

**Wildlife Restoration OPERATING GRANT  
FINAL PERFORMANCE REPORT**

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 23-2018

**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 2017–30 June 2018

**REPORT DUE DATE:** September 1, 2018

**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).

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**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:** Between March 20 and April 9 we recaptured 13 known age female caribou and fitted them with new GPS collars. Caribou ages ranged from 4–15 years. An additional 38 short-yearling female caribou were captured during this report period and fitted with VHF collars to maintain an adequate sample (~20) of collared three-year-old cows to monitor parturition rate. This maintains a current sample of 185 collared FCH cows (74 GPS, 119 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 2017, and January, April, May, and June 2018 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) Six adult bull caribou were captured and fitted with GPS collars during this report period maintaining 32 collared bulls in the Fortymile herd (27 GPS, 5 VHF). During this report period FCH bull survival was evaluated for the first time. Preliminary analysis indicates substantial variation 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 ( $\leq 3$  days old) calves throughout the calving area during May 18–June 1 which spanned the peak of calving (May 25). Females averaged 6.78 kg (SD=1.30, range=3.41–10.11,  $n=46$ ) which was below the averages 7.18, 7.44, and 7.26 kg observed in 2015, 2016, and 2017 respectively. The males averaged 7.56 kg (SD=1.05, range=5.80–9.89,  $n=44$ ) compared to 7.93, 8.63, and 7.91 kg in 2015, 2016, and 2017 respectively.

ACTIVITY 2: Model FCH demographics

ACCOMPLISHMENTS: All collared cows 3-years-old or older were observed from the air daily during 16 May–1 June to determine parturition. Out of 98 total cows included in this year's parturition survey, 59 (60%) were parturient. Six (32%) of 19 three-year-old cows observed were parturient. Among cows  $\geq 4$  years old, 53 (67%,  $n = 79$ ) were parturient.

OBJECTIVE 3: Examine calf survival in the FCH 2016-2019.

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

ACCOMPLISHMENTS:

- 1) 90 newborn calves (46 females and 44 males) were collared during May 18-June 1.
- 2) All 90 calves were radiotracked daily during 18 May-1 June. Nineteen (21.1%) calves died during this period. All kill sites were visited  $\leq 4$  hours of first detection of a mortality signal and cause of death determined. During this period, 8 (9%) calves were killed by grizzly bears, 5 (6%) by wolves, and 1 (1%) by a black bear. One non-predator or accident caused death was observed among collared calves during the 2018 field season. We did not observe any capture-related abandonment.

- 3) We were again able to redeploy 10 collars from calves that died during the calving period. This boosted our sample of collared calves from 80 to 90.
- 4) We radiotracked all collared calves 10 times (roughly three times per week) in June. An additional 20 (22%) 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 FY19, we will continue to radiotrack all calves weekly during July and August and visit kill sites.
- 6) Monthly radiotracking was scheduled during September 2017 –April 2018 and all kill sites were visited as soon as possible. Among the 90 calves collared in 2017, 49 (54%) were killed by predators, of which 19 (39%) were killed by wolves. In addition, 7 (8%) collars were lost or failed prior to one year, and 34 (38%) survived through June 2018.

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 50 collared cows that gave birth to a calf in 2018. Three cases of perinatal mortality were observed. Two were likely attributed to predation the third drowned.

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: We captured and weighed 60 newborn ( $\leq 3$  days old) calves on June 4 at the peak of the calving period. All calves (34 female, 26 male) were randomly selected from calving concentrations west of the Dalton Highway. Weights averaged 6.67 kg (SD=1.92, range=4.70–8.75,  $n=60$ ) which is similar to the 6.9 kg (SD=1.91, range=4.90–9.10,  $n=57$ ) and 6.63 kg (SD=1.11, range=3.75–8.70,  $n=57$ ) reported in 2015 and 2016 respectively.

ACTIVITY 2: Assess early calf survival.

ACCOMPLISHMENTS: No collars were deployed on CAH neonates in 2018. However, calves of collared cows were revisited 24 hours after birth and no perinatal mortality was observed.

Both summer and annual survival among the 63 newborn calves collared in 2017 were below the ranges reported during 2001-2006. By October 20 survival was 46% Calves were not radiotracked between Oct 20 and April 18. Only 19 of the calves were observed on the calving grounds in summer 2018. If the 13 calves missing in summer 2018 are assumed to have died during winter off their calving grounds, estimated annual survival was 29% compared to 38-87% reported during 2001-2006.

## **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 both the 2016 and 2017 photocensuses and 2016 composition survey. However, further study and additional years data are needed fully address this issue.

OBJECTIVE 2: Based on annual data and logistic regression (generalized linear model) long term three-year-old parturition rates have declined since the 1990s (1994-2017, Slope on the logit scale = -0.08,  $P < 0.023$ ,  $R^2 = 0.39$ ,  $n=3-20$ ) but any decline in adult parturition rate based on annual data and logistic regression is not statistically significant over this time period (1994-2017,  $P < 0.315$ ,  $R^2 = 0.097$ , sample size 30-93).

OBJECTIVE 3: Analysis of FCH calf survival data are ongoing. Calf survival varied between years with annual survival rates of 47% and 38% observed during 2017 and 2018 respectively. This falls within the range of annual FCH calf survival rates reported during 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.**

None,

## **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. Although 27 GPS collars are currently deployed on adult bull caribou in the FCH, bulls are a poorly understood component of herd dynamics and movements remain largely unexamined. Additional GPS collars would allow for detailed spatial analysis of seasonal bull movements and distribution relative to cows and improve techniques for estimating

herd size and composition.

**Prepared by:** Torsten Bentzen

**Date:** 21 August 2018