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-33-8

PROJECT NUMBER: 1.62

PROJECT TITLE: Response of moose and their predators to wolf reduction and short-term bear removal in a portion of Unit 19D East

PROJECT DURATION: 1 July 2005–30 June 2011

REPORT PERIOD: 1 July 2009–30 June 2010

REPORT DUE TO HQ: 1 September 2010

PRINCIPAL INVESTIGATOR: Mark A. Keech

WORK LOCATION: Interior Alaska. Unit 19D East, the upper Kuskokwim River drainage upstream of the Selatna River. Intensive study area (also known as the "Experimental Micro-Management Area" or "EMMA"). The 528-mi^2 area along the Kuskokwim and Takotna rivers within Unit 19D East that immediately surrounds the community of McGrath.

I. PROGRESS ON PROJECT OBJECTIVES DURING LAST SEGMENT

OBJECTIVE 1: Monitor response of moose to recent management actions.

Since the start of this project we have completed 5 moose (*Alces alces*) population estimates, as well as monitored survival of 4 radiocollared cohorts of calves and 5 radiocollared cohorts of yearling moose. In addition, we have monitored calving, twinning, and survival rates of adult moose during each year.

OBJECTIVE 2: Characterize winter moose browse in Unit 19D East, with emphasis on the intensive study area.

A winter browse survey was completed under federal aid project 5.20 within the study area during spring 2009 that meets the objectives for this study.

OBJECTIVE 3: Estimate wolf numbers in Unit 19D East with emphasis on the intensive study area.

We completed a wolf (*Canis lupus*) population estimate in the study area in spring 2006 and spring 2009.

OBJECTIVE 4: Estimate black bear numbers in the intensive study area.

We completed a black bear (*Ursus americanus*) population estimate in the study area in spring 2007 and spring 2010.

OBJECTIVE 5: Analyze hair and tissue samples for species, sex, and age information.

During 2008 we had DNA analyzed from hair samples of suspected predators collected from 67 calf mortality sites. DNA was identified to species, sex, and individual when possible. In addition, in 2008, ages of bears captured in 2006 and 2007 were determined through cementum annuli counts from extracted teeth.

OBJECTIVE 6: Review literature, write annual progress reports, write final project report, and publish results in peer-reviewed journals.

Since the start of this project the principal investigator reviewed literature on moose mortality, population dynamics/modeling, and productivity. Additionally, literature on DNA analysis, bear and wolf population estimation techniques, and methods to evaluate browsing intensities by moose were reviewed. The 2006, 2007, 2008, and 2009 annual research progress reports for this project were also completed, and a manuscript "Effects of predator control, individual traits, and environment on moose survival in Alaska" was prepared and submitted to *The Journal of Wildlife Management* during FY10 and is currently in review.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

No federal Pittman-Robertson operating funds were used on these job activities, funding was provided from ADF&G's General Fund.

JOB/ACTIVITY 1A: Estimate moose numbers and population composition in Unit 19D East

During 17–20 November 2009 we conducted aerial moose surveys within the Experimental Micro Management Area (EMMA) (528 mi^2) and expanded EMMA (1118 mi^2) portions of Unit 19D East. We estimated 830 (±174) moose in the EMMA and 1820 (±323) moose within the expanded EMMA. We used 5 fixed-wing aircraft to complete the survey.

JOB/ACTIVITY 1B: Calf mortality study/determine primary causes of mortality of moose calves

In May 2010 we captured and radiocollared 60 newborn moose calves in the EMMA. One calf was considered a capture-related mortality. Calf survival through 25 July 2010 was approximately 57% (31 of 54 lived, we censored 5 calves from survival analysis). We attributed 12 deaths (52%) to black bears, 4 deaths (17%) to grizzly bears, 3 deaths (13%) to wolves, and 4 deaths (17%) to nonpredation causes. During this reporting period we also monitored survival of calves born to radiocollared cows in May 2009. Annual (May 2006–May 2007) survival for these uncollared calves was approximately 50% (25 of 50 lived), however, causes of mortality were not determined.

JOB/ACTIVITY 1C: Determine condition, movements, and mortality rates of yearling moose

We captured and fitted radiotransmitters to 15 short-yearling female moose during 1–2 April 2010 (without capture-related mortalities). Survival of these radiocollared yearlings from 15 May to 30 June 2010 was 100%. During this report period we also monitored the annual survival of the 2009 yearling cohort; their survival was approximately 83% from May 2009 to May 2010.

JOB/ACTIVITY 1D: Determine twinning rates and reproductive indices of moose in Unit 19D East

During May and June 2010 we conducted approximately 10 flights to determine parturition and twinning rates among both radiocollared and non-radiocollared cows. Overall parturition rate for 2010 was approximately 93% for all radiocollared cows. Twinning rate was 33% among parturient radiocollared cows and 29% for randomly encountered uncollared cows.

JOB/ACTIVITY 1E: Monitor collared adult and yearling moose for survival and movement information

During this report period we conducted approximately 12 radiotracking flights to determine survival and movements of adult and yearling moose.

JOB/ACTIVITY 3: Wolf population estimation

Because of inadequate snow depth and texture in the study area during late-winter 2010 we were unable to conduct a wolf population survey. Therefore this job was not accomplished during this reporting period.

JOB/ACTIVITY 4: Black bear population estimation

During 2–12 May 2010 we completed a mark–recapture population estimate of black bears within the EMMA. During that time we also captured and marked 9 black bears to assist with the estimate (no capture-related mortalities). Based on the May 2010 survey we calculated a preliminary estimate of 102 independent black bears.

JOB/ACTIVITY 6: Literature review, data analysis, reporting writing, and publication of results

During this report period the principal investigator reviewed literature on moose mortality, population dynamics/modeling, and productivity, as well as bear and wolf population estimation techniques, and methods to evaluate browsing intensities of moose. The 2009 annual research performance report for this project was also completed during this report period and a manuscript “Effects of predator control, individual traits, and environment on moose survival in Alaska” was prepared and submitted to *The Journal of Wildlife Management* and is currently in review.

III. PUBLICATIONS

KEECH, M. A. 2009. Response of moose and their predators to wolf reduction and short-term bear removal in a portion of Unit 19D East. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Annual Research Performance Report. Grant W-33-7. Project 1.62. Juneau, Alaska, USA.

KEECH, M. A., M. S. LINDBERG, R. D. BOERTJE, P. VALKENBURG, B. D. TARAS, T. A. BOUDREAU, AND K. B. BECKMEN. *In press*. Effects of predator control, individual traits, and environment on moose survival in Alaska. Journal of Wildlife Management.

IV. RECOMMENDATIONS FOR THIS PROJECT (optional)

None.

Prepared by: Mark A. Keech

Date: 25 August 2010