ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: AKW-B-R3-2021

PROJECT NUMBER : 3.53

PROJECT TITLE: Nutrition, mortality, range use, and demographics of the Fortymile and Central Arctic caribou herds

PERIOD OF PERFORMANCE: 1 July 2019–30 June 2020

PROJECT START AND ENDING DATES: - July 1, 2014 – May 15, 2025

REPORT DUE DATE: Submit to FAC August 28, 2020

PRINCIPAL INVESTIGATOR: Torsten Bentzen

COOPERATORS: Jeff Gross, Jeff Wells and Beth Lenart (ADF&G), Jim Herriges (U.S. Bureau of Land Management), and Mike Suitor and Martin Kienzler (Dept. of Environment Yukon).

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERIOD OF PERFORMANCE

OBJECTIVE 1: Map expansion and changes in seasonal use of the FCH range to assist explaining how, when, and where overgrazing may adversely affect nutrition.

ACTIVITY 1: Maintain a sample of at least 50 GPS collared cows to model annual FCH demographics.

ACCOMPLISHMENTS: In October 2019, 18 adult female caribou were fitted with new GPS collars. During this report period an additional 40 short yearling female caribou were captured and fitted with VHF collars to maintain a sample (>20) of collared three-year-old cows to monitor parturition rate. Due to a combination of increased mortality and failed GPS collars, the current sample of collared FCH cows has dropped to 141 (33 GPS, 108 VHF).

ACTIVITY 2: Conduct radiotracking flights to assess range size and use and evaluate adult survival rates.

ACCOMPLISHMENTS: Comprehensive radio tracking flights were conducted in October and December 2019, and January, April, May, and June 2020 to assess range size and use and to estimate adult survival rates.

ACTIVITY 3: Collar adult bull caribou and evaluate distribution and survival.

ACCOMPLISHMENTS:

1) Thirteen adult bull caribou were captured during this report period. There are currently 15 bulls with functioning GPS collars in the herd. Due to collar failures, bull survival could not be evaluated during May 15, 2019 to May 15, 2020. Preliminary analysis indicates substantial variation in bull survival rates between years with survival rates estimated between 68-86% during the two year interval, May 15, 2016-May 15, 2018.
2) During this report period we continued to evaluate distribution of bulls relative to collared cows during Fortymile photocensus based population estimates and composition surveys.

OBJECTIVE 2: Determine change in the long-term nutritional status of the FCH.

ACTIVITY 1: Reassess newborn calf mass as index of changing nutritional condition in the FCH.

ACCOMPLISHMENTS: We captured and weighed 90 newborn (≤3 days old) calves throughout the calving area during May 18–May 29 which spanned the peak of calving (May 22). Females averaged 14.50 lbs. (6.6kg) (range=8.5–21.0, *n*=44) which was below the long term average (2015-2019). The males averaged 14.8 lbs. (6.7 kg) (range=8.75–21.75, *n*=46).

ACTIVITY 2: Model FCH demographics

ACCOMPLISHMENTS: All collared cows 3-years-old or older were observed from the air daily during 17 May–29 May to determine parturition. Out of 97 cows observed during the 2020 parturition survey, 81 (83.5%) were parturient. Six (40%) of 15 three-year-old cows observed were parturient. Among 82 cows ≥4 years old, 75 (91.5%) were parturient.

OBJECTIVE 3: Examine calf survival in the FCH 2016-2023.

ACTIVITY 1: Determine timing and source of mortality relative to changes in herd status and predator abundance.

ACCOMPLISHMENTS:

1) 90 newborn calves (44 females and 46 males) were collared during May 18-May 29.
2) All 90 calves were radiotracked daily during May 18-May 29. Fourteen (16%) calves died during this period. All kill sites were visited ≤4 hours of first detection of a mortality signal and cause of death determined. During this period, 5 calves were killed by grizzly bears, 4 by wolves, 3 by golden eagles and 1 by black bear. One non-predator related death was observed among collared calves during the 2020 field season. We did not observe any capture-related abandonment.

3) We were able to redeploy 8 collars from calves that died during the calving period. This boosted our sample of collared calves from 82 to 90.
4) We radiotracked all collared calves 8 times (roughly twice per week) in June. An additional 22 (24%) of the collared calves died by June 30. All kill sites were visited the same day they were observed and cause of death determined.
5) In FY21, we will continue to radiotrack all calves weekly during July and August and visit kill sites.
6) Monthly radiotracking was scheduled during September 2019 –April 2020 and all kill sites were visited as soon as possible. Among the 106 calves collared in 2019, 77 (73%) were killed by predators, of which 37 were killed by wolves and 28 by grizzly bears. In addition, 6 (5%) collars were lost or failed prior to one year, and 23 survived through 15 May 2020.

ACTIVITY 2: Determine perinatal mortality rate.

PROCEDURE: Daily radiotracking of all parturient cows until calves were collared 24-48 hours after birth allowed us to determine perinatal mortality rates among a sample of 81 collared cows that gave birth to a calf in 2020. Three cases of perinatal mortality were observed. Two were likely attributed to predation the third died in birth.

OBJECTIVE 4: Reassess newborn calf weights and survival as index of changing nutritional condition in the Central Arctic herd (CAH).

ACTIVITY 1: Weigh newborn calves.

ACCOMPLISHMENTS: No Central Arctic Herd calves were captured in 2020

ACTIVITY 2: Assess early calf survival.

ACCOMPLISHMENTS: No collars were deployed on CAH neonates in 2019 or 2020.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

OBJECTIVE 1: Seasonal range maps and core area estimates for the FCH starting during calving 2014 are being routinely updated and archived. We used both VHF and GPS collar data to best compare current movement, range size and density information to data collected during 1992-2008. Evaluation of long-term change in seasonal distribution and caribou density is ongoing and annual adult survival rates among all collared cows continue to be monitored. Preliminary analysis of bull collar data suggests that they were adequately included in groups of collared cows in all recent photocensuses and composition surveys. However, further study and additional years data are needed to fully address this issue.

OBJECTIVE 2: Based on annual data and logistic regression (generalized leaner model) long term three-year-old parturition rates have declined since the1990s (1994-2020, Slope on the logit scale = -0.079, $P < 0.006$, SE=*0.26*, n=3–26) but any decline in adult

parturition rate based on annual data and logistic regression is not statistically significant over this time period (1994-2020, $P < 0.28$, sample size 30–93).

OBJECTIVE 3: Analysis of FCH calf survival data are ongoing. Calf survival has declined during this study from 54% in 2016, to 44% (2017), 33% (2018) and 19% in 2019. The 2019 calf survival rate was below the range of annual survival rates previously reported for this herd (1994-2003).

OBJECTIVE 4: Analysis of CAH calf survival data are ongoing. Calf survival varies between years with annual survival rates of 53%, 32%, and 29% observed in 2016, 2017 and 2018, respectively. Preliminary analysis indicates annual calf survival in the CAH has declined since 1992-2000.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

As parts of Objective 2: Determine change in the long-term nutritional status of the FCH.

FCH fecal samples were systematically collected while conducting other work throughout the year. This substantially improved the distribution of sampling sites in the core portions of the range. Approximately ten samples were collected at each site and analyzed for diet content by Jim Herriges (BLM) using the Wildlife Habitat Nutrition Laboratory at Washington State University. These data provide baseline FCH diet information during both summer and winter and will allow a comparison to winter diet information collected during 1992-1996. We continue to collect samples and analysis of 2016-2020 samples is ongoing.

Less money spent traveling in FY20 is due to several factors that are hard to predict ahead of time. Covid is the biggest. Because of Covid I did not travel through Tok while preparing for the May field season but instead went direct from Fairbanks. Also because of the distribution of caribou this year they were closer to Fairbanks than Tok for both our usual fall and spring captures so again I did not travel to Tok. Third, there were no Fortymile Harvest Management Coalition, Advisory Committee, BOG meetings etc. this year that required travel outside of Fairbanks (partly because of Covid). At this point I would still expect to spend about $1000 on travel in FY2021 despite Covid continuing to make life less predictable than usual.

IV. PUBLICATIONS

None. All specific results in this report are preliminary and will be discussed in a larger context in a final report.

V. RECOMMENDATIONS FOR THIS PROJECT

I recommend continued deployment of 90 neonate collars in the Fortymile caribou herd to improve power to detect changes in predator specific causes of mortality.

A summary of existing bull movement data across Alaskan caribou herds is needed. The current number of functioning GPS collars deployed on adult bull caribou in the FCH is

inadequate to monitor either bull survival or movements. Bulls are a poorly understood component of herd dynamics and movements remain largely unexamined. Maintaining >20 GPS collars on bulls would allow for detailed spatial analysis of seasonal bull movements and distribution relative to cows and improve techniques for estimating herd size and composition. Additional bull collaring is planned for October 2020.

Additional cow collaring is needed to increase the sample of GPS collared cows up to the objective of 50. These collars are currently available and are expected to be deployed in October 2020. Further collaring may be needed in April 2021to maintain an adequate sample and will be assessed during winter 2020-2021.

Prepared by: Torsten Bentzen

Date: 28 August 2020