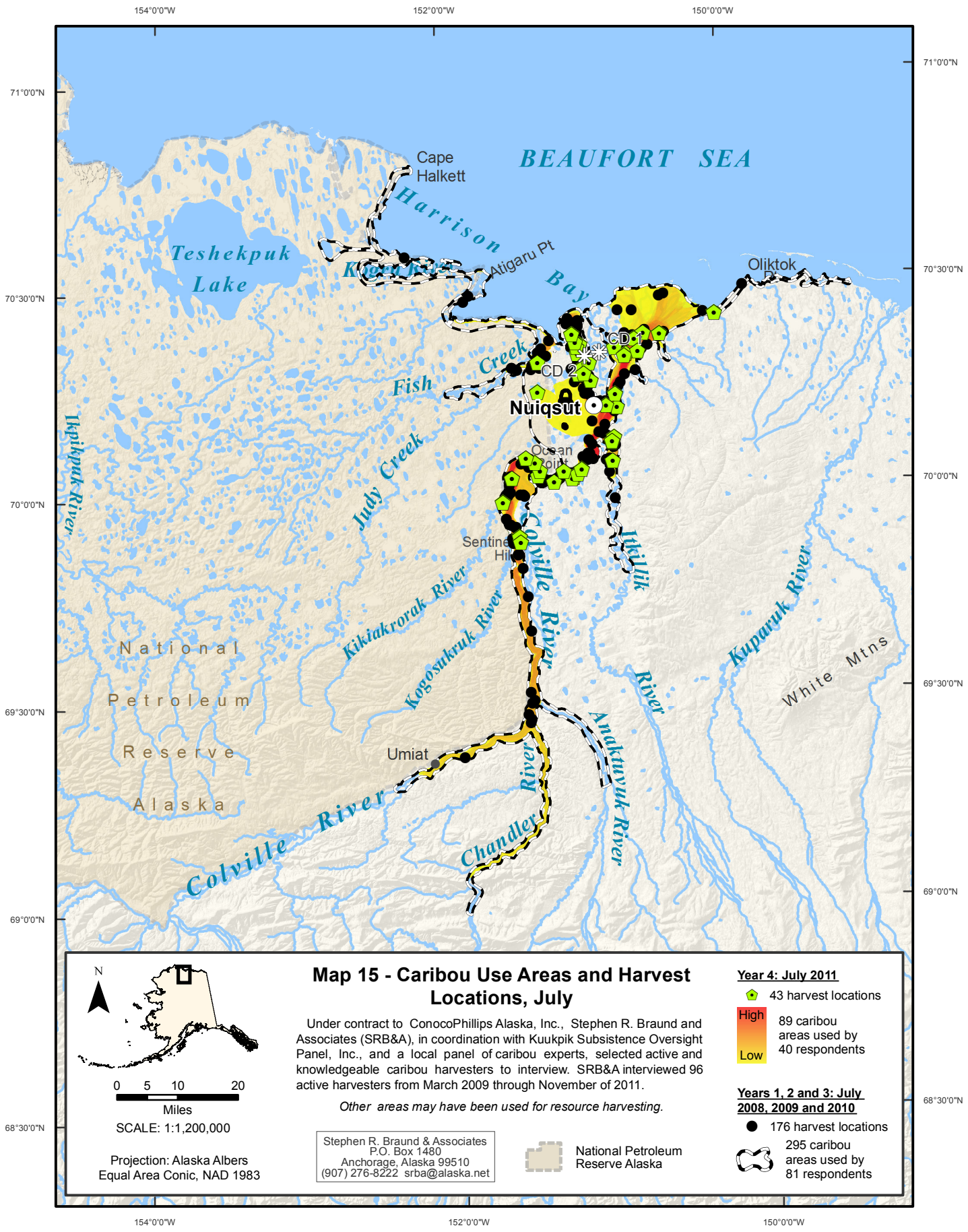
- 1 harvest locations
- High / Low: 4 caribou areas used by 3 respondents

Years 1, 2 and 3: April 2008, 2009 and 2010

- 6 harvest locations
- 14 caribou areas used by 13 respondents


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
CD 1
CD 2
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Ikpikpuk River
Sentinel Hill
Colville River
Itkillik River
Kuparuk River
White Mtns
Kikiakrorak River
Kogosukruk River
National Petroleum Reserve Alaska
Umiat
Anaktuvuk River
Chandler River
Colville River
N
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers Equal Area Conic, NAD 1983
Map 13 - Caribou Use Areas and Harvest Locations, May
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: May 2011
3 harvest locations
High
Low
4 caribou areas used by 2 respondents
Years 1, 2 and 3: May 2008, 2009 and 2010
2 harvest locations
14 caribou areas used by 12 respondents


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kuparuk River
CD 1
CD 2
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Sentine Hill
Itkillik River
Colville River
Kikiakrorak River
Kogosukruk River
Kuparuk River
White Mtns
National Petroleum Reserve Alaska
Umiat
Anaktuvuk River
Chandler River
Colville River
Map 14 - Caribou Use Areas and Harvest Locations, June
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Year 4: June 2011
20 harvest locations
High
Low
48 caribou areas used by 31 respondents
Years 1, 2 and 3: June 2008, 2009 and 2010
50 harvest locations
135 caribou areas used by 54 respondents
National Petroleum Reserve Alaska
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers Equal Area Conic, NAD 1983
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net



Map 15 - Caribou Use Areas and Harvest Locations, July

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

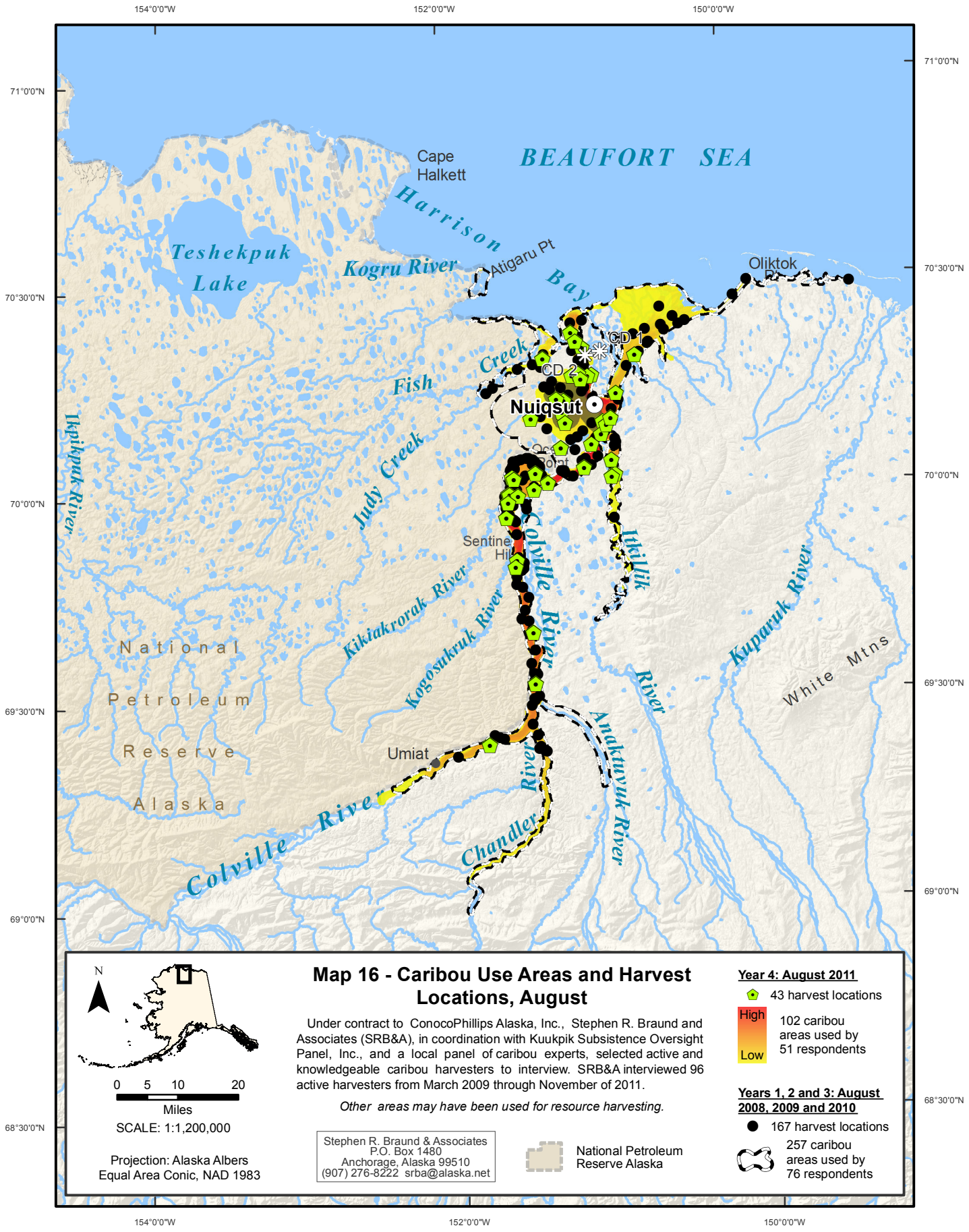
National Petroleum Reserve Alaska

Year 4: July 2011

- 43 harvest locations
- High / Low: 89 caribou areas used by 40 respondents

Years 1, 2 and 3: July 2008, 2009 and 2010

- 176 harvest locations
- 295 caribou areas used by 81 respondents



Map 16 - Caribou Use Areas and Harvest Locations, August

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

National Petroleum Reserve Alaska

Year 4: August 2011

43 harvest locations

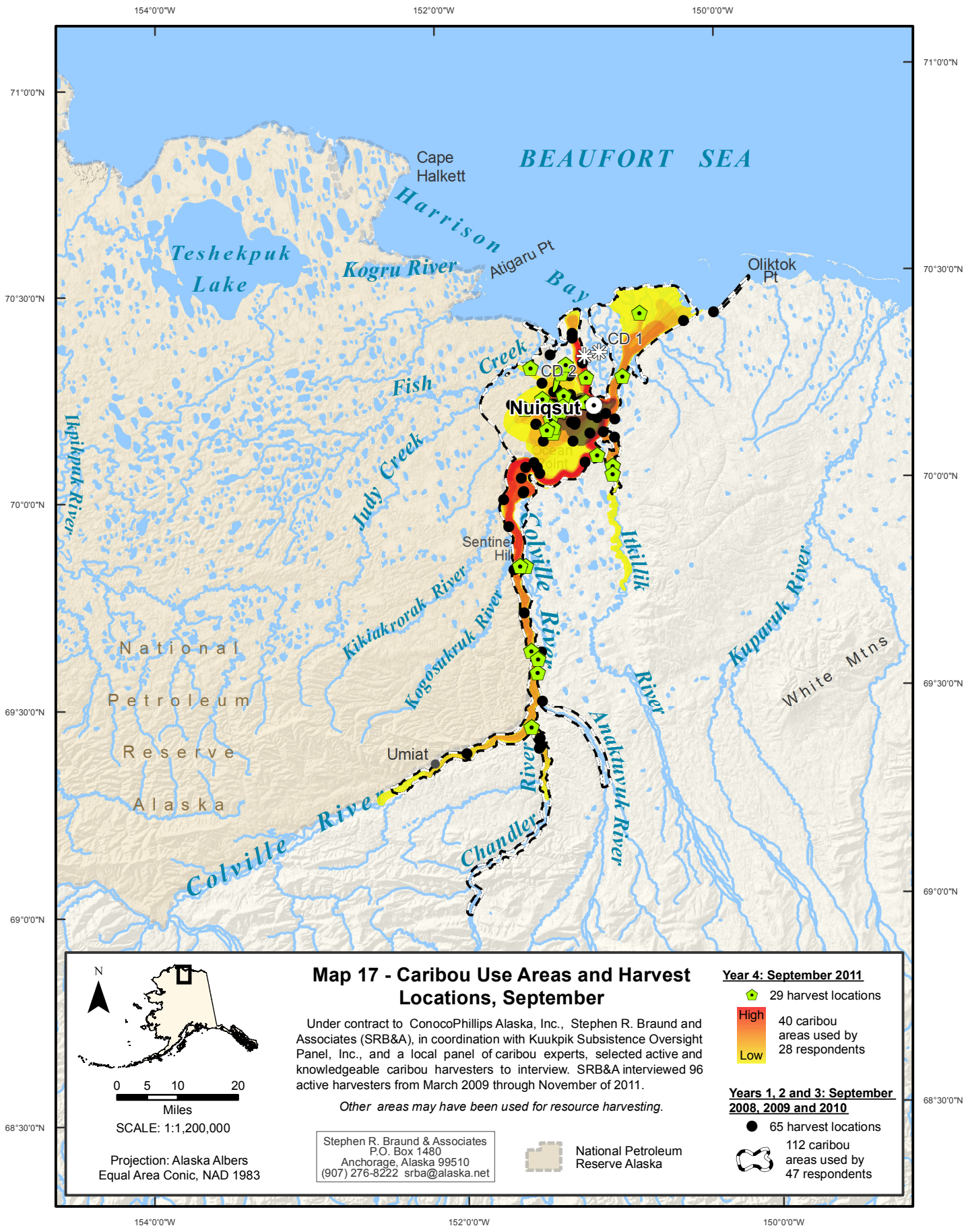
High / Low

102 caribou areas used by 51 respondents

Years 1, 2 and 3: August 2008, 2009 and 2010

167 harvest locations

257 caribou areas used by 76 respondents



Map 17 - Caribou Use Areas and Harvest Locations, September

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

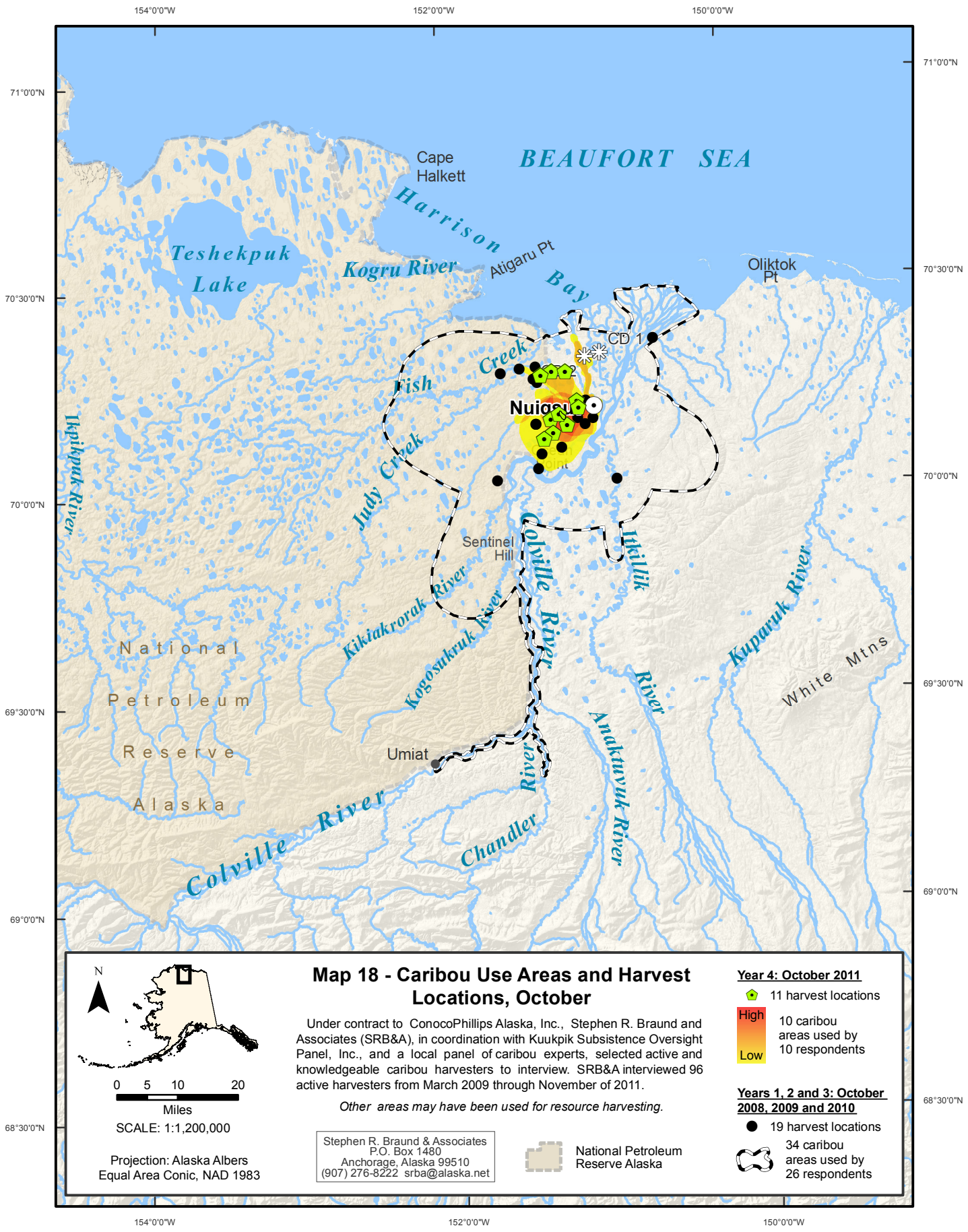
National Petroleum Reserve Alaska

Year 4: September 2011

- 29 harvest locations
- High / Low: 40 caribou areas used by 28 respondents

Years 1, 2 and 3: September 2008, 2009 and 2010

- 65 harvest locations
- 112 caribou areas used by 47 respondents



Map 18 - Caribou Use Areas and Harvest Locations, October

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

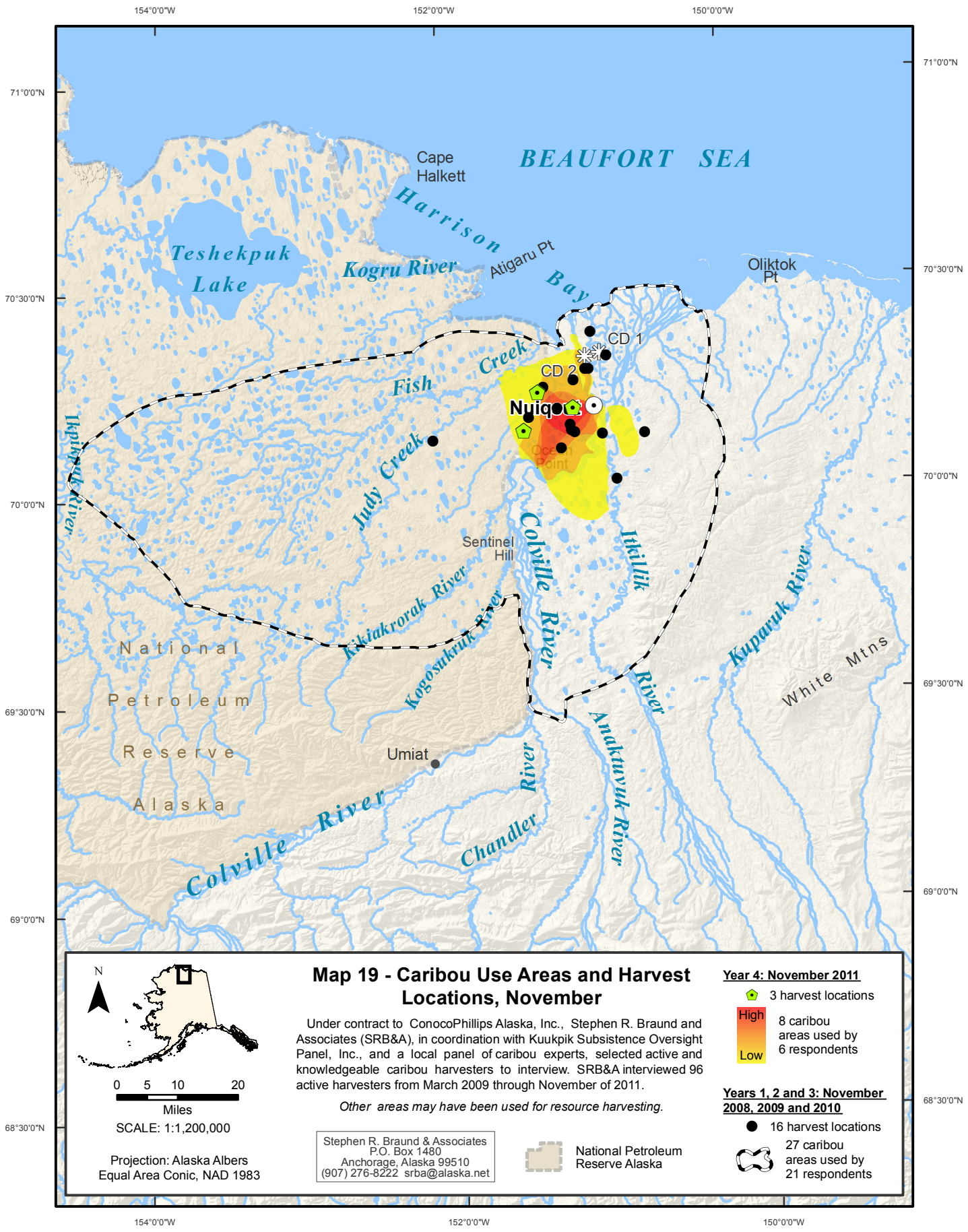
National Petroleum Reserve Alaska

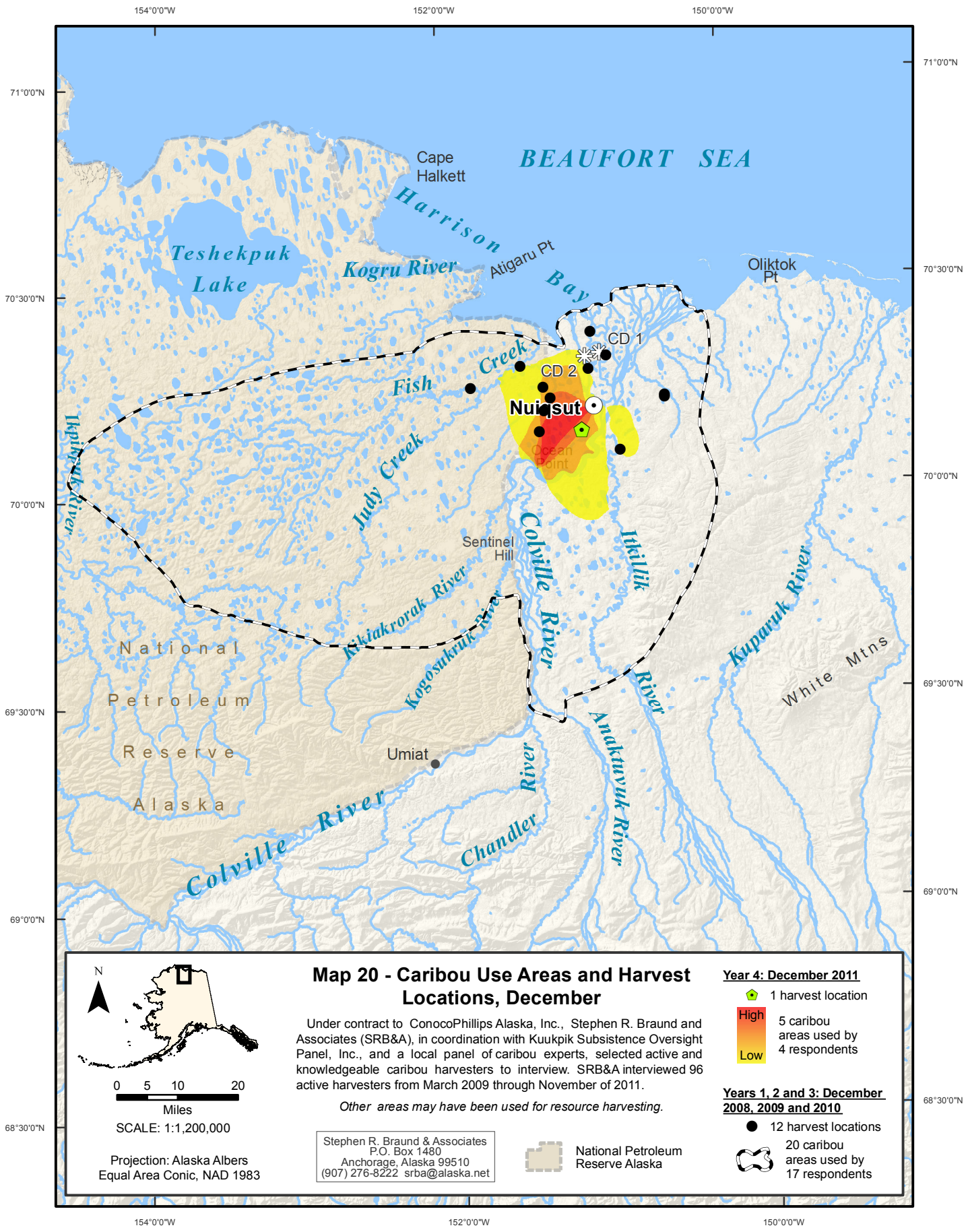
Year 4: October 2011

- 11 harvest locations
- High / Low: 10 caribou areas used by 10 respondents

Years 1, 2 and 3: October 2008, 2009 and 2010

- 19 harvest locations
- 34 caribou areas used by 26 respondents


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
CD 1
CD 2
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Sentinel Hill
Itkillik
Colville River
Kuparuk River
Kikiakrorak River
Kogosukruk River
National Petroleum Reserve Alaska
White Mtns
Umiat
Anaktuvuk River
Chandler River
Colville River
N
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983
Map 19 - Caribou Use Areas and Harvest Locations, November
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: November 2011
3 harvest locations
High
Low
8 caribou areas used by 6 respondents
Years 1, 2 and 3: November 2008, 2009 and 2010
16 harvest locations
27 caribou areas used by 21 respondents


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
CD 1
CD 2
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Ikpikpuk River
Sentinel Hill
Itkillik
Colville River
Kuparuk River
White Mtns
Kikiakrorak River
Kogosukruk River
National Petroleum Reserve Alaska
Umiat
Anaktuvuk River
Chandler River
Colville River
N
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983
Map 20 - Caribou Use Areas and Harvest Locations, December
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: December 2011
1 harvest location
High
Low
5 caribou areas used by 4 respondents
Years 1, 2 and 3: December 2008, 2009 and 2010
12 harvest locations
20 caribou areas used by 17 respondents

Previous study years also show respondents traveling to additional coastal areas west of the community, with use areas extending up to Atigaru Point and Cape Halkett during June, July, and August. These locations have generally been utilized by a small number of respondents, who reported more limited coastal hunting in Year 4.

Harvest locations during the summer months are similar for all four years of the study, with the majority of harvests occurring close to the community and occurring with less frequency with increased distance from the community. This trend may be due to the fact that a much higher number of trips are taken within a short distance of Nuiqsut compared to the number of long distance trips taken. Upriver trips are also often combined with moose hunting, and therefore caribou are not the only target species during these trips.

Starting in August and peaking in September and October, harvest activities increase in an overland area west of the community (Map 16 through Map 18). October hunting activities occur almost solely in overland areas, as do hunting activities for the remainder of the calendar year. Hunting activities during the months of October, November and December (Map 18 through Map 20) generally consisted of shorter travel distances around the community as reported by Year 4 harvesters. Respondents generally reported using areas to the west of the community, from Fish Creek to Ocean Point and down along Itkillik River. These locations are within the boundaries of all previous study year locations, although they do not reach the extent of previous years use areas.

Travel Method

Similar to previous study years, respondents reported boats as their principal mode of travel for caribou harvesting activities; 80 percent of caribou use areas in Year 4 were accessed by boat, followed by snowmachines (12 percent) and four-wheelers (nine percent) (Table 10). Figures 3 through Figure 5 show the percentage of boat, snowmachine and four-wheeler use areas reported by Nuiqsut respondents by month. During all study years, boat travel began as soon as the ice broke up in May or June, and continued until September or October when the waterways iced over again. In terms of the number of use areas, the peak month for boat travel for Years 1, 2 and 3 was July, with Year 4 having a slightly later peak in August.

Table 10: Travel Method to Caribou Use Areas

Travel Method	% of Caribou Use Areas
Boat	80%
Four-wheeler	9%
Snowmachine	12%

Stephen R. Braund & Associates, 2013.

The later peak in boating activities may be due to a later breakup than usual. One individual noted, “Break up here was in mid-July, late-July, [it wasn't] until early August [when] we started taking our four-wheelers out” (SRB&A Nuiqsut Interview November 2011). Snowmachine use generally occurs between September and April or May, with peak snowmachine use for Year 4 occurring during the months of September through November. Four-wheeler use is generally limited to the summer and fall months. In Year 4, residents reported four-wheeler travel beginning in June and peaking in August, slightly earlier than in previous years. Four-wheeler use continued until November (Figure 5).

Figure 3: Boat Use by Month, Years 1-4

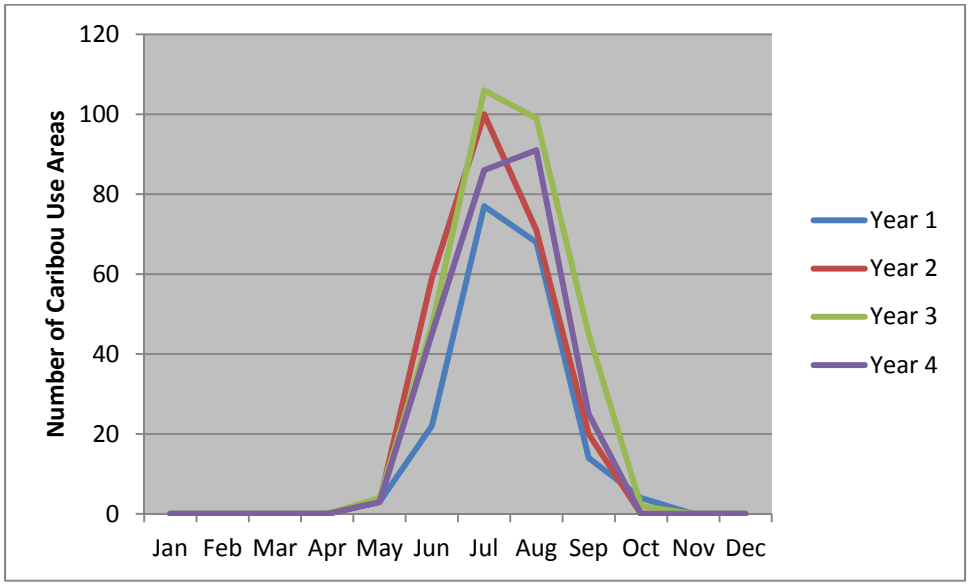


Figure 4: Snowmachine Use by Month, Years 1-4

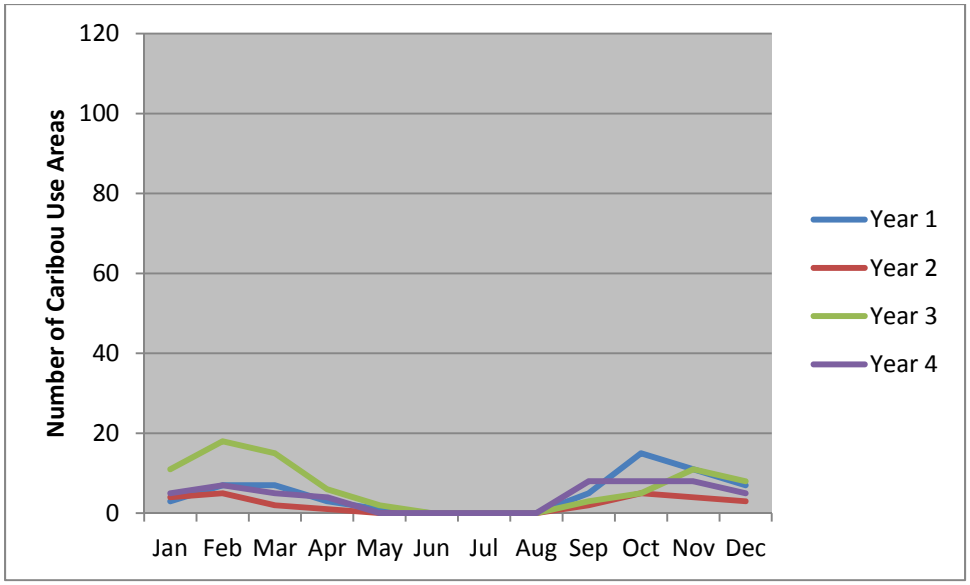
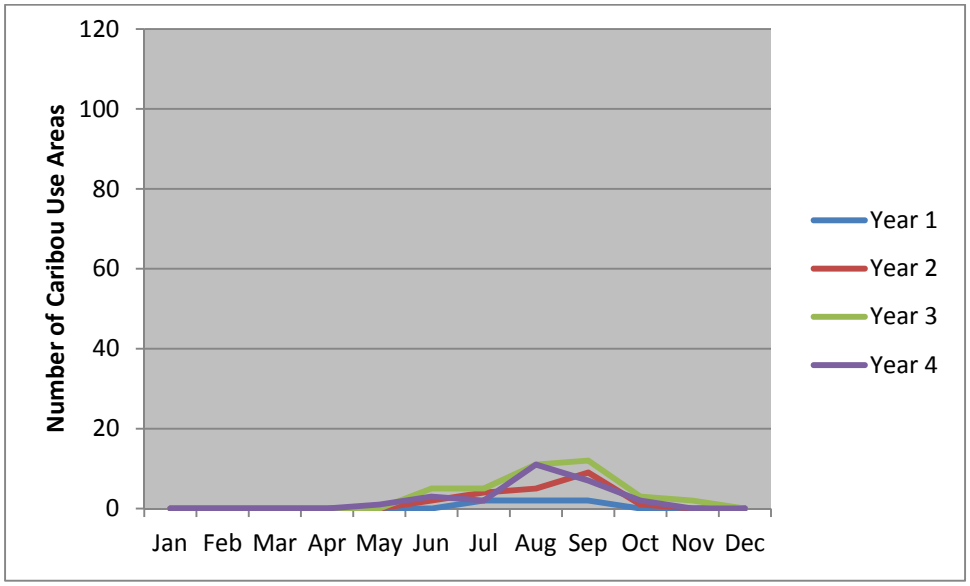


Figure 5: Four-wheeler Use by Month, Years 1-4



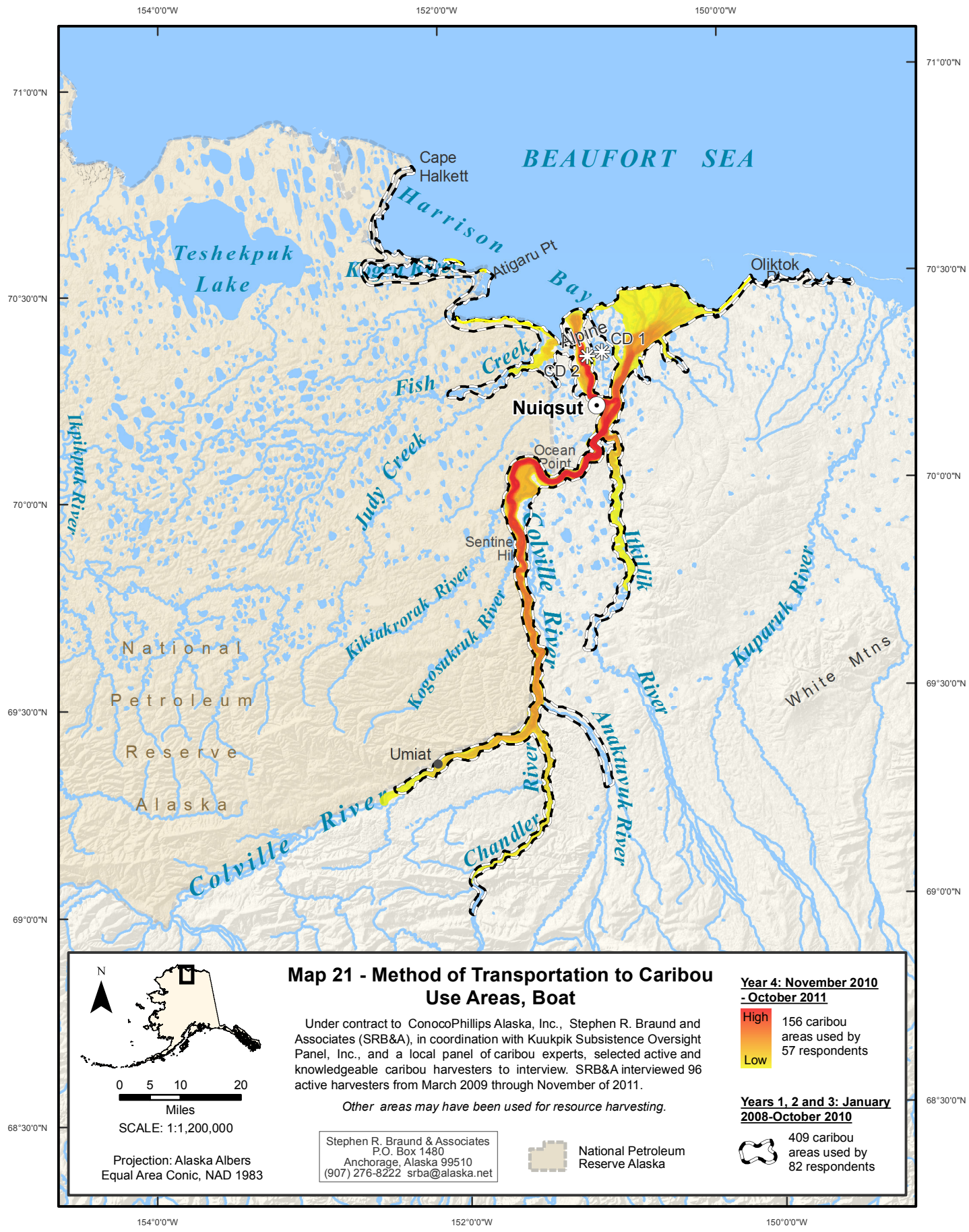
As indicated in this and the previous section, the timing of hunting activities and method of transportation are closely related. Several respondents provided the following observations regarding the timing and method of transportation related to Year 4 caribou hunting:

> *I went once [upriver], I went a couple times boating this year and caught a couple caribou. I went and camped out for a day [in August].* (SRB&A Nuiqsut Interview November 2011)

> *The only hunting I did was by boat… I was downriver pretty much the whole summer. A little earlier than June, as soon as we were able to put the boats in the water I was out. [I boated from] early June until it froze up.* (SRB&A Nuiqsut Interview November 2011)

> *You don't go out a whole bunch [by four-wheeler]. You can go, with a gas tank, 20 miles round trip. That's an all day trip; ten [miles] out and ten [miles] back. By Honda, you do a lot of turning. There's a lot of water, and the swamps, you stay away from those. You have to know where the flat ground is and stay there. It's really rough out there with all those pingos. You can go out with the Honda there, people do that. They burn up gas until they catch something. Some people, they are good [on a four-wheeler]. They can go way out here, but I don't. I don't get out like I used to.* (SRB&A Nuiqsut Interview November 2011)

Year 4 caribou use areas by transportation method are shown on Map 21 through Map 23. As shown on Map 21, boat travel in Year 4 occurred along the Colville, Itkillik, and Chandler rivers, as well as in Fish Creek and the Nigliq Channel. A limited amount of boat travel was also reported along the coastal areas between Atigaru Point and Oliktok Point. Boat travel was heaviest along the Nigliq Channel and along the main Colville River between Pisiktaġvik and Sentinel Hill. When traveling along the Nigliq Channel, residents more generally reported use areas as far as Nigliq Camp, with some individuals traveling farther to the mouth of the river. A relatively low number of boating areas were reported in coastal areas and along Fish Creek, Chandler River, and upper Itkillik River when compared to boating areas as a whole. Four-wheeler hunting areas are located west of the community and Nigliq Channel and, in Year 4, were generally located within 10 miles of the community (Map 22). Snowmachine hunting occurs over a larger area. In Year 4, residents traveled as far west as Fish Creek by snowmachine and south to Ocean Point (Map 23). A few individuals traveled east of the community by snowmachine to Itkillik River and beyond to the Toolik River.



Map 21 - Method of Transportation to Caribou Use Areas, Boat

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

National Petroleum Reserve Alaska

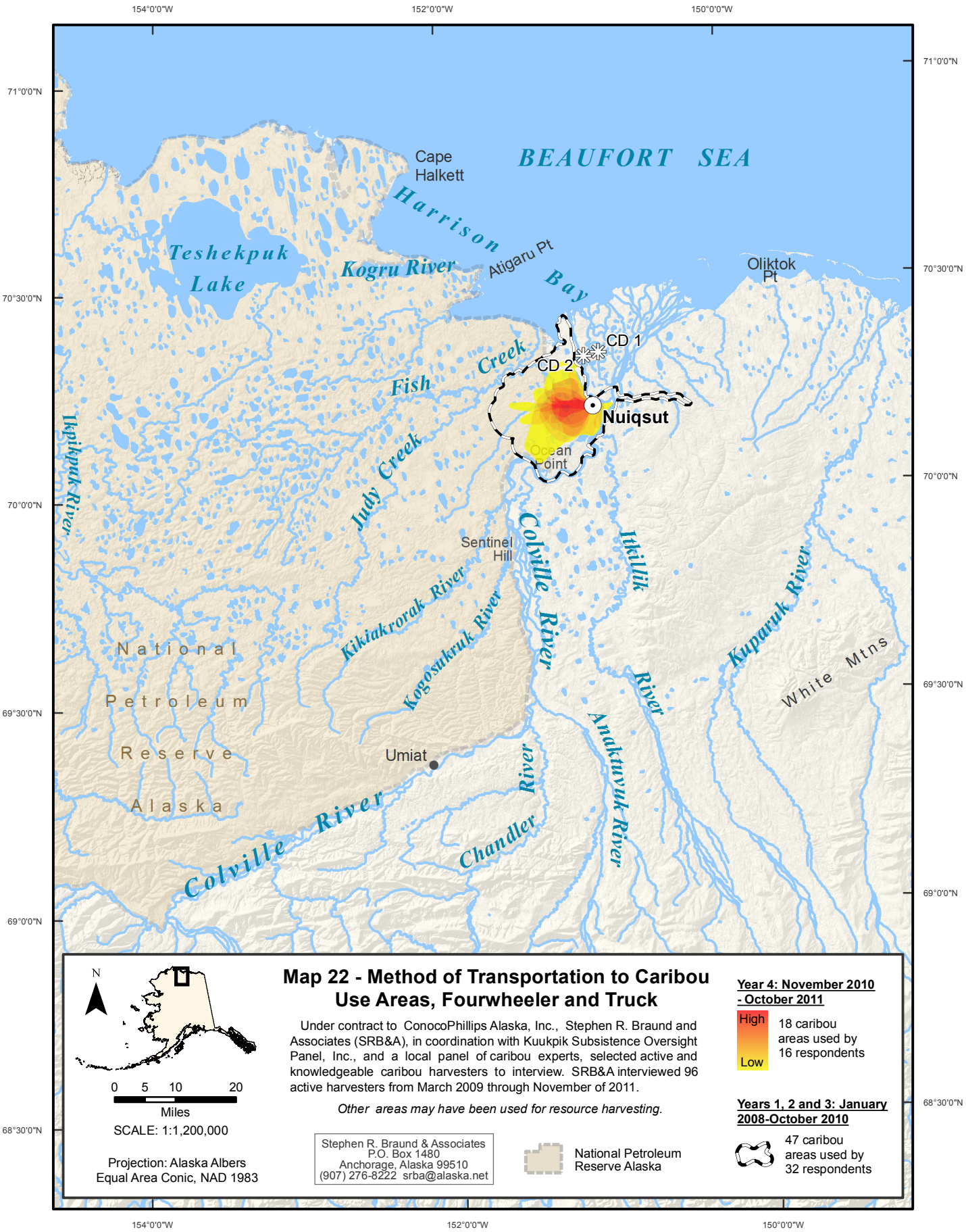
Year 4: November 2010 - October 2011

High — Low

156 caribou areas used by 57 respondents

Years 1, 2 and 3: January 2008-October 2010

409 caribou areas used by 82 respondents



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

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

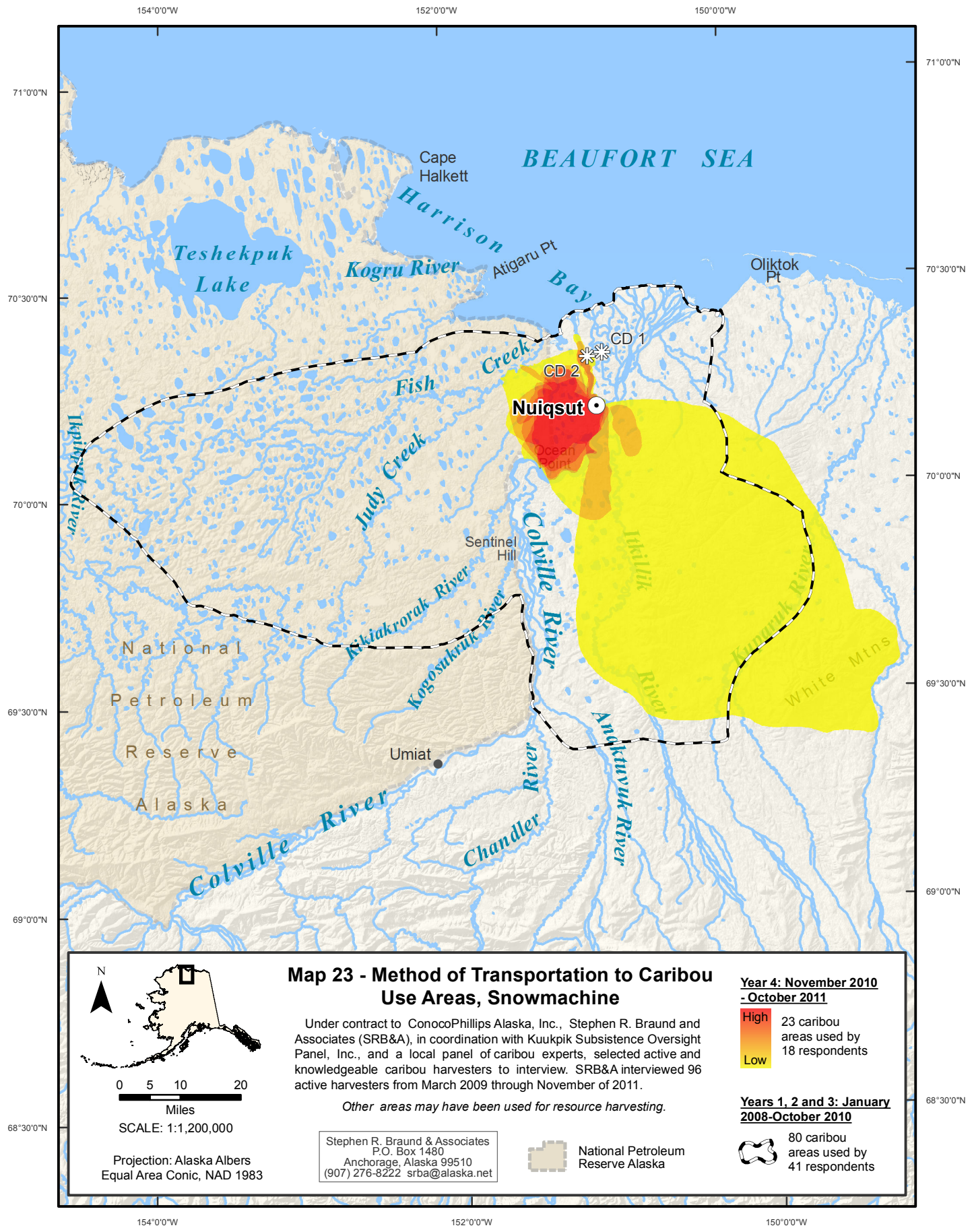
National Petroleum Reserve Alaska

Year 4: November 2010 - October 2011

High — Low: 18 caribou areas used by 16 respondents

Years 1, 2 and 3: January 2008-October 2010

47 caribou areas used by 32 respondents


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
CD 1
CD 2
Nuiqsut
Fish Creek
Judy Creek
Ocean Point
Itkillik River
Sentinel Hill
Colville River
Kikiakrorak River
Kogosukruk River
Kuparuk River
White Mtns
National Petroleum Reserve Alaska
Umiat
Chandler River
Anaktuvuk River
Colville River
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers Equal Area Conic, NAD 1983
Map 23 - Method of Transportation to Caribou Use Areas, Snowmachine
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: November 2010 - October 2011
High
Low
23 caribou areas used by 18 respondents
Years 1, 2 and 3: January 2008-October 2010
80 caribou areas used by 41 respondents

Harvest Success

The percentage of caribou use areas in which respondents reported successful harvests has dropped each study year, from 78 percent in Year 1 to 55 percent in Year 4 (Table 11). In addition, the percentage of respondents who reported use areas where they were not successful increased over the four study years, from 47 percent in Year 1 to 76 percent in Year 4. While overall harvest estimates have not dropped (see "Harvest Amounts") over the same time period, the data show that respondent harvests have been concentrated into a smaller portion of use areas. They also show that a higher percentage of respondents are unsuccessful at one or more of their hunting areas.

Table 11: Percentage of Caribou Use Areas in Which Respondents Reported Successful Harvests, Nuiqsut, Years 1-4

	% of Use Areas				% of Respondents			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
No	22%	39%	42%	45%	47%	68%	72%	76%
Yes	78%	61%	58%	55%	100%	89%	95%	93%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Number of Trips	137	187	215	195	36	53	57	58

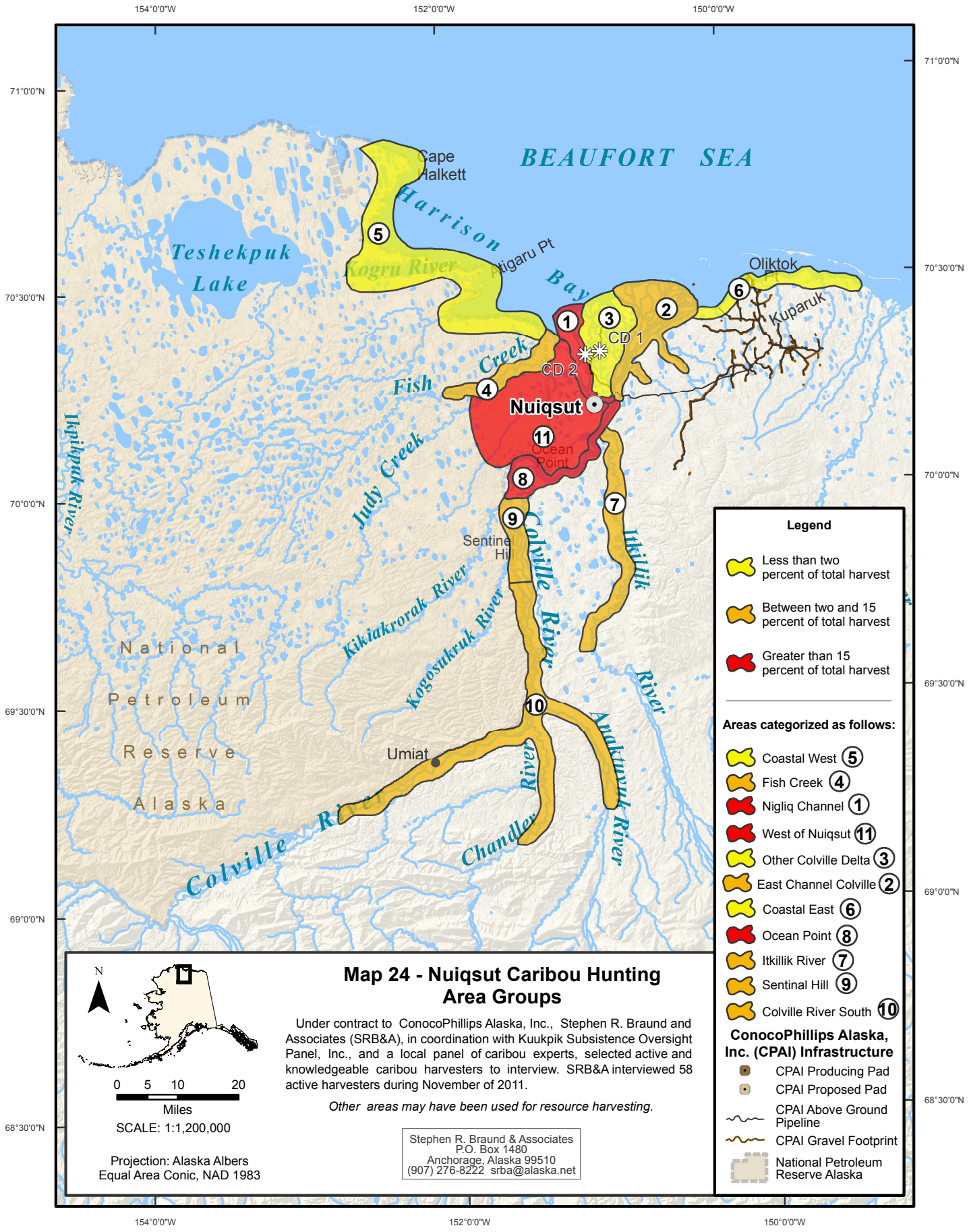
Stephen R. Braund & Associates, 2013.

Table 12 reports the percentage of caribou harvest locations and the percentage of caribou harvested for each study year by 12 caribou hunting areas. The study team identified these 12 geographic caribou hunting areas based on residents' descriptions of those areas as separate hunting activities (e.g., Nigliq, Fish Creek, Coastal area west of Nuiqsut, upriver to Sentinel Hill, upriver to Umiat) (see Map 24). Map 24 depicts the geographic boundary of each hunting area group and categorizes each area as yellow, orange, or red. The yellow areas represent the smallest percentage of the total caribou harvest (less than 2 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).

During Year 4, the area west of Nuiqsut (Area 11) accounted for the highest portion (40 percent) of the caribou harvested, an increase from previous years: 30 percent of harvests occurred in this area in Year 3, 17 percent in Year 2 and 18 percent in Year 1 (Table 12). Ocean Point (Area 8) was the second most productive hunting area, with 17 percent of the total caribou harvest, followed by Nigliq Channel (Area 1) with 15 percent of the total harvest. The East Channel of the Colville River (Area 2) had the next highest harvest totals with 10 percent (a higher percentage than in previous years), followed by the Sentinel Hill area (Area 9) (five percent) and Itkillik River (Area 7) and Colville River South areas (Area 10), which each accounted for four percent of the total reported caribou harvests. Harvests at Nigliq Channel have declined steadily throughout the study years, from 23 percent of the harvest in Year 1 to 15 percent in Year 4 (Table 12).

As shown on Map 24, three areas closest to the community of Nuiqsut (Nigliq Channel, West of Nuiqsut, and Ocean Point) accounted for a majority (the first 70 percent) of reported caribou harvests during Year 3. Those areas, in addition to the East Channel of the Colville River accounted for the first 80 percent of caribou harvested.

Map 25 depicts both successful and unsuccessful hunting areas as reported by Year 4 respondents. In both cases, use areas are concentrated along the Nigliq Channel and Colville River. Overlapping successful areas are more concentrated in the overland area west of the community; however, in general, there is no overall difference in the location of successful and unsuccessful areas in Year 4.

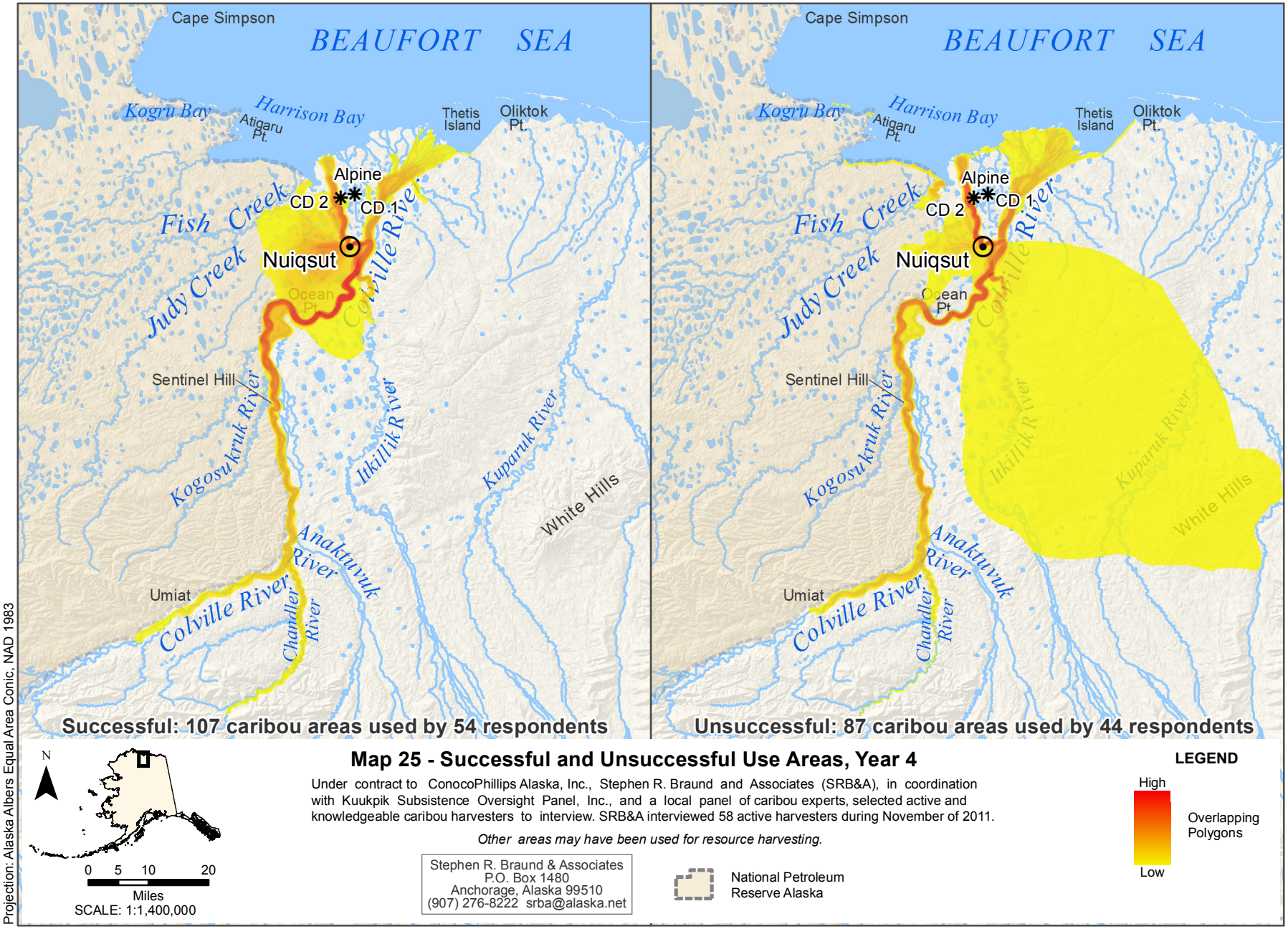


Map 24 - Nuiqsut Caribou Hunting Area Groups

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 58 active harvesters during November of 2011.

Other areas may have been used for resource harvesting.

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



Map 25 - Successful and Unsuccessful Use Areas, Year 4

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 58 active harvesters during November of 2011.

Other areas may have been used for resource harvesting.

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

National Petroleum Reserve Alaska

LEGEND

High

Overlapping Polygons

Low

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

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

Stephen R. Braund & Associates, 2013.

Table 13 shows the number of harvest locations by the number of caribou harvested. In general, residents reported harvesting fewer than 10 caribou at any given caribou harvest location. In most cases, residents reported harvesting 1 to 2 caribou at a single harvest location. In Year 4, 151 of the 163 harvest locations (93 percent) represented harvests of five or fewer caribou. Compared to previous study years, respondents reported a higher number of harvest locations where they harvested four or more caribou, and a lower number of harvest locations where they harvested only one caribou. This may reflect the increasing percentage of caribou harvested west of the community by four-wheeler or snowmachine. Residents may be more likely to harvest multiple caribou when using these modes of travel and when harvesting caribou within a close distance from the community.

Table 13: Number of Caribou Harvested by Number of Harvest Locations, Years 1-4

Number of Caribou Harvested	Year 1	Year 2	Year 3	Year 4
1	95	75	99	58
2	44	48	60	47
3	19	16	22	19
4	7	8	7	17
5	13	4	5	10
6	1	1	2	6
7	2	0	0	1
8	0	0	0	2
9	0	0	0	1
10	0	0	0	1
11	0	0	0	1

Stephen R. Braund & Associates, 2013

Duration of Trips

The typical duration of caribou hunting trips has maintained a similar pattern across all four years. Residents typically take day trips to over 80 percent of their caribou hunting areas (90 percent in Year 4) (Map 26). Residents took trips lasting between two and six nights to at least seven percent of caribou use areas during each study year (eight percent in Year 4). Residents also reported the longest trip they took to each area during the study year. In Year 4, residents indicated that they took only same day trips to 81 percent of their caribou use areas. This was similar to Year 3 but substantially higher than in Year 1 and Year 2. The percentage of longest trips taking at least two days has dropped from its peak in Year 2 of 32 percent of all of the longest trips to 16 percent in Year 3 and 15 percent in Year 4 (Table 15).

At 12 percent of Year 4 use areas, residents indicated that their longest trip lasted between two and six nights, and at three percent of use areas, residents' longest trip lasted between one and two nights. Map 26 depicts use areas where respondents reported staying for one or more nights, and Map 27 depicts use areas where respondents reported taking same day trips. The red areas depict higher numbers of overlapping use areas on each map and do not reflect differences in trip length.

As shown in Map 26, respondents most commonly reported taking overnight trips when traveling upriver by boat from Nuiqsut. Respondents rarely reported taking overnight trips in areas downriver from the community such as Nigliq Channel. No overnight trips were reported in use areas along the East Channel of the Colville River, and no overnight trips were reported during overland (i.e., snowmachine or four-wheeler) trips. In general, distance from the community resource availability seemed to be the primary reasons given for camping trips versus day trips. Two individuals observed,

> *I did a two day campout about half of the distance where I went in [to the Colville], checking to see for moose at the same time.* (SRB&A Nuiqsut Interview November 2011)

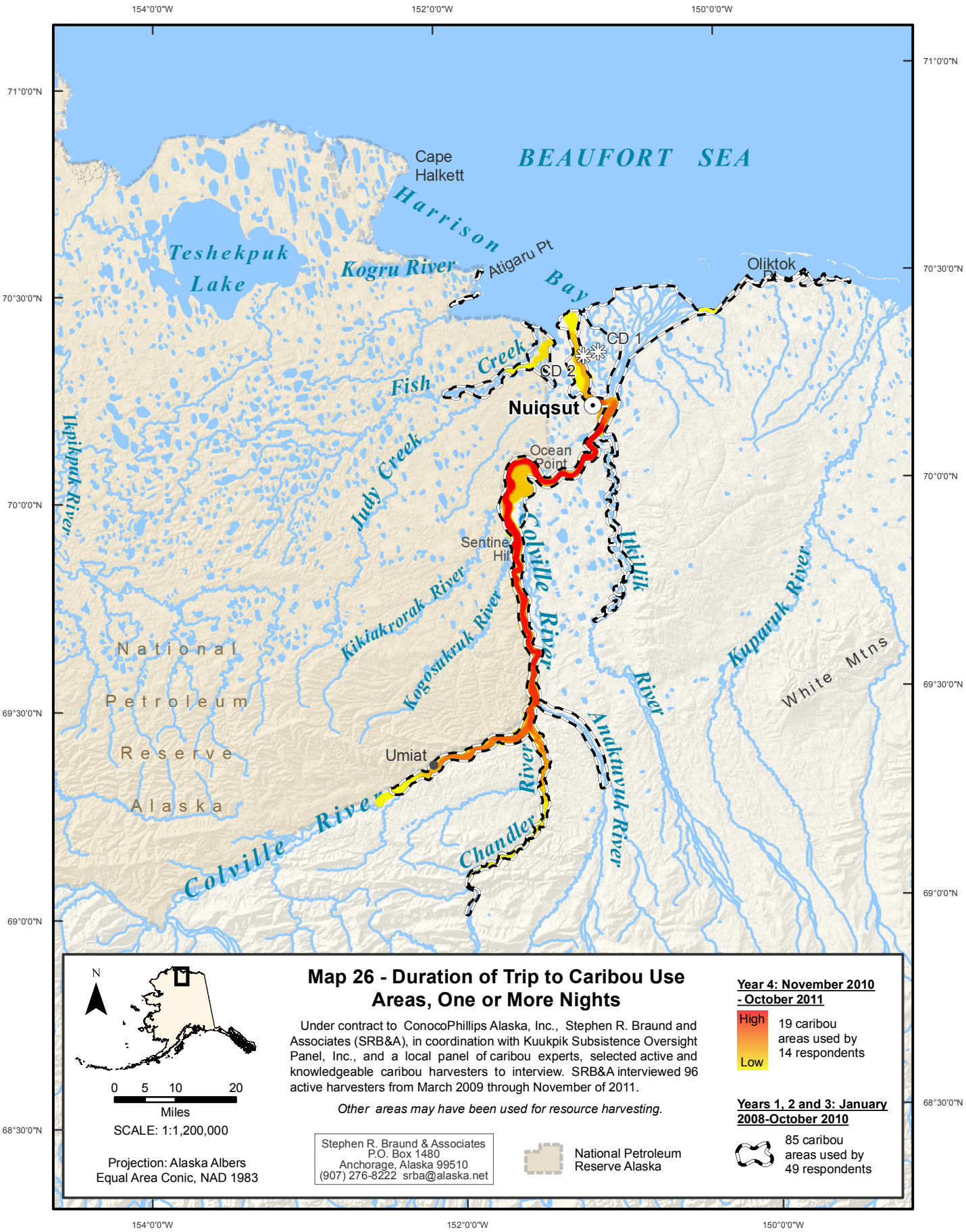
> *Maybe three or four times [into Itkillik in] August and September. Maybe a few more times in August cause we went in there looking for moose. [We took] all day trips cause it's so close to home.* (SRB&A Nuiqsut Interview November 2011)

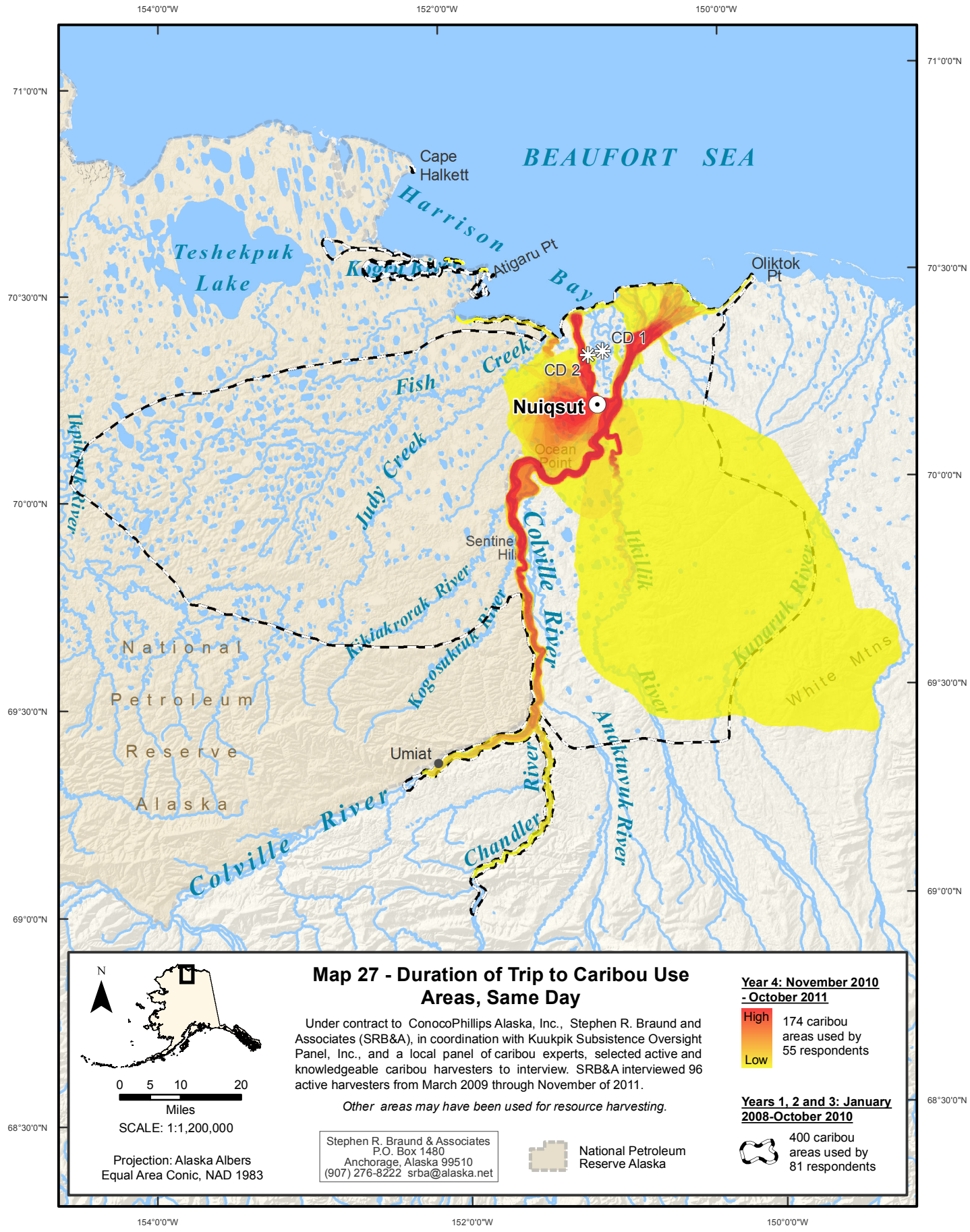
> *[How many trips did you take?] It was actually go home, get more bullets and get back up. It takes 6.5 hours to go there and back…. Most of my boating trips are about 6 six days to a week; I stay out until I catch something. I don't like coming home with nothing, especially when you spend $600 on fuel. You have to make it count. (SRB&A Nuiqsut Interview November 2011)*

Frequency of Trips

The distribution of the number of trips taken to caribou use areas has remained relatively consistent over the four years, with about 20 percent of caribou use areas in each of the following reporting category: 1 trip, 2-3 trips, 4-5 trips, and 6-20 trips (Table 16). Nuiqsut harvester respondents were more likely to take more than 20 yearly trips to a caribou use area in Years 3 and 4 with nine and seven percent of use areas, respectively, associated with 20 or more trips per year compared to zero percent during Years 1 and 2 (Table 16).

The frequency of trips to a use area depended on various factors, including the distance of the area from the community, hunting success, availability of transportation to the user, and personal reasons. One respondent described the frequency of trips taken throughout the summer, saying, "Almost all summer it seems like. Every day, just about every day, more than twenty times total…. [We just go] up and back" (SRB&A Nuiqsut Interview November 2011).


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Teshekpuk Lake
Kogru River
Oliktok
CD 1
CD 2
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Itkillik River
Colville River
Sentine Hill
Kikiakrorak River
Kogosukruk River
Kuparuk River
White Mtns
National Petroleum Reserve Alaska
Umiat
Chandler River
Anaktuvuk River
Colville River
Miles
0 5 10 20
SCALE: 1:1,200,000
Projection: Alaska Albers Equal Area Conic, NAD 1983
Map 26 - Duration of Trip to Caribou Use Areas, One or More Nights
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 96 active harvesters from March 2009 through November of 2011.
Other areas may have been used for resource harvesting.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
National Petroleum Reserve Alaska
Year 4: November 2010 - October 2011
High
Low
19 caribou areas used by 14 respondents
Years 1, 2 and 3: January 2008-October 2010
85 caribou areas used by 49 respondents



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

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

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

National Petroleum Reserve Alaska

Year 4: November 2010 - October 2011

High — Low

174 caribou areas used by 55 respondents

Years 1, 2 and 3: January 2008-October 2010

400 caribou areas used by 81 respondents

Table 14: Caribou Hunting Typical Trip Duration, Nuiqsut, Years 1-4

	Year 1	Year 2	Year 3	Year 4
More than 2 weeks	0%	1%	0%	0%
1-2 Weeks	1%	1%	1%	1%
2-6 Nights	7%	15%	7%	8%
1 Night	5%	2%	2%	1%
Same Day	87%	81%	90%	90%
Total	100%	100%	100%	100%
Number of Trips	135	176	212	193
Chi Square p = .028				

Stephen R. Braund & Associates, 2013.

Table 15: Caribou Hunting Longest Trip Duration, Years 1-4

	Year 1	Year 2	Year 3	Year 4
More than 2 weeks	1%	2%	0%	0%
1-2 Weeks	3%	6%	4%	3%
2-6 Nights	20%	24%	12%	12%
1 Night	6%	5%	4%	4%
Same Day	70%	63%	80%	81%
Total	100%	100%	100%	100%
Number of Trips	97	163	211	193
Chi Square p = .011				

Stephen R. Braund & Associates, 2013.

Table 16: Caribou Hunting Number of Trips, Nuiqsut, Years 1-4

	Year 1	Year 2	Year 3	Year 4
20+	0%	0%	9%	7%
6-20 trips	30%	28%	21%	28%
4-5 trips	23%	21%	19%	15%
2-3 trips	27%	26%	27%	29%
1	20%	24%	24%	21%
Total	100%	100%	100%	100%
Number of Trips	121	174	212	193
Chi Square p = .001				

Stephen R. Braund & Associates, 2013.

Caribou Hunting Areas Over Time

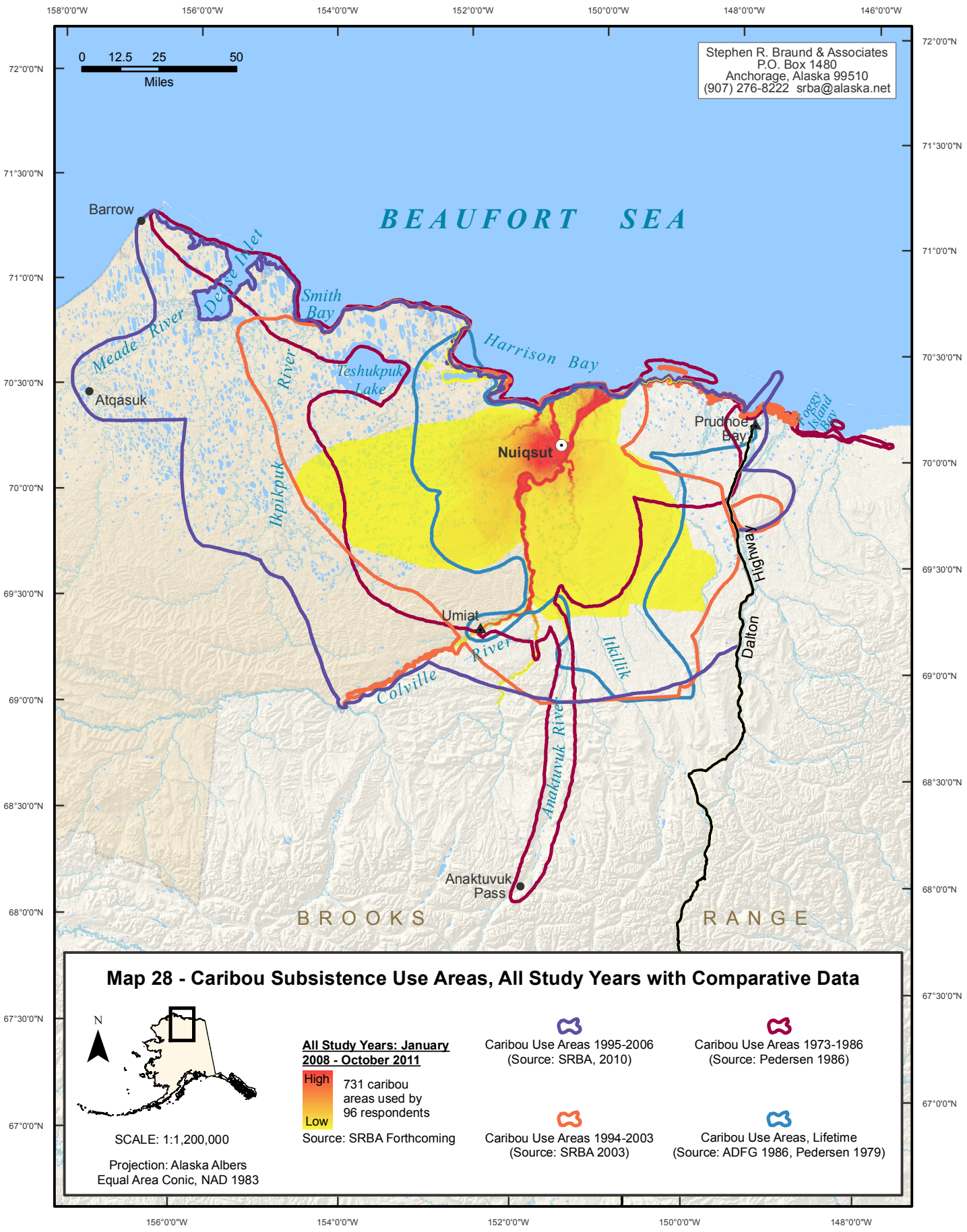
Map 28 shows Years 1 through 4 caribou use areas in addition to use area data from previous studies. These include lifetime use areas documented by Pedersen (1979) and updated for the 1973-1986 time period (Pedersen 1986), use areas documented by SRB&A for an approximately 10 year time period (1995-2006) in a separate mapping study (SRB&A 2010b), and use areas documented for the 1994-2003 time period by SRB&A related to the Alpine Satellites EIS (SRB&A 2003). Although not shown on Map 28. Brown (1979) published Nuiqsut use areas in *Nuiqsut Heritage: A Cultural Plan* (also referred to as *Nuiqsut Paisaŋiich*). The areas documented in Brown (1979) are almost identical to Pedersen's (1979) use areas documented around the same time (Map 28).

In general, the lifetime and 10 year mapping studies (Map 28) show a greater extent of caribou use areas than for Years 1 through 4, likely due in part to the larger study periods. These studies also included documentation of use areas for other resources such as wolf and wolverine. Caribou are sometimes harvested as needed during wolf and wolverine hunting, and this pattern of use is reflected in the 1995-2006 use areas, where areas used primarily for wolf and wolverine hunting were also documented as caribou use areas. When asked specifically about caribou (as in the Nuiqsut Caribou Subsistence Monitoring Study), respondents are much less likely to identify these larger wolf and wolverine areas, as caribou are not the "target" species.

In its mapping study for the 1995-2006 time period, SRB&A employed the same "overlapping use areas" method used in the Nuiqsut Subsistence Caribou Monitoring study. Map 29 shows the overlapping Years 1 through 4 (2008 through 2011) use areas side by side with the overlapping 1995-2006 use areas, in the area of the Colville River Delta. It is important to note that the red on each map is relative and not based on the same scale (i.e., the red on one map represents a different number of overlapping use areas than the red on another map). However, a comparison of these two data sets indicates less use of the middle Colville Delta and, in particular, the Tamayayak and Elaktoveach channels, in recent years. More overland use areas shown for the 1995-2006 time period may be in part due to the reporting of wolf/wolverine use areas as caribou use areas (as discussed above).

Harvest Amounts (Household Harvest Surveys)

This section presents the results of the Year 4 household caribou harvest surveys alongside harvest data available from ADF&G and NSB harvest studies from previous years. Table 17 compares harvest information over time. The percentage of households using caribou has remained above 90 percent during every available study year since 1985. The percentage of households attempting to harvest caribou has varied over time, with the percentage in Year 4 being in the mid-range of reported values (70 percent of households). However, the percentage of households reporting successful harvests was lower in 2011 than in most previous study years, at 56 percent. By comparison, 76 percent of households reported successful harvests in the previous year (Year 10). The only year where a smaller percentage of households reported successful harvests was in the year 2002-03; however, in this year only a slightly higher percentage (47 percent) reported trying to harvest caribou. In Year 4, there was a difference of 14 percentage points between households who attempted harvesting caribou and those who successfully harvested caribou. The percentages of households giving or receiving caribou were also relatively low in Year 4, with 49 percent giving and 58 percent receiving caribou in this year. The estimated harvest in Year 4 (408 caribou) was lower than Year 3 (471 caribou) and below the mean of the fourteen observations available from 1985 to 2011. The average pounds harvested per household in Year 4 (523 pounds) was somewhat lower than the average across all study years. However, pounds harvested per capita, at 134 pounds, was slightly higher than the mean of the fourteen observations between 1985 and 2011



Map 28 - Caribou Subsistence Use Areas, All Study Years with Comparative Data

SCALE: 1:1,200,000

Projection: Alaska Albers
Equal Area Conic, NAD 1983

All Study Years: January 2008 - October 2011

High
Low

731 caribou areas used by 96 respondents

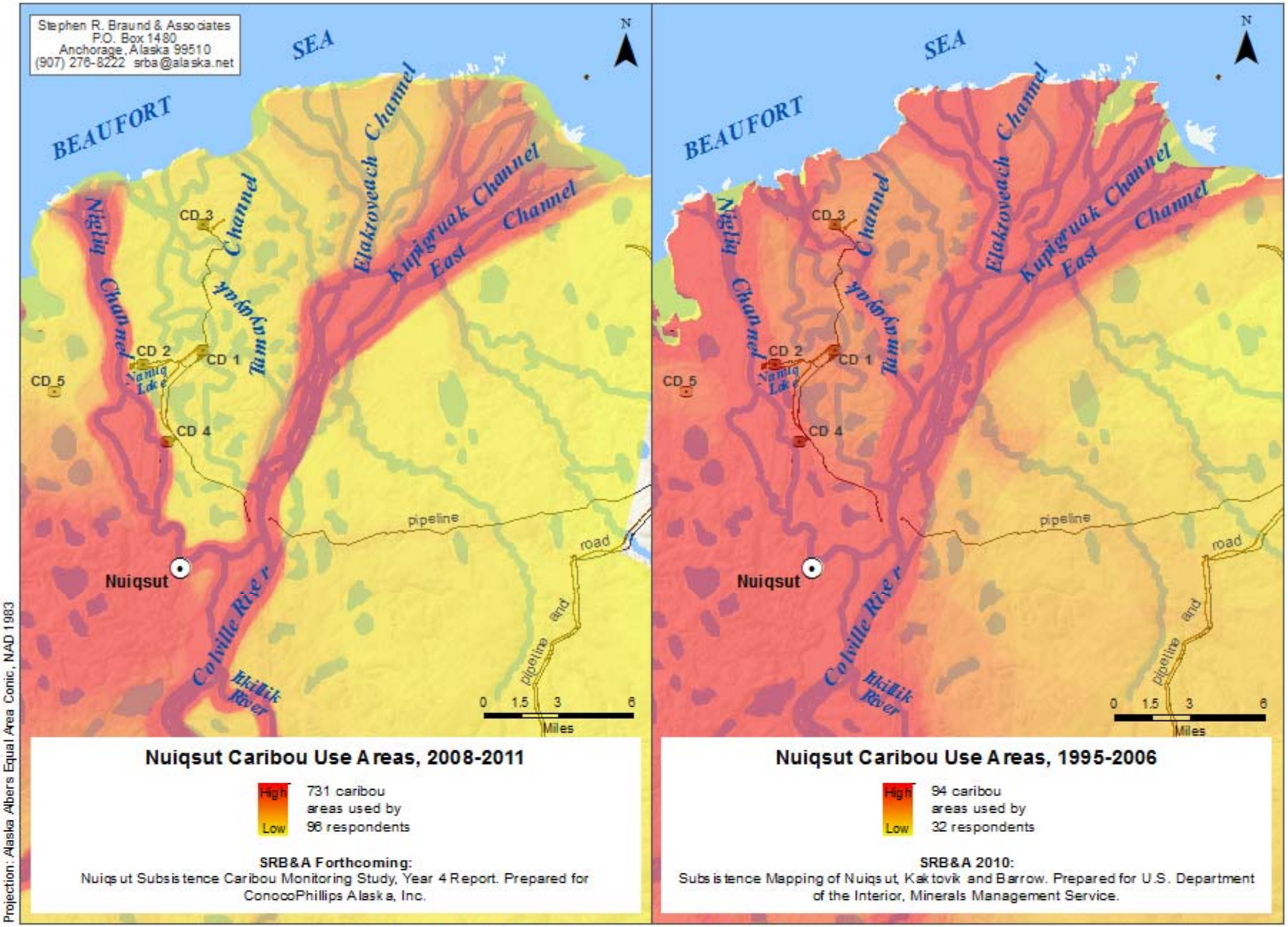
Source: SRBA Forthcoming

Caribou Use Areas 1995-2006
(Source: SRBA, 2010)

Caribou Use Areas 1973-1986
(Source: Pedersen 1986)

Caribou Use Areas 1994-2003
(Source: SRBA 2003)

Caribou Use Areas, Lifetime
(Source: ADFG 1986, Pedersen 1979)



Map 29 - Comparative Use Areas, Caribou, Colville River Delta

Table 17: Nuiqsut Caribou Harvests 1985-2011

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%			562	65,754	707		SRB&A 2011
2011	92%	70%	56%	49%	58%	498	58,226	619	134	SRB&A 2012
Mean of observed values	97%	72%	67%	77%	74%	444	52,498	560	129	

Blank cells indicate data not available

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

Observations of Changes in Harvest Patterns

During the active harvester interviews, caribou harvester respondents were asked if any of the following hunting attributes had changed from the previous year: hunting area, frequency of trips, duration of trips, months of use, and harvest amounts. In each case where they answered that a change had occurred, harvester respondents were asked to describe the change and to state what they believed (or thought) caused the change. Table 18 summarizes the percent of respondents reporting a given type of change.

The percentages of respondents reporting changes in hunting area, frequency, duration, and harvest amount in Year 4 are all within the range of variation for the previous three years of observation. There are no observed trends in these four variables. The percentage of households reporting a change in months (21 percent) is nine percentage points higher than in Year 3 and six percentage points higher than in Year 2. Figure 2 showed a higher percentage of Year 4 harvests occurring in September compared to previous years. Respondents were also asked if they harvested enough caribou to meet their needs. Table 19 shows that 16 percent of respondents reported not harvesting enough caribou in Year 4 compared with 21, 53, and 47 percent in Years 3, 2, and 1 respectively. The data shown in Table 19 indicate an increase in the percentage of respondents who believed they had harvested enough caribou during the previous 12 months.

Changes in Harvest Amount

During Year 4 interviews, 72 percent of Nuiqsut respondents reported a change in harvest amounts, within the range of variation observed in previous years, with 75 percent reporting a change in harvest amount in Year 1, 85 percent in Year 2 and 68 percent in Year 3 (Table 18). The 72 percent of respondents reporting a change in harvest amounts is divided into 55 percent who reported harvesting less and 17 percent who reported harvesting more (Table 20). The percentage reporting that they harvested less is higher than in Year 3 but lower than in Years 1 and 2.

Table 21 shows a cumulative list of reasons given for a decrease in harvest from the previous year. The most common reasons given for a decrease in harvest in Year 4 were “personal reasons,” “I don’t know,” “lack of transportation/equipment,” “change in subsistence providers,” “employment/lack of time,” and “resource availability,” The most common reason given during previous study years was a more general observation of “take fewer trips” (Table 21).

Personal reasons is the category capturing the largest number of reasons given for a decrease in harvest amount in Year 4 (Table 21). Five respondents did not know the reason for the decrease and four respondents each mentioned one of the following reasons: lack of transportation equipment, change in subsistence providers, employment/lack of time, and resource availability. Three respondents mentioned a change related to the distribution or migration of caribou. Two respondents each mentioned that a change in the number of subsistence dependents as the reason for a decreased harvest. Helicopter traffic disturbance was not mentioned as a reason for a decrease in harvest in Years 2 or 3, but was mentioned as a reason by four respondents in Year 1.

One individual noted that he harvested more caribou than he could handle during the previous year and decided to harvest fewer in Year 4. He described, “[I got] less, because I got 25 last year; just too much [to handle]. My dad wanted me to go every day and I said, ‘No, just every other week or so and wait until they get a little fatter.’” Two individuals cited injuries that prevented them from hunting as much, and one individual indicated that he had focused more on harvesting moose in Year 4.

Four respondents faulted a lack of transportation such as four-wheelers or snowmachines for their decreased harvest (Table 21). Two respondents described,

> *I usually get one or two, but I didn't go out too much [this year]. No transportation. My four-wheeler broke down. I had to use my stepdad's. I helped butcher some though.* (SRB&A Nuiqsut Interview November 2011)

> *Usually I get about five [less harvested this year]. I didn't have a snowmachine or Honda, that's why.* (SRB&A Nuiqsut Interview November 2011)

Table 18: Percentage of Respondents Reporting Changes in Harvest Activities Compared to Previous Year, Years 1, 2, 3 and 4[1]

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Hunting Area Changed	31%	28%	39%	33%
Frequency Changed	50%	77%	65%	60%
Duration Changed	39%	32%	21%	21%
Months Changed	19%	15%	12%	21%
Harvest Amount Changed	75%	85%	68%	72%

Stephen R. Braund & Associates, 2013.

Table 19: Percentage of Respondents Reporting Not Harvesting Enough Caribou, Years 1, 2, 3 and 4

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Reported Did Not Harvest Enough	47%	53%	21%	16%

Stephen R. Braund & Associates, 2013.

Table 20: Type of Change in Harvest Amount, Years 1-4

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Harvest more	11%	15%	21%	17%
Harvest less	64%	70%	47%	55%

Stephen R. Braund & Associates, 2013.

[1] In the Year 1 and Year 2 reports, the percentage of respondents reporting changes in harvest activities was calculated based on the total number of respondents interviewed (including elders). In this report as well as the Year 3 report, the percentage of respondents is based on the total number of respondents who participated in the active harvester interview (not including elders who had not hunted during the previous year), as these questions were only asked of active harvesters. Thus, the percentages depicted for Years 1 and 2 are slightly different than those depicted in previous study year reports.

Table 21: Reasons for Decrease in Harvest Amount, Nuiqsut, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	0	3	3	7
I Do not Know	0	2	1	5
Lack of transportation/equipment	2	1	3	4
Change in subsistence providers	1	1	2	4
Employment/Lack of time	1	2	2	4
Resource Availability	8	9	2	4
Change in distribution/migration	0	1	0	3
Change in subsistence dependents	3	2	0	2
Helicopter Traffic Disturbance	4	0	0	2
Take fewer trips	0	1	6	1
Moved out of area	0	0	3	1
Climate affecting travel	0	0	0	1
Airplane Traffic Disturbance	2	1	0	1
Sport Hunting and Fishing	0	0	0	1
Concern of Disease/Infection	0	0	0	1
Miscellaneous	0	0	0	1
Farther from riversides/farther inland	0	2	4	0
Development	2	1	2	0
Reduced harvest opportunities	0	0	1	0
Worse success	0	0	1	0
Wind	0	0	1	0
Skittish Behavior in Species	0	0	1	0
Predators	0	0	1	0
Earlier Migration/Arrival	0	0	1	0
Need less	2	0	0	0
More difficult	2	0	0	0
Travel farther to harvest resource	1	0	0	0
Air Traffic	1	0	0	0
Oil Drilling	0	1	0	0
Pipeline	1	1	0	0
Contamination from air pollution	0	1	0	0
Sport Hunting Methods Disturbing Migration Routes	0	1	0	0
Resource in Smaller Groups	1	0	0	0
Increase in Predators	0	1	0	0
Migration changed or diverted	3	5	0	0
Further from Community	0	1	0	0
Change in Food Availability	0	2	0	0

Stephen R. Braund & Associates, 2013.

Four respondents indicated a change with their subsistence provider, which decreased their personal caribou harvest. In all of these cases, other individuals in the respondent's family had been more active hunters during the previous year, resulting in the respondent needing to harvest fewer caribou. Two individuals observed,

> *Like I said my brother came in and did more hunting with my dad. I don't really like to waste or get more than I need, stuff like that.* (SRB&A Nuiqsut Interview November 2011)

> *Less [that he caught]; I was hunting with one of my cousins, and my brothers were hunting on their own.* (SRB&A Nuiqsut Interview November 2011)

In addition, two residents indicated that they had fewer people to hunt for in Year 4. Employment and lack of time reduced hunting activities for four respondents, resulting in decreased caribou harvests. One individual said, "It was only half of what I usually catch. I wasn't here [a lot], and there was already a lot of caribou caught in the family" (SRB&A Nuiqsut Interview November 2011).

Four residents considered resource availability the reason for their decreased harvest. These hunters suggested that fewer caribou were in their usual hunting areas during Year 4, that they hesitated to cross Nigliq Channel, and that hunters missed opportunities to harvest them when they did finally cross:

> *This year is not too good. That herd took off someplace. Either they came through the coast and we missed them… but the ones that go through the coast usually return through the south of Nuiqsut. There are less in the whole area I would say.* (SRB&A Nuiqsut Interview November 2011)

> *Little lower [than usual]. Due to the fact that it took a long time for them to cross. Most of the time when they went across the river it was at night when we were sleeping.* (SRB&A Nuiqsut Interview November 2011)

> *I just hardly saw some this year. Pretty much the whole time we were going to Nigliq, we never see no caribou.* (SRB&A Nuiqsut Interview November 2011)

Similar to their observations about reduced resource availability, residents also blamed their decreased harvest in Year 4 on changes in the distribution or migration of caribou, as well as disturbances due to air traffic not only from oil companies but from federal agencies and sport hunters. According to these respondents, caribou were not in expected locations, they arrived late to the area, and they were further out than normal:

> *We were a little further out for one thing. You would be lucky if you get one real close. When they are lucky it's okay.* (SRB&A Nuiqsut Interview November 2011)

> *Just that one chopper down by Anaktuvuk. It's their way of hunting now; I don't know why they are doing that. There was a bunch of caribou up there, but that chopper came around, and they started running inwards. They got them after that.* (SRB&A Nuiqsut Interview November 2011)

> *I got a little less than last year. Air traffic. Choppers way up here in the Umiat area. Choppers and those headhunters, planes.* (SRB&A Nuiqsut Interview November 2011)

> *I guess it's just [due to] movement. I don't know if the air traffic had anything to do with it. Not always by the oil companies, but BLM.* (SRB&A Nuiqsut Interview November 2011)

As shown in Table 20, 17 percent of Nuiqsut active harvester respondents reported harvesting more caribou in Year 4 compared to Year 3. The primary reasons given for an increased harvest were personal reasons and resource availability (Table 22).

Table 22: Reasons Given for Increase in Harvest Amount, Nuiqsut, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	2	2	1	5
Resource Availability	0	2	2	4
Change in subsistence providers	0	0	1	1
Change in subsistence dependents	1	0	1	1
I Do Not Know	0	0	0	1
Take more trips	1	3	2	0
Moved into area	0	0	2	0
Better transportation/equipment	0	0	1	0
Better success	0	0	1	0
Migration changed or diverted	0	0	1	0
Need more	0	1	0	0
Closer to Community	1	0	0	0

Stephen R. Braund & Associates, 2013.

The research team coded five responses under "personal reasons" for an increase in harvest amounts. Three of these were first time harvesters; the others had harvested more during Year 4 because they had not hunted during the previous year. The responses below describe personal reasons for an increased harvest:

> *I caught only one, and he caught the rest of them. This one I caught. I brought it to my mom; I gave her the whole thing. When you catch your first caribou you're supposed to give it to an elder, so I gave it to my mom…. This time I followed by husband! I said "I'm not staying home this year!"* (SRB&A Nuiqsut Interview November 2011)

> *This was the first caribou I caught in my life. I was using a scope. The first time I missed, and I caught it the second time.* (SRB&A Nuiqsut Interview November 2011)

Four residents indicated that "resource availability" caused their increased harvest. Specifically, respondents either attributed their success during Year 4 to being "lucky" or compared a more successful Year 4 to a poor previous year.

> *The season was good, the freezer was full. I don't know why, we just got lucky. Somehow whenever we went out we saw groups of them.* (SRB&A Nuiqsut Interview November 2011)

> *I got 11 or 12 [caribou]. It was a good year. It was more than last [year]. There was a lot of animals on the west of us in October.* (SRB&A Nuiqsut Interview November 2011)

Other reasons for increased harvests involved changes in the number of subsistence providers or subsistence dependents. One individual noted that he had more people to provide for in Year 4, saying, "Everybody wanted caribou. I had to be [active]" (SRB&A Nuiqsut Interview November 2011).

Changes in Trip Frequency

As shown in Table 18, the percentages of harvester respondents reporting a change in trip frequencies has varied over the four study years from 50 percent (Year 1) to 77 percent (Year 2), 65 percent (Year 3), and 60 percent (Year 4). In Year 4, 34 percent of respondents reported taking fewer trips and 26 reported

taking more trips (Table 23). Both figures are similar to prior years. "Personal reasons" was the most frequently cited category for explaining an increase in the frequency of trips in Year 4, with seven observations, followed by "resource availability" (four observations) and "better transportation/equipment" (two observations) (Table 24). "Weather," and "change in subsistence" were also given as reasons by respondents for taking more trips during Year 4. There are no trends in the frequency of different reasons given for an increase in the number of trips.

Table 23: Type of Change in Trip Frequency, Nuiqsut, Years 1-4

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

Stephen R. Braund & Associates, 2013

Table 24: Reasons for Increase in Trip Frequency, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	0	6	7	7
Resource Availability	4	7	2	4
Better transportation/equipment	0	0	7	2
Weather	0	0	0	1
Change in subsistence	0	0	0	1
I Do not Know	0	1	0	1
Need more	0	0	2	0
Moved into area	0	0	1	0
Moved out of area	0	0	1	0
Sharing More	1	0	0	0
Mitigation Funds	1	0	0	0
Competition with sport hunters	0	1	0	0
Traffic Disturbance	1	1	0	0
Development	2	1	0	0
Pipeline	1	0	0	0
Migration changed or diverted	2	0	0	0

Stephen R. Braund & Associates, 2013

As noted above, seven individuals cited personal reasons for an increase in trip frequency in Year 4. Their comments generally indicated that they hunted more in Year 4 primarily for personal enjoyment:

> *More [trips] just looking for caribou. We decided a boat ride was relaxing after work.* (SRB&A Nuiqsut Interview November 2011)

> *[I] just wanted to go. Even fishing. I got some Arctic Chars with the fishing rod. That's up here.* (SRB&A Nuiqsut Interview November 2011)

More this year than the other times. Free time! Take me out! You know, I am a volunteer search and rescue and fishing all the time. (SRB&A Nuiqsut Interview November 2011)

Residents also increased their trip frequency due to "resource availability," most frequently because residents had difficulty finding caribou and therefore had to expend more effort to harvest them. However, one resident indicated that an abundance of caribou in the area led him to hunt more often, which resulted in his taking more frequent trips. Regarding the influence of resource availability on the frequency of their caribou hunting trips, two individuals observed,

I'd have to say about twenty trips maybe. Some days I would go down and there would be nothing so I'd come over here. More [trips] than usual. I would go out and find nothing. I'd go all the way over here and not find anything. (SRB&A Nuiqsut Interview November 2011)

I went out more this year because there were caribou out there. When you hear there's caribou around, you go out! (SRB&A Nuiqsut Interview November 2011)

Residents with new, better, or more equipment also conducted trips more frequently. Four residents reported that they hunted more frequently because of transportation or equipment. Two respondents reported,

I think I went more because I had my own boat. Yeah. (SRB&A Nuiqsut Interview November 2011)

I had more gas to burn. (SRB&A Nuiqsut Interview November 2011)

In Year 4, 34 percent of respondents reported a decrease in their trip frequency compared to the previous year (Table 23). As in the case of Year 3, "personal reasons" accounted for the largest number of reported reasons for a decrease in trip frequency (10 observations), followed by "employment/lack of time" (seven observations) and "lack of transportation" (five observations) (Table 25). Employment/lack of time and personal reasons were more commonly reported as reasons for a decrease in trip frequency in Year 4 compared to all previous years.

Table 25: Reasons for Decrease in Trip Frequency, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	2	2	8	10
Employment/Lack of time	3	3	5	7
Lack of transportation	4	10	6	5
I Do not Know	0	0	0	2
Moved into area	0	0	0	1
Moved out of area	0	0	1	0
Need less	0	1	0	0
Less Snow	1	0	0	0
Resource Availability	0	4	0	0

Stephen R. Braund & Associates, 2013

Personal reasons comprised the bulk of the explanations by residents for their decrease in trip frequency. Specifics ranged widely and included medical problems, absence from the community, and disruptions to their hunting partners' hunting activities. Seven residents indicated they had a lack of time for subsistence activities due to employment. The comment below illustrates how employment can conflict with subsistence activities:

It was like I say, because of work [I hunted less]. It's harder to do stuff. This coming year I know it will be more [trips hunting] cause the pump season will be short. (SRB&A Nuiqsut Interview November 2011)

Five residents decreased their trip frequency because they either lost access to transportation or could not afford gas to power their equipment. One individual observed, "I had snow machine trouble and no fuel. It takes like $600 bucks to fill up my boat!" (SRB&A Nuiqsut Interview November 2011). In contrast to the individual (discussed above) who took more trips because the caribou were in the area, one individual indicated that because the caribou moved into the Nuiqsut area ("moved into area," Table 25) he was able to successfully harvest caribou with less effort and therefore took fewer trips than he had in the previous year.

Changes in Trip Duration

Nuiqsut harvester respondents were equally likely to report a change in their trip duration in Year 4 as in Year 3, with 21 percent of harvester respondents reporting a change in both years, compared to 39 percent in Year 1 and 33 percent in Year 2 (Table 18). Twelve percent of Year 4 respondents reported taking longer trips than in previous years, and 9 percent reported taking shorter trips (Table 26). The percentage of respondents taking longer trips in Years 3 and 4 is considerably lower than in Years 1 and 2 while the percentage of respondents taking shorter trips has varied less over the four years.

Table 26: Type of Change in Trip Duration

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Take Longer Trips	33%	25%	9%	12%
Take Shorter Trips	6%	8%	12%	9%

Stephen R. Braund & Associates, 2013

"Personal reasons" and "resource availability" are the two most commonly cited reasons for taking longer trips in Year 4; one or both of these were also among the top cited reasons in prior years (Table 27). The only other reason mentioned for taking longer trips during the Year 4 study period was "travel farther to harvest resource," which was mentioned by one respondent.

Table 27: Reasons for Taking Longer Trips, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	0	3	3	3
Resource Availability	4	3	0	3
Travel farther to harvest resource	1	1	1	1
Worse success	0	0	1	0
Increased cost of living/expenses	0	1	0	0
More difficult	1	0	0	0
Helicopter Traffic Disturbance	2	0	0	0
Airplane Traffic Disturbance	2	0	0	0
Development	1	0	0	0
Migration changed or diverted	5	0	0	0
Farther from riversides/farther inland	0	1	0	0

Stephen R. Braund & Associates, 2013

Three active harvesters reported taking longer trips in Year 4 due to personal reasons. One respondent brought his young son with him, which increased the length of his trips. Another spent a night camping, unlike in previous years. Another respondent described their personal reasons for taking longer trips during Year 4 as follows:

> *Just felt like it, enjoying nature. It was so nice last summer, real beautiful. Like steam coming from the river with sunshine on top, it was pretty cool though. We don't know why it did that one day. The next day it didn't even do that.* (SRB&A Nuiqsut Interview November 2011)

Three respondents provided "resource availability" reasons for taking longer trips. These respondents blamed sparser populations of caribou, scattered herds, and hunting pressure for their longer trips in Year 4. One individual observed,

> *It was tiring, I had to wait. It was a long wait. It was slower when they crossed this [east channel] because there were people getting them there and they were scattered.* (SRB&A Nuiqsut Interview November 2011)

Nine percent of Year 4 active harvesters reported taking shorter hunting trips in Year 4 compared to the previous year (Table 26). A variety of reasons were provided by respondents for taking shorter trips during the Year 4 study period including "personal reasons," "lack of transportation/equipment," "resource availability," "I don't know," and "employment/lack of time" (Table 28).

Table 28: Reasons for Taking Shorter Trips, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	1	0	5	2
Lack of transportation/equipment	0	1	1	1
Resource Availability	0	0	1	1
I Do not Know	0	0	0	1
Employment/Lack of time	1	1	0	1

Stephen R. Braund & Associates, 2013.

"Personal reasons" account for why two respondents took shorter trips during Year 4. One respondent reported a broken toe, which hindered his movement; the other reported fewer overnight camping trips during Year 4 in favor of shorter day trips.

Changes in Use Area

As shown in Table 18, 33 percent of harvester respondents reported that their hunting area had changed in Year 4 compared to the previous year, similar to the percentages in Years 1 (31 percent), 2 (28 percent), and Year 3 (39 percent). Twenty-nine percent of Nuiqsut caribou harvester respondents reported a general change in use area in Year 4, and two percent reported that, compared to the previous year, they traveled farther (Table 29). Table 30 shows the reasons given for the more general observation of "use area changed." "Personal reasons" were cited by eleven respondents to explain their reported change in general use area, while four cited a lack of transportation or equipment and three cited shallower lakes or rivers (Table 30). "Change in distribution/migration," "resource availability," "development," and "river channel changed" were each mentioned once as reasons for respondents' use area change.

Table 29: Type of Change in Use Area, Nuiqsut, Years 1-4

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

Stephen R. Braund & Associates, 2013

Table 30: Reasons Given for a Change in Use Area, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	0	1	5	11
Lack of transportation/equipment	0	0	1	4
Shallower Rivers/Lakes	0	0	1	3
River channel changed	0	0	0	1
Development	1	0	0	1
Resource Availability	1	1	0	1
Change in distribution/migration	0	1	0	1
Better transportation/equipment	0	0	1	0
Employment/Lack of time	0	1	0	0
Increased cost of living/expenses	0	1	0	0
Climate affecting travel	0	2	0	0
Wind	0	1	0	0
Airplane Traffic Disturbance	1	0	0	0
Migration changed or diverted	1	2	0	0
Move to Different Areas	0	1	0	0

Stephen R. Braund & Associates, 2013

The eleven responses coded under the "personal reasons" category included two who simply did not go to one or more of their usual areas (no particular reason), four whose changes stemmed from their Year 4 hunting partners, one who had a personal injury, one first-time hunter for whom any hunting area was new, and several who hunted in different areas due to the presence or lack of industrial activity. The following quotes are from respondents who reported different use areas due to personal reasons:

> *I hardly went out this year, I wanted to go out when I came back from work but my brother didn't want to go out. I actually went in there, [Itkillik] I don't usually go in there. We went to catch the tutus but we didn't see any.* (SRB&A Nuiqsut Interview November 2011)

> *I usually hunt in Fish Creek area, but I didn't go this year. I'd rather go with a peer, I usually don't go by myself.* (SRB&A Nuiqsut Interview November 2011)

Four respondents explained that they changed their use area due to a "lack of transportation/equipment;" as two respondent described,

> *I usually go different areas, but this time I didn't have any gas this year. I go [east channel] to check nets this year. Some years I go all the way up to Chandler River for moose hunting [and caribou]. I usually go more. Usually I go around two o'clock and come back past midnight.* (SRB&A Nuiqsut Interview November 2011)

> *Last year I went on four-wheelers, and we'd go out this way off onto to the tundra. My Honda broke.* (SRB&A Nuiqsut Interview November 2011)

Boat access to certain use areas is often dependent on water levels. Three respondents cited "shallower rivers/lakes" in their normal use areas and another respondent indicated that higher water levels in the Chandler River allowed them to hunt in that area in Year 4. Two respondents observed,

> *Inside Itkillik [usually go there]. Just didn't feel like it I guess, too shallow. There was a lot of islands starting to form inside.* (SRB&A Nuiqsut Interview November 2011)

> *I went with someone else into Chandler. [We went] further inland. You could actually get inside Chandler this year. It was higher water and the moose are known to be in there.* (SRB&A Nuiqsut Interview November 2011)

One individual indicated that while he had hunted in his usual areas, he had noticed increased erosion and shallower waters in these areas, saying, "I think you got all my areas. Lands dropping that's all I know, it's getting more shallow too" (SRB&A Nuiqsut Interview November 2011).

Another three respondents described one each of the follow reasons for changing their use areas: "development," "resource availability," and "change in distribution/migration." One individual indicated that did not go to the East Channel of the Colville River in Year 4 due to another developer's (not CPAI) activities in that area:

> *I always did go up there, but with Pioneer's activities up there I was picturing another Alpine or Satellite and drill pads. Gonna have to get used to that.* (SRB&A Nuiqsut Interview November 2011)

Another individual explained that the location of the herds affected his hunting area in Year 4, saying, "Herds, we went by the herds. When they go further inland they spread out a lot more. The herds were by the ocean" (SRB&A Nuiqsut Interview November 2011).

Changes in Hunting Months

Twenty-one percent of Nuiqsut caribou harvester respondents reported a change in their hunting months in Year 4, compared with 12 percent in Year 3, 15 percent in Year 2, and 19 percent in Year 1 (Table 18). The percentage of respondents reporting changes in their hunting months was higher than in all previous study years. Citing a general change in harvest season (Table 31), respondents most commonly cited "personal reasons" for the change (seven observations), followed by "lack of transportation/equipment" (three observations), "employment/lack of time" (two observations), and "change in distribution" (one observation) (Table 32).

Seven respondents cited personal reasons for a change to their harvest season. One respondent shot two moose so decided against pursuing caribou during September. Other respondents were out of town during their usual hunting months, had different hunting partners, or had a personal injury that limited when they hunted. Several individuals described how personal reasons affected their hunting months in Year 4:

I went later this year though, more hunting later than I did last year. I went with a different person. (SRB&A Nuiqsut Interview November 2011)

Pretty normal. Just when my grandma asks me, that's when I do it. Pretty much normal [duration] for caribou hunting. Mostly in August and September, because they're so fat. I didn't go in September because I got the two moose. (SRB&A Nuiqsut Interview November 2011)

I sometimes go in July [but not this year]. I just go out there and look at the view and see what's out there. (SRB&A Nuiqsut Interview November 2011)

Table 31: Type of Change in Months of Harvest by Type of Change, Nuiqsut, Year 2 and Year 3

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Later Hunting Season	11%	0%	5%	0%
Harvest Season Changed	9%	15%	7%	21%

Stephen R. Braund & Associates, 2013

Table 32: Reasons Given for a Change in Harvest Season, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Personal Reasons	0	2	0	7
Lack of transportation/equipment	0	2	0	3
Employment/Lack of time	0	0	0	2
Change in distribution	0	0	0	1
I Do Not Know	0	0	0	1
Better transportation/equipment	0	0	2	0
Resource Availability	0	2	1	0
Moved out of area	0	0	1	0
Change in subsistence dependents	0	1	0	0
Airplane Traffic Disturbance	0	1	0	0

Stephen R. Braund & Associates, 2013

The availability of certain types of transportation also affected when residents went hunting in Year 4. Three respondents lacked transportation or equipment during their normal hunting months. One individual said, "Sometimes [I hunt in] September, October, November. But no snowmachine, no Honda [this year]" (SRB&A Nuiqsut Interview November 2011). Another respondent made a similar comment, saying

I do most of my caribou hunting in the summer. We usually do snowmachining, but not right now. My snowmachine's not running. (SRB&A Nuiqsut Interview November 2011)

"Employment/lack of time" altered the hunting months for two respondents with one respondent noting that he spent less time hunting during the summer months due to employment. He described,

I usually go most of the summer, but I was gone most of the summer. I usually go with my Grandma downriver but I was at work. So I wasn't really there. (SRB&A Nuiqsut Interview November 2011)

Harvested Enough Caribou

Sixteen percent of Nuiqsut respondents indicated that they did not harvest enough caribou during Year 4, compared to 21 percent from Year 3, 56 percent in Year 2 and 49 percent in Year 1 (Table 19). No single reason for not harvesting enough caribou was mentioned by more than 2 percent of respondents (Table 33). The data show an increase since Years 1 and 2 in the percentage of respondents indicating that they harvested enough caribou to meet their needs. While harvest data for Years 1 and 2 are not available, the harvest data for Years 3 and 4 indicate that mean household and per capita harvests for those years are generally consistent with previous study years.

The difference in responses over the four study years regarding why residents did not harvest enough caribou is due in part to a change in the study team's methods of coding responses to this question. Respondents often indicated that the reason for not harvesting enough caribou was the same reason they provided for harvesting less caribou, in which case (in the case of Years 1 and 2), the study team used the same "why" code in response to both questions. Starting in Year 3 and continuing in Year 4, the study team coded residents' responses to reflect residents' actual statements (e.g., "because I harvested less" was coded as "harvest less" rather than as the reason given for harvesting less [e.g., "helicopter traffic"]). The result is a differing range of responses presented in Years 3 and 4.

Table 33: Reasons for Not Harvesting Enough Caribou, Nuiqsut, Years 1-4

	Percentage of Respondents			
	Year 1	Year 2	Year 3	Year 4
Resource Availability	19%	23%	0%	2%
Change in subsistence dependents	8%	2%	0%	2%
Change in subsistence providers	0%	0%	0%	2%
Employment/Lack of time	0%	4%	0%	2%
Lack of transportation/equipment	6%	0%	0%	2%
Personal Reasons	0%	2%	0%	2%
Need More	0%	0%	0%	2%
I Do Not Know	0%	0%	0%	2%
Harvest less	0%	0%	12%	0%
Migration changed or diverted	14%	4%	0%	0%
Sharing More	0%	2%	2%	0%
Helicopter Traffic Disturbance	6%	0%	0%	0%
Development	6%	0%	0%	0%
Increased cost of living/expenses	0%	2%	0%	0%
Traffic Disturbance	0%	2%	0%	0%
Airplane Traffic Disturbance	3%	0%	0%	0%
Air Traffic	3%	0%	0%	0%

Stephen R. Braund & Associates, 2013

Respondents cited the following varied reasons for insufficient caribou harvests during Year 4: "resource availability," "change in resource dependents," "change in resource provider," "employment/lack of time," "lack of transportation/equipment," "personal reasons," "need more," and "I do not know." The respondents below described their reasons for not harvesting enough caribou in Year 4:

> *Not really [enough caribou for my household]. I didn't really go out and I am the man of the house and my Dad passed away. So I am alone for hunting now.* (SRB&A Nuiqsut Interview November 2011)

> *Personally I don't really know, locals say it's all the activity, the helicopters and whatnot scaring them away. Airboats. You always see them heading towards Umiat. They go all over.*
> *We probably could have used more caribou I'd say. We received some from her family.* (SRB&A Nuiqsut Interview November 2011)

Observations of Harvested Caribou Health and Condition

The percent of respondents reporting one or more "abnormalities" declined from 64 percent in Year 1 to 38 and 40 percent in Year 2 and Year 3, and to 29 percent in Year 4 (Table 34). The percentage of respondents reporting caribou abnormalities related to health, parasites, and size was similar in Years 2 through 4. A slightly higher percentage of respondents reported changes related to quality in Year 4 compared to previous years (Table 34). The two principle descriptors used to describe observed abnormalities during all study years are "health" (85 percent of abnormal caribou) and "size" (44 percent of abnormal caribou) (Table 35). In addition, in Year 4 22 percent of reported abnormal caribou had changes related to quality. The overall numbers of caribou harvested that were characterized as "abnormal" were similar in Years 2 through 4. Year 1 had a particularly high number of caribou reported as skinny or with abnormal numbers of parasites, which resulted in higher overall numbers reported that year. For all types of abnormalities, respondents reported using 11 of the 27 caribou with reported abnormalities in Year 4, or slightly less than half (41 percent) (Table 35). They used 25 of 37 in Year 3 (68 percent), 20 of 34 in Year 2 (59 percent), and 47 of 70 in Year 1 (67 percent). In Year 4, respondents were more likely to use caribou with health problems (44 percent compared to between 13 percent and 25 percent in previous years) (Table 35). In a number of cases in Year 4, residents reported cutting off and discarding the infected areas of meat and using the remainder.

Table 34: Respondent Observations of Abnormalities in Harvested Caribou, Nuiqsut, Years 1-4[2]

	Percent of Respondents			
	Year 1	Year 2	Year 3	Year 4
Health	47%	26%	18%	26%
Other	3%	4%	0%	0%
Parasites	22%	4%	5%	3%
Quality	8%	4%	4%	10%
Size	31%	13%	18%	14%
One or More Abnormalities	64%	38%	40%	29%

Stephen R. Braund & Associates, 2013.

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

Table 35: Number and Percent of Abnormal Caribou by Type of Abnormality, Nuiqsut, Years 1-4

	Number (%) of Abnormal Caribou				Number (%) of Abnormal Caribou Used			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Health	25 (36%)	16 (47%)	15 (41%)	23 (85%)	4 (16%)	4 (25%)	2 (13%)	10 (44%)
Other	1 (1%)	2 (6%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)	0 (0%)	0 (0%)
Parasites	13 (19%)	5 (15%)	8 (22%)	3 (11%)	11 (85%)	5 (100%)	7 (88%)	0 (0%)
Quality	3 (4%)	2 (6%)	2 (5%)	6 (22%)	2 (67%)	1 (50%)	2 (100%)	1 (17%)
Size	42 (60%)	9 (26%)	17 (46%)	12 (44%)	39 (93%)	8 (89%)	15 (18%)	1 (8%)
One or More Abnormalities	70 (100%)	34 (100%)	37 (100%)	27 (100%)	47 (67%)	20 (59%)	25 (68%)	11 (41%)

Stephen R. Braund & Associates, 2013.

In addition to the active harvester interviews, the Year 4 household harvest surveys also included questions about sick or injured caribou. As shown in Table 36, 18 percent of Nuiqsut households reported harvesting sick caribou in 2011, accounting for at least seven percent of all caribou harvested (see table note). In most cases (81 percent of sick caribou), households did not use these caribou.

Table 36: Household Harvest Survey Observations of Sick Caribou, 2011

% of HH Reporting Sick/Injured Caribou	Number (%) of Sick/Injured Caribou*	Number (%) of Sick/Injured Caribou Used by HH
18%	26 (7%)	5 (19%)
*In five cases, researchers documented that the household harvested sick caribou, but did not document the number of sick caribou harvested. The study team assigned one caribou in each of these cases. It is possible that the number of sick/injured caribou was higher than that reported in this table.		

As in the case of previous years, "disease/infection" was the most commonly reported specific observation during the Year 4 active harvester interviews, with 20 observations (Table 37).Several respondents described harvesting caribou with green-colored or pus-filled meat or organs, which was often described in animals that were also reported to be abnormally skinny by harvesters. Respondents noted,

> *The one that my neighbor shot. It had really greenish yellowish stuff on the side of the ribs, under the skin it was like pus. Different smell. He [hunting partner] just left it. It was kind of skinny. Not like some of these ones [further north]. They were healthy, and a lot of fat. That's the only one I saw like that. We left it.* (SRB&A Nuiqsut Interview November 2011)

> *I caught three but one of them was all filled up. It had puss on it around the lung area. They were all healthy, the one I got at the ocean was a sick one, all the other ones were all healthy. I cut it open and the lungs were full of yellow stuff. Just completely covered with pus… I shot it cause it was big, I thought it would be healthy. It was skinny. I chose it from a herd. I thought it would be a good one, but it wasn't.* (SRB&A Nuiqsut Interview November 2011)

> *Two was waste. They keep having this green gel, pus on them in the meat, and on the neck. I got three males, one female. The males, two of them were waste… They had green gel.* (SRB&A Nuiqsut Interview November 2011)

Table 37: Perceived Reasons for Abnormality, Nuiqsut, Year 4

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

Stephen R. Braund & Associates, 2013

Several other respondents commented on the same type of green colored or pus filled meat, but noted that other than this abnormality the animals looked healthy, with one respondent even describing the healthy size of the caribou:

> *We left two behind because they were sick, green saliva all along their ribcages…Right on the ribs, where the fat was. There was a lot of fat on them too, like an inch. It was the same on both of them.* (SRB&A Nuiqsut Interview November 2011)

When asked to provide explanations for disease/infection, residents commonly responded that they did not know the cause of the observed sickness (Table 38). However, five respondents thought human waste or pollution was responsible for the observed disease/infection, two cited contamination, and one cited habituation to development (Table 38).

Residents expressed concern that the caribou were made ill by feeding on contaminated vegetation or drinking water that was contaminated. Respondents also cited air pollution as a potential source of contamination. Observations regarding the causes of disease/infection in caribou include the following:

> *We don't know, it left us clueless…. I was kind of blaming the one [area] over at the Puviksuk [dump site]. There's still debris from the 1940s, cellophane bottles still lie around up there. These people didn't bother to clean that up. Maybe because some of the parts are in the ground [and leaking].* (SRB&A Nuiqsut Interview November 2011)

> *I would think it's from, a lot of us talk it's from the air pollution. They were all the same [problems], these five I couldn't use. I got a little bit of fat from them. A lot of people have been getting caribou around here, they say "I've been getting a lot of sick caribou; I just took the head off."* (SRB&A Nuiqsut Interview November 2011)

> *I don't know why. There's some ponds in there that I will run into and they are a little gassy colored [oily] on the top of the ponds. That's between here and the pipeline, all the way through. And then there's this one lake over there in the middle of nowhere that smells like a sewage dump… got around that pond one time and it was pretty bad, like a sewage dump.* (SRB&A Nuiqsut Interview November 2011)

I don't know. Whatever they're eating, whatever it is. I think it's that. Whatever they are eating is causing it. We didn't notice until we got here. We just threw out the meat. (SRB&A Nuiqsut Interview November 2011)

Table 38: Perceived Reasons for Disease/Infection, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
Human Waste/Pollution	0	0	1	5
I Do not Know	12	4	6	5
Contamination	0	1	0	2
Habituated to development	0	0	0	1
Development	1	0	0	0
Oil Spill Contaminate	1	0	1	0
Contamination from a	4	2	3	0
Concern of Contaminant	1	0	0	0
Predators	0	1	0	0
Change in Feeding	1	0	0	0
Resource Injury	1	3	2	0
Change in Food Avail	1	0	0	0

Stephen R. Braund & Associates, 2013

Respondents in Year 4 remarked on a decrease in resource size in 12 caribou during the active harvester interviews, similar to previous study years. The most common term to describe these caribou was "skinny," as indicated by the following quotes:

Like it was the same age [as the other animals], horns were the same. Real skinny. Like a couple years old. It wasn't that big. Real skinny. We noticed that it was real skinny because you can pull the skin and there was no fat. (SRB&A Nuiqsut Interview November 2011)

It was just skinny, no fat at all. It was just very skinny. It wasn't healthy. Just skinny. The veins, the blood was kind of a purplish color. It wasn't normal. (SRB&A Nuiqsut Interview November 2011)

The one we got kind of close, I think it was this Itkillik one, it was very skinny, just skin and bones, barely any meat. Like really skinny, it was not one ounce of fat on it, just skin. (SRB&A Nuiqsut Interview November 2011)

We got one caribou that was so skinny and it had a ball on its ankle like this big around. That caribou was so skinny we could see its ribs, its backbone. We were stunned when we saw that big old knot on its ankle. (SRB&A Nuiqsut Interview November 2011)

When asked for reasons why some caribou were observed as smaller, eight respondents said they "do not know" (Table 39). Individual respondents each gave different reasons including "human waste/pollution," "concern of contamination," "predators," "change in feeding," and "change in food availability." Other observations of abnormal caribou included a change in the smell of the meat (five observations) itself or in the texture/color of the meat (four observations), and unusually high parasite loads (three observations). In all cases where residents reported high numbers of parasites, they also reported the caribou was abnormal in terms of health and size. Respondents described,

We left that one. It was half dead anyway, it was so sick. I shot it and looked at it; we cut the head off and left it. I don't know why, that's what we do anyways [cut the head off]. I couldn't describe it. It was an awful strong odor. (SRB&A Nuiqsut Interview November 2011)

When you cut the skin on this inside it was like yellow. And the fur on the outside was different from the others. It was like a grayish brownish color. We didn't use it. Anything that looked unusual we just threw it. (SRB&A Nuiqsut Interview November 2011)

One was bad. I cut the head off and left it. It was in December, just on the other side of Freshwater Lake. I remember that was in December or January or something… It's probably right there. It was stinking pretty bad. I cut the head off and it stunk real bad. Just real stinky… I looked at it and I could just smell it. It stunk. (SRB&A Nuiqsut Interview November 2011)

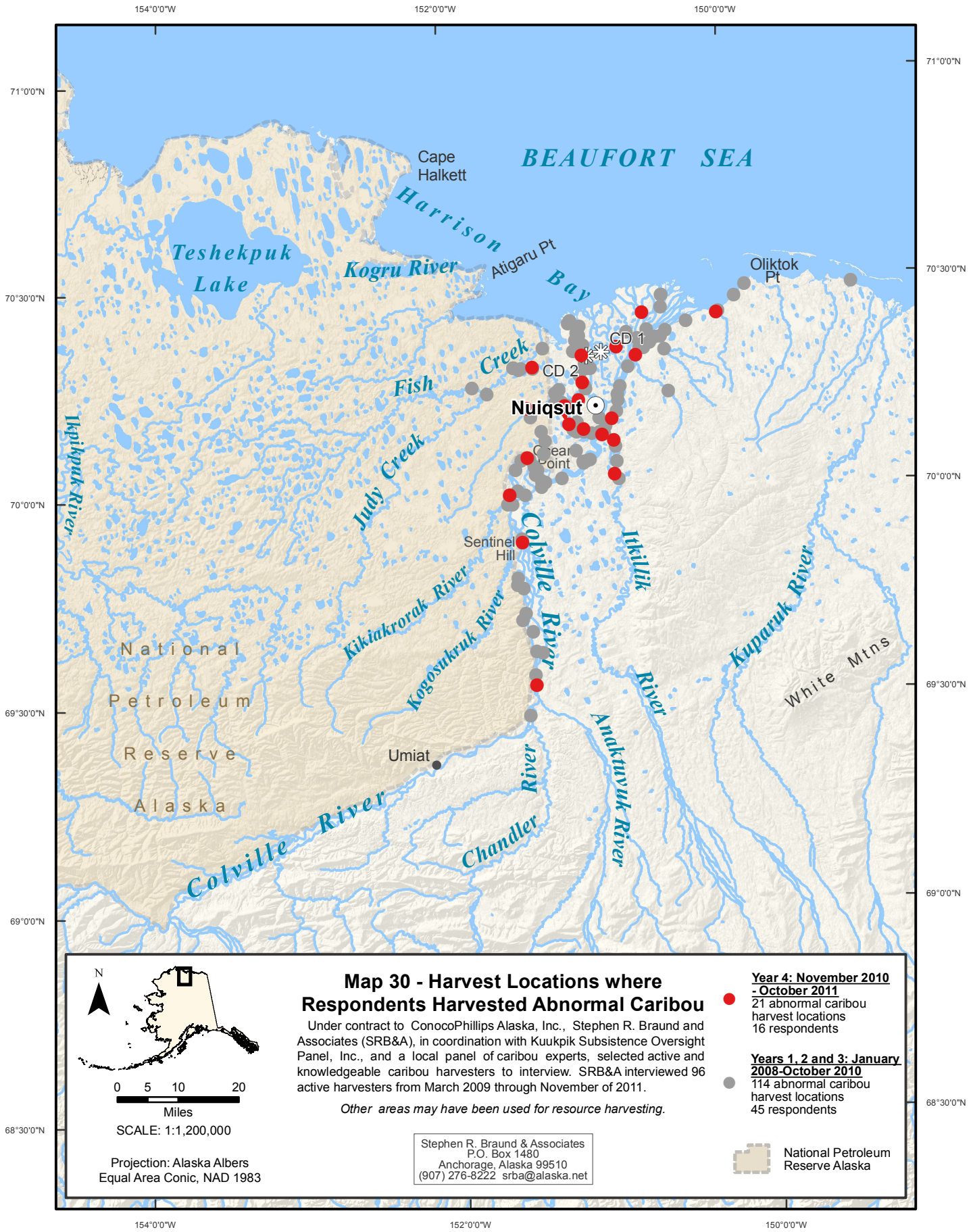
A male, bull. But he had a hole in between his shoulder blades. With like maggots growing in there. We put him out of his misery. A hole, like this big around [4 inches], like six inches deep with maggots in there. The meat was already brown. It was really hot that day. It seemed a little skinny. More flies than usual. Like actual maggots. Those flies were just all over the skin. We caught that caribou, a buddy of mine got that after the Teshekpuk herd went through town. (SRB&A Nuiqsut Interview November 2011)

Table 39: Perceived Reasons for Decrease in Resource Size, Years 1-4

	Number of Observations			
	Year 1	Year 2	Year 3	Year 4
I Do not Know	3	2	6	8
Human Waste/Pollution	0	0	0	1
Concern of Contamination	0	0	0	1
Predators	0	0	0	1
Change in Feeding	0	0	0	1
Change in Food Availability	0	0	0	1
Miscellaneous	0	0	0	1
Warmer Temperatures	1	0	1	0
Airplane Traffic Disturbance	0	1	0	0
Air Traffic	0	0	1	0
Contamination from air pollution	1	0	1	0
Resource is Smaller	0	1	0	0
More Parasites	0	0	1	0
Natural causes	0	2	1	0
More Snow	1	0	0	0
Development	1	0	0	0
Declining/Damaged Feeding Habitat	1	0	0	0
Contamination	2	0	0	0
Change in Feeding	1	0	0	0

Stephen R. Braund & Associates, 2013

The locations where Year 4 respondents reported harvesting caribou they perceived to be abnormal are depicted in red on Map 30 , and locations identified during previous study years are shown in gray. For the Year 4 time period, respondents reported harvesting "abnormal" caribou along the Colville River including both Nigliq and the East Channel. Other areas include near Fish Creek, Itkillik River, and



Map 30 - Harvest Locations where Respondents Harvested Abnormal Caribou

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 96 active harvesters from March 2009 through November of 2011.

Other areas may have been used for resource harvesting.

Year 4: November 2010 - October 2011
21 abnormal caribou harvest locations
16 respondents

Years 1, 2 and 3: January 2008-October 2010
114 abnormal caribou harvest locations
45 respondents

National Petroleum Reserve Alaska

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

overland west of the community. During all study years, the majority of "abnormal" caribou reported were harvested north of Ocean Point; however, this is generally the case for caribou harvests as a whole (Map 8).

Impacts on Harvesting Activities

Thirty-one percent of harvester respondents in Year 4 reported one or more Alpine-related impacts on caribou hunting (Table 40). This compares with 72 percent of respondents in Year 1, 64 percent of respondents in Year 2 and 58 percent of respondents in Year 3. The higher percentage of study participants reporting impacts in 2008 (Year 1) is due in part to Year 1 respondents including impacts that had occurred since the Alpine development had begun. During Years 2, 3 and 4, researchers tried to document only impacts that had occurred during the respective study time period. In addition, in this report researchers reviewed all four years of data to improve the focus on only impact reports that are Alpine-related. Hence, the data in Table 40 for Years 1 through 3 may differ from data reported in previous study year reports. Although residents were asked to report specifically on Alpine-related impacts, residents sometimes either reported impacts not associated with Alpine or Alpine Satellites, or they were unsure what the source of the impact was. In Year 4 in particular, a substantial percentage (26 percent) of the mentioned impacts were not associated with Alpine, despite being cued to report Alpine-only impacts. A majority of these reported impacts were associated with increased air traffic near Umiat, presumably related to studies for the Foothills West Transportation Access Project. These are not represented in Table 40, unless the respondent reported that the traffic originated at Alpine. Researchers have continually worked to filter for only Alpine-related impacts.

Table 40: Respondent Report Alpine-Related Impacts on Caribou Hunting, Nuiqsut, Years 1-4

Type of Impact	Percentage of Respondents				Percentage of Observations			
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
Helicopter traffic	61%	40%	47%	22%	28%	26%	49%	54%
Man-made structures	61%	32%	9%	5%	30%	22%	9%	11%
Plane traffic	42%	32%	16%	9%	22%	21%	16%	18%
Other traffic	25%	19%	2%	3%	10%	12%	2%	7%
Oil company personnel	6%	2%	4%	0%	2%	1%	4%	0%
Regulations	14%	11%	0%	0%	6%	7%	0%	0%
Seismic lines or activity	0%	11%	18%	0%	0%	7%	18%	0%
Other	6%	6%	2%	5%	2%	4%	2%	11%
One Or More Types/ All Types	72%	64%	58%	31%	100%	100%	100%	100%
Total Counts	36	53	57	58	87	82	55	28

Stephen R. Braund & Associates, 2013

As in the case of Year 1, Year 2, Year 3, the most commonly reported Alpine-related impact is associated with helicopter traffic, with 22 percent of harvester respondents reporting helicopter traffic impacts in Year 4. These observations account for 54 percent of all impact observations in Year 4 (Table 40). The percentage of respondents reporting helicopter-related Alpine impacts decreased from 47 percent in Year 3 to the current 22 percent of respondents. During the July, 2013 review meeting with the Nuiqsut Caribou Panel, attending panel members remarked that during the Year 3 study year increased communication between the community and Conoco resulted in a noted improvement regarding impacts from helicopters on subsistence hunters. This improvement may be reflected in the decline in the percentage of respondents who reported impacts from helicopters during Year 4.

The percentage of respondents reporting impacts from man-made structures in Year 4 shows a continuing downward trend, from 61 percent in Year 1 to 32 percent in Year 2, 9 percent in Year 3, and five percent in Year 4. The reader should be aware that in Years 1 and 2, respondents were more likely to report indirect effects (i.e., caused by the action but later in time or farther removed in distance) related to pipelines and infrastructure, such as changes in caribou migration and resource availability due to pipeline obstructions. The study team has made greater efforts to focus respondents on direct impacts (i.e., at the same time and place as the action) in recent study years. Therefore, while residents and Nuiqsut Caribou Panel members continue to express concerns about the impacts of pipelines and other infrastructure on caribou migration, they are less likely to report pipelines as direct impacts on their caribou hunting (i.e., impacts that occurred while they hunted) in recent years.

Reports of plane-related impacts have declined from 42 percent of respondents in Year 1, to 32 percent in Year 2, 16 percent in Year 3, and nine percent in Year 4. Three percent of respondents reported impacts from "other traffic" (i.e., airboats) in Year 4, continuing the low observed percentage in Year 3 interviews. There were no reports of impacts related to oil company personnel, regulations, or seismic lines or activity in Year 4.

One potential factor affecting the decrease in reported impacts over time could be related to the study team's efforts to gather more specific data regarding the time and place of impacts. In earlier study years, residents were more likely to report indirect impacts (i.e., caused by the action but later in time or farther removed in distance) on their hunting activities and therefore were unable to provide specific information about the time and place of these indirect impacts (e.g., plane traffic disrupting the caribou in general, but no information about the types of planes or the locations where these impacts were occurring). After Year 1, the study team began prompting respondents to be more specific about the time and place of the impacts they reported ("Where were you when this impact occurred? Was there a specific time and place when this impacted your hunting?"). As the study has progressed over the four study years, respondents are more aware of the type of data the study team is trying to document and the result is that the study team is collecting more specific impact information, rather than the more general impacts that they have already reported in previous years. Residents have described and reported these more overarching concerns in previous years, and the study team has been more persistent in only addressing specific, "last year" impacts.

Another potential reason for the change in reported Alpine-related impacts is the increasing frequency of reported impacts from other developers and entities. The presence of multiple developers and researchers in respondents' hunting areas may result in increased difficulty distinguishing between the sources of, for example, helicopter and air traffic. Furthermore, over the four study years the study team has become more consistent in asking respondents to identify the source of reported impacts (i.e., which developer or entity caused the impact).

The decreased reports of impacts over time could also reflect a trend of user avoidance, whereby respondents are not experiencing direct impacts related to Alpine because they are purposefully avoiding areas where they believe they may experience impacts. During the Year 4 household harvest surveys, the study team asked each household whether they had experienced impacts related to Alpine. As shown in Table 41, 20 percent of households reported experiencing Alpine-related impacts on their caribou hunting in 2011, nine percent mentioned other impacts, and nine percent mentioned that they did not experience any Alpine impacts because they avoid the area altogether. Information collected with this survey included "Stayed away from Alpine, there are no caribou when he goes up there," and "Don't go hunting in the Alpine area anymore" (SRB&A Nuiqsut Household Surveys 2012). As the question cued the respondents regarding Alpine-related impacts, it is likely that responses related to "other" (non-Alpine) impacts and "avoiding Alpine area" are under-represented.

Table 41: Household Observations of Impacts, 2011

Year	Percentage of Nuiqsut Households		
	Alpine-related Impacts	Other Impacts	Avoiding Alpine Area
2011	20%	9%	9%

Stephen R. Braund & Associates, 2013.

Finally, decreased impacts over time could in fact reflect fewer impacts related to the Alpine development. In recent years, residents have indicated that improved communication with CPAI related to aircraft overflights have reduced conflicts with hunters.

Thus, while the data show a clear decline in reported Alpine impacts over time, it is unclear whether this decrease represents an actual decline in harvesters experiencing Alpine-related impacts; whether it signals that some local residents are adjusting to the increased activity in their hunting areas (and therefore no longer perceive this activity as an "impact" unless it directly disrupts their harvests); if it is a reflection of respondents' providing more detailed responses over time and experiencing new sources of impacts in their hunting areas; or if it is a combination of all of the above. Future study years and adjustments to study protocols will help provide a better understanding of these trends.

Figure 6 shows the number of reported impacts on caribou hunting of all types by month for the four study years, and Figure 9 through Figure 12 show individual impact reports by month for the four study years. The peak months for reported impacts in all four years are June, July, and August, the same months as peak caribou hunting activity (Figure 1). Reported impacts for Year 4 peak slightly later than previous study years, with the highest number of reported impacts occurring in August rather than July; this is consistent with the peak number of use areas reported in Year 4. Helicopter and airplane impacts account for most of all reported impacts and occur primarily from June through September (Figure 7 and Figure 8). Reported impacts associated with seismic activities and oil company personnel were more likely to occur during the winter months (Figure 9 and Figure 12)

Figure 6: Reported Impacts by Month, Years 1-4

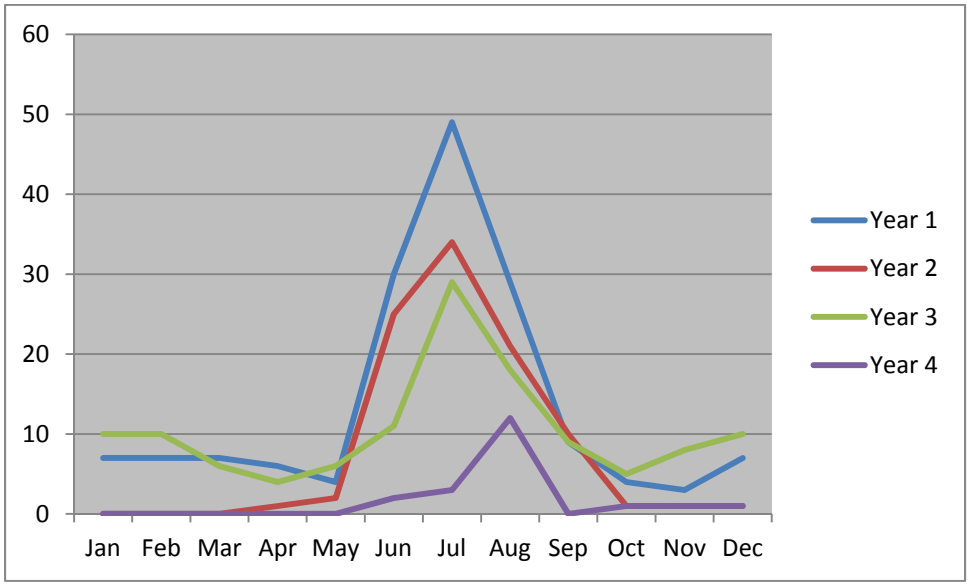


Figure 7: Reported Helicopter Impacts on Caribou Harvest Activities by Month: Years 1-4

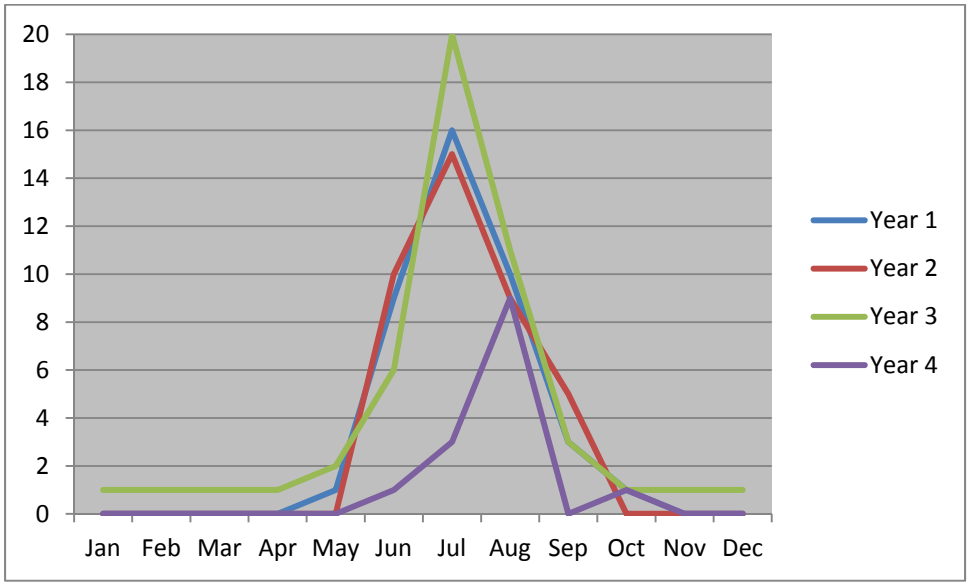


Figure 8: Reported Airplane Impacts on Caribou Harvest Activities by Month: Years 1-4

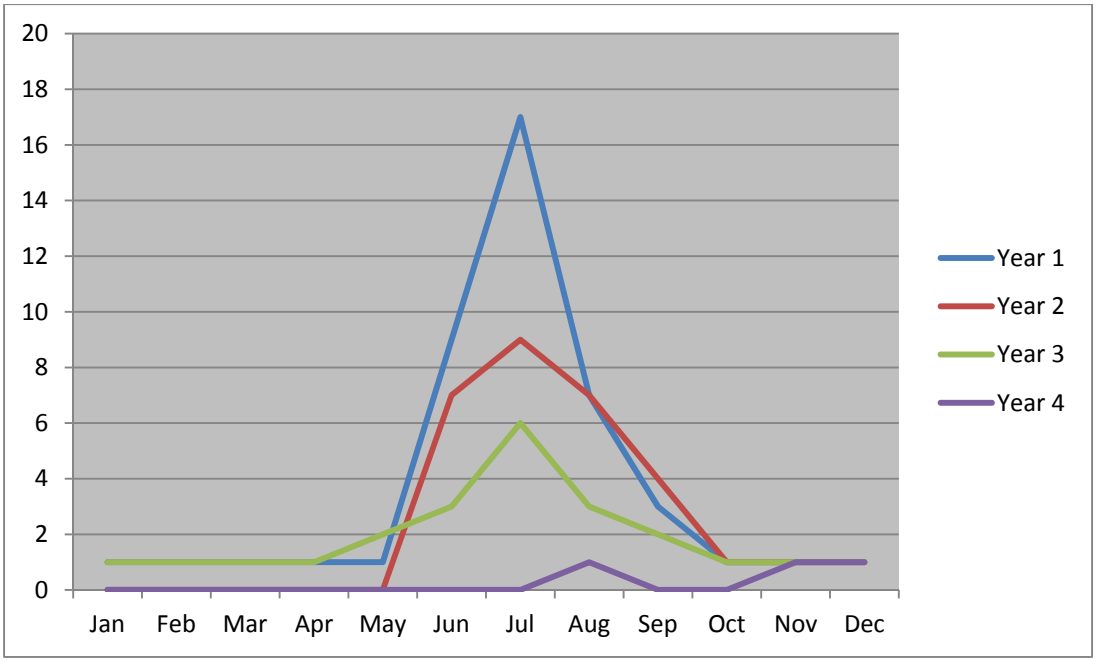


Figure 9: Reported Oil Company Personnel Impacts by Month

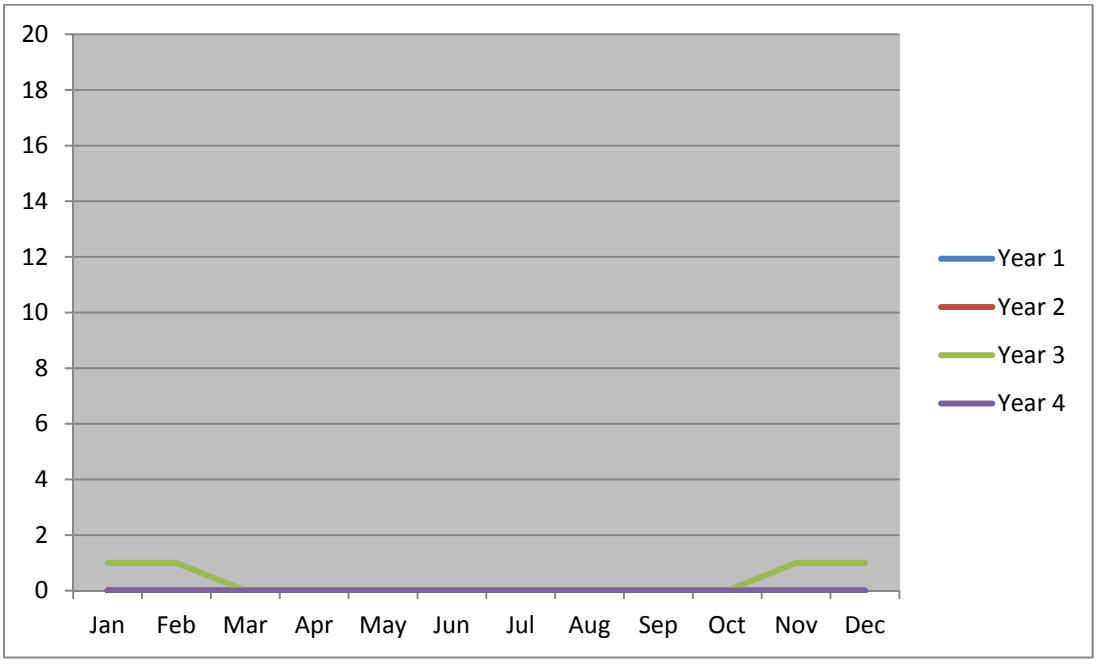


Figure 10: Reported Man-Made Structure Impacts by Month, Years 1-4

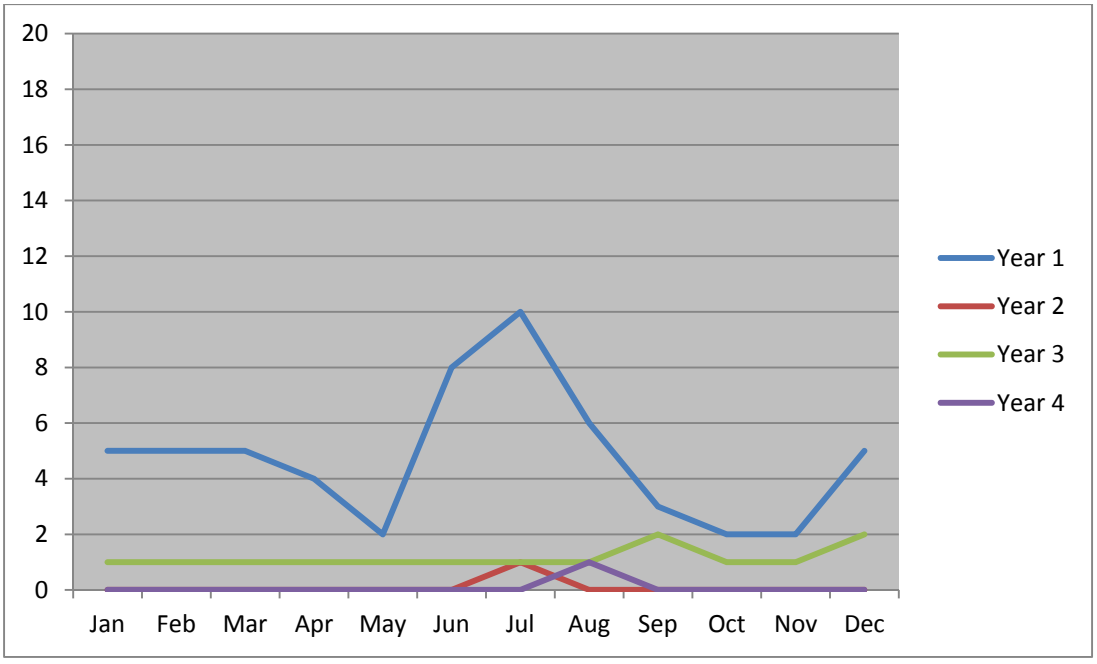


Figure 11: Reported Regulation Impacts by Month, Years 1-4

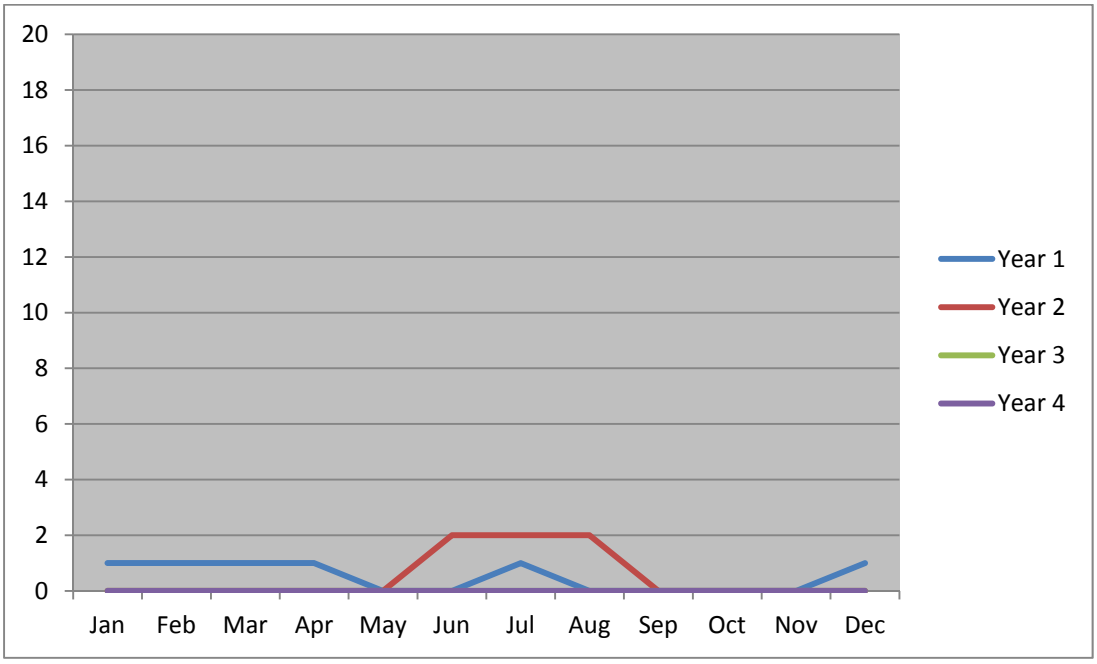
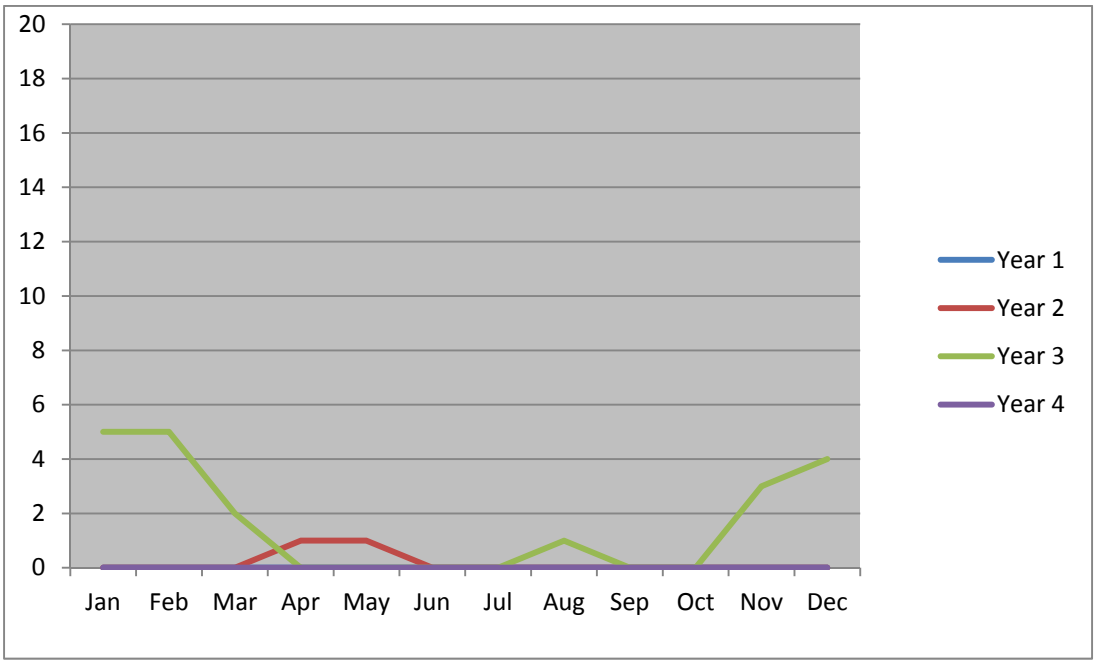


Figure 12: Reported Seismic Line and Activity Impacts by Month, Years 1-4



Map 31 shows the locations of impacts reported by Year 4 harvester respondents. The study team generally only recorded impact locations only when the respondent could identify the specific (i.e., point) locations where they were when the impact occurred. However, in one case a respondent provided a large polygon and indicated that impacts occurred along the entire area during his hunt. The majority of reported helicopter impacts occurred along Nigliq Channel and directly west of the community; however, impacts were also reported on the east channel, near the mouth of Itkillik River, and upriver near Ocean Point, and Chandler River. Structure impacts were reported along the Nigliq Channel, and personnel impacts were reported on Nigliq Channel and outside the mouth of the East Channel of the Colville River. Two respondents reported the location for impacts from planes, one which occurred at a location near Ocean Point, and a second which occurred within an extended section of the Colville River from the community upriver past Umiat, and into the Chandler River.

Impacts of Helicopter Traffic

As shown in Table 40, 22 percent of respondents reported helicopter impacts in Year 4, a smaller percentage than in Year 3 (51 percent), Year 2 (49 percent) and Year 1 (69 percent). Helicopter impacts accounted for 54 percent of the reported impacts during the Year 4 study period. In seven cases, active harvesters were unable to identify the owner of the helicopter or provide a description of the helicopters appearance (Table 42). In six cases, respondents indicated that the impact involved a "blue and white" helicopter; other descriptions included "Blue Helicopter," and "Blue and Orange Helicopter." Helicopter impacts were reported along and west of Nigliq Channel, along the East Channel of the Colville River, and south of the community along the Colville River, with one respondent reporting a helicopter impact at the mouth of the Chandler River.

Table 42: Respondent Descriptions of Helicopters Associated with Impacts, Nuiqsut, Year 4

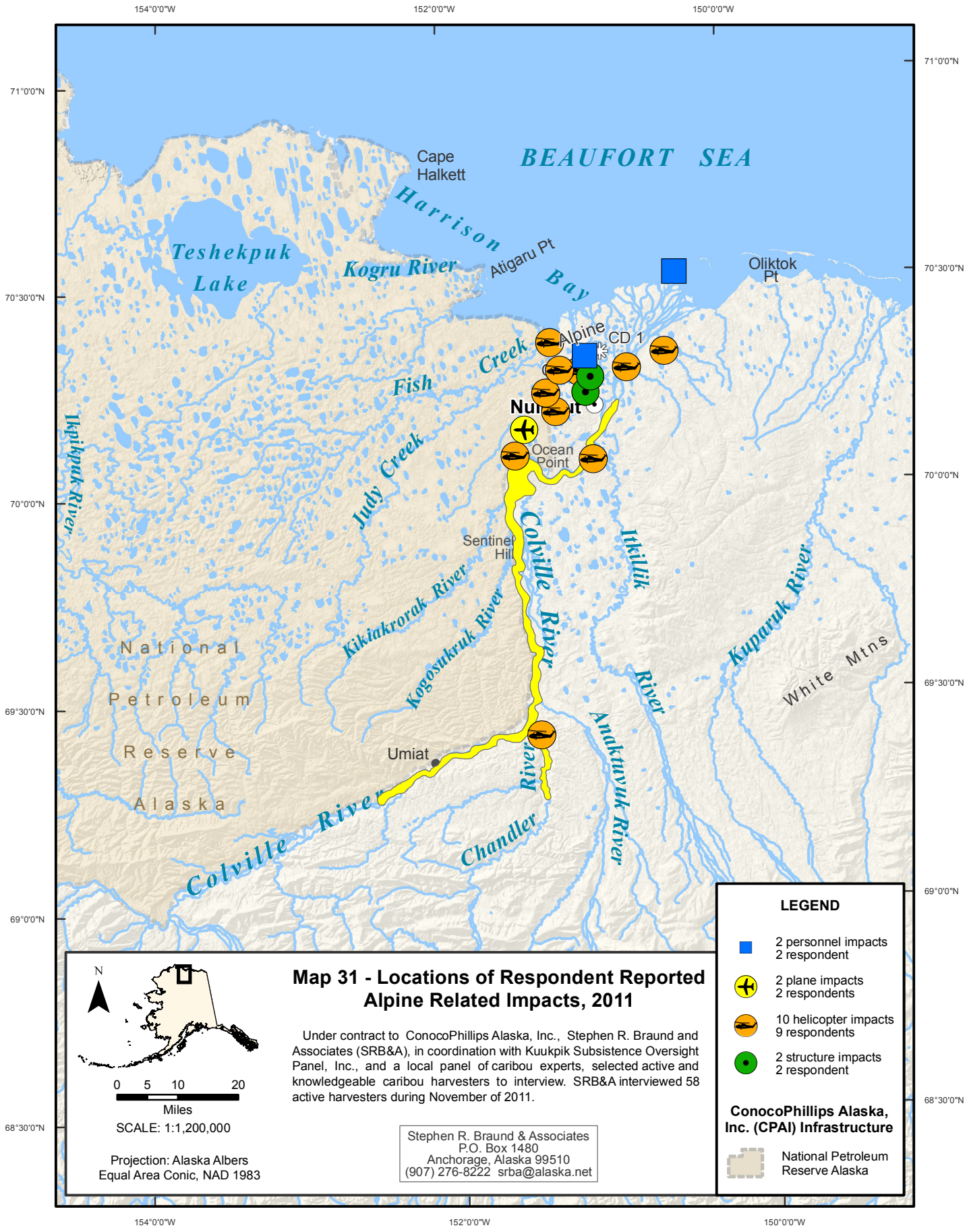
	Year 3	Year 4
Helicopters - Unknown Owner	9	7
Blue and White Helicopter	8	6
Blue Helicopter	0	1
Blue and Orange Helicopter	0	1
Alpine Helicopter	4	0
Air Logistics Helicopter	4	0
Conoco Phillips Helicopter	1	0
Red Helicopter	1	0
Total	27	15

Stephen R. Braund & Associates, 2013

Residents generally indicated that helicopter traffic resulted in caribou acting spooked, being diverted from their migratory path toward another direction, or being kept from crossing local rivers where hunters waited for them. A number of individuals cited specific instances in which helicopter diverted caribou they had been pursuing:

> *There were some [caribou] that were 10 miles from Miluveach. They were going to come this way, but that chopper scared them. That was in August, just [went] once. It started to snow. It was unusual, that August. The [caribou] were scattered by the chopper. It was a blue and white one. We were maybe three miles into the river.* (SRB&A Nuiqsut Interview November 2011)

> *Just choppers I would say. They were flying around right when they were getting closer, and they could see the boat on the river from a good 200 to 400 feet up. They will see the herd and try and herd them closer to us, but they always end up going farther away. That was pretty much around the time we caught this one [on Nigliq]… The choppers took off from CD2 and circled around towards Nuiqsut and circled back around towards us trying to push them towards us, but it ended up doing the opposite.* (SRB&A Nuiqsut Interview November 2011)


154°0'0"W
152°0'0"W
150°0'0"W
71°0'0"N
70°30'0"N
70°0'0"N
69°30'0"N
69°0'0"N
68°30'0"N
BEAUFORT SEA
Cape Halkett
Harrison Bay
Atigaru Pt
Oliktok Pt
Teshekpuk Lake
Kogru River
Alpine
CD 1
Fish Creek
Nuiqsut
Ocean Point
Judy Creek
Ipviqpuk River
Sentinel Hill
Colville River
Itkillik River
Kuparuk River
White Mtns
Kikiakrorak River
Kogosukruk River
National Petroleum Reserve Alaska
Umiat
Chandler River
Anaktuvuk River
Colville River
N
0 5 10 20
Miles
SCALE: 1:1,200,000
Projection: Alaska Albers
Equal Area Conic, NAD 1983
Map 31 - Locations of Respondent Reported Alpine Related Impacts, 2011
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 58 active harvesters during November of 2011.
Stephen R. Braund & Associates
P.O. Box 1480
Anchorage, Alaska 99510
(907) 276-8222 srba@alaska.net
LEGEND
2 personnel impacts
2 respondent
2 plane impacts
2 respondents
10 helicopter impacts
9 respondents
2 structure impacts
2 respondent
ConocoPhillips Alaska, Inc. (CPAI) Infrastructure
National Petroleum Reserve Alaska

As indicated in the above quote, one individual believed that the helicopter had in fact tried to assist the hunters by herding the caribou toward them, but that these efforts had resulted in the opposite effect. One respondent noted that while helicopters can affect hunting activities, there have been fewer impacts to hunting activities lately. He cited improved communication for this change and described,

> *Sometimes yeah, sometimes [helicopters], they show up at the wrong time. Like when you start to go get the caribou they come at the wrong time and scare them away. Especially the chopper and those airboats. It hasn't happened so much recently. We already let them know that they have to let us know when they are going around the river and into Nigliq. There was some around Alpine last winter.* (SRB&A Nuiqsut Interview November 2011)

Respondents described the majority of helicopter activity taking place around Nigliq Channel and the Colville Delta area. Respondents provided their observations regarding the helicopter activities within the area,

> *I just noticed that there was a lot of chopper activity [in the delta]. I guess that plane that goes back and forth, you could see it… I seen a lot of chopper activities again, on that side. I just seen a lot of choppers [no particular place]* (SRB&A Nuiqsut Interview November 2011)

> *Air traffic. Helicopter and plane. It's just when I come around here, the traffic from Deadhorse to the Alpine area. And the chopper during the summer when they do their weekly routes or whatever. [In the East Channel].* (SRB&A Nuiqsut Interview November 2011)

> *When I was working in Prudhoe, we were flying all around here with the chopper, going to all the oil rigs. There were lots of choppers, the whole three weeks, we were just flying in choppers. Less than normal… Just the choppers. They were flying all around here doing the survey. And all around here. [Nigliq and East Channel]… they're super loud. There were a lot of choppers.* (SRB&A Nuiqsut Interview November 2011)

> *Just the survey people in the east side, that's about it. Helicopters, those blue and white helicopters. They were doing surveys from right about behind CD4 on up this way. This general area right here. On the east side. We weren't happy when that chopper showed up. I knew, we know the chopper pilot saw us trying to get the caribou, but he just went ahead and flew over the caribou and scared the caribou. It was early July. Just helicopters and planes [affected my caribou hunting], that's it.* (SRB&A Nuiqsut Interview November 2011)

Residents made similar observations during the Year 4 household harvest surveys. Responses related to helicopter traffic impacts included the following:

> *Choppers downriver, northwest of Alpine are keeping caribou away from the river.*

> *Choppers, make them [caribou] really spooked. [They] run away. [It happened] up towards Nigliq, where caribou escape insects.*

> *Choppers make hunting more difficult; I had to go farther.* (SRB&A Nuiqsut Household Harvest Surveys 2012)

Several individuals commented that helicopter traffic impacts were less in Year 4 and that caribou were more available to them along Nigliq Channel and west of the community. As one respondent described,

> *I didn't see as much helicopters as I did last year. Flying around. There were more on the west side because the whole herd was at Fish Creek, it was pretty good…. I don't really go to meetings with Conoco, it was an OK season for me. A lot better than the last few years with the helicopters. It was a good season, there wasn't as much interference. It was a pretty relaxed season.* (SRB&A Nuiqsut Interview November 2011)

Impacts of Airplane Traffic

Airplane traffic was the second most commonly reported impact during the Year 4 respondent interviews. Nine percent of respondents reported impacts from airplanes during the Year 4 study period, accounting for 18 percent of all reported impacts (Table 40). Three respondents did not provide a description of the airplane, one respondent reported an impact from a "cargo plane" and one respondent mentioned an impact from an "Alpine airplane" (Table 43). Active harvesters reported impacts from planes occurring south of the community along the Colville River. One respondent described a particular experience he had while attempting to harvest caribou,

> *I did have air traffic. I don't know whose airplanes they were, but they were around quite a bit. I was at Puviksuk over here at the little creek; we were trying to wait out eight caribou's all summer. He [the pilot] saw us and was saying "Hi" and circling us and we were like 'get away.' The caribou took off. He noticed and tried to fly them back in but it just made it worse out there. It [irritated] us a bit. I think it was an Alpine plane to me.* (SRB&A Nuiqsut Interview November 2011)

Another individual reported that the noise from a cargo plane during the previous winter had been disruptive to his hunting activities:

> *Oh yeah, I got a caribou last winter over here. Northern Air Cargo came; it was really loud. It flew right over me. I was quite a ways over here somewhere. That was last winter. November, December, somewhere around there. I remember because that plane flew over me because it was super-duper loud.* (SRB&A Nuiqsut Interview November 2011)

Plane traffic was also reported as an impact during the household harvest surveys for Year 4. Notes on survey forms included references to air traffic in the Colville River Delta:

> *Air traffic – helicopter and 207. Small planes. Down river by Alpine conexes, the caribou turned around when the planes and helicopters flew over.*
>
> *I noticed lots of planes, small cubby planes going westward. Back and forth at Nigliq Channel.* (SRB&A Nuiqsut Household Harvest Surveys 2012)

Table 43: Descriptions of Airplanes Associated with Airplane Traffic Impacts, Nuiqsut Year 4

	Year 3	Year 4
Airplane - Unknown Owner	2	3
Cargo Airplane	4	1
Alpine Airplane	0	1
Cessna	1	0
Twin Otter	1	0
Conoco Airplane	1	0
Total	9	5

Stephen R. Braund & Associates, 2013

Impacts of Man-made Structures

Impacts related to man-made structures were reported by five percent of Year 4 respondents, compared to nine percent of Year 3, 32 percent in Year 2 and 61 percent in Year 1 (Table 40). The higher percentage of Year 1 respondents reporting impacts related to man-made structures is likely due to researchers in Year 1 collecting data on changes that started since the beginning of the Alpine development. In the case of man-made structures, a number of Nuiqsut residents believe that the pipelines constructed in association with the Alpine development have resulted in general changes to the caribou migration. Years 2, 3 and 4 active harvester interviews focused on recording impacts that occurred during the study time period and that directly affected caribou harvesters.

Active harvesters who reported impacts from man-made structures during the Year 4 interviews mentioned pipelines, infrastructure, and waste (Table 44). Two respondents described their experiences with impacts related to structures and waste,

> *I don't really go in those areas [where the pipelines are], beause the pipeline is pretty much in between those two rivers. Except for that area, it's pretty close. You just can't shoot if there is a caribou in that way.* (SRB&A Nuiqsut Interview November 2011)

> *I know when we went up here there was a big pile of delineators… It was like not even before this creek, right before this creek… That was a really big pile of delineators. The sticks they put on the side of the ice road. They were like in a ditch or something. It was a ditch, but you could see a whole bunch of them sticking out. It was a really big pile. Like in the middle of nowhere… They are probably still there too.* (SRB&A Nuiqsut Interview November 2011)

Table 44: Descriptions of Sources of Man-Made Structures Associated with Impacts, Nuiqsut, Year 4

	Year 3	Year 4
Pipeline	2	1
Infrastructure	1	1
Waste	0	1
Ice Roads and Bridges	2	0
Total	5	3

Stephen R. Braund & Associates, 2013

Impacts of Other Traffic

Only two respondents mentioned impacts related to "other traffic" during Year 4 interviews which included one impact from "airboats," and one impact from "trucks" (Table 45). Previous study years also report fairly low percentages of respondents reporting "other traffic" impacts with six percent in Year 1 and Year 2, and two percent in Year 3 (Table 40). The respondents who reported other traffic impacts in Year 4 described,

> *We've seen trucks. Like when we saw that big herd. When we first saw them they were running to the other caribou over here. Our net was by CD4 and they were running to the other side. You could see them and hear the diesel trucks. And the big water trucks. On whatever side there. They were running to the bigger herd.* (SRB&A Nuiqsut Interview November 2011)

> *Those airboats [up Nigliq], you can hear them a long ways. I don't see them, but I hear them.* (SRB&A Nuiqsut Interview November 2011)

Table 45: Sources of Other Traffic Impacts, Nuiqsut, Year 4

	Year 3	Year 4
Airboats	1	1
Trucks	0	1
Total	1	2

Stephen R. Braund & Associates, 2013

General Observations Regarding status of Caribou Herds

This section summarizes residents' general Year 4 observations relevant to the behavior, distribution, or migration of caribou in 2011. This section includes observations that cannot be organized into the sections above, or observations made during the final section of the active harvester interviews, where respondents were asked, "Was there anything else abnormal about the behavior, distribution, or migration of caribou in 2011?" Review of residents' general observations revealed six themes: general observations about the

caribou migration, reported obstacles to the caribou migration, reported obstacles during hunting trips, general observations about communication with developers, general safety concerns, and observations related to the overall impacts (or lack of impacts) from development during Year 4.

Year 4 respondents' observations about the caribou migration primarily concerned several observations of unusual patterns: an atypical migration from the west (i.e., Teshekpuk Herd) during Year 4, late timing of the caribou migration, and scattered herds. One active harvester addressed the Teshekpuk Herd's migration in Year 4, indicating that the herd went south rather than continuing to and crossing the Nigliq Channel as it has in previous years:

> *Once they break trail you have a caribou migration that's going to stay with it. Same as they did on this side. A big herd had come and gone. A majority of our caribou had come on the west side towards CD2. They were grazing around. One herd was right across. They were going to cross but for some reason they just stayed there. The others were waiting to cross but they just ended up going southward.* (SRB&A Nuiqsut Interview November 2011)

> *They were just coming from the south side of us and heading west. Normally Teshekpuk Herd will come towards our village and then come south and roam for the winter. There was no sign that the caribou came across after the river froze up. That is where they used to come across, but now you don't see any trails going eastward.* (SRB&A Nuiqsut Interview November 2011)

Residents provided varying observations about the availability of caribou in Year 4. Some individuals believed that caribou were generally less available and in smaller herds than in the past, while others noted a large herd on the Nigliq Channel from which they harvested caribou. A number of individuals noted the presence of this herd on the Nigliq Channel in Year 4 but indicated that by the time they learned of it and arrived at the reported herd location, the herd had dispersed or was too far inland to access. Below, several active harvesters described their differing experiences with the herd on Nigliq Channel:

> *They usually would be more upriver [but] when I went out they were so close that … [I]… didn't even have to go that far. Thousand [were] all in one little area. They were all together, wherever they went.* (SRB&A Nuiqsut Interview November 2011)

> *And the biggest herd was over here, [a] two and a half mile stretch across from CD2. That was July, 10,000-plus [caribou]. That was the first herd like that we've seen not being herded by air traffic all summer long…. By the time I saw them back here, those were the same ones that ended up at Nigliq. But none of them came across to the east side. They were kind of heading towards Nuiqsut. They were out of range though. There were about four or five boats there waiting for them to come across. I haven't heard of any hunters getting caribou in this area.* (SRB&A Nuiqsut Interview November 2011)

> *They weren't crossing for some reason. We waited a couple of hours [for them to cross]. They kept turning around. They were all in one big herd.* (SRB&A Nuiqsut Interview November 2011)

> *They tried to cross here [across from CD4], but they turned around. Maybe because of CD4, maybe they could smell the pollution or something. It was real calm wind, and there was a lot of air pollution. There were a lot of people looking at them. Five boats waiting for them to cross, but they just turned around. They spotted them near Barrow about a week after.* (SRB&A Nuiqsut Interview November 2011)

Residents also noted the unusual late timing of the caribou migration during the Year 4 study period and their sparse distribution over a wide area. While, as indicated above, a number of respondents observed a relatively large herd in Year 4 along Nigliq Channel, others noted that in general the caribou are more scattered and in smaller groups than in the past. The three comments below illustrate residents' comments concerning the late timing and scattered distribution of caribou during Year 4:

West of us…they are mostly scattered all over…. They were late though, real late. Like, we would catch them in the Indian summer. (SRB&A Nuiqsut Interview November 2011)

[It] seemed like the migration was slow or delayed. We didn't get as many caribou in July or August like we usually do. They started showing up in September, from this way, from Fish Creek area. Like from the coast area and heading inland. The other ones were heading inland and going west. (SRB&A Nuiqsut Interview November 2011)

Just herd by herd. They came by herd by herd. They used to come in big herds. Now they're scattered herds. On top of that these caribou were coming in from the west. Even from the west. I was hoping they would come in a big herd too, but they were scattered. (SRB&A Nuiqsut Interview November 2011)

Residents provided general observations about several sources of obstacles to the caribou migration, including obstructions caused by locals, natural obstructions, and obstructions caused by development. Respondents frequently noted the importance of allowing the first caribou in a herd to pass without disturbance. Several individuals faulted impatient young hunters for attempting to harvest the first group of caribou, which was reported as having diverted the path of the entire herd:

You used to see them by the thousands, now you only see them by the hundreds or maybe in tens. Another problem we have is that the young hunters. Some of them are just greedy and go right after them. They push them all south or too far north. We try to get them to let the first herd through. (SRB&A Nuiqsut Interview November 2011)

It seems to be the same almost every year. If people will just wait for them, they'll get across the river and it'll be alright. Sometimes people will get a little crazy and start shooting them and then they'll either go all the way around or they'll split up and do a "Y". (SRB&A Nuiqsut Interview November 2011)

During Year 4 two residents suggested that a growing grizzly bear population may be a factor in changes to caribou movement. The comments on these natural disruptions are as follows:

Another problem could be the population of the grizzly bears going up. There were a lot of reports of grizzly's being sighted by other hunters. (SRB&A Nuiqsut Interview November 2011)

Sort of, when that herd of caribou came from this way it seemed like they wanted to come back across. They went in the water right here and then the bull came around and turned back. They came back this way towards CD2 like they were lost, like they didn't want to cross [Nigliq Channel by CD2]. I'm not too sure [why]. They might have seen that bear because …the same day … we saw that herd and at the same time that bear came around. I was surprised that they saw that bear. There was a caribou somewhere around those ponds. It was going around in circles playing with it, but I'm not too sure if they saw [the bear]. (SRB&A Nuiqsut Interview November 2011)

Residents' general observations also highlighted obstacles to caribou migrations from development, specifically pipelines and noise emanating from developments:

I've been going down there all summer, usually this way along the coast. That was in July. There's a lot of caribou that I saw by CD2 and Nigliq. They couldn't cross out that way. That's when they, you know, had that real thin fur, that time. Sometimes they will be super loud, the rig. It echo's or something certain times I guess. I don't know if it bothers them, but you can hear it. Grinding in the earth. Those were the only things. (SRB&A Nuiqsut Interview November 2011)

I think they always look to cross [the pipeline]. They always go down there or up that way. They try to go around. I don't think they like very much to go through there. (SRB&A Nuiqsut Interview November 2011)

It seems like the caribou migration is changing rapidly from the pipeline. We had to go look for the caribou where we don't usually look. They are usually at Fish Creek or you have to go hit the first ones that come in over here or go further upriver to find them. There have been a bunch of them in there, but they are all dead and all sick. A friend of mine has been running into quite a few

dead ones. I guess they just sit down and die when it's time. (SRB&A Nuiqsut Interview November 2011)

I saw a lot of caribou this year. When I was at Prudhoe I saw a whole bunch of them locked up in there, couldn't cross the pipelines and stuff. (SRB&A Nuiqsut Interview November 2011)

The pipelines, they need to cover them somehow. And I don't know, I just miss all the caribou coming in through here, just south of us or right through us. Now you have to travel to the coast or further south. You used to see them by the thousands; now you only see them by the hundreds or maybe in tens. (SRB&A Nuiqsut Interview November 2011)

Gas prices and flight disturbances (mentioned five times), encompass the general obstacles during hunting trips for the Year 4 study period. Gas prices during this atypical migration hindered hunters, especially those who relied on populations of caribou in predictable locations.

We never have much caribou this summer at Nigliq. Not really go through my camp [caribou] but they were on the south side. They went through there. They crossed towards Fish Creek. I never go out anywhere, too much gas! It's sort of only back and forth, using a lot of gas. (SRB&A Nuiqsut Interview November 2011)

A number of Year 4 respondents remarked on improved communication with CPAI and decreased conflicts related to air traffic. As noted previously in this report ("Impacts of Helicopter Traffic"), the percentage of respondents reporting impacts from helicopter traffic was lower in Year 4. The improved communication discussed by local hunters in Year 4 may be one reason for decreased reports of impacts:

I think our communication is improving a lot, 100%. We hope to keep it that way if we can. At some point we might have a problem because of this over here, CD5, they still want that bridge over there. And the proposed road over there towards CD5, 6 and 7. (SRB&A Nuiqsut Interview November 2011)

They [CPAI] listen nowadays. We just had a letter from them about boundaries, about where we can hunt and where we can't. When these pipelines started they told us they would be able to hunt around the pipelines, but now they made these boundaries. You can't shoot close to the pipeline, a couple miles or so, unless you're turned away from it. (SRB&A Nuiqsut Interview November 2011)

This summer with that agreement with KSOPI and ConocoPhillips that they were to report daily when they start flying, that has helped. No flights took off during the duration of the summer harvesting. I said there are caribou here, the caribou are coming. We have caribou in the freezer and hanging right now. Get it while you can, they will be here one day and gone the next day. (SRB&A Nuiqsut Interview November 2011)

The impact was very minimal [this past year]. It was tremendous. It was good for the people. It was good for the hunters. No air traffic was flying around the caribou that were flying towards Alpine. No airboats. We only had one rep [that] was doing their shallow hazard, they were out here, they were checking to see how shallow it is for their winter ice road. They are thinking of putting a drill right here four miles west of Nigliq-pa. That's the only thing that was out there. (SRB&A Nuiqsut Interview November 2011)

However, one individual believed communications could improve and expressed the desire for more informational meetings in the community, saying,

I don't see them [CPAI] come around. I think they need to start coming around. Let them come over; tell us what's going on. After the bridge thing, they stopped coming. (SRB&A Nuiqsut Interview November 2011)

General observations also included two residents who mentioned concerns about safety while hunting. One resident raised awareness about a lack of equipment necessary in emergency situations while another warned about increasing tourism in the area, which could conflict, potentially, with hunting activities:

> *It would be nice to have communications in case something happens or when they get stuck , like a VHF or something. Some of us have nothing so we have to go over here and walk [to get help].* (SRB&A Nuiqsut Interview November 2011)

> *[There are] people going out to Umiat with planes and whatnot, and I started hearing there's a woman up there, in a bikini! That's no good for us to see up there. These people are coming from outside, these party people. There were quite a few rafters up that way, some of them hunting, but some of them just seeing the area. When they're hunting it's alright… but what if they were mistaken? If people were hunting and didn't know there were people on the other side [and they got shot].* (SRB&A Nuiqsut Interview November 2011)

Four residents affirmed no noticeable differences in the caribou migration during Year 4 as compared to previous years. The statements from the resident below depict the general observation that everything was typical during Year 4:

> *I'd have to say it [the caribou migration] was right around its normal schedule. Us being up there at that time of the year, they're normally there around the river at that time. The timing went good. The harvest was good. The timing of the caribou coming around the rivers were good. With the amount of caribou that was even close to the village, within Honda riding distance, they were even that close. There were a lot of caribou that weren't even disturbed. They wouldn't even run, they wouldn't even get startled or anything. Just like we're not even there. I don't think there was anything different about the caribou.* (SRB&A Nuiqsut Interview November 2011)

> *I usually do subsistence representative and during the summer I come and monitor all the hunters and what's going on around them. Throughout the summer activities, there wasn't really any impacts going on towards the hunter.* (SRB&A Nuiqsut Interview November 2011)

The general observations of residents during the Year 4 active harvester interviews covered a range of topics which included general observations about the caribou migration in Year 4, sources of disruption to the caribou migration, observations about communication with CPAI, general safety concerns, and discussions about the overall hunting season.

Teshekpuk and Central Arctic Herd Trends

This section summarizes current Teshekpuk Herd (TH) and Central Arctic Herd (CAH) trends, based primarily on information provided by ABR, Inc. and available in the 2011 report on the Alpine Satellite Development Plan (ASDP) caribou monitoring study (Lawhead, Prichard, and Macander 2012). Data on 2011 Nuiqsut caribou hunting activities are incorporated and discussed where relevant. The ASDP caribou monitoring study area, which is centered on the Colville River, is used at various times of the year by two neighboring herds of caribou (Rangifer tarandus)—the TH and the CAH. Based on extensive radio-tracking by the ADF&G, NSB, Bureau of Land Management, and CPAI since the late 1970s and early 1980s, the TH generally ranges to the west and the CAH to the east of the Colville River delta, but caribou from both herds use the delta occasionally, primarily in summer (Lawhead et al. 2010). In addition to radio-telemetry using VHF, satellite, and GPS collars, these herds have been the focus of many aerial transect surveys in the last 25 years. The other two herds that inhabit Alaska north of the Brooks Range—the Western Arctic Herd (WAH) and Porcupine Herd (PH)—have not been recorded in the ASDP study area. The WAH normally ranges well to the southwest, migrating to and from western Alaska south of the Brooks Range, and the PH spends the year far to the east, migrating to and from the Yukon in Canada. Residents of Nuiqsut, located on the Nigliq Channel of the Colville River delta, therefore rely primarily on caribou from the CAH and TH. According to Pedersen (2008), a greater proportion of Nuiqsut caribou harvests comes from the TH (approximately 60 percent) versus the CAH (approximately 30 percent).

The TH generally remains on the coastal plain year-round. The area of most concentrated calving is located consistently around Teshekpuk Lake and the primary area used for relief from insect harassment in midsummer is the swath of land between Teshekpuk Lake and the Beaufort Sea coast (Prichard and

Murphy 2004, Carroll et al. 2005, Person et al. 2007). Most TH caribou winter on the coastal plain, although the specific areas used vary widely from year to year and some TH caribou occasionally (most notably in 1990–1991 and 2008–2009) overwinter south of the Brooks Range with the Western Arctic Herd (WAH) (Philo et al. 1993, Prichard and Murphy 2004, Carroll et al. 2005, Carroll 2007, Person et al. 2007, Parrett 2009). In recent years, a substantial portion of the TH also has wintered in areas outside the previous range of the herd, from far east in the Arctic National Wildlife Refuge (ANWR) in 2003–2004 (Carroll et al. 2004, Carroll 2007) to southeast in the winter range of the CAH since 2004–2005 (Carroll 2007; Lawhead et al. 2007, 2008; Lenart 2009; Parrett 2009).

Caribou movements often are unpredictable, except for broad seasonal patterns, and it is not uncommon for herds that are increasing in size to shift their range use into marginal areas as they grow larger (Hemming 1971). The TH increased substantially in size since the late 1970s and early 1980s, when it was estimated at 3,000–4,000 animals (Carroll 2007). Subsequent censuses produced estimates of 11,822 caribou in 1984; 13,406 in 1985; 16,649 in 1989; and 27,686 in 1993 (Carroll 2007). The TH experienced a dip in numbers in the early/mid-1990s similar to that seen in the neighboring CAH, but increased steadily from 25,076 animals since 1995, reaching at least 28,627 animals in 1999, 45,166 animals in July 2002, and 64,106 caribou on the most recent photocensus in July 2008 (Parrett 2009), the greatest size yet recorded for the TH.

The CAH is the primary herd using the oilfield region on the central arctic coastal plain. From the early 1970s to 2002, the CAH grew at an overall rate of 7 percent per year. The herd grew rapidly from about 5,000 animals in the mid-1970s to the early 1990s, reaching a count of 23,444 caribou in July 1992 before declining 23 percent to 18,093 caribou in July 1995 (Lenart 2009). The herd has increased since then, reaching 19,730 animals in July 1997, 27,128 animals in July 2000, and 31,857 animals in July 2002 (Lenart 2009). A photocensus conducted in July 2008 by ADFG produced an estimate of 66,772 caribou, the greatest size yet recorded for this herd (Lenart 2009) and representing a 13 percent average annual rate increase since 2002. A photocensus conducted by ADFG in July 2011 yielded an estimate of approximately 55,000 animals in the herd, representing a 14 percent decline from the previous (2008) estimate (Lawhead and Prichard, 2012). Another photocensus had been conducted in 2010, but the results were considered unsatisfactory. Both the 2010 and 2011 censuses for the CAH and the TH experienced difficulties due to mixing of the two herds (Lawhead and Prichard, 2012).

Concentrated calving activity by the CAH tends to occur in two areas of the coastal plain, one located south and southwest of the Kuparuk oilfield and the other east of the Sagavanirktok River (Wolfe 2000, Arthur and Del Vecchio 2009, Lawhead and Prichard 2010). The CAH typically moves to the Beaufort Sea coast during periods of mosquito harassment (White et al. 1975, Dau 1986, Lawhead 1988). In recent years the majority of the CAH has wintered south of the Brooks Range, generally east of the Trans-Alaska Pipeline (Arthur and Del Vecchio 2009, Lenart 2009) and summer movements since about 2003 have extended much farther east than in the previous two decades, with some CAH animals traveling far east on the coastal plain of ANWR (Lenart 2009, Lawhead et al. 2010). Use of the Colville River delta by caribou is highest during the summer insect season (late June to early August), which is also when residents of Nuiqsut most frequently harvest caribou in that area (Map 14 through Map 16).

The caribou monitoring study implemented by ABR, Inc. provides data on the number and density of caribou in four different survey areas: National Petroleum Reserve – Alaska (NPRA) (west of the Colville River delta beyond Fish Creek), Colville River Delta, Colville East (east of the delta), and Itkillik River toward the Kuparuk oilfields. Surveys of the Colville River Delta occurred on five different survey dates. According to Lawhead et al. (2012), the density of caribou in the Colville River Delta in 2011 was relatively low compared to the NPRA and Colville East survey areas, similar to previous study years. A group of approximately 200 caribou was observed in early August, in addition to over 600 caribou July 25 and 140 caribou near CD3 on August 1. Data from transect surveys in 2011 show caribou increasing in density west of the community in late June, no data for July, and relatively large groups of caribou in early August in the middle Colville River delta as well as near the East Channel of the Colville River. No

surveys were flown during the fall migration. Large numbers of caribou have occurred during some years such as in 1992, 1996, 2001, and 2007; however, large herds of caribou on the Colville delta or crossing the delta has been relatively uncommon overall.

Lawhead et al. (2012) notes that the yearly distribution of caribou from the TH and CAH herds is dependent on a variety of factors, including herd range, snow cover, vegetative conditions, and habitat type. For example, areas with recent snowmelt are favorable to caribou due to new, high quality, vegetative growth. In addition, the density of caribou along creeks and in coastal areas is higher during the peak mosquito season. Annual weather conditions, therefore, have a substantial effect on the distribution of caribou and their resulting availability to local hunters. Because the Colville River delta is "at the interface of the annual ranges of the TH and CAH," (Lawhead et al., 2012) and in most years does not see large movements or aggregations of caribou from either herd, any factor that influences their distribution and/or behavior, including weather patterns, food availability, and/or development-related disturbances, could have substantial impacts, either positive or negative, on the availability of caribou to Nuiqsut harvesters.

Summary

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

Fifty-six active harvester respondents reported 194 caribou use areas for the Year 4 time period (November 2010 to October 2011). They also identified 163 successful harvest locations, compared to 182 in Year 1 (reported by 34 harvesters), 160 in Year 2 (reported by 52 harvesters) and 199 in Year 3 (reported by 55 harvesters). In Year 4 the research team also conducted a household harvest survey yielding an estimate of 408 caribou harvested by all Nuiqsut households in a twelve month period from January to December 2011 compared to the 471 caribou harvested by all Nuiqsut households in Year 3. The average pounds harvested per household in the 2011 survey (523 pounds) is lower than that reported in Year 3 (593 pounds) but within the range of harvest estimates made over the 14 available study years, somewhat higher than those from 1992 and 1994-1995. Harvests over the last decade are lower than estimates made in 1993 (903 mean pounds per household) and 1985 (790 mean pounds per household) (Table 17). The gap between the percentage of households attempting to harvest caribou and those households successfully harvesting caribou was highest in 2010 (Year 3) (10 percent gap) and 2011 (Year 4) (14 percent gap) compared to all other available study years, indicating decreased rates of success for local hunters.

Hunters provided observations on their caribou use areas, harvest locations, and harvest characteristics. In addition, hunters reported on their observations of changes in harvests and caribou, impacts on hunting activities, and assessments of mitigation actions. Comparison of previous use area data to the use areas collected for the Nuiqsut Subsistence Caribou Monitoring Project indicate decreased use of the middle Colville River Delta (including along Tamayayak River) and around the proposed CD5 drill site. Responses related to impacts on caribou hunting during Year 4 household harvest surveys also indicate hunter avoidance of Alpine facilities. The area west of Nuiqsut provided the greatest percentage of reported harvests in Year 4 (40 percent), followed by Ocean Point area (17 percent), and Nigliq Channel (15 percent). Over the four study years, the percentage of harvests coming from Nigliq Channel decreased steadily from 23 percent to 15 percent.

Year 4 results show an increase in the number of respondents who claimed their hunting months were different in Year 4, with 21 percent of respondents mentioning the change compared to seven percent in

Year 3, 15 percent in Year 2 and nine percent in Year 1. The majority of respondents reporting the change cited personal reasons as the cause. Year 4 results show the lowest percentage of respondents reporting that they did not harvest enough caribou. Sixteen percent of Year 4 respondents reported not harvesting enough caribou for their households compared to 21 percent in Year 3, 53 percent in Year 2 and 47 percent in Year 1.

The percent of harvesters observing caribou with abnormalities declined over the four study years from 64 percent in Year 1 to 38 and 40 percent in Years 2 and 3, respectively and 29 percent in Year 4. However, the overall number of reported abnormal caribou remained relatively stable over Years 2 through 4. The two principle types of abnormalities observed are "health" and "size." The overall number of abnormal caribou reported in Year 4 (27) is less than the number reported in Year 3 (37) and Year 2 (34), and substantially below that reported in Year 1 (70); however, in Year 4 the number of caribou reported with "health" abnormalities was higher than in Years 2 and 3 and similar to Year 1. Disease/Infection was the most common abnormality observation during all three study years, followed by a decrease in resource size.

Thirty-one percent of harvesters in Year 4 reported one or more development impacts on caribou hunting. This compares with 83 percent of harvesters in Year 1, 70 percent of harvesters in Year 2 and 60 percent of harvesters in Year 3. As in the case of Year 1, Year 2 and Year 3, the most commonly reported impact was associated with helicopter traffic, with 22 percent of harvesters reporting helicopter traffic impacts during the Year 4 study period. These observations accounted for more than half (54 percent) of all impact observations in Year 4. There has been a marked decrease in reports of impacts of planes within the area, with nine percent of respondents reporting impacts in Year 4 compared to Year 3 (19 percent), Year 2 (38 percent), and Year 1 (53 percent). Reports of impacts from man-made structures have continued to decline in Year 4, with five percent of harvesters reporting compared to nine percent in Year 3, 34 percent in Year 2 and 67 percent in Year 1.

While respondents continued to express concerns about the impacts of Alpine activities on their caribou hunting activities, their comments in Year 4 indicate an increasing number of individuals who report fewer impacts and improved communication with CPAI, particularly related to helicopter and airplane traffic. Review of data from the four study years, as well as comparison to previous study years, indicate possible impacts related to hunter avoidance or previously used harvest areas, as well as some decreased rates of hunting success in hunting areas; however, the source of these decreased rates of success are unclear.

REFERENCES

Alaska Department of Fish and Game. 2011. Community Subsistence Information System. Available online at http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=main.home. Accessed November 2011.

Arthur, S. M., and P. A. Del Vecchio. 2009. Effects of oil field development on calf production and survival in the Central Arctic Herd. Final research technical report, Federal Aid in Wildlife Restoration Project 3.46. Alaska Department of Fish and Game, Juneau. 36 pp.

Bacon, J., T. Hepa, H. Brower, Jr., M. Pederson, T. Olemaun, J. George, and B. Corrigan. 2009. Estimates Of Subsistence Harvest For Villages On The North Slope Of Alaska, 1994-2003. North Slope Borough, Department of Wildlife Management, Barrow, Alaska.

Braem, N., S. Pedersen, J. Simon, D. Koster, T. Kaleak, P. Leavitt, J. Patkotak, and P. Neakok. 2011. Monitoring of Annual Caribou Harvests in the National Petroleum Reserve in Alaska: Atqasuk, Barrow, and Nuiqsut, 2003–2007. ADF&G, Division of Subsistence, Technical Paper No. 361.

Braund, Stephen R. & Associates (SRB&A). 2012. Nuiqsut Caribou Subsistence Monitoring Project: Results of Year 3 Hunter Interviews. Prepared for ConocoPhillips Alaska, Inc. Anchorage, Alaska.

_____ 2011. Nuiqsut Caribou Subsistence Monitoring Project: Results of Year 2 Hunter Interviews. Prepared for ConocoPhillips Alaska, Inc. Anchorage, Alaska.

_____ 2010a. Nuiqsut Caribou Subsistence Monitoring Project: Results of 2009 Hunter Interviews. Prepared for ConocoPhillips Alaska, Inc. Anchorage, Alaska.

_____ 2010b. Subsistence Mapping of Nuiqsut, Kaktovik, and Barrow. Funded by the U.S. Department of the Interior, Minerals Management Service. Alaska OCS Region, Environmental Studies Program. Contract No. 1435-01-02-CT85123.

_____ 2009 Impacts and Benefits of Oil and Gas Development to Barrow, Nuiqsut, Wainwright, and Atqasuk Harvesters. Prepared for the North Slope Borough, Department of Wildlife Management, Barrow, Alaska.

Brower, H. Jr., and R. Hepa. 1998. North Slope Borough Subsistence Documentation Project: Data for Nuiqsut, Alaska for the Period July 1, 1994 to June 30, 1995. North Slope Borough, Department of Wildlife Management. Barrow, Alaska.

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

Carroll, G. M., L. S. Parrett, J. C. George, and D. A. Yokel. 2005. Calving distribution of the Teshekpuk caribou herd, 1994–2003. Rangifer, Special Issue 16: 27–35.

Carroll, G. M., A. K. Prichard, R. S. Suydam, L. S. Parrett, and D. A. Yokel. 2004. Unexpected movements of the Teshekpuk Caribou Herd. Presentation at the 10th North American Caribou Workshop, 4–6 May 2004, Girdwood, AK. [abstract]

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

Fall, J.A., and C.J. Utermohle. Unpublished. An Investigation of the Sociocultural Consequences of Outer Continental Shelf Development in Alaska. Harvest data collected by ADF&G, Division of Subsistence. Prepared for U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region, OCS Study MMS 95-012.

Fuller, A. and J. George. 1999. Evaluation of Subsistence Harvest Data from the North Slope Borough 1993 Census for Eight North Slope Villages: For the Calendar Year 1992. North Slope Borough, Department of Wildlife Management, Barrow, Alaska.

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

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

Lawhead, B.E. and A.K. Prichard. 2012. Mammal surveys in the Greater Kuparuk Area, northern Alaska, 2011. Report prepared for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks.

Lawhead, B.E., A.K. Prichard, and M.J. Macander. 2011. Caribou Monitoring Study for the Alpine Satellite Development Program, 2010 – Sixth Annual Report. Prepared by ABR, Inc. – Envioronmental Research & Services for ConocoPhillips Alaska, Inc. Anchorage, Alaska.

_____ 2010 Caribou monitoring study for the Alpine Satellite Development Program, 2009. Fifth annual report prepared for ConocoPhillips Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks. 101 pp.

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

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

Lenart, E. A. 2009. Units 26B and 26C, Central Arctic Herd. Pages 299–325 in P. Harper, ed. Caribou management report of survey and inventory activities, 1 July 2006–30 June 2008. Alaska Department of Fish and Game, Juneau.

Parrett, L. S. 2009. Unit 26A, Teshekpuk Caribou Herd. Pages 271–298 in P. Harper, ed. Caribou management report of survey and inventory activities, 1 July 2006–30 June 2008. Alaska Department of Fish and Game, Juneau.

Pedersen, S. 2008. Monitoring of Annual Caribou Harvests in Three Communities (Atqasuk, Barrow, and Nuiqsut) within the National Petroleum Reserve-Alaska: 2002-2007. Alaska Department ofo Fish and Game, Division of Subsistence, and Bureau of Land Management – Alaska, Northern Field Office, in cooperation with the Iñupiat Community of the Arctic Slope.

_____ 1986 Nuiqsut Subsistence Land Use Atlas, 1986 Update. ADF&G, Division of Subsistence, Fairbanks, Alaska, File Report 1986-01.

_____ 1979 Regional Subsistence Land Use, North Slope Borough, Alaska. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska, Fairbanks, Alaska and Conservation and Environmental Protection, North Slope Borough, Barrow, Alaska, Occasional Paper No. 21.

Person, B. T., A. K. Prichard, G. M. Carroll, D. A. Yokel, R. S. Suydam, and J. C. George. 2007. Distribution and movements of the Teshekpuk Caribou Herd, 1990–2005: prior to oil and gas development. Arctic 60: 238–250.

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

Prichard, A. K., and S. M. Murphy. 2004. Analysis and mapping of satellite telemetry data for the Teshekpuk Caribou Herd, 1990–2002. Final report for North Slope.

U.S. Census Bureau. 2011. 2010 Census Tables. Available online at http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Accessed on April 2011.

White, R.G., B.R. Thomson, T. Skogland, S.J. Person, D.E. Russell, D.F. Holleman, and J.R. Luick. 1975. Ecology of caribou at Prudhoe Bay, Alaska. Pp. 151-201 *in* J. Brown, editor. Ecological investigations of the tundra biome in the Prudhoe Bay region, Alaska. Biological Papers of the University of Alaska, Special Report No. 2, Fairbanks.

Wolfe, S.A. 2000. Habitat selection by calving caribou of the Central Arctic Herd, 1980-95. M.S. thesis, University of Alaska, Fairbanks. 83 pp.

APPENDIX A: NUIQSUT CARIBOU MONITORING PROTOCOL, ACTIVE HARVESTER INTERVIEW YEAR 4

NUIQSUT CARIBOU MONITORING PROTOCOL, 2011

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

SECTION A: CARIBOU HUNTING ACTIVITIES, NOVEMBER 2010 – OCTOBER 2011

1. Did you go caribou hunting between November 2010 and October 2011? YES ___NO___ (IF NO, INTERVIEW OVER)
2. Where did you hunt for caribou between November 2010 and October 2011? (Draw caribou hunting areas on map)

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

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

3. Compared to 2010, was your hunting area different in 2011? YES _____ NO _____

3a. [IF YES], HOW? _____

_____

3b. [IF YES], WHY? _____

_____

4. Compared to 2010, was the # of hunting trips in 2011 the same, less, or more? LESS _____ SAME ____ MORE ____

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

_____

5. Compared to 2010, was the duration of trips in 2011 the same, less, or more? LESS _____ SAME ____ MORE ____

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

_____

6. Compared to 2010, were the months you hunted for and harvested caribou in 2011 different? YES _____ NO ____

6a. [IF YES], HOW? _____

_____

6B. [IF YES], WHY? _____

_____

7. Compared to 2010, was the # of caribou you harvested in 2011 the same, less, or more? LESS _____SAME __ MORE ___

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

_____

8. Did your household harvest enough caribou in 2011 to meet your needs? YES_____ NO _____

8a. [IF NO], WHY? _____

_____

SECTION B: ASSESSMENT OF HARVESTED CARIBOU, 2011

1. Thinking about the caribou you shot or harvested in 2011, did you notice any of the following?

(If none, Skip to Section C)

_____ Abnormal health (e.g., disease/infection/color of meat)

_____ Abnormal quality (e.g., taste, smell)

_____ Abnormal size (e.g., fat content or overall size)

_____ Abnormal quantity of parasites (flies)

_____ Other abnormalities

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

Type of Observation: _____ Health _____ Quality _____ Size _____ Parasites _____Other

Please describe the abnormality: _____

_____

_____

_____

_____

Please describe why you think the abnormality occurred: _____

_____

_____

_____

_____

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

Approximately how many of the caribou were abnormal? _____

Did you use these caribou? YES _____ NO _____

SECTION C: IMPACTS ON CARIBOU HUNTING, 2011

1. In 2011, 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 2010, 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]**	**How could this impact be lessened in the future?**
Helicopter traffic*					
Plane traffic*					
Other traffic					
Oil company personnel					
Structures (e.g., pipelines) blocking hunter access					
Regulations					
Seismic lines or activity					
Other					

SECTION D: ADDITIONAL OBSERVATIONS ABOUT CARIBOU, 2011

1. Was there anything else abnormal about the behavior, distribution, or migration of caribou in 2011? YES _____ NO ____

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

APPENDIX B: NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY FOR 2011

NUIQSUT HOUSEHOLD CARIBOU HARVEST SURVEY FOR 2012

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

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

Between January and December 2012…

1. Did you or anyone in your household use caribou (e.g., harvested, received, or utilized in the home)? _____YES _____ NO

2. Did you or anyone in your household try to harvest caribou? _____YES _____ NO (If NO, Skip to Q6)

3. Did you or anyone in your household successfully harvest caribou? _____ YES _____ NO (If NO, Skip to Q6)

4. How many caribou did your household harvest (only harvested or shot by residents in your household; do not count other households' harvests) in 2012? _____

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

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

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

8. Did any Alpine-related activities in 2012 make your household's caribou hunting more difficult? _____ YES _____ NO

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

_____

_____

[**Continue notes on back of page if necessary**]

APPENDIX C: NUIQSUT CARIBOU MONITORING INFORMED CONSENT, YEAR 4

Stephen R. Braund & Associates

P.O. Box 1480, Anchorage, Alaska 99510
907-276-8222 (Phone); 907-276-6117 (Fax)
srba@alaska.net

Nuiqsut Caribou Subsistence Monitoring Project
November 2011
Informed Consent Form

Description of the Study

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

While in your community, we would like to interview knowledgeable subsistence harvesters about their caribou subsistence use during 2011. 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 in 2011.

Risks and Benefits of Being in the Study

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

Anonymity

Your name will not be used in our study without your permission. Some people wish to be acknowledged for participating in this kind of study. Others prefer that their names are not mentioned in publications and reports. The decision is entirely up to you.

Confidentiality

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

Voluntary Nature of the Study

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

Honoraria

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

Contacts and Questions

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

Statement of Consent

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

Signature & Date	Printed Name

APPENDIX D: HARVEST ACTIVITY AND HARVESTED RESOURCE ASSESSMENT CODES

Table D-1: Harvest Activity Assessment Codes

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

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

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

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

Table D-2: Harvested Resource Assessment Codes

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

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