

**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-29

PROJECT NUMBER: 2.0

PROJECT TITLE: Demography and Sources of Mortality in Unit 17 Moose

PERIOD OF PERFORMANCE: 23 March 2018 – 31 October 2022

PERFORMANCE YEAR: 24 March 2020 – 30 Sept 2021

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

PRINCIPAL INVESTIGATOR: Kassidy Colson – ADF&G Wildlife Biologist II

COOPERATORS:

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: *Document reproductive and nutrition related metrics for Unit 17 moose.*

ACCOMPLISHMENTS: Twelve 10 month-old female moose were captured during March 2021, divided evenly between Units 17B and 17C. An additional adult female moose was captured during this period to replace GPS collars. Short yearling average weight was 197 kg (SD = 22 kg, $n = 7$) with 43 % of individuals with weight above 200 kg. The single adult was diagnosed as pregnant via PSPB.

OBJECTIVE 2: *Determine survivorship of calf, yearling, two-year-old, and adult moose, as well as likely sources of mortality.*

ACCOMPLISHMENTS: We captured and radiomarked a total of 49 moose neonates between one and four days old, and followed them through June 1st. Twenty three of the 49 died before June 1st (47 %), and we were able to determine cause specific mortality for all these individuals. All (100 %) died from bear predation, with 13 % dying to black bear predation while 87 % dying to brown bear predation. All three assignments to black bear predation were noted as uncertain, so it is possible that the proportion of brown bear predation is higher.

We surveyed the unmarked calves at heel of radio-marked adults in April 2021, and found that 27 % (95% CI = 18%-38%) of the cohort of calves born during 2020 survived to 1 year. During the 2021 parturition season, due to efforts radio-marking neonates, we largely forewent monitoring radio-marked adults. A minority of individuals were surveyed early in the season before we shifted effort towards monitoring the radio-marked neonate calves. Between May 2020 and May 2021 we monitored 49 adult females and 11 2 year-old females for survival.

OBJECTIVE 3: Investigate the spatial and temporal pattern in mortality amongst calf and adult moose, and how this relates to landscape predation risk.

ACCOMPLISHMENTS: In 2021, a single additional GPS collar was deployed. Data collection is not yet complete, precluding analysis at this time. Calf mortality was monitored and calf mortality sites were investigated; causes of adult mortalities were not determined for either of the mortalities. One additional wolf collar was deployed by N. Demma during this period (see project titled: Unit 17 Wolf Demography, Abundance, and Movement; AKW-29 P7.0); analyses of these data are pending.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

This was the fourth year of a five-year project; as such, results should be considered preliminary and subject to change. In year one, 24 adult females were captured and fitted with remote-downloadable GPS radio collars. With the inclusion of 38 previously radiomarked individuals, 58 adult cows were monitored through the 2018 parturition season. In spring of 2019, a total of 38 moose were captured. Six were ≥ 22 months-old (one of whom was male and was disregarded), and the remainder were female 10 month-olds. A total of 59 adult cows were monitored through the 2019 parturition season. Through the 2021 parturition season, a total of 49 adult cows were monitored. In 2018, 18 of the newly captured adults had their pregnancy status diagnosed through the use of PSPB, of which 17 (94%; 95% CI = 71%-99%) were diagnosed as pregnant. In 2019, 24 of 26 (92%; 95% CI = 74%-99%) were diagnosed as pregnant. Due to the lack of spring captures, pregnancy status was not determined for any moose in 2020. During 2021, a single adult female was captured, and was determined to be pregnant.

Parturition in 2018 was similar to the previous pilot-study year, with the first calf born on 12 May, the last observed birth on 2 June, and the peak number of calves alive was 28 May. Median date of observed calves was 21 May. Twinning rate of adults ≥ 36 -months-old was 65% (95% CI = 50%-77%). Seven out of eight 24-months-old cows were observed with calves at heel. Calf survivorship to June 4th was 42% (95% CI = 32%-54%), while calf survivorship to June 23rd was 30% (95% CI = 21%-41%). Median date of death for observed calves was 28 May. Four out of 58 adults died during the calving season (7%; 95% CI = 2%-17%). Adult predation mortality during the entire 2018 year was due to brown bears (*Ursus arctos*) in all cases where cause could be determined ($n = 4$ predatory, one birth complications, three unknown). Nine out of 78 calves of the year survived to 11.5 months (11%; 95% CI = 6%-21%)

Similarly, parturition in 2019 occurred between 13 May- 5 June. Twinning rate of adults ≥ 36 -months-old was 70% (95% CI = 56%-81%), with two sets of triplets born. The lone 24-month-old cow was observed with calves at-heel. Calf survivorship to early June was 36% (95% CI

=27%-47%), while calf survivorship to early July was 20% (95% CI = 13%-30%). Median date of death for observed calves was 25 May. Seven out of 59 adults died (11%; 95% CI =6%-23%); we were able to ascertain cause of death for only four, with two dying to predation and two dying to non-predatory causes. Three out of 83 calves of the year survived to 11.5 months-old (4%; 95% CI = 1%-10%)

Due to the COVID-19 emergency, parturition was not monitored through the whole period. However, of those monitored, twinning rate of adults ≥ 36 -months-old was 65% (95% CI = 49%-78%). Of the 24-month-old cows 45% (95% CI = 21%-72%) were observed with calves at-heel. Calf survivorship to early June was 28% (95% CI =19%-39%). Two out of 49 adults died (4%; 95% CI =0.3%-14%), neither with known cause of death; Twenty one out of 76 calves of the year survived to 11.5 months-old (28%; 95% CI = 19%-39%).

Nutritional metrics were generally high, including a high proportion of adults ≥ 36 -months-old producing twins (65%; 95% CI = 50%-77%) in 2018, and an average 10 month-old female weight of 200 kg (SD = 10.4 kg, $n = 8$) in 2017, 197 kg (SD = 10 kg, $n = 7$) in 2019, and 197 kg (SD = 22 kg, $n = 7$) in 2021. However, late winter rump fat was moderate (1.8 cm, SD = 0.8, $n = 21$) in 2019.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

No additional significant developments were reported during this period.

IV. PUBLICATIONS

We are still in the data collection phase of the project and do not yet have any publications associated with this project.

V. RECOMMENDATIONS FOR THIS PROJECT

Data collection is nearing completion with no additional field work planned at this time. The project will be completed during calendar year 2022.

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