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

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Project Title: Evaluation and testing of techniques for ungulate management and operation of the Kenai Moose Research Center

Project Duration: 1 July 2011 – 30 June 2018

Report Due Date: **September 29, 2017**

Partner:

PRINCIPAL INVESTIGATORS: John Crouse and Dan Thompson

COOPERATORS: USFWS Kenai NWR; Dr. Perry Barboza, Texas A&M University; Drs. John and Rachel Cook (National Council of Air and Stream Improvement); Dr. Tom Stephenson (California Department of Fish and Game); Drs. Véronique St-Louis and Michelle Carstensen (Minnesota DNR)

WORK LOCATION: Kenai Moose Research Center

I. PROGRESS ON PROJECT OBJECTIVES DURING LAST SEGMENT

OBJECTIVE 1: MRC maintenance and operations.

We maintained 15 adult moose during the last reporting period including 3 males and 12 females. Females were held within Pens 2 and 3; separate from the males in Pen 1 throughout most of the year. Eight females were translocated to Pen 1 with the males for breeding 17 September through 18 October. One male died from injuries sustained during fighting in early October. Seven pregnancies were confirmed using blood samples collected in December and again in April. The remaining 2 adult males were fed 13% Reindeer Ration (22.7 kg/animal/week) 1 November – 15 April to supplement their intake of native vegetation. The 8 bred females were translocated to Pen 2 in October and held there overwinter and fed a high-quality pelletized ration (10 kg/animal/week) February through parturition in May to supplement their intake of native vegetation.

OBJECTIVES 2-5: Moose nutrition, physiology, and reproductive research. We weighed and chemically immobilized animals to measure rump fat and loin muscle thickness and collected blood, urine and feces from all 12 female moose in September, December and April to monitor resource allocation to fat and lean mass.

As part of our collaborative studies with the Minnesota DNR to evaluate whether sensors located in the collar can be used to infer specific animal behaviors (e.g., lying, standing, foraging), observations were conducted during two 2-week time periods during summer and fall. Each of 8 moose were observed 4 times for 6 hour periods for a total of 192 hours. MRC personnel were responsible for half of the observations and observed moose to collect activity data 96 hours during July and October.

During April, we deployed a VHF collar (Telonics Inc., Mesa, AZ, USA) and an intravaginal VHF transmitter (Advanced Telemetry Systems, Isanti, MN, USA), each with imbedded activity and temperature sensors, in 4 non-pregnant moose at the MRC and observed animals for 48 hours to collect activity data.

During May, we fitted a GPS collar with imbedded activity and temperature sensor (Telonics Inc., Mesa, AZ, USA) on 3 pregnant moose and affixed secondary activity (Actical, Phillips Respironics, Bend, OR, USA) and temperature (Thermacron® iButton, Maxim Integrated, San Jose, CA, USA) sensors to all 12 radio-collars on female moose.

Thirteen calves (6 twins and 1 singleton) were born between 12 May – 01, June 2016. Parturition was detected by daily observation of pregnant females. Calves were handled within 24h of birth to determine mass, collect blood and morphological measures and swab nasals for viral and bacterial pathogens. A male calf, of twins, was not alive when first observed and shipped to pathologists to determine cause. All calves were fitted with an expandable VHF radio collar (ATS, Isanti, MN, USA) and marked with an ear tag (Destron Fearing, Duflex® Sheep and Goat Ear Tag, SKU 140979, http://www.qcsupply.com/). Average calf mass was 13.5 kg.

Daily marker dosing of Cr was provided in 500g of a pelletized feed (0.0015g Cr/g feed) to 7-12 lactating and non-lactating females from 02 May – 25 August, 2016. Fecal samples were collected twice weekly on Tuesday and Thursday (fecals, n = 320). Plants and plant parts were collected monthly from 3 areas in each of the 2 enclosures (Pen 2 and Pen3) where moose had been observed browsing to determine dry matter and nutrient content (2 pens x 3 Sites x 5 Species x 30 Plants x 4 sampling periods = 3600 plants total). Analyses to be performed include %CP, %GE, sequential fibers, tannin analysis and total phenolics.

OBJECTIVE 6: Vegetation management. We have classified the existing vegetative cover within each of the MRC enclosures using a combination of aerial photography and satellite imagery to develop a vegetation management plan. We used current vegetation age structure and composition in conjunction with information from historic enhancement efforts to identify areas suitable for treatment to increase forage availability to moose and have treated over 400 acres within the enclosures. KNWR staff prepared for burning 50 acres of the windrowed sheared forest materials in Pen 4 and began the approval process

for their burn plans. We are still short of our initial goal to treat over 500 acres (~ 20% of each enclosure) and our long-term goal to maintain ~ 35% of the forest within each enclosure ≤ 15 years old.

Objective 7: Drug testing. Thiafentanil (A-3080) was purchased but we have been unable to evaluate its efficacy in Alaskan moose. Reasons for not making much progress on this objective include, 1) only a small number of captive animals with which to conduct a controlled study, and 2) only 2 vials of thiafentanil because of its limited availability due to delay in DEA scheduling.

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

JOB/ACTIVITY 1A: We maintained 14 adult moose during this period including 2 males and 12 females. Females and their calves (n = 12) were held within Pens 2 and 3; separate from the males in Pen 1 throughout the year. One 14-year-old female died in February from undetermined causes. One 10-month-old male calf died in March from undetermined causes. No pregnancies were detected in blood samples collected in April. The 2 adult males were fed 13% Reindeer Ration (22.7 kg/animal/week) 1 November – 15 April to supplement their intake of native vegetation. We fed the females and their calves a high quality pelletized ration (136.2 kg/pen/week) 1 January – 15 April to supplement their intake of native vegetation.

JOB/ACTIVITY 1C: We repaired 100 meters of Pen 1 perimeter fencing damaged by fighting bull moose during the rut.

JOB/ACTIVITY 3B: We directly observed moose (144 hours) to collect behavioral data to compare to activity data collected by sensors on animal collars (activity and temperature, Telonics Inc., Mesa, AZ, USA; activity, Actical, Phillips Respironics, Bend, OR, USA; temperature, Thermacron® iButton, Maxim Integrated, San Jose, CA, USA). During April, we deployed a GPS collar (Telonics Inc., Mesa, AZ, USA) and an intravaginal VHF transmitter (Advanced Telemetry Systems, Isanti, MN, USA), each with imbedded activity and temperature sensors, in 7 non-pregnant female moose at the MRC.

JOB/ACTIVITY 4C-F: Daily marker dosing of Cr was provided in 500g of a pelletized feed (0.0015g Cr/g feed) to 7-12 lactating and non-lactating females through 25 August, 2016. Fecal samples were collected twice weekly on Tuesday and Thursday (fecals, n = 320). Plants and plant parts were collected monthly from 3 areas in each of the 2 enclosures (Pen 2 and Pen3) where moose had been observed browsing to determine dry matter and nutrient content (2 pens x 3 Sites x 5 Species x 30 Plants x 4 sampling periods = 3600 plants total). Diet and fecal samples were shipped to Texas A&M University where Dr. Barboza's lab determined %CP, %GE, sequential fibers, total phenolics, and mineral content of plants and Cr concentrations of feces. In addition, samplings of feces from each animal were combined for 2-week periods May – August 2014 – 16 and shipped to the Washington State University Wildlife and Habitat Nutrition Lab for microhistologic determination of diet composition. Diet composition and digestibilities will be used with fecal output determined by marker concentration to estimate intake.

JOB/ACTIVITY 5A-C: We chemically immobilized all 12 female moose in September, December and April (n = 11) and measured weight, rump fat and loin muscle thickness and collected blood, urine and feces to monitor resource allocation to fat and lean mass relative to reproductive status.

Calves were immobilized 30 – 31 August to determine calf growth relative to their mother's summer food intake. Mean calf weight was 144 ± 15.4kg (± SD, range = 122 – 168kg).

JOB/ACTIVITY 6B-C: During December 2016, KNWR staff burned 50 acres of the windrowed sheared forest materials in Pen 4. Burning of the remaining 50 acres is planned to proceed in November 2017.

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

Research to better understand moose reproduction and survival in the Kenai Peninsula's 2 Intensive Management (IM) areas (GMU15, Subunits A & C) continued. MRC staff contributed to the capture and collaring operations 14 days during November 2016 and 13 days during February – March 2017to provide assessments of moose body condition and deploy vaginal implant VHF transmitters to detect moose birthing events. In addition, female moose were captured in GMU, Subunit B to evaluate habitat use in response to the 2014 Funny River Fire. We deployed 16 additional GPS collars and recaptured 14 females to determine their nutritional condition and reproductive status.

As part of his Graduate Studies Program, Wildlife Biologist Dan Thompson continued to make significant progress on several aspects of his PhD proposed work. Some of the highlights from this last year include: deployed 7 temperature VITs (Advanced Telemetry Systems, Isanti, MN, USA) in MRC moose to continuously record body temperature; observed respiration rate, heart rate and skin temperature weekly to examine moose response to environmental variables; prepared 2 manuscripts to be included as part of his PhD dissertation. The results will contribute meaningfully to our understanding of thermoregulatory requirements of moose.

IV. PUBLICATIONS

A TECHNIQUE FOR DEPLOYMENT OF RUMEN BOLUS TRANSMITTERS IN FREE-RANGING MOOSE (ALCES ALCES)

Larissa Minicucci, D.V.M.; M.P.H.; Dipl. A.C.V.P.M., Michelle Carstensen, M.S.; Ph.D., John Crouse, B.S.; M.S., Jon M. Arnemo, D.V.M.; Ph.D.; Dipl. E.C.Z.M., and Alina Evans, D.V.M.; M.P.H.; Ph.D.

Submitted 02/19/2017 to: Journal of Zoo and Wildlife Medicine (http://zoowildlifejournal.com/?code=zvet-site)

ARE MINNESOTA MOOSE WARMING UP TO CLIMATE CHANGE? A VALIDATION OF TECHNIQUES FOR REMOTELY MONITORING MOOSE BEHAVIOR AND BODY TEMPERATURE

Andrew M. Herberg

A thesis submitted to the faculty of the University of Minnesota. April 2017.

Prepared by: John Crouse

Date: September 1, 2017