

Wildlife Restoration MULTI-YEAR GRANT INTERIM 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-R-15-2020

PROJECT NUMBER: P1.0

PROJECT TITLE: Mulchatna Caribou Herd Abundance, Survival, and Body Condition

PERIOD OF PERFORMANCE: 10 Feb 2020 – 31 March 2023

PERFORMANCE YEAR: 01 October 2020 – 30 September 2021

REPORT DUE DATE: Submit to Coordinator 01 Dec 2021; due to FAC 29 Dec 2021

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COOPERATORS:

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Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Estimate age-specific survival rates and identify the proximate cause of death in adult caribou.

ACCOMPLISHMENTS: Estimating survival rates and proximate cause of death requires monitoring marked individuals. To this end, we captured 60 adult female caribou (>47 months old) that were equally distributed across the greater Mulchatna range and affixed GPS collars in October of 2020 (Fig. 1). Of these individuals, seven died during this reporting period resulting in an estimated 88% adult female survival rate. The proximate causes of mortality were illegal harvest (n=3), predation (n=3), and of an unknown cause (n=1). Additionally, we had one collar fail and one female whose health and disease status warranted euthanasia; these were excluded from our assessment of adult female survival and cause of death.

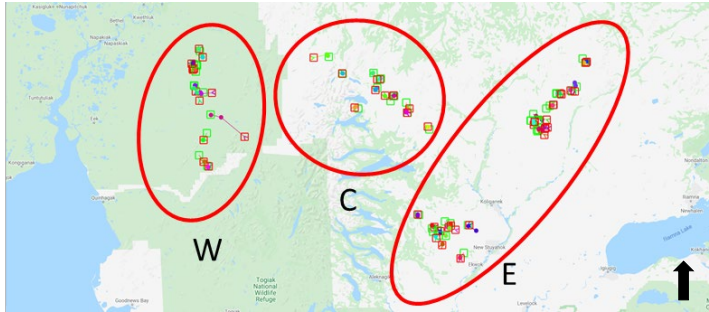


Figure 1. The capture locations of sixty adult female Mulchatna caribou spatially categorized as western (W), central (C), and eastern (E).

In addition to this current adult female survival estimate, we used archived monitoring data from known-aged VHF collared female Mulchatna caribou to estimate annual survival by two age-classes (sub adults = 11 months – 4 years old, adults = 4+ years old) from 1992 to 2020. Using a Kaplan Meier estimator (Pollock et al. 1998), we found large variability in sub-adult (avg = 0.81, range 0.56 – 0.96) and adult (avg = 0.83, range 0.65 - 0.96) female annual survival rates over the past 28 years (Fig. 2).

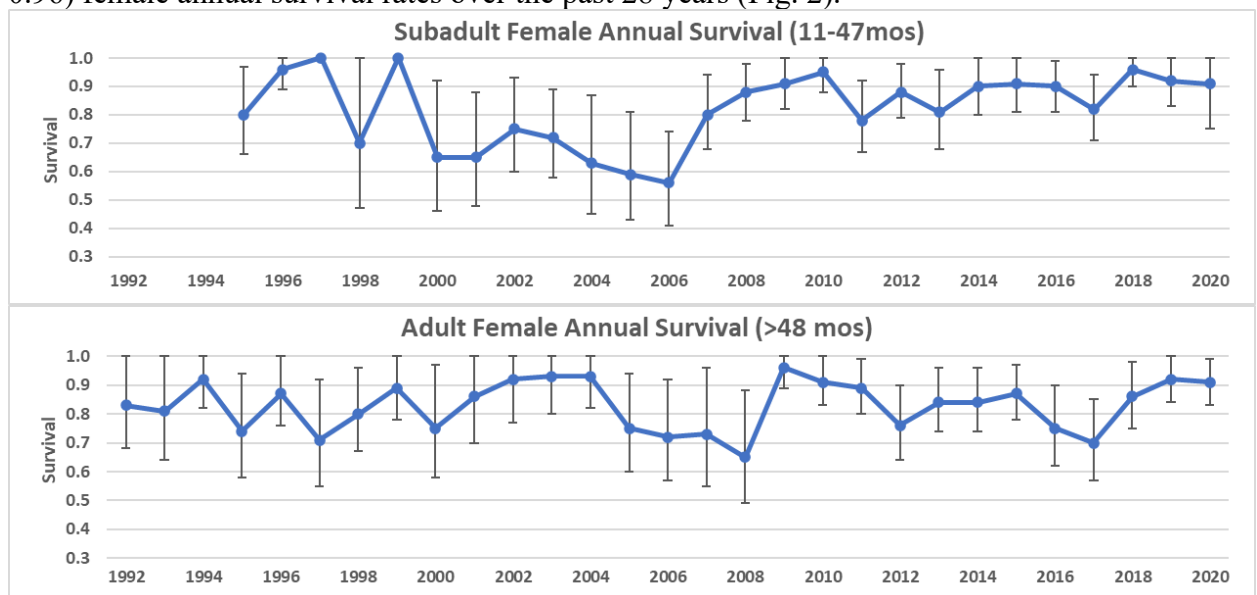


Figure 2. Kaplan Meier estimated annual survival rates of subadult and adult females in the Mulchatna caribou herd from 1992 – 2020.

Together, the current data on the causes of mortality combined with age-class-specific survival probabilities over the last 20+ years has led the Alaska Department of Fish and Game to increase educational and outreach efforts to surrounding communities on the status, health, and hunting closures of the Mulchatna caribou herd.

OBJECTIVE 2: Test the one herd hypothesis: evaluate the genetic structure within and between the east and west calving grounds and compare estimates of herd mixing identified through GPS data.

ACCOMPLISHMENTS: During the October 2020 adult female caribou capture effort, we collected biological samples that have been sequenced at the University of Minnesota Genomics Lab for the estimation of genetic sub-structuring within the Mulchatna herd. Additionally, caribou location data is being continually collected and archived from the initial 60 GPS collared females to which additional collared animals' location data will be added over the next two years to identify seasonal space-use.

OBJECTIVE 3: Quantify the effects of caribou health and body condition (e.g. rump fat, serology, and disease) on population growth rates and variation in individual reproductive success.

ACCOMPLISHMENTS: During the fall 2020 capture efforts, we collected and analyzed caribou blood samples ($n = 57$) for the presences of *Brucellosis suis.*, a zoonotic bacterial infection associated with swollen joints, reproductive failures (i.e. abortions, weak calves), and reduced survival rates. Blood was tested both internally at the Alaska Department of Fish and Game Veterinary Lab and externally at the National Veterinary Services Laboratory. Of the 57 samples, 21 tested positive for brucellosis antibodies resulting in an estimated prevalence rate of 36% in adult females. The detection of Brucellosis is not novel; it is commonly found in Alaskan caribou and reindeer herds at an enzootic equilibrium of 2-4.8% (ADFG State Veterinarian, Dr. Kimberlee Beckmen). However, brucellosis prevalence rates of 8-12% have been associated with “abortion storms” and significant reproductive failures in other ungulate species. Given the 2020 prevalence rate in the Mulchatna caribou herd, we have increased outreach efforts to raise awareness about caribou health and brucellosis infection in humans. Additionally, we are monitoring the reproductive success and survival in our brucellosis-positive females and will continue to do so for the duration of this study.

To evaluate current caribou body condition entering winter, we followed newly developed methods by Cook et al. (2021) and collected a body condition index via palpation and ultrasound measurements of rump fat, loin fat, and loin depth to calculate percent ingesta-free body fat and protein in lactating and non-lactating females. While we found no notable difference in average body condition indices across caribou captured in the western, central, and eastern portion of the Mulchatna herd's range, we did find differences in body condition per lactational status at the time of capture. Lactating females had lower protein ($17.14 \text{ kg} \pm 1.37 \text{ SD}$, $n = 26$) and significantly less body fat ($6.66\% \pm 1.95 \text{ SD}$, $n = 26$) than non-lactating females (protein = $18.34 \text{ kg} \pm 1.99 \text{ SD}$, $n = 19$; body fat = $10.2\% \pm 3.37 \text{ SD}$). Cook et al. (2021) extensively sampled Alaskan caribou herds and found % body fat to range from 2.1 – 26%. Similar to our disease findings, the Mulchatna caribou body condition estimates have raised concern about the current health of this herd and have highlighted the need for investigation of habitat quantity and quality.

OBJECTIVE 4: Develop and test new techniques to detect and monitor changes in caribou herd abundance, survival, cause-specific mortality, and reproductive success.

ACCOMPLISHMENTS: During the last reporting period, we conducted literature reviews and broad collaborative discussions between potential state, federal, and university partners on novel techniques and analytical approaches that could further elucidate

drivers of the population dynamics of the Mulchatna caribou herd. We have not made any additional advancements on this objective during this reporting period.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

We are in year 2 of this 3 year study. While our capture efforts were initially delayed due to COVID-19 associated challenges, we successfully restructured capture efforts and caught and sampled 60 adult female caribou during this reporting period in October of 2020. Two additional capture and sampling efforts are scheduled for the fall of 2021 and 2022. Additionally, we completed a 20+ year survival analysis in female caribou, and made significant progress toward characterizing the current causes of death, disease prevalence, and fall body condition. Finally, we are continuing to develop collaborative partnerships with academic, state, and federal entities to expand the reach of our study of the Mulchatna caribou herd by exploiting sample acquisition opportunities during caribou captures. For example, we have partnered with University of Alaska Anchorage to assess seasonal diet composition with reproductive success using modern isotope analysis.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

We have no significant development reports or amendments to report at this time.

IV. PUBLICATIONS

We have no publications or project products to report at this time.

V. RECOMMENDATIONS FOR THIS PROJECT

We have no recommendations for changes to this project at this time. We recommend that the project continue as planned.

Prepared by: Renae Sattler, Wildlife Biologist III, ADFG

Date: 11 November 2021