

**FEDERAL AID ANNUAL
RESEARCH 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: W-20 Wildlife Restoration Grant FY2017 **SEGMENT NUMBER:** 7

PROJECT NUMBER: 3.53 Caribou

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

PROJECT DURATION: July 1, 2014–June 30, 2019

REPORT DUE DATE: September 1, 2017; Resubmitted December 1, 2017

PARTNER: None

PRINCIPAL INVESTIGATORS: Torsten Bentzen

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

WORK LOCATIONS: Fortymile caribou range including most of Units 20E, 20B, and 25C east of the Steese Highway, Unit 20D north of the Tanana River, and portions of western Yukon Territory, Canada.

Central Arctic caribou range, central arctic slope and Brooks Range including portions of Units 24A, 24B, 25A, 26A, 26B and 26C.

**I. SUMMARY OF WORK COMPLETED THIS SEGMENT ON JOBS IDENTIFIED
IN ANNUAL WORK PLAN**

OBJECTIVE 1: Map expansion and changes in seasonal use of the Fortymile caribou herd (FCH) range

ACTIVITY 1: Maintain a sample of at least 50 GPS collared cows.

PROCEDURE: During April 10-12, we recaptured 13 known age female caribou and fitted them with new GPS collars. Caribou ages ranged from 4–13 years. An additional 40 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, 112 VHF).

ACTIVITY 2: Conduct radiotracking flights to assess range size and use and evaluate appropriate sample of GPS collars to evaluate range use relative to VHF collars.

PROCEDURE:

- 1) Comprehensive radio tracking flights were conducted in October and December 2016, and January, April, May, and June 2017 to evaluate adult survival and distribution of GPS relative to VHF collared cows.
- 2) Evaluation of seasonal distribution maps and caribou density is ongoing. Seasonal range maps and core area estimates for the FCH starting during calving 2015 are being routinely updated and archived. We used both VHF and GPS collar data to best compare current movement information to data collected during 1992-2008.

ACTIVITY 3: Collar adult bull caribou and evaluate distribution.

PROCEDURE:

- 1) 16 adult bull caribou were captured and fitted with GPS collars during this report period bringing the total number of collared bulls in the Fortymile herd to 35 (29 GPS, 6 VHF).
- 2) During this report period, we began to evaluate distribution of bulls relative to collared cows in Fortymile photocensus based population estimates and composition surveys. Preliminary analysis suggests that bulls 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: Determine change in the long-term nutritional status of the FCH.

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

PROCEDURE: In May 2017, we captured and weighed 90 newborn (≤ 3 days old) calves randomly selected throughout the calving area during May 16–29 which spanned the peak of calving (May 21). Females averaged 7.26 kg (SD=0.63, range=5.90–8.41, $n=40$) which was similar to the averages 7.18 and 7.44 kg observed in 2015 and 2016 respectively. The males averaged 7.91 kg (SD=0.65, range=5.11–10.00, $n=50$) compared to 7.93 and 8.63 kg in 2015 and 2016 respectively.

ACTIVITY 2: Model FCH demographics

PROCEDURE: All collared cows 3-years-old or older were observed from the air daily during 12–29 May to determine parturition. Out of 98 total cows included in this year's parturition survey, 89 (91%) were parturient. Seventeen (89%) of 19 three-year-old cows observed were parturient. Among cows ≥ 4 years old, 72 (91%, $n = 79$) were parturient. Despite high parturition the rates observed this year, based on using annual data and logistic regression (generalized linear model) longer term three-year-old parturition rates have declined since the 1990s (1994-2016, Slope on the logit scale = -0.11, $P < 0.001$, R^2

= 0.39, $n=3-20$) but the decline in adult parturition rate also based on using annual data and logistic regression is less pronounced (1994-2016, Slope on the logit scale = -0.03, $P < 0.015$, $R^2 = 0.097$, sample size 30-93).

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.

PROCEDURE:

- 1) 90 newborn calves (40 females and 50 males) were collared during May 16-29.
- 2) All 90 calves were radiotracked daily during 17-31 May. Thirteen (14.4%) 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, 7 (8%) calves were killed by grizzly bears, 5 (6%) by wolves, and 1 (1%) by a black bear. We did not observe any capture-related abandonment or non-predator caused perinatal death among collared calves during the 2017 field season.
- 3) We were 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 13 times (roughly every other day) in June. Only 3 (3%) collared calves died during June. All kill sites were visited the same day they were observed and cause of death determined.
- 5) In FY18, we will continue to radiotrack all calves weekly during July and August and visit kill sites.
- 6) Monthly radiotracking was scheduled during September 2016 –April 2017 and all kill sites were visited as soon as possible. Among the 69 calves collared in 2016, 32 (46%) were killed by predators, of which 15 (47%) were killed by wolves. In addition, 9 (13%) collars were lost or failed prior to one year, and 28 (41%) survived through June 2017. Although analysis of survival data is ongoing, preliminary data indicate a 47% survival rate to age 1 year among calves born in 2016.

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 98 cows. Two cases of perinatal mortality were observed. Both were attributed to predation.

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.

PROCEDURE: We captured and weighed newborn (≤ 3 days old) calves during June 2-5 at the peak of the calving period. Calves (30 female, 33 male) were randomly selected from areas both east and west of the Dalton Highway. Weights averaged 5.81 kg (SD=0.98, range=3.50-8.50, $n=63$) which is lighter than the 6.9 kg (SD=0.93, 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.

PROCEDURE: Lightweight expandable VHF collars were deployed on all 63 newborn calves when they were captured for weighing. Based on preliminary analysis, perinatal survival among the 2017 cohort (birth to June 15) was 86%. Six calves died of exposure during severe weather on June 5th and 6th. Summer (June 15- Sept 6), overwinter, and annual survival rates have yet to be determined.

Both summer and annual survival among newborn calves collared in 2016 were below the ranges reported during 2001-2006. By the end of summer (Sept 6) survival was 72% compared to 77-100% during 2001-2006. Calves were not radiotracked over winter. However, only 18 calves were observed on the calving grounds in summer 2017. If the 10 calves missing in summer 2017 are assumed to have died during winter off their calving grounds, estimated annual survival was 32% compared to 38-87% during 2001-2006.

II. SIGNIFICANT DEVIATIONS AND/OR ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

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

- 1) Due to an unallowable expense on the FY2017, AKW-7 grant report, \$210,620 will be debited to this grant in FY2018, AKW-23.
- 2) I continued to reassessed October –April weight change among FCH female calves as an index of nutritional condition. We weighed 25 four-month-old female calves for this project during October 5–10, 2015 during routine collaring for the FCH management program. The average weight was 54.8 kg (SD=4.5, range=49.0–63.5, $n=25$). The long-term trend in fall calf weighs continues to decline 0.16 kg per year (1990–2015, $P=0.018$). Short-yearling cows were weighed during April 2016 captures. Similar to 2015, the mean weight of 49.6 kg (SD=3.82, range=43.5–57.6, $n=13$) was significantly lower ($P=0.0011$, ANOVA) than the October average, which is relatively similar to weight loss reported in 1991 when it was last examined among Fortymile calves. Preliminary analysis of the 2016 calf weight data was begun in July 2017.
- 3) 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 are expected to provide baseline FCH diet information during both summer and winter and will allow a comparison to winter diet information collected during 1992-1996. Preliminary results from 2014 contain a higher than expected proportion of lichen in summer samples. We continue to collect samples and analysis of 2016-2017 samples is ongoing.

III. PUBLICATIONS

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

IV. 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 29 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: 10 August 2016

Revised by: Brenda Bowers and Lem Butler

Date: December 1, 2017