

# 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:** Evaluation and testing of techniques for ungulate management

**PRINCIPAL INVESTIGATOR:** John Crouse

**COOPERATORS:** US Fish and Wildlife Service Kenai National Wildlife Refuge,  
University of Alaska – Fairbanks, Dr. Perry Barboza

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NO.** W-33-8

**PROJECT NO.** 1.63

**WORK LOCATION:** Moose Research Center

**STATE:** Alaska

**PERIOD:** July 1, 2009 – June 30, 2010

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## PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

### **OBJECTIVE 1: Kenai Moose Research Center (MRC) maintenance and operations.**

We held and cared for 22-25 moose and 0-9 caribou. We constructed a 0.5 mile long by 30 feet wide fenced alleyway across the northeast portion of Pen 2 to direct the movement of animals between enclosures and from Pen 3 to our animal holding, processing and weighing facilities. Shrubs and trees have been removed from 8000 linear feet of enclosure fence. A 3,200 square feet uninsulated steel shop building has been constructed and electrical, gas, and water lines have been put in place. Conifers have been thinned around existing structures and fire suppression equipment (gasoline powered water pump, hose and sprinklers) has been purchased and is on-site.

### **OBJECTIVE 2: Drug testing.**

We evaluated the combination of medetomidine and ketamine to immobilize a male moose.

We evaluated the combination of butorphanol, azaperone, and medetomidine (BAM) to immobilize 11 moose.

### **OBJECTIVE 3: Moose nutrition, physiology and reproductive studies.**

We developed and evaluated techniques to estimate food acquisition rates of foraging moose. Acquisition rates can further be combined with plant nutrient content and time-activity budgets to estimate total nutrient intake.

We evaluated the use and physiologic effects of a TASER<sup>®</sup> energy device to immobilize moose.

We evaluated the use of vaginally inserted radio transmitters (VITs) to detect moose birthing events.

**OBJECTIVE 4: Caribou nutrition, physiology and reproductive studies.**

The original objective of these studies was to examine the extent to which nutritional factors influenced reproduction in caribou, and how that relationship might have contributed to the decline of the Southern Alaska Peninsula caribou herd. The caribou studies have been concluded. The remaining 4 animals were euthanized in 2007. Necropsies were performed and carcasses were sampled for chemical determination of body composition (protein, fat, and ash). Data from all caribou body composition analyses will be analyzed and prepared for publication.

**Objective 5: Preparation of reports and technical publications.**

Annual research performance reports and Institutional Animal Care and Use (IAUC) documents have been submitted. Initial results of remote parturition monitoring with vaginally inserted radio transmitters (VITs) were summarized and presented at the 2007 annual meeting of the Alaska Chapter of the Wildlife Society. Further use and evaluation of VITs was completed after that time and a manuscript is being prepared.

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

**II.**

JOB/ACTIVITY 1A: Maintain captive moose at the MRC. We cared for 22 moose during this period. Following a high rate of morbidity associated with phosphorus deficiency among hand-reared moose calves, we changed our milk replacer formula and bottle-fed 3 female and 2 male calves. The new formula achieved a concentration of 30% protein, 40% fat, 15% lactose (dry weight) and 20% solids using 75g of Zoologic® Milk Matrix 30/55 and 25g of Foal-Lac® Powder mixed 4:1 with water (if weighing is not possible, 4 cups Zoologic® Milk Matrix 30/55 + 1 cup Foal-Lac® Powder + 10 cups water ~ 20% solids). No additives were used in the milk replacer formula. Calves were held together in an 80 acre enclosure with access to natural forage, water and a trace mineral lick. Calves were introduced to an alfalfa-based reindeer ration (13% crude protein) at about 3 weeks of age. Once calves were regularly consuming at least 2 cups of the reindeer ration a day, the amount offered was gradually increased to a maximum of 1.5kg at weaning (120 days). Calves were supplemented with 1.5kg of the reindeer ration daily throughout winter until “green” forage was once again available in mid-May. All calves survived and were alive at time of reporting (15 months old).

One pregnant adult female moose was killed by a brown bear on 18 April and a second adult female died from an undetermined cause in June.

JOB/ACTIVITY 1B: Cabin repair and upgrades. This job was inactive during the FY10 reporting period.

JOB/ACTIVITY 1C: Fence repair and replacement. We removed 225ft of an interior fence in preparation of replacing it with new. Additional steel pipe supports were put in place and 3 gates were constructed.

JOB/ACTIVITY 2A: Evaluate the use of medetomidine and ketamine in 6-8 moose. This job was inactive during the FY10 reporting period.

JOB/ACTIVITY 3B: Develop a statewide database of moose forages and their nutritional content. This job was inactive during the FY10 reporting period.

JOB/ACTIVITY 3C: Using stable isotopes as indicators of protein balance in female moose. ACUC Protocol No. 09-29 – Isotopic Indicators of Nitrogen (N) Balance in Female Moose During Winter was submitted to and approved by the DWC Animal Care and Use Committee. The purpose of this study is to evaluate whether natural abundance of  $\delta^{15}\text{N}$  in serial samples of blood, urine and feces may be used to monitor N losses in relation to tissue change and diet contribution. We used 6 pregnant females from the captive herd at the MRC. Animals were held together outdoors in a 2.5km<sup>2</sup> enclosure (Pen 3) foraging on natural browse with access to water or snow. Each female was observed twice each month from November through May to quantify intake rates and determine which plants and plant parts were being eaten (~665 hours of foraging observations). Plants and plant parts consumed by moose were collected each month and stored frozen for analysis of nutrient, isotopic and alkane composition. In addition, diet composition of each female will be measured by microscopic examination of plant fibers in feces and the analysis of plant-wax markers (alkanes) in feces. Spontaneous feces and urine samples were collected from each animal 3 times per month (120 samples). Once each month during January through June, blood was sampled (28 samples) and animals were weighed using a walk-on scale. The depth of subcutaneous fat over the rump (an index of total body fat) was measured by ultrasound at each weighing. Animals were sedated for intravenous administration of deuterium oxide (D<sub>2</sub>O) and sodium bromide (NaBr) for measurement of body composition by water dilution in January and again in June following parturition. Blood samples were collected 4h, 24h and 72h after dosing with D<sub>2</sub>O and NaBr. Calves were weighed with a linear spring scale within 24h of birth (n = 8). Following parturition, adult females weighed on average 103.1kg (227lb) less than their maximums attained in December – January (maximum mass  $\text{mean Dec - Jan} = 432.3\text{kg}$  (953lb)). The average mass of a singleton calf (n = 2) was 17.7kg (39lb) and each twin (n = 6) averaged 12.8kg (28lb).

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

We continued our collaboration with Dr. Kimberlee Beckmen (ADF&G staff veterinarian) to determine trace mineral, serum phosphorus and vitamin D levels in moose calves. Blood samples were collected from 6 calves (4 female and 2 male) and 3 neonate carcasses (2 male and 1 female) were shipped to Dr. Beckmen for further pathologic and histopathologic findings.

The quality and quantity of forage available to moose within the enclosures continues to decline as a result of succession and browsing by moose. The capacity for the MRC to overwinter moose in a healthy condition is compromised and further degrading. We worked with the Kenai National Wildlife Refuge (Refuge) to identify areas suitable for mechanical treatment. Refuge Fire Management Staff used a feller/buncher mounted on a Bobcat T-300 to remove and pile 17.5 acres of woodland-spruce (~ 25 years old and  $\geq$  8in DBH) in Pen 1. An additional 33 acres of aspen-birch saplings (~ 23 years old and  $\leq$  8in DBH) were knocked down and mulched using a hydro-axe in Pen 2.

#### **IV. PUBLICATIONS**

None.

**Prepared by:** John Crouse, ADF&G