Snowy Range Moose Project

January 2016 Update

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Project Description

Shiras moose have seen declines in recent decades across much of their statewide range due to a multitude of factors. The Snowy Range herd, which colonized the area following an introduction into North Park Colorado in the 1970s, is thought to be robust to these changes. Relatively new, lacking wolves or grizzly bears, and with liberal human harvest, the Snowy Range herd may be free of density-dependent pressures and existing as a small but highly productive population. Despite the impressions of stable population performance, the landscape of the Snowy Range has been altered dramatically by the mountain pine beetle, and the moose herd has not been studied since 2006. Moreover, effects of pine beetle outbreak on large mammals are almost entirely unknown. A collaborative study initiated in fall 2014 by the Wyoming Cooperative Fish and Wildlife Research Unit and the Wyoming Game and Fish Department presents an excellent opportunity to examine the relationship between moose habitat use and seral changes brought about by bark beetles. By making use of an existing GPS dataset collected prior to extensive beetle damage (Baigas 2008), comparing it to new GPS data, and examining current individual movement strategies through the lens of body condition, this project will provide new information on the status of moose in the Snowy Range and their response to its beetle-killed forests. The project began its field component in March 2015; 30 female moose (29 adults and one yearling) were captured via helicopter darting on winter habitats within and surrounding the Medicine Bow National Forest. Moose were fitted with GPS store-on-board collars set to collect 90-minute fixes, which will allow us to compare movement strategies and space use of moose prior to and following the extensive bark beetle damage. Collars will remain deployed for a period of two years, during which study animals will be recaptured twice per year to gather longitudinal data on demography and body condition (measured via ultrasonography). Monitoring body condition in the context of pregnancy (during winter) and lactation costs (in summer) will allow the project to critically examine the habitat quality of the Snowy Range, with the goal of understanding where the herd sits relative to nutritional carrying capacity.

Project Update

A summer field season has been completed and the first recapture was executed in early December. Calf survival was monitored during two ground survey efforts (one at the beginning of July and the other at the end of August) and calves with collared females were noted during December recaptures. Willow communities were sampled by Philip Baigas and Brett Jesmer in 2007 and 2013 respectively; a selection of survey locations were re-visited this summer for long term habitat quality monitoring. Vegetation sampling was conducted in pine forests in an effort to quantify differences in thermal cover and forb communities across a gradient of tree canopy losses attributed to bark beetle mortality. Four collared moose died since initial collaring, although no deaths were attributed to capture mortality. 25 of the remaining 26 moose were recaptured in December, and three recovered collars were deployed on new moose, bringing the current sample size up to 29. One collar suffered minor damage that prohibited immediate redeployment; this collar is being repaired and will be deployed in March. One moose slated for recapture was in terrain inaccessible to the helicopter; we expect to recapture her in March. The March recapture will be followed by an expanded second summer field season.

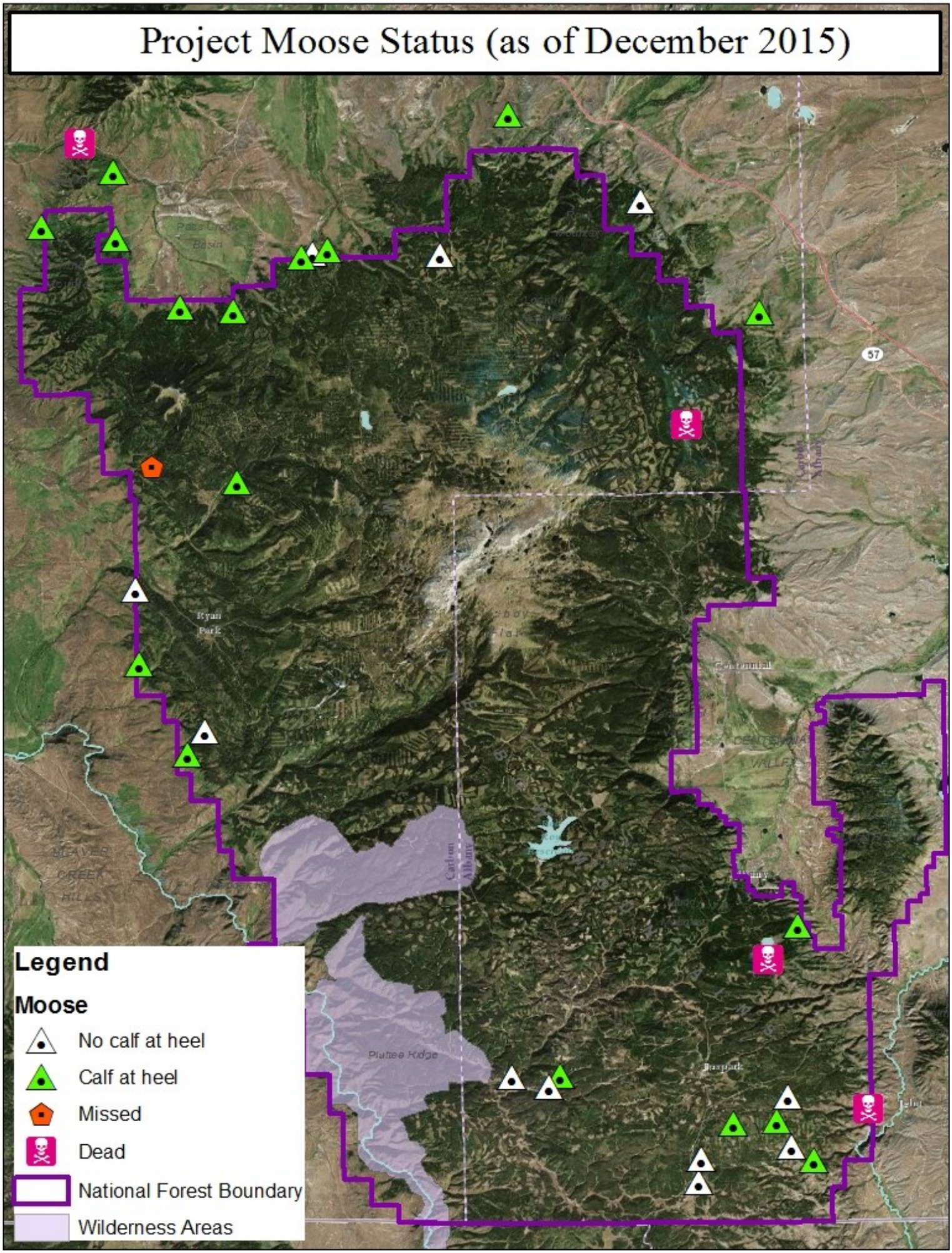

Figure 1: Most recent pertinent locations of all moose collared for the project. Calf status current as of December 2015.

Summer Calf Surveys

Collared moose that were found to be pregnant in March (n=22) were re-sighted in early July and late August/early September to determine calf survival. One pair of twins was seen during the summer surveys. Two moose that were pregnant in March failed to produce a calf that survived to July. Two calves were lost between the July and September survey. An additional calf was lost between the last calf survey and the recapture earlier this month. All told, 16 moose calves have been produced from the 30 moose initially collared in March.

Habitat Quality and Vegetation Monitoring

Willow communities are extremely important food sources for moose in the Rocky Mountains. A metric of browsing pressure developed by Richard Keigley was employed by two other University of Wyoming students working in the area in 2007 and 2013. Previously established transects (n=20) were revisited this past summer with the intention of quantifying habitat quality trends for moose. Vegetation sampling and habitat monitoring efforts will continue in an expanded capacity next summer.

Plots were established in conifer patches within the National Forest in an effort to evaluate how the bark beetle epidemic has potentially modified moose habitat. Tree death and resulting canopy loss may affect moose forage availability and the ability of a pine stand to provide thermal cover and snow refuges. Canopy closure, visual obstruction, and forb/shrub cover was measured within each plot (n=23). Percent tree death will be calculated for each surveyed plot by remote sensing to examine whether heavily affected areas are different in these respects compared to less affected stands.

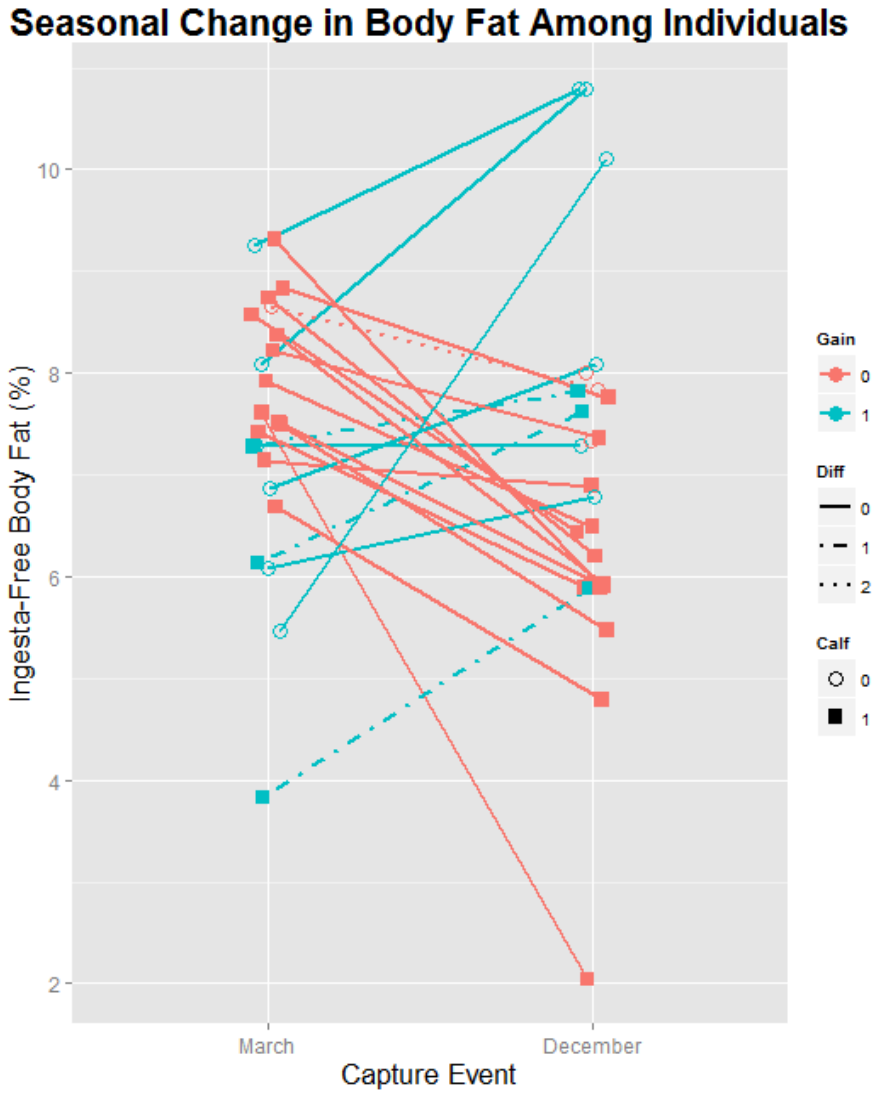

Figure 2: A gain of 0 indicates that moose lost fat reserves between March and December. Gain of 1 indicates that a moose gained fat. Dotted lines represent moose that had trends opposite of the majority given their reproductive status (i.e. moose with calves that gained fat, and lone cows that lost fat).

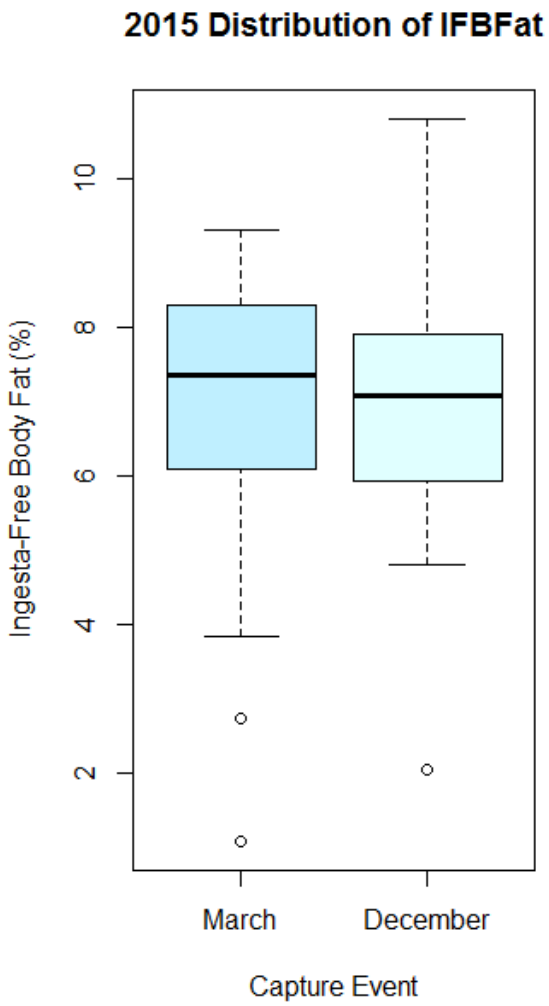

Figure 3: Distributions of percent ingesta-free body fat of all females between capture events. Bolded lines represent means.

December Recapture

Assessing longitudinal trends in body condition as a function of habitat selection and reproduction is a crucial component of this project. Measuring percent ingesta– free body fat (IFBFat) through ultrasonography is an informative method to determine nutritional condition. The majority of moose with calves lost fat reserves between captures, which likely reflects the costs associated with lactation and associated behavioral sacrifices related to calf rearing. Some females who raised calves were able to gain fat reserves (indicated by blue dashed lines in Figure 2) and some lone cows lost fat reserves (red dashed lines in Figure 2). Overall, median IFBFat was lower among all females in December than in March (Figure 2, 7.08 and 7.35, respectively). Mean IFBFat was somewhat higher (7.12 in December and 6.84 in March), which was likely attributable to large fat gains in a few individuals.

Ear-cropping (a clinical presentation of *Elaeophora schneideri* infection) was unchanged between the two captures; moose with cropped ears did not display additional cropping, and moose without cropping in March did not lose ear tissue between captures. Tick monitoring continued during the December capture, though most ticks existed as nymphs in December and were very difficult to detect. Comparisons in the upcoming March capture should be more interesting.

Hunter Samples

WGFD personnel facilitated collection of kidney, tooth, and blood samples from moose harvested in units 38 and 41. 22 out of 45 tag holders submitted at least one sample for study. Teeth were obtained from 19 moose, which will help expand age structure sample size for females and add valuable information about males. At least 8 pairs of kidneys were contributed in analyzable condition; kidneys from hunter harvested moose will develop our understanding of moose body condition in the Snowies beyond those already radio-collared.

Acknowledgments

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