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: 1.67

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

PROJECT DURATION: 1 July 2008–30 June 2013

REPORT PERIOD: 1 July 2009–30 June 2010

REPORT DUE DATE: 1 September 2010

PRINCIPAL INVESTIGATOR: Kalin A. Kellie

WORK LOCATION: Interior Alaska, Unit 20

COOPERATOR: U.S. Army

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

High-density populations of moose near Fairbanks and Delta Junction have provided a proximate and sizeable moose harvest for Alaska hunters (Fig. 1). In the last 3 years, harvest in Units 20A, 20B, and 20D has increased to over 30% of the statewide harvest due to liberal antlerless hunts initiated in part to alleviate poor nutrition (Young and Boertje 2004). The hunting public values these moose populations and closely scrutinizes their management (Young et al. 2006). Units 20A, 20B, and 20D are intensive management (IM) areas where management for increased yield is mandated. ADF&G biologists regularly explain and advocate harvest strategies at advisory committee meetings, Board of Game meetings, and to the media. Finally, major portions of these areas have recently burned and we have little information on the short-term effects of burns on moose populations that are nutritionally limited. Research on population dynamics at high density in these areas is timely for the development and defense of sound moose harvest strategies.

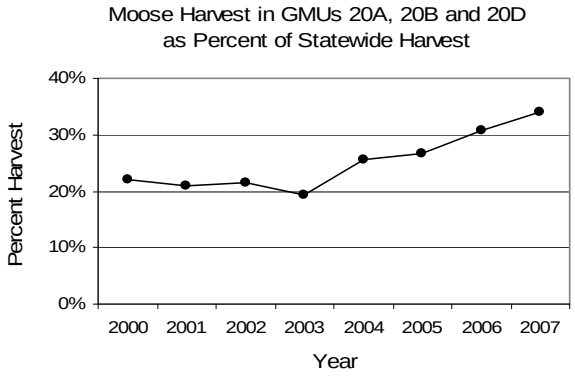

FIGURE 1. Moose harvest in the proposed study area relative to statewide harvest.

Where moose are at high density, measurement of population nutrition is vital to management strategies. In this project, we compare nutrition among 4 high-density and high-yield subpopulations surrounding central Unit 20A (Fig. 2). We will measure short-yearling weights (Keech et al. 1999, 2000) and conduct browse surveys (Seaton 2002) to provide managers with a nutritional context for these subpopulations relative to the well-documented dynamics in central Unit 20A. We will examine long-term trends in winter density and reproduction from on-going annual population surveys (Kellie and DeLong 2006) and twinning surveys. This study will also study immigration and emigration from areas currently managed as subpopulations (Young 2006), detailing the relationship between harvested moose, movements, and population indices gathered during other seasons.

Finally, this study will provide a reference for the effects of recent burns (6–10 years old) on the dynamics of nutritionally-limited moose. Seasonal burn use, relative nutrition, available browse biomass and population trends in recent burns are unknown and likely to differ greatly from moose dynamics in older habitat. Documentation of high-density dynamics occurring in recent burns will better equip us to model moose populations in a climate where burn frequency may be increasing.

Moose movements in Unit 20A were examined 3 years before and 5 years after a major fire in 1980 (Gasaway et al. 1989). However, the population was at a much lower density, and presumably higher level of nutrition, than the current population. Major wildfires occurred during 2001 and 2002 in 3 subpopulations (east, central, and west Unit 20A; Fig. 2). These burns have created contrasting habitats in 3 areas where nutrition is limiting moose subpopulations. These burns are adjacent to significant access corridors such as roads, trails, and waterways. Thus, moose dynamics in these recent burns will influence highly accessible (i.e., harvestable) portions of these subpopulations. We need to understand how population dynamics in the burn are influencing harvest in these high-yield units. Information on the response of moose nutrition and density to burn regeneration 6–10 years post-fire may soon be applicable to large portions of Interior Alaska that have recently burned (i.e., 2004–2006).

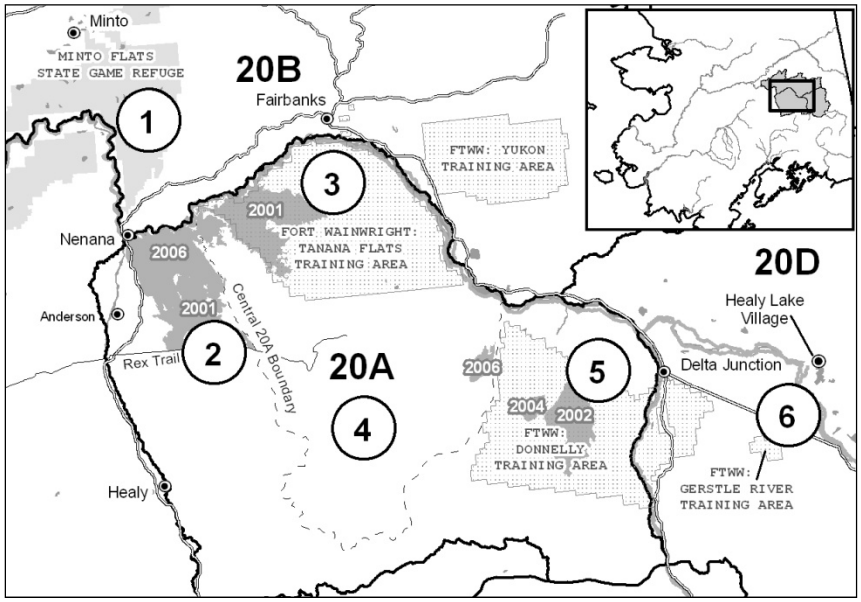

FIGURE 2. Study areas included in the evaluation of nutrition at high density: 1) Minto Flats, 2) western Unit 20A, 3) central Tanana Flats, 4) Alaska Range foothills, 5) eastern Unit 20A, and 6) southwestern Unit 20D. Areas 3 and 4 combine to form central Unit 20A. Recent fires (i.e., after 2000) are indicated in dark gray and labeled with year burned.

TABLE 1. Summary of nutritional information for the study areas.

Study area	Moose population or subpopulation	2006 Moose density (m/mi^2)	Population trend	Age of first reproduction (months, %)	Mature reproduction rate (%)	Twinning rate (%, yr incl.)	F short-yearling weight (kg, SE)	Browse biomass removal rate (%)
1	Minto Flats	3.5	Increasing, high density			18, 1998–2005		
2	Western Unit 20A	3.0*	Stable, high density			24, 2007		
3	Central Tanana Flats	2.7*	Stable, high density	36, 27	70	7, 1997–2005	155, 1.6	41
4	Alaska Range Foothills	3.2*	Stable, high density	36, 30	80	12, 1997–2005	172, 2.4	43
5	Eastern Unit 20A	2.3*	Stable, high density			10, 2007		
6	Southwest Unit 20D	5.6	Increasing, high density			21, 2000–2005		26

* These are all part of a single estimate for Unit 20A from 2006. Reproduction and browse information is from Boertje et al. (2007):Table 1.

III. APPROACHES USED AND FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED

We will expand existing information on moose nutrition and winter range by comparing data among 6 high-density and high-profile moose subpopulations. This will improve our understanding of variability in the relationship of density, nutrition and productivity at high density. In addition, we will confirm the physical link between nutritional indices, moose surveys, and fall moose harvest by monitoring moose movement. Finally, we will examine the dynamics of moose density and nutrition relative to recent burns, providing managers with improved models of the short-term effects of wildfire on moose nutrition.

IV. MANAGEMENT IMPLICATIONS

This project will apply research conducted in central Unit 20A to accessible, high-density moose populations in Interior Alaska. We will learn spatial and temporal differences in carrying capacity among 4 other high-use subpopulations of moose. Further, we will document whether information currently collected during twinning and population surveys reflect characteristics of the hunted population. Finally, we will document population dynamics occurring in regenerating burns, better equipping us to model moose populations in a climate where burn frequency may be increasing.

V. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY

OBJECTIVE 1: Conduct a literature review.

Accomplishments: I read peer-reviewed literature on the following topics: moose and wildfire, fire regeneration, moose movements and moose nutrition. All pertinent information was summarized in a short review for future inclusion in manuscripts and entered into my digital notes archive by topic.

Federal funds were used to pay salary.

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: In March 2010, we captured and weighed 78 10-month-old calves in Unit 20A. This sample was divided among 3 different sub-areas: non-burn, 2001 burn, and 2009 burn. We also captured 29 10-month-old female moose in the Minto Flats study area and 30 10-month-old female moose in the Delta study area (Unit 20D). All calves were weighed and measurements recorded for nutritional development comparisons among study areas. A portion of the calves in Unit 20A were radiocollared for further monitoring of movement relative to the burn scars. Federal funds were used to pay salary, charter pilots and for capture supplies. Federal funds include military funding from U.S. Army.

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

JOB/ACTIVITY 3A: Conduct browse surveys in burned and unburned portions of east, central, and west Unit 20A

Accomplishments: We conducted a browse survey in the 2001 burn area of Unit 20A. We also began preliminary work in establishing long-term browse plots in the 2001 and 2009 burns to more accurately measure changes in browse production with succession. See project 5.20 for details. Federal funds were used to pay salary and charter pilots. Federal funds include military funding from U.S. Army.

JOB/ACTIVITY 3B: Conduct browse surveys in comparable subpopulations likely to have higher carrying capacity

Accomplishments: We conducted browse surveys in the Minto Flats and Unit 20D. See project 5.20 for details. Federal funds were used to pay salary and charter pilots. Federal funds include military funding from U.S. Army.

JOB/ACTIVITY 3C: Calculate available and removed biomass of moose browse in the 5 subpopulations

Accomplishments: Browse survey information was entered and analyzed by T. Paragi under project 5.20. Results for this section are listed under the 5.20 progress report. The results from these analyses are now ready to be incorporated into the manuscript comparing nutritional condition among the 6 subpopulations. Federal funds were used to pay salary.

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

JOB/ACTIVITY 4A: Radiotrack moose and obtain location information

Accomplishments: I used department aircraft to locate radiocollared moose 1–2 times per month in Unit 20A. Charter pilots were used to complete location flights twice during this period when I was unavailable because of competing fieldwork priorities in this 1.67 project or other projects. Federal funds were used to pay salary, charter pilots, and fuel for state aircraft. Federal funds include military funding from U.S. Army.

VI. PUBLICATIONS

No publications specific to this project were drafted in FY10.

Literature Cited:

BOERTJE, R. D., K. A. KELLIE, C. T. SEATON, M. A. KEECH, D. D. YOUNG, B. W. DALE, L. G. ADAMS AND A. R. ADERMAN. 2007. Ranking Alaska moose nutrition: Signals to begin liberal antlerless harvests. Journal of Wildlife Management 71:1494–1506.

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SEATON, C. T. 2002. Winter foraging ecology of moose in the Tanana Flats and Alaska Range foothills. Thesis, University of Alaska Fairbanks, Alaska, USA.

YOUNG, D. D. 2006. Unit 20A moose. Pages 322–342 *in* C. Brown, editor. Moose management report of survey and inventory activities 1 July 2003 through 30 June 2005. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska, USA.

YOUNG, D. D., AND R. D. BOERTJE. 2004. Initial use of moose calf hunts to increase yield, Alaska. Alces 40:1–6.

YOUNG, D. D., R. D. BOERTJE, C. T. SEATON, AND K. A. KELLIE. 2006. Intensive management of moose at high density: Impediments, achievements, and recommendations. Alces 42:41–48.

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

We used an R-44 helicopter to investigate cause of death for 10 calf and yearling mortalities that occurred between 10 March and 31 July 2010. This information was included in ongoing investigations of age-specific survival at high density (see federal aid project 1.65).

Federal funds were used to pay salary and charter pilots. Federal funds include military funding from U.S. Army.

We also conducted work on Objective 5 during FY10 because the funding for this work was transferred from the military in time for the October 2009 and March 2010 field seasons.

OBJECTIVE 5: Document habitat use and movement patterns on military land.
JOB/ACTIVITY 5A: Document movement patterns of moose in the Fort Wainwright Gerstle River Training Area with reference to the Healy Lake hunting areas

Accomplishments: In October 2009 we captured and radiocollared 43 adult male moose in the Unit 20D area. We took antler measurements and a tooth for aging. In March 2010, we captured and radiocollared an additional 18 adult female moose and also captured and weighed their offspring as part of job/activity 2a.

From October 2009 to the end of the fiscal year, we chartered fixed-wing pilot J. Cummings to radiotrack all adult radiocollared moose in Unit 20D and record their locations. S. DuBois (DWC Delta Area Biologist) and I participated as observers and recorded pertinent location and biological data during these flights. Preliminary location information indicates that there are movement patterns between the Gerstle River Training Area and the Healy Lake area. Radiotracking will continue through next fiscal year.

Federal funds were used to pay salary, charter pilots, capture supplies and fuel for state aircraft. Federal funds include military funding from U.S. Army.

VIII. RECOMMENDATIONS FOR THIS PROJECT

In summer 2009, substantial portions of Unit 20A burned, providing us with a rare opportunity to monitor moose nutrition in a recent burn. Thus, we chose to include the 2009 burns as our sixth study area and remove eastern Unit 20A. During winter 2010–2011, a reevaluation of project design is needed to ensure that samples and direction are adequate to achieve definitive results over the long-term regarding the relationship between wildfire succession and moose nutrition.

Prepared by: Kalin A. Kellie

Date: 25 August 2010