

**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: March 23, 2019 - March 23, 2020

PERFORMANCE YEAR: July 1, 2019 - June 30, 2020; year 2 of a 5-year grant.

REPORT DUE DATE: Submit to Coordinator 12 June 2020; due to FAC 29 June 2020

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

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

Performance reporting on activities ensures performance expectations are being achieved while complying with Federal regulation. Please include, at minimum, the following project information in Sections I – V below:

1. A comparison of actual accomplishments to the objectives of the project established for the period. In other words: what progress have you made toward completion of the objective(s) of the project? Describe how your objective(s) were met.
2. The reasons why established goals or objectives were not met, if appropriate. In other words, please describe and justify any changes in the implementation of objective(s) or approach(es).
3. Additional pertinent information including, when appropriate, analysis and explanation of cost overruns or high unit costs. If applicable, please describe how the project resulted in any benefits, promising practices, new understandings, cost efficiencies, management recommendations, or lessons learned.
4. Additional work not previously described accomplished during this period of performance.

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR
OBJECTIVE 1: *Document reproductive and nutrition related metrics for Unit 17 moose.*

ACCOMPLISHMENTS: Due to the Covid-19 crisis we were unable to capture any adult or 10 month-old female moose. Therefore no progress was made on this objective.

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

ACCOMPLISHMENTS: We monitored 83 unmarked moose calves through the 2019 parturition season. We followed a cohort of 10 month-old females captured in the spring of 2019 through spring of 2020. A single 1 year 10 month-old female was captured in the spring of 2019, and was followed through the spring of 2020. No cause specific mortality assessment was accomplished for calves, except where it was evident from the air. Cause specific mortality was determined for four out of seven adult female moose deaths.

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

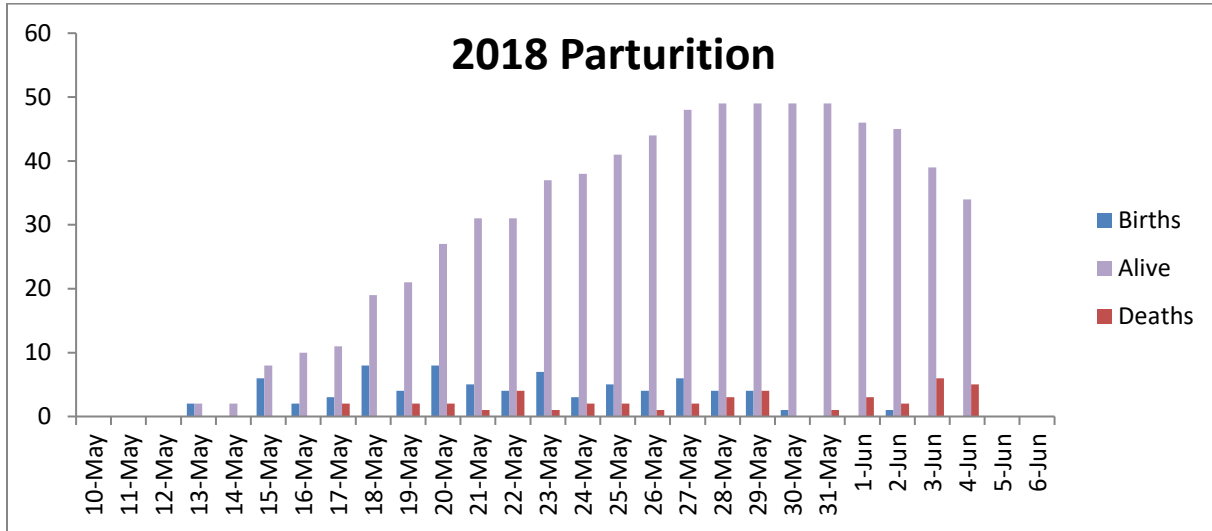
ACCOMPLISHMENTS: In 2020, no additional GPS collars were deployed due to the Covid-19 crisis impacting fieldwork. Data collection is not yet complete, precluding analysis at this time. A total of 59 adult females were monitored through the calving period and were located at calving sites in 2019. Calf mortality was monitored, however, no calf mortality sites were investigated, and causes of adult mortalities were only determined in four of seven cases. Six additional wolf collars were deployed by N. Demma during this period (see project titled: Unit 17 Wolf Demography, Abundance, and Movement); analyses of these data are pending.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

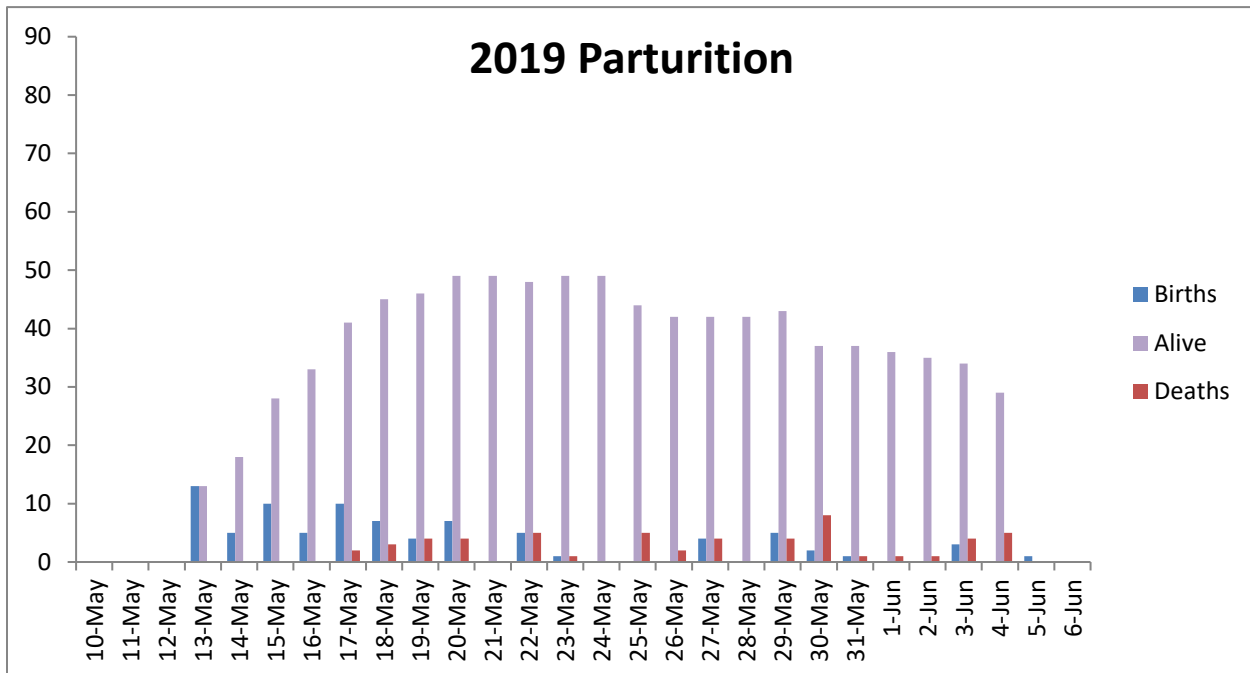
This was the second year of a five-year project; as such, results should be considered preliminary and subject to change. In year one, 24 adult females were captured and fitted with remote-downloadable GPS radio collars. With the inclusion of 38 previously radiomarked individuals, 58 adult cows were monitored through the 2018 parturition season. In spring of 2019, a total of thirty-eight 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. 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 2020.

Parturition in 2018 was similar to the previous 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 calving 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 mortality was due to

brown bears (*Ursus arctos*) in all cases where cause could be determined. 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%)



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 and 197 kg (SD = 10 kg, $n = 7$) in 2019. However, late winter rump fat was moderate (1.8 cm, SD = 0.8, $n = 21$) in 2019.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

During the reporting period, the following significant development report was submitted:

We are requesting a change to AKW-29 P2.0, Objective 2, to accommodate a more powerful analysis in response to recent information. Specifically, we estimated multiyear (2017, 2018) recruitment of moose calves to fall was 0.175, with annual calf recruitment of $\hat{S}_{\text{calf}} = 0.11$ in 2018. Conversely, adult apparent survival remained relatively high ($\hat{S}_{\text{adult}} = 0.89$, 2017-2018). Our preliminary estimate of population growth rate ($\hat{\lambda} = 0.95$; 95% CI = 0.88-1.03), resulted in an 87.8% probability that the population is declining. During 2018, area staff were able to separately estimate moose abundance in GMU 17C using a GSPE; while the subpopulation's abundance point estimate was at the population objective, it was lower than the previous estimate in 2014 and represented an 73% chance of having declined, corresponding to a $\hat{\lambda} = 0.93$. This evidence suggests that the population is declining, and this decline is largely driven by poor calf survival.

The final portion of Objective 2 ("Follow calves through their first year, determine cause-specific mortality where possible") has not been accomplished due to a lack of calves instrumented with tracking devices and the difficulty of finding remains of unmarked calf in the event of mortality. We therefore have been unable to establish cause of death leading to this abnormally low calf survival. To acquire the information, we propose marking a cohort of calves in the parturition season of 2020 by following marked adults and capturing and radiomarking their offspring. This information is important for regulatory action that may be taken during 2021.

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

Project has been extended and will continue four more years.

Prepared by: Kassidy E. Colson – ADF&G Wildlife Biologist II

Date: 28 May 2019