

**Alaska Department of Fish and Game  
Division of Wildlife Conservation  
September 2008**

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

**Mark A. Keech**

**Research Annual Performance Report  
1 July 2007–30 June 2008  
Federal Aid in Wildlife Restoration  
W-33-6  
Study 1.62**

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# FEDERAL AID ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF WILDLIFE CONSERVATION  
PO Box 115526  
Juneau, AK 99811-5526

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

**PRINCIPAL INVESTIGATOR:** Mark A. Keech

**COOPERATOR:** None

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NO.** W-33-6

**PROJECT NO.** 1.62

**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<sup>2</sup> area along the Kuskokwim and Takotna Rivers within Unit 19D East that immediately surrounds the community of McGrath.

**STATE:** Alaska

**PERIOD:** 1 July 2007–30 June 2008

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## I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

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

Since the start of this project we have completed 3 moose population estimates, as well as monitored survival of 3 cohorts of both calf and 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.

No browse surveys have been completed since the start of this project. We anticipate completing a browse survey in March 2009.

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

We completed a wolf population estimate in the study area in spring 2006.

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

We completed a black bear population estimate in the study area in spring 2007.

**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 that we collected at 67 calf mortality sites. DNA was identified to species, sex, and individual when possible. In addition, in 2008, ages of bears captured in 2006 were determined through cementum annuli counts from extracted teeth. We anticipate age analysis of bears captured in 2007 to be completed by spring 2009.

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 calf mortality, DNA analysis, bear population estimation techniques, and methods to evaluate browsing intensities by moose. The 2006 and 2007 annual research progress reports for this project were also completed during this report period.

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

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

During 8–14 November 2007 we conducted aerial moose surveys within the EMMA and its immediate vicinity. We estimated 874 moose in the 528 mi<sup>2</sup> EMMA and 1804 moose within the buffered EMMA. We used 5 fixed-wing aircraft to complete the survey. No Federal PR operating funds were used on this job.

JOB/ACTIVITY 1B: Determine primary causes of mortality of moose calves.

During this report period we continued to monitor moose calves captured in May 2007. Calf survival for the 2007 cohort through 15 May 2008 (1-year-of-age) was approximately 35% (16 of 51 lived, 2 individuals were censored). We attributed 7 deaths (21%) to black bears, 14 deaths (42%) to grizzly bears, 6 deaths (18%) to wolves, 4 deaths (12%) to nonpredation causes, and 2 deaths (6%) to unknown causes. No Federal PR operating funds were used on this job.

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

We captured and fitted radio transmitters to 15 yearling female moose during 17 and 18 May 2008. Survival of radiocollared yearlings from 18 May to 30 June 2008 was 100% (there were no capture-related deaths). During this report period we also monitored the annual survival of the 2007 yearling cohort, their survival was 100% from May 2007 to September 2007 (after which time no collared yearlings remained due to collars slipping off). No Federal PR operating funds were used on this job.

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

During May and June 2008 we conducted approximately 10 flights to determine parturition and twinning rates among both radiocollared and non-radiocollared cows. Five of 8 radiocollared 3-year-old moose were observed with calves, giving an observed parturition rate of 63% for that age class during spring 2008. Overall parturition rate for 2007 was approximately 88%. Twinning rate was 53% among parturient collared cows. No Federal PR operating funds were used on this job.

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

During this report period we conducted approximately 12 radio tracking flights to determine survival and movements of adult and yearling moose. No Federal PR operating funds were used on this job.

JOB/ACTIVITY 2: Conduct moose browse surveys.

This job was not scheduled to be completed during this report period. No Federal PR operating funds were used on this job.

JOB/ACTIVITY 3: Wolf population estimation.

This job was not accomplished during this report period due to unfavorable spring survey conditions. No Federal PR operating funds were used on this job.

JOB/ACTIVITY 4: Black bear population estimation.

This job was not scheduled to be completed during this report period. No Federal PR operating funds were used on this job.

JOB/ACTIVITY 5: DNA analysis.

During this report period, we had DNA analyzed from hair samples of suspected predators that we collected at 67 calf mortality sites. Of these samples, 54 were successfully identified to species, 6 were wolf, 35 (11 male, 12 female, 12 unknown) were black bear, and 13 (6 male, 2 female, 5 unknown) were grizzly bear. No Federal PR operating funds were used on this job.

Procedure: Hair or tissue samples taken from captured bears, or from mortality sites of moose calves, will be submitted for DNA analysis on an alternating year basis to determine genetic information regarding numbers, sex, and age classes, of bears involved in calf predation. DNA analysis may also contribute to mark-recapture population estimates. In addition, hair from unknown sources located at calf mortality site may also be submitted to help identify species presence at a given site.

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

During this report period the principal investigator reviewed literature on moose calf mortality, DNA analysis, bear population estimation techniques, and methods to evaluate browsing intensities by moose. The 2007 annual research progress report for this project was also completed during this report period. No Federal PR operating funds were used on this job.

### **III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD**

None.

### **IV. PUBLICATIONS**

Keech, M. A. 2006. 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-33-4. Project 1.62. Juneau, Alaska.

Keech, M. A. 2007. 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-33-5. Project 1.62. Juneau, Alaska.  
[http://www.wildlife.alaska.gov/pubs/techpubs/research\\_pdfs/1.62\\_07.pdf](http://www.wildlife.alaska.gov/pubs/techpubs/research_pdfs/1.62_07.pdf) Accessed 26 Aug 2008.

**V. RECOMMENDATIONS FOR THIS PROJECT**

None.

**VI. APPENDIX**

None.

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