

# 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:** AKW-10 Wildlife Restoration FY2016

**PROJECT NUMBER:** 1.65

**PROJECT TITLE:** Age-specific natural mortality rates of male versus female moose

**PROJECT DURATION:** 1 July 2006–30 June 2017

**REPORT DUE DATE:** 1 September 2016

**PRINCIPAL INVESTIGATOR:** Scott M. Brainerd, ADF&G

**COOPERATORS:** Layne G. Adams (USGS) and Brad Griffith (University of Alaska Fairbanks)

**WORK LOCATION:** Fairbanks

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

OBJECTIVE 1: Continue literature review on 1) moose biology and ecology at high densities; 2) indices to nutritional status of ungulates; 3) models of ungulate population dynamics; 4) predator-prey ratios in relation to population dynamics of moose, caribou, sheep, wolves, and grizzly bears; 5) predator-prey relationships in multi-prey, multi-predator systems; and 6) population and harvest data on moose, caribou, sheep, wolves, and bears in Unit 20A.

Dr. Boertje has been given access to ARLIS by the project leader to keep abreast of the literature on a regular basis.

OBJECTIVE 2: Estimate causes and age-specific rates of mortality among radiocollared male and female moose in Unit 20A. These data are expected to be useful in determining whether male moose have high survival rates in the 2- through 6-year age-classes as documented among females. These data will also be useful in evaluating when and why changes occur in population density.

Data continued to be collected incidental to other projects for this purpose in FY16.

OBJECTIVE 3: Continue to estimate and evaluate the usefulness of several reproductive and condition indices for moose in Unit 20A. In particular we need to complete age-

AKW-10 1.65 Age Specific Moose Mortality FY2016  
Annual Research Performance Report

specific reproductive rates for moose older than 9 years old. These data will also be useful in determining when and why changes occur in population density.

Data continued to be collected incidental to other projects for this purpose in FY16 for Job/Activity 3a and 3b.

OBJECTIVE 4: Write reports and publications.

The principal investigator, Rod Boertje, retired in early FY13. He has been contracted to complete work associated with this project and Federal Aid Project 3.50 (Fortymile Caribou).

He is currently working two papers Dr. Boertje continues to collect and analyze data for two papers, tentatively entitled:

- Age-specific productivity of female moose in interior Alaska
- Causes of mortality of male and female moose in interior Alaska.

The project leader is administering this contract to facilitate completion of this work.

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

This is a long-term cohort analysis and cannot be satisfactorily completed until the last of the radio-collared moose in this sample die. There were 17 moose alive at the beginning of FY 2016 and 10 radiocollared moose alive at the end of FY16. These moose are very old. The average age for males is 11 and females average 14 years old. This study provides a good opportunity to see how male and female lifespans differ, with and without human-caused mortality. There are few studies on moose with such a large sample of moose age cohorts, including very old moose. The project will be kept on the books until the last moose dies and the two papers based on these data can be written up and published in peer-reviewed journals.

Dr. Boertje is in close contact with colleagues in Fairbanks that continue to collect the last bits of moose data in conjunction with other funded projects. Thus, no expenses were incurred for this project during the report period. The moose are flown each month and data are collected in the same manner as when Dr. Boertje was on staff. Data files are updated with each telemetry flight.

**III. PUBLICATIONS**

No papers were submitted for publication for this project in FY16, as Dr. Boertje's contract priority was to complete the final publication for FA Project 3.50 on Fortymile caribou. These papers will be prioritized in FY17 once the Wildlife Monograph for

AKW-10 1.65 Age Specific Moose Mortality FY2016  
Annual Research Performance Report

Project 3.50 is published.

One paper from this project was published in FY15:

Boertje, R. D., M. M. Ellis, and K. A. Kellie. 2015. Accuracy of moose age determinations from canine and incisor cementum annuli. *Wildlife Society Bulletin* 39:383-389.

**IV. RECOMMENDATIONS FOR THIS PROJECT**

Dr. Boertje is under contract to Publication of results from this study will be contracted to retired biologist Rodney D. Boertje in FY17, and costs of publication will be covered by this project.

**PREPARED BY:** Scott M. Brainerd, ADF&G

**DATE:** 7 October 2016 (revised)