

**Alaska Department of Fish and Game
Wildlife Restoration Grant**

Grant Number: AKW-10 Wildlife Restoration Grant FY2016
Project Number: 1.70
Project Title: Moose population dynamics in southeastern Alaska
Project Duration: 1 July 2010–30 June 2017
Report Due Date: 1 September 2016
Principal Investigators: Kevin S. White, Stephanie Sell, Carl Koch
Cooperators: Glacier Bay National Park, DOT/PF
Work Location: Gustavus and Berners Bay, Alaska (GMU 1C)

I. PROGRESS ON PROJECT OBJECTIVES DURING LAST SEGMENT

OBJECTIVE 1: Acquire long-term demographic data from radio-collared moose in Gustavus and Berners Bay.

We monitored pregnancy rates by collecting fresh fecal pellets and blood serum samples from radio-marked adult female moose during February-March 2015 (Gustavus, n = 17). Fecal pellets were analyzed for progesterone concentration (Corrinne Kozlowski, St. Louis Zoo) and blood serum analyzed for pregnancy-specific protein B (PSPB; Biotracking, Moscow, ID) to determine pregnancy status. During May-June 2014, we conducted aerial (Gustavus, n = 2; Berners Bay, n = 2) and ground-based surveys to determine calf status of radio-marked adult female moose (Gustavus, n = 34, Berners Bay, n = 27).

We monitored survival of radio-marked adult female moose (Gustavus, n = 41; Berners Bay, n = 35) each month via ground- or air-based radio-telemetry surveys. During 2014–2015, we investigated six mortality events involving radio-marked moose (Gustavus, n = 2; Berners Bay, n = 4).

We monitored survival of calves associated with radio-marked adult female moose (Gustavus, n = 21; Berners Bay, n = 31) during May–June 2014, November 2014 and April 2015 via ground- or air-based radio-telemetry surveys. In March 2015, we deployed 13 time-lapse cameras on radio-marked adult females in Gustavus to validate calf status determinations.

We conducted 2 aerial surveys during winter in order to estimate moose population size and composition (Gustavus, n = 1; Berners Bay, n = 1). During these surveys moose sighting probabilities were estimated using mark-resight techniques based on data collected from radio-marked adult female moose.

We conducted moose capture activities during this reporting period in Gustavus. In Gustavus, we captured 19 moose (Nov 2014, n = 3; March 2015, n = 14 adult females and 2 10-month old calves) using ground-based capture methods.

We prepared a report detailing activities conducted in the Gustavus area, to satisfy ADFG Federal Aid reporting requirements.

OBJECTIVE 2: Develop deterministic population models for moose in Gustavus and Berners Bay

We estimated annual and seasonal survival (adult female and calf) and reproductive (calving, twinning and fecundity) rates for radio-marked adult female moose and associated calves monitored in Gustavus (2003–2014, n = 89, 351 moose years) and Berners Bay (2006–2014, n = 81, 223 moose years). We also estimated age-specific survival and reproductive rates for each population.

We developed and validated a 2-stage matrix population model parameterized using vital rate data summarized in Job 2a. In 2013, the model was extended to estimate the proportion of legal (spike/fork and 3-brow tine/50 inch) and non-legal bulls in the population. The model was used to inform harvest management decisions for the Gustavus and Berners Bay populations in 2014.

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

JOB/ACTIVITY 1a: Estimate reproductive performance of radio-marked adult female moose

Accomplishments: We monitored pregnancy rates by collecting fresh fecal pellets and blood serum samples from radio-marked adult female moose during February-March 2016 (Gustavus, n = 20, Berners Bay, n = 5). Fecal pellets were analyzed for progesterone concentration (Corrinne Kozlowski, St. Louis Zoo) and blood serum analyzed for pregnancy-specific protein B (PSPB; Biotracking, Moscow, ID) to determine pregnancy status. During May-June 2016, we conducted aerial (Gustavus, n = 2; Berners Bay, n = 2) and ground-based surveys to determine calf status of radio-marked adult female moose (Gustavus, n = 38, Berners Bay, n = 29).

JOB/ACTIVITY 1b: Estimate survival of radio-marked adult female moose

Accomplishments: We monitored survival of radio-marked adult female moose (Gustavus, n = 36; Berners Bay, n = 31) each month via ground- or air-based radio-telemetry surveys. During 2015–2016, we investigated 6 mortality events involving radio-marked moose (Gustavus, n = 3; Berners Bay, n = 3).

JOB/ACTIVITY 1c: Estimate survival of calves associated with radio-marked adult female moose

Accomplishments: We monitored survival of calves associated with radio-marked adult female moose (Gustavus, n = 30; Berners Bay, n = 24) during May–June 2016,

November 2015 and April 2016 via ground- or air-based radio-telemetry surveys. In March 2016, we deployed 11 time-lapse cameras on radio-marked adult females in Gustavus to validate calf status determinations.

JOB/ACTIVITY 1d: Estimate moose population size and composition.

Accomplishments: We conducted 1 aerial surveys during winter in order to estimate moose population size and composition (Gustavus, n = 1; Berners Bay, n = 0); exceptionally mild winter conditions severely limited opportunity to conduct aerial surveys this period. During this survey moose sighting probabilities were estimated using mark-resight techniques based on data collected from radio-marked adult female moose.

JOB/ACTIVITY 1e: Capture and radio-mark adult female moose.

Accomplishments: We conducted moose capture activities during this reporting period in both Gustavus and Berners Bay. In Gustavus, we captured 22 moose (Nov 2015, n = 2; March 2016, n = 15 adult females and five 10-month old calves) using ground-based capture methods. In Berners Bay, we captured 5 animals (adult females) in March 2016.

JOB/ACTIVITY 1f: Prepare annual reports.

Accomplishments: We prepared a progress report detailing activities conducted in the Gustavus area, to satisfy ADF&G Federal Aid reporting requirements.

JOB/ACTIVITY 2a: Synthesize population-specific demographic data.

Accomplishments: We estimated annual and seasonal survival (adult female and calf) and reproductive (calving, twinning and fecundity) rates for radio-marked adult female moose and associated calves monitored in Gustavus (adult females, 2003–2016, n = 104, 461 moose years; calves, 2004–2016, n = 282) and Berners Bay (2006–2016, n = 86, 320 moose years; 2007–2016, n = 204). We also estimated age-specific survival and reproductive rates for each population.

JOB/ACTIVITY 2b: Develop a moose population model for management applications.

Accomplishments: We developed and validated a 2-stage matrix population model parameterized using vital rate data summarized in Job 2a. In 2015, the model was extended to estimate the proportion of legal (spike/fork and 3-brow tine/50 inch) and non-legal bulls in the population. The model was used to inform harvest management decisions for the Gustavus and Berners Bay populations.

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

None

IV. PUBLICATIONS

White, K. S., Barten, N. L., J. R. Scott and S. Sell. 2015. Moose population dynamics in southeastern Alaska. Federal Aid Annual Report. Alaska Department of Fish and Game. Juneau, AK.

Colson, K. E., K. S. White, and K. J. Hundertmark. 2016. Parturition site selection in moose (*Alces alces*): evidence for social structure. Journal of Mammalogy, DOI:10.1093/jmammal/gyw006

V. RECOMMENDATIONS FOR THIS PROJECT

This project should be continued as described in the study plan.

Prepared by: Kevin White, Wildlife Biologist III

Submitted by: Anthony Crupi, Acting Research Coordinator

Date: 1 September 2016