

**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

**PROJECT NUMBER :** 1.67

**PROJECT TITLE:** Comparative nutritional status among 6 high density moose subpopulations in Interior Alaska

**PERIOD OF PERFORMANCE:** 1 July 2008–30 June 2019

**REPORT DUE DATE:** Submit to Coordinator August 24, 2018; due to FAC Sept 1, 2018

**PRINCIPAL INVESTIGATOR:** Graham G. Frye

**COOPERATORS:** Kalin Seaton (former ADF&G Research Biologist)



**I. PROGRESS ON PROJECT OBJECTIVES DURING PERIOD OF PERFORMANCE**

OBJECTIVE 1: Conduct a literature review.

ACCOMPLISHMENTS: A review of the literature on moose nutrition and reproduction was continued during FY2018.

OBJECTIVE 2: Estimate and evaluate nutritional differences among 6 high-density subpopulations using short yearling weights.

JOB/ACTIVITY 2A: Immobilize and weigh March calves (short-yearlings) in 5 subpopulations.

ACCOMPLISHMENTS: During March of 2018, 58 short-yearlings were captured and weighed in the GMU 20B subpopulation. Of the 58 moose captured, 29 were females and 29 were males. The former had a mean weight of 363.25 (SD = 60.53). The latter had a mean weight of 375.36 (SD = 41.61).

JOB/ACTIVITY 2B: Compare nutrition among 6 high-density subpopulations.

ACCOMPLISHMENTS: We continued work on an analysis comparing nutritional condition among populations, as well as several other populations at different nutritional levels across the state. We continued acquiring and proofing data for a comparison of trace mineral levels, 10-month weights, and pregnancy rates at individual and population levels.

JOB/ACTIVITY 2C: Compare twinning rate surveys with short-yearling weights.

ACCOMPLISHMENTS: Not addressed during FY2018. Another year of twinning rate and short-yearling weight estimates was collected during FY2018, so comparison of these metrics was postponed until FY2019.

OBJECTIVE 3: Evaluate differences in winter range for 6 subpopulations with similar high densities.

ACCOMPLISHMENTS: Not addressed during FY2018

OBJECTIVE 4: Connect nutritional indices, population estimates and harvest by monitoring the movements of individual moose (% present) during survey and hunting seasons

ACCOMPLISHMENTS: Not addressed during FY2018

OBJECTIVE 5: Document habitat use and movement patterns on military land.

ACCOMPLISHMENTS: Not addressed during FY2018

OBJECTIVE 6: Evaluate the progression of nutritional differences between burned and unburned areas of Unit 20A.

JOB/ACTIVITY 6A: Evaluate use of recent burns by collared moose

ACCOMPLISHMENTS: We continued to process location information to determine home ranges of GPS-collared moose relative to burn perimeters. Because battery life was waning, all GPS collars have now been removed and location data are being archived and prepared for analyses.

JOB/ACTIVITY 6B: Determine nutritional differences between burned and unburned habitat.

ACCOMPLISHMENTS: In March 2018, we worked with Fairbanks Area staff to capture and weigh an additional 58 male and female moose short-yearlings in GMU 20B as part of their long-term monitoring program.

JOB/ACTIVITY 6C: Collect fine-scale movement information to determine movement and use patterns in burned and unburned habitat

ACCOMPLISHMENTS: We continued to collect GPS location information from remaining GPS-collared adult female moose in burned and unburned habitats in GMU 20A. The final remaining GPS collars were retrieved in March and June, 2018.

JOB/ACTIVITY 6D: Prepare a long-term monitoring strategy for GMU 20A population response to wildfires.

ACCOMPLISHMENTS: Not addressed during FY2018

OBJECTIVE 7: Write annual progress reports, write final report, and publish in peer-reviewed journals.

ACCOMPLISHMENTS: A progress report for this project was written in August 2017. Preparation of a peer reviewed paper is contingent on completion of analyses that are still underway or have yet to be conducted. A draft peer-reviewed manuscript will be completed following final analyses during FY2019.

## **II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.**

Among trace minerals examined, zinc levels in blood serum may provide some indication of relative nutritional status among populations in moose. It correlates well with two well-established indices of nutrition: pregnancy rates and 10-month calf weights. However, more analyses are needed to confirm the relationship. Additional data have been acquired since these preliminary analyses were conducted. A final analysis will be conducted during FY2019. If zinc proves to be a good indicator of nutritional condition, it may be logistical compliment to existing indices

Male calf weights may increase more quickly than females following an improvement in range quality (or decreased intraspecific competition). The exact mechanism for this is unclear, though accelerated weight/size gain may be more important to fitness for males than females. This has ramifications for the use of calf weights as an index to nutritional condition- especially when monitoring changes in nutrition following habitat improvement or population decline. Recent

calf weight data suggest that this may be the case, but further analyses are required to determine whether observed differences in weights among females and males over the last 15 years are biologically significant. An analysis and summary of differences between male and female short-yearling weights will be completed using all available data during FY2019.

See earlier annual progress reports for summary of work done in previous years.

**III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.** All GPS collars have been removed from moose associated with this study, but VHF collars are still deployed and will allow completion of remaining objectives.

**IV. PUBLICATIONS**

NA

**V. RECOMMENDATIONS FOR THIS PROJECT** This project will be closed after FY2019. Final analyses for remaining objectives will be conducted between December 2018 and June 2019. Trace mineral, short-yearling, twinning, and movement/habitat use data will be analyzed and summarized to this end. A draft peer-reviewed manuscript will be completed following these analyses. Data on survival (Objective 8b) will be collected throughout FY2019 and data on parturition/twinning (Objective 8a) will be collected in May and June 2019. Survival and reproduction data will be analyzed and summarized in June 2019. Appropriate federal aid reports will be submitted following completion of FY2019 work.

**Prepared by:** Graham G. Frye

**Date:** 20 August 2018