Alaska Department of Fish and Game
Division of Wildlife Conservation
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Evaluation of moose-habitat relationships in southeastern Alaska

Kevin White

Research Annual Performance Report
1 July 2007–30 June 2008
Federal Aid in Wildlife Restoration
W-33-6
Study 1.61

FEDERAL AID ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
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PROJECT TITLE: Evaluation of moose-habitat relationships in southeastern Alaska

PRINCIPAL INVESTIGATOR: Kevin White

COOPERATORS: USFS-Forestry Sciences Lab

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NO. W-33-6

PROJECT NO. 1.61

WORK LOCATION: Gustavus, Alaska

STATE: Alaska

PERIOD: 1 July 2007 – 30 June 2008

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Assess body condition, reproductive success, and population density of moose on the Gustavus forelands.

Since the inception of the study (i.e. November 2003), adult female moose have been live-captured each spring (n = 135 captures) and fall (n = 91 captures) in order to assess body condition and pregnancy (during spring only). In addition, calf recruitment has been assessed for each radio-marked animal during June, November and March of each year. Overall, 57 individual adult female moose have been captured, radio-marked and monitored since 2003. Population density and composition has been estimated annually via winter aerial surveys conducted during November-March, depending on survey conditions.

OBJECTIVE 2: Evaluate relationships between moose winter range conditions, body condition and reproductive success.

Moose diet composition has been evaluated monthly during winter (November-April) since 2003. In addition, moose habitat conditions have been monitored annually during fall and winter by assessing biomass productivity and consumption for 300 individually marked *Salix barclayi* ramets (i.e., plants), both inside and outside fenced exclosures. Moose habitat conditions have also been monitored along 7 long-term transects during April of each year. Preliminary analyses have been conducted to compare habitat conditions to moose body condition and reproductive success.

OBJECTIVE 3: Evaluate landscape-level habitat use patterns and population carrying capacity.

Moose spatial use patterns have been gathered by deploying 5-8 GPS radio-collars during each year. Additional, spatial use information has been collected via monitoring of VHF marked moosed. Habitat-specific forage biomass and utilization data have been collected on 400 sampling plots across the winter range (2004-2006). Chemical analyses of key winter forages have been estimated via laboratory analyses. Nutritional carrying capacity estimates for the Gustavus moose population have not yet been estimated.

OBJECTIVE 4: Develop an adaptive harvest management model (AHM) for the Gustavus forelands moose population.

Preliminary population models focusing on the adults female and calf component of the population have been developed. Additional vital rate data is needed on yearling and younger age-class animals to complete this objective.

OBJECTIVE 5: Analyze data, prepare reports and present results.

Field data have been annually summarized in order to characerize moose population, habitat conditions, and relationships therein. Findings related to specific aspects of the study have been published in the peer-reviewed literature (White et al. 2007, Hood et al. 2007). In addition, several presentations of study results have been given for local communities, advisory committees, and resource managers each year.

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

OBJECTIVE 1: Assess animal condition and population status.

JOB/ACTIVITY 1A: Determine age-specific body condition and pregnancy of adult female moose.

JOB/ACTIVITY 1B: Determine age-specific body condition and pregnancy for harvested cows.

Body condition and measures of reproductive success were assessed in moose inhabiting the Gustavus forelands during winter from 23 live-captured adult female moose during November 2007 and 30 adult female moose during March 2008. No animals died at the time of capture. During captures, we examined tooth wear and extracted a single 4th incisor to determine age (if necessary). Unlike originally planned, we only captured adult females; 10-month old calves were not captured because of funding constraints. To assess individual body condition we used a real-time portable ultrasound to measure maximum rump fat thickness of all captured animals. Body condition was also assessed using the Franzmann body condition scoring technique. Additionally, we collected complementary body condition data using a muscle palpation techniques. We did not collect body condition data from harvested adult female moose because the fall anterless hunting season was suspended during fall 2007.

We estimated calf productivity and survival by monitoring 35 radio-marked moose and their calves. Calving success was evaluated during helicopter and/or walk-in surveys during June 2008. Subsequent monitoring of calves associated with radiomarked cows during the following year enabled estimates of calf

survival. We estimated pregnancy rates for 32 radio-marked adult females using pregnancy specific protein-B (PSPB) blood serum assays. Additionally, we estimated calf productivity/survival during 1 fall and 2 winter aerial survey flights.

Moose population abundance and density data were collected during 2 replicate aerial surveys conducted in November 2006-April 2007. We estimated sighting probabilities of moose during these surveys using mark-resight techniques that were based on data collected from 32-35 radiomarked animals that inhabited the study area during survey flights. We used a modified Lincoln-Peterson estimator to calculate moose population abundance and estimate variability.

OBJECTIVE 2: Assess moose habitat on wintering grounds.

JOB/ACTIVITY 2A: Determine spatial distribution of GPS collared individuals.

JOB/ACTIVITY 2B: Conduct ground-based surveys to characterize habitat conditions within individual home ranges.

Fresh fecal samples were collected from all captured and most harvested adult female moose. In addition, fresh fecal samples were collected throughout the winter range on a monthly basis. These samples were aggregated based on the geographic location of collection sites and month collected. These samples were subsequently analyzed using micro-histological techniques to determine composition and frequency of occurrence of plant species in 35 aggregate fecal samples. These data provide information about seasonal and micro-geographic patterns of moose diet composition on the Gustavus winter range. In addition, during this reporting period, we collected 14 tissue samples from important winter forages used by moose. These samples were analyzed to determine digestible energy and protein.

Winter range conditions were evaluated by measuring biomass availability and utilization of key winter forages across the winter range. These data were collected April 2008 on seven long-term browse monitoring transects. Further, we also used moose habitat exclosures in order to investigate how high levels of moose browsing influence willow biomass productivity, reproduction and survival. Overall, we collected data from 8 paired browsed and un-browsed sites. At each site, 20 individual willow ramets were marked and monitored before and after the winter period to estimate current annual growth production and subsequent removal by moose. Willow catkin productivity and ramet survival were also quantified in May-June 2008.

OBJECTIVE 3: Evaluate habitat use and carrying capacity.

JOB/ACTIVITY 3A: Develop resource selection models to determine winter habitat use patterns and range distribution.

Location data collected via GPS and VHF radio-collars have been compiled but will not be analyzed until ongoing data collection efforts are completed.

JOB/ACTIVITY 3B: Estimate winter range carrying capacity for the Gustavus moose population.

Habitat-specific forage biomass data has been collected and data management activities are ongoing. Chemical composition data for important winter forages have been collected and summarized.

OBJECTIVE 4: Develop adaptive management model.

JOB/ACTIVITY 4A: Develop quantifiable management objectives and a list of feasible management actions.

JOB/ACTIVITY 4B: Develop models relating objectives, management actions, monitoring data, and the Gustavus moose/habitat system.

JOB/ACTIVITY 4C: Develop monitoring protocols to obtain the necessary data for the moose/habitat models and for assessing whether management goals are being achieved.

Preliminary population models focusing on the adult female and calf component of the population have been developed. Additional vital rate data is needed on yearling and younger age-class animals to complete this objective.

OBJECTIVE 5: Data analysis and reports.

JOB/ACTIVITY 5A: Analyze data from field studies and literature. Conduct statistical analysis on data sets and develop predictive models that will be used in AHM.

JOB/ACTIVITY 5B: Prepare Reports. Write annual progress reports and final reports at the end of the study. Prepare manuscripts for publication for all appropriate data sets.

JOB/ACTIVITY 5C: Report results.

Preliminary analyses of adult female body condition, pregnancy and twinning rates, calving success and survival and winter range habitat condition data have been conducted. Adaptive Harvest Management (AHM) modeling analysis is planned, but formal analyses will not be conducted until additional field data is collected. Preliminary findings from this study have been presented at a professional conference and at meetings with local agencies, communities, and advisory committees.

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

None.

IV. PUBLICATIONS

White, K.S., N.L. Barten, and J.A. Crouse. 2007. Ecology of moose on the Gustavus forelands: Population irruption, nutritional limitation and conservation implications. Proceedings of the 4th Glacier Bay Science Symposium, 4: 25-28.

Hood, E., A.E. Miller, and K.S. White. 2007. Effects of moose foraging on soil nutrient dynamics in the Gustavus forelands, Alaska. Proceedings of the 4th Glacier Bay Science Symposium, 4: 20-24.

V. RECOMMENDATIONS FOR THIS PROJECT

This project should be continued in order to accomplish project objectives. In particular, continued collection of individual- and population-level data will be critical for assessing the effects of the controversial antlerless moose harvest strategy recently (i.e., 2002) implemented in the project study area.

VI. APPENDIX

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