

**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:** W-33

**SEGMENT NUMBER:** 12

**PROJECT NUMBER:** 29.0

**PROJECT TITLE:** Biometric research and support

**PROJECT DURATION:** 1 July 2013–30 June 2014

**REPORT DUE DATE:** 1 September 2014

**PARTNER:** None

**PRINCIPAL INVESTIGATORS:** Brian D. Taras (Biometrician III) and Martha M. Ellis (Biometrician II), ADF&G

**COOPERATOR:** None

**WORK LOCATION:** Regions III and V

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

**JOB/ACTIVITY:** Biometric consulting.

The Region's III and V biometricians reviewed and performed statistical analyses, assisted in study design, and provided statistical editing in support of numerous federal aid projects.

**Federal aid proposal review.**

- Spent substantial time reviewing a federal aid project proposal for FY15 entitled “Nutritional status, range use, and demographics of the Fortymile and Central Arctic caribou herds” by Torsten Bentzen.

**Federal aid research project 1.62 – “Response of moose and their predators to wolf reduction and short-term bear removal in a portion of Unit 19D East.”**

- Revised manuscript accepted and published.

KEECH, M. A., B. D. TARAS, T. A. BOUDREAU, AND R. D. BOERTJE. 2014. Black bear population reduction and recovery in western Interior Alaska. *Wildlife Society Bulletin* 38(1):71–77.

**Federal aid research project 1.65 – “Age-specific natural mortality rates of male versus female moose.”**

- Analyzed accuracy of method for ageing moose teeth and assisted in preparing a draft manuscript.

BOERTJE, R. D., M. M. ELLIS, AND K. A. KELLIE. *In prep.* Accuracy of moose age determinations from canine and incisor cementum annuli. Submitted to *Wildlife Society Bulletin*, June 2014.

**Federal aid research project 1.69 – “Movements and sightability of moose in Game Management Unit 21E.”**

- Continued work on the memorandum documenting moose population survey in Unit 21E that included estimating a sightability correction factor (SCF). Expect to finalize memorandum by September 2014.

**Federal aid research project 1.73 – “Long-term effects of predator reductions on moose abundance, survival, nutrition, and hunting harvest in the Unit 19D East moose management area.”**

- Assisted in the design of a mark-resight survey to estimate the abundance of black bears in the McGrath area and analyzed the data collected.

**Federal aid research project 3.50 – “Analysis and summary of data from the Fortymile caribou range.”**

- Analyzed natality, mortality, and composition data. Assisted in writing and editing draft manuscript.

BOERTJE, R. D., C. L. GARDNER, J. A. GROSS, T. W. BENTZEN, AND M. M. ELLIS. *In prep.* Demography of the Fortymile caribou herd relative to low-intensity nonlethal and lethal wolf control programs and implications to management. Submitted to *Wildlife Society Bulletin*, May 2014.

- In preparation for the Board of Game (BOG) meeting, updated selected analyses and figures in “BOERTJE, R. D., C. L. GARDNER, K. A. KELLIE, AND B. D. TARAS. 2012. Fortymile caribou herd: Increasing numbers, declining nutrition, and expanding range. Alaska Department of Fish and Game, Wildlife Technical Bulletin 14 ADF&G/DWC/WTB-2012-14, Juneau.”
- Developed a matrix population model for Fortymile caribou.

**Federal aid research project 4.39 – “Grizzly and black bear distribution and abundance relative to the 2004 wildfires in eastern Interior Alaska: Possible intensive management consequences.”**

- Continued analysis of DNA capture-recapture data for grizzly bear in Unit 20E using spatially-explicit capture-recapture models. Continued work on a manuscript to document the study results. Draft nearly ready for external review.

GARDNER, C. L., B. D. TARAS, K. A. KELLIE, AND N. J. PAMPERIN. *In prep.* Sampling design and modeling challenges for estimating abundance and density of

a remote, low density and geographically open grizzly bear population. *Journal of Wildlife Management*.

**Federal aid research project 4.40 – “Grizzly bear use of the North Slope oil fields and surrounding region.”**

- Continued to provide statistical analysis and report preparation for a comparison of slope and aspect measurements taken at grizzly bear den sites with those taken from digital elevation maps generated using interferometric synthetic aperture radar.
- Also, continued to assist in developing a strategy to proceed with the resource selection analysis.

**Federal aid research project 5.20 – “Habitat evaluation techniques for moose management in Interior Alaska.”**

- Developed several models for analyzing distribution of moose with regard to browse, distance to river, and environmental covariates. Prepared write up of methods, results, and interpretation.
- Provided consultation on the next steps in the analysis of snow depths and effects on moose. Recommended running descriptive statistics on snow stake data and comparing previous approaches to summarize why those approaches didn't work. Working on draft manuscript emphasizing the difficulties with linking demographic rates to environmental covariates, and developing an index of winter severity that could provide a better indicator of environmental effects on moose.
- Summarized methods applied to date to snow stake data, with comparison of approaches.
- Calculated confidence intervals for estimates of moose twinning rates.

**Federal aid research project 14.27 – “Development of an aerial wolf census survey operations manual for Interior Alaska.”**

- Reviewed and provided comment on the wolf survey manual.

GARDNER, C. L., AND N. J. PAMPERIN. 2014. Intensive aerial wolf survey operations manual for Interior Alaska. Alaska Department of Fish and Game. Wildlife Special Publication ADF&G/DWC/WSP-2014-01, Juneau.

**Federal aid survey and inventory projects.**

- Performed extensive data analysis of survival and natality data from the Delta caribou herd (1979–2008). Researched and compared different statistical methods for survival analysis and model assessment. Prepared documentation of methods and results to assist in the preparation of an ADF&G technical bulletin. Draft title is “Population dynamics of Alaskan caribou with focus on the Delta caribou herd, 1978–2007.”
- Assisted ADF&G Assistant Area Manager Josh Peirce (Region III-McGrath) in designing and analyzing the results of a moose survey, including estimating an SCF, for a portion of eastern GMU 19A.

- Assisted ADF&G Area Manager Roger Seavoy (Region III-McGrath) in designing a moose survey, including estimating an SCF, for a portion of western GMU 19A.
- Assisted ADF&G Area Manager Tony Gorn (Region V-Nome) in designing the first geospatial population estimator (GSPE) moose surveys in Units 22D and 22E that included estimating an SCF. Also analyzed the data and assisted in preparing a memorandum documenting the survey.
- Assisted ADF&G Assistant Area Manager Brandon Saito (Region V-Kotzebue) in designing a GSPE moose survey for the upper Kobuk moose survey area that included estimating an SCF. Also analyzed the SCF data.
- Assisted ADF&G Biometrician Earl Becker with the design and analysis of a moose survey undertaken by Area Manager Charlotte Westing (Region II).
- Assisted ADF&G Area Manager Beth Lenart (Region III) in analyzing and interpreting the results of a caribou census survey for the Central Arctic herd in 2013.
- Assisted ADF&G caribou biologists Jim Dau (Region V-Kotzebue) and Lincoln Parrett (Region V-Fairbanks) in analyzing and interpreting the results of caribou census surveys for the Western Arctic and Teshekpuk caribou herds in 2013.
- Assisted ADF&G caribou biologist Lincoln Parrett (Region V-Fairbanks) with the analysis of caribou calf weight data relative to first year survival.
- Assisted ADF&G Assistant Area Manager Jason Caikoski (Region III-Fairbanks) with analyzing and interpreting muskoxen survival data in preparation for the BOG meeting.
- Performed a number of trend analyses with moose abundance estimates obtained pursuant to federal aid management survey and inventory projects.
- Updated simple population dynamics models for moose in GMU 20A to assess effect of management actions. Provided consultation to Don Young in preparation for advisory committee and BOG meetings.
- Assisted Programmer Analyst Rob DeLong (Region III-Fairbanks) by performing a power analysis to estimate sample sizes needed to detecting differences in error rates in harvest data.

#### **Other Federal Aid Projects.**

- Minor consulting was performed for a variety of federal aid projects on a drop-in basis.
- Continued work on the manuscript “Consequences of violating the independence assumption in aerial mark-recapture distance-sampling studies” by Anna-Marie Benson, R. P. Barry, B. D. Taras, and J. H. Reynolds.

#### **JOB/ACTIVITY: Conferences, training, papers.**

- Martha Ellis and Brian Taras participated in a workshop entitled “Wildlife home range, habitat selection, and space use” given by Dr. Oz Garton from the University

of Idaho. The workshop was held at the University of Alaska Fairbanks during 3–7 September 2013.

- Brian Taras and Martha Ellis attended the 24<sup>th</sup> annual meeting of the Alaska Chapter of *The Wildlife Society* during 31 March–2 April 2014 in Anchorage, Alaska. Included was a workshop entitled “Analysis of animal spatial selection and movement” given by Dr. Mark Boyce of the University of Alberta. A trip report is available upon request.
- Brian Taras took 2 courses to broaden statistical programming skills. “Visualization in R with ggplot2” given by Dr. Randall Pruim of Calvin College and “Mapping in R” given by Professor Chris Brunsdon of the National University of Ireland. The courses were offered on-line by [statistics.com](http://statistics.com).

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

None.

## **III. PUBLICATIONS**

Except for the following, citations for publications mentioned in Section II are reported in performance reports written by Region III principal investigators:

BENSON, A-M., R. P. BARRY, B. D. TARAS, AND J. H. REYNOLDS. *In Prep*. Consequences of violating the independence assumption in aerial mark-recapture distance-sampling studies. To be submitted to *Journal of Agricultural, Biological, and Environmental Statistics*.

## **IV. RECOMMENDATIONS FOR THIS PROJECT**

None.

**PREPARED BY:** Brian D. Taras and Martha M. Ellis

**DATE:** 15 August 2014