HAUB SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

Wyoming Range Mule Deer Project

Summer 2017 Update

UW UNIVERSITY OF WYOMING

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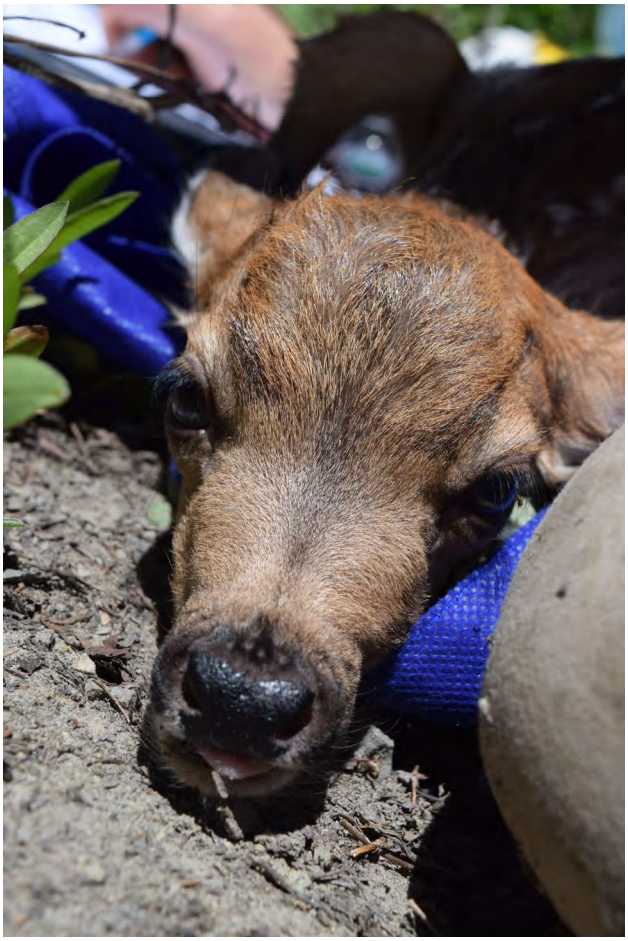
PROJECT BACKGROUND

The Wyoming Range Mule Deer Project was initiated in March 2013. The overarching goal of the project is to investigate the nutritional relationships among habitat conditions, climate, and behavior to understand how these factors interact to regulate population performance. Since the initiation of the project, we have tracked and monitored the survival, behaviors, reproduction, and habitat conditions of 164 female, adult mule deer of the Wyoming Range. In March 2015, we expanded our research efforts to include evaluation of survival and cause-specific mortality of fawns belonging to our collared mule deer. This component of the project is aimed at unraveling the relative contributions of habitat, maternal nutrition, and predation on survival of young mule deer—a study that is the first of it's kind in Wyoming. This update will report on some of our accomplishments and preliminary findings of adult survival and reproduction and will highlight the breadth of factors that contribute to fawn mortality in western Wyoming. So far, our research has gleaned invaluable insight into what regulates population performance of this iconic population, and we aim to further refine our understanding of the factors that affect the population with continued, robust data collection on various aspects of mule deer ecology, including nutrition and habitat contributions, predation, migration, reproduction, and survival.



WINTER 2016/2017

Adult Survival

This last winter of 2016/2017 proved to be a tough one for mule deer. Conditions on winter ranges for Wyoming Range mule deer were severe with snowpack levels exceeding 200% and numerous days of sub-zero weather. These harsh winter conditions strongly affected winter survival and only 63% of our collared adults survived from November until summer 2017 (compared with >90% in years past). Older animals and animals that entered winter in poor condition were more susceptible to succumbing to winter exposure (Figure 1).

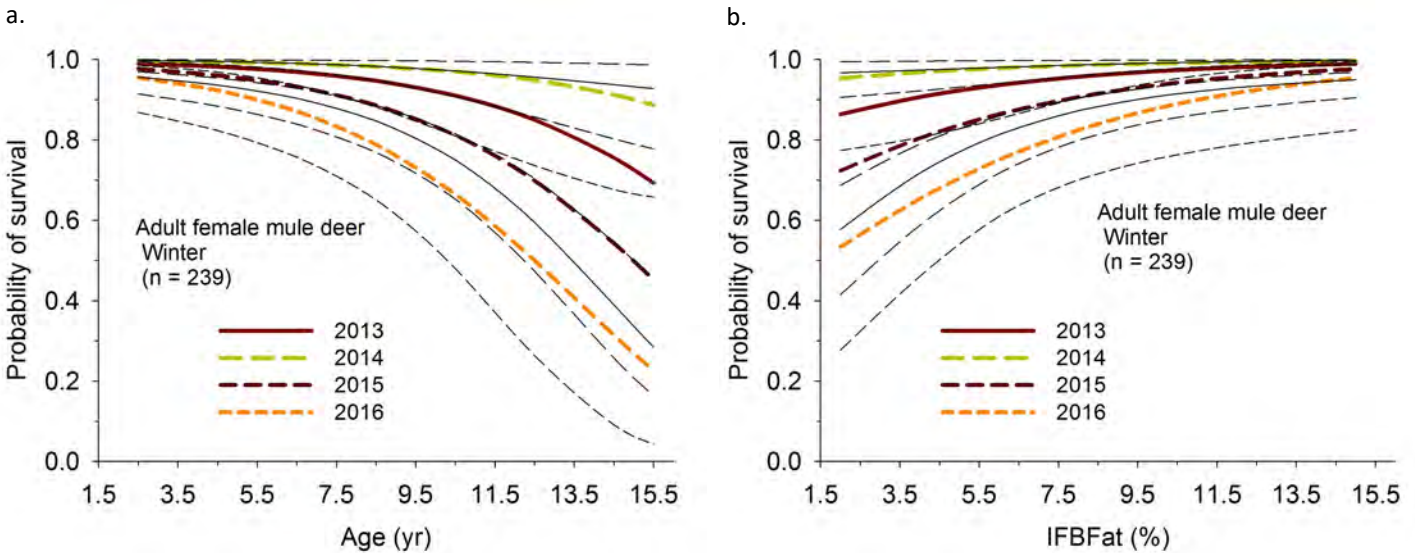


Figure 1. The effects of age (a) and December body fat (IFBFat %; b) on the probability of survival overwinter. Probability of survival decreases as animals get older and as the % body fat (IFBFat %) in December decreases.

Fawn Survival

Winter conditions tend to have the greatest effect on survival of fawns and this winter was no exception. We observed 100% mortality of the fawns we collared in summer 2016 and had survived to the beginning of winter. Mortality rates of that caliber can have substantial repercussions on population dynamics because the majority of an entire cohort of deer is gone. Although these numbers are staggering, winter die-offs like the one observed this winter do occasionally occur and populations do eventually rebound. We have now found ourselves with a unique opportunity to evaluate how mule deer populations rebound from harsh winters.

We retrieved all remains of mortalities of collared fawns. Whole carcasses were submitted to the Wyoming State Veterinary Lab and WGFD Wildlife Health Laboratory for necropsy.

MARCH 2017 ADULT CAPTURES

Since March 2013, we have recaptured collared mule deer as they enter winter ranges in December and before they leave winter ranges in March. This has allowed us to track changes in nutritional condition and reproductive status of animals.

We use ultrasonography to measure % body fat and evaluate pregnancy of collared mule deer.

Nutritional Condition

Nutritional condition in March 2017, measured as % body fat, was the lowest we have observed in our research (averaging 1.8% ± 0.25; Figure 2). Although it is rare to see animals in this poor of condition, it was expected given the severity of the winter.

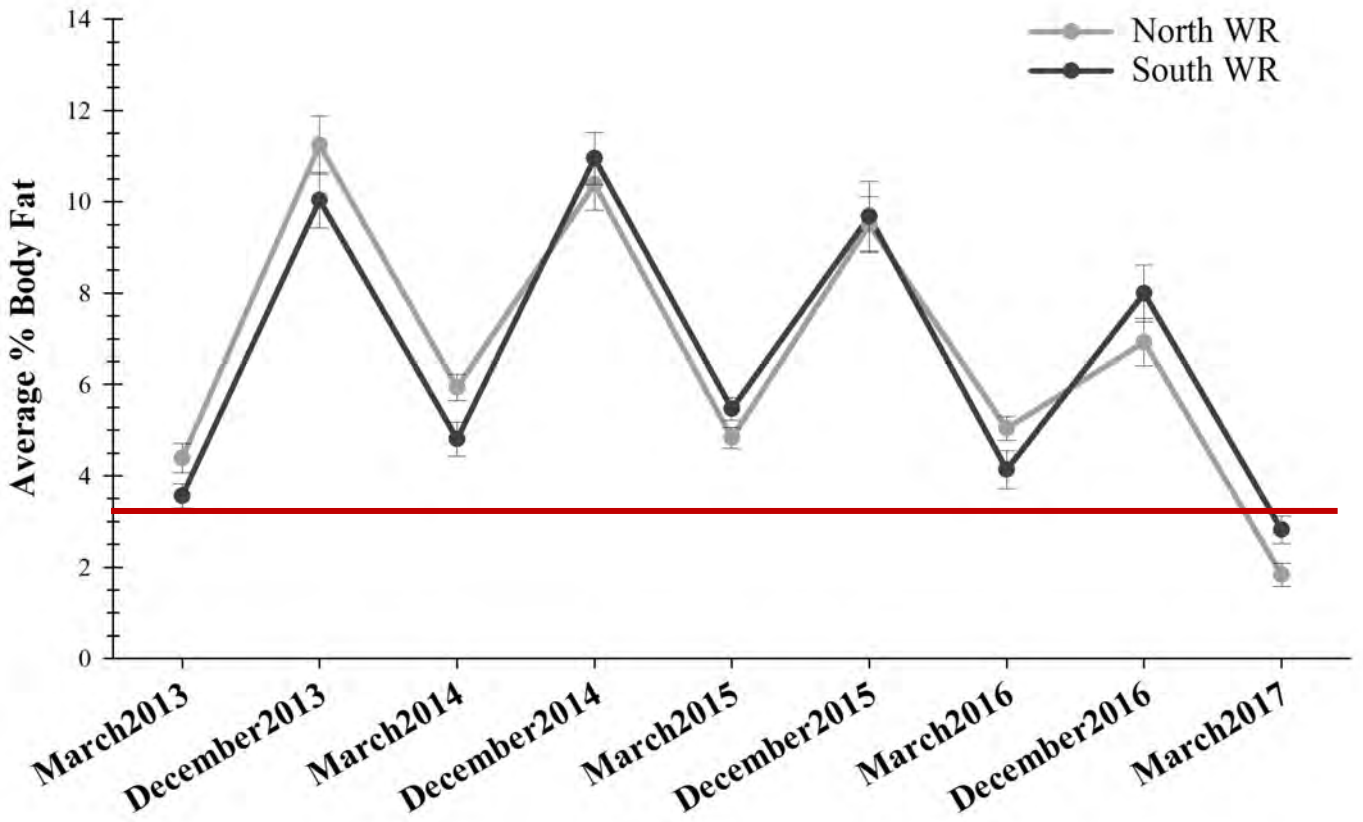


Figure 2. Average % body fat of adult, female mule deer on North (near Big Piney,WY) and South (near Cokeville and Evanston, WY) winter ranges for Wyoming Range mule deer. Deer were in significantly poorer shape in March 2017 than any other year.

Pregnancy

Despite extremely poor nutritional condition of animals this March, fetal rates among winter ranges were comparable to the preceding 4 years (Figure 3) and pregnancy rates remained high. Interestingly, average eye diameter of fetuses was lower in March 2017 (14.0 ± 0.18) than in previous years (15.3 ± 0.11; Figure 4). Fetal eye diameter is a measure of fetal development and is often used to estimate the timing of birth.

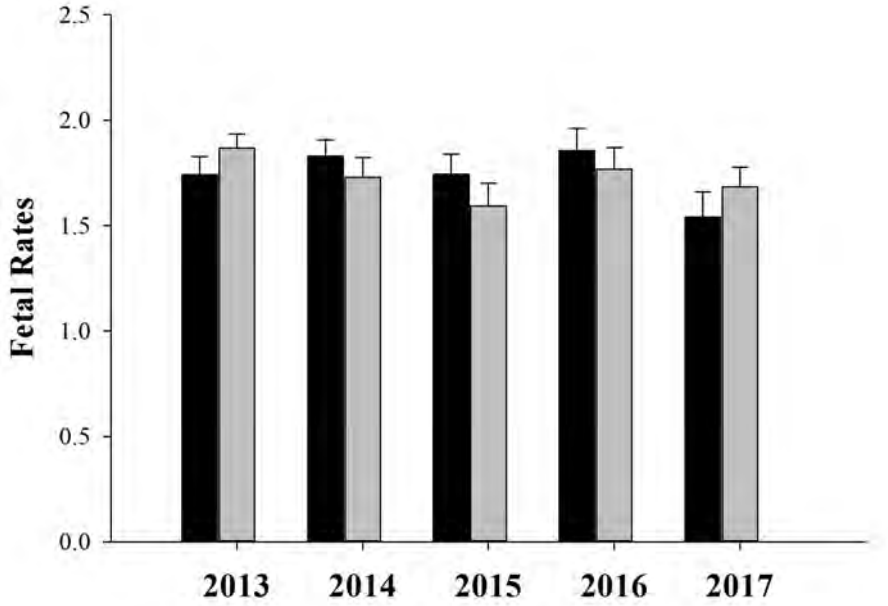


Figure 3. Fetal rates (average number of fetuses per pregnant animal) did not differ among years—despite severe winter conditions.

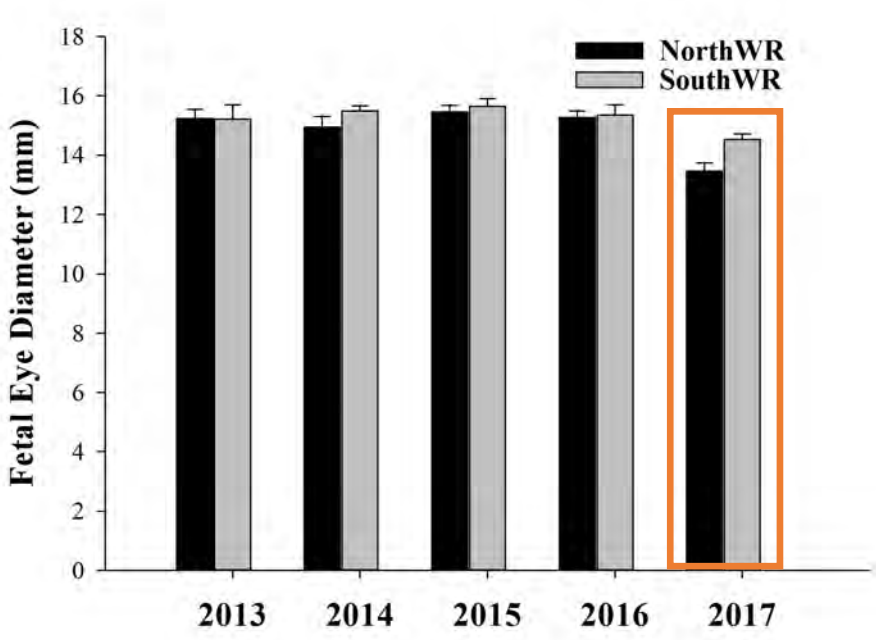


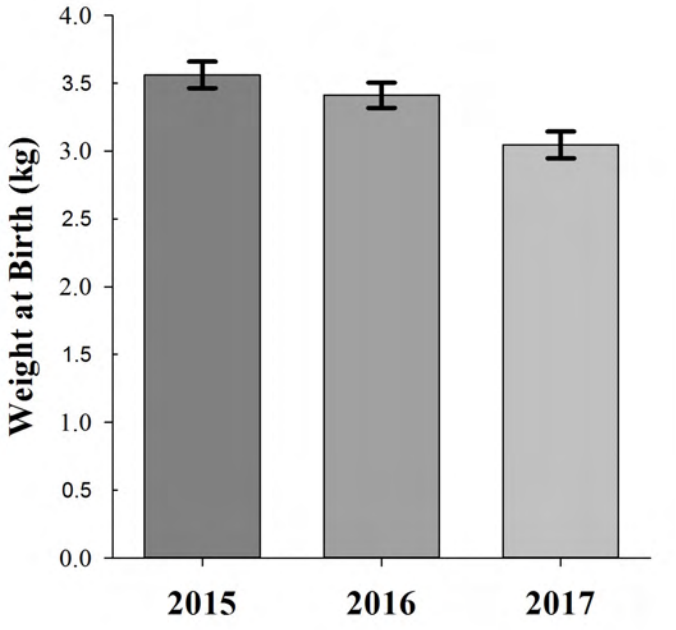
Figure 4. Average fetal eye diameter measured in March of each year. Fetal eye diameter was significantly smaller in March 2017 compared with any other year.

FAWN SURVIVAL

Fawn Capture and Collaring

Since March 2015, we have been capturing and collaring fawns of our collared adults to evaluate what factor most influence fawn survival. Fawns are located using a vaginal implanted transmitter (VIT) deployed in pregnant females that is expelled at birth. Once fawns are located, we then capture, radio-collare, and collecte a suite physical data (e.g., body weight). We then monitored daily survival of collared fawns. Over the three summers, we have tracked the survival of 194 mule deer fawns throughout the Wyoming Range.

	2015	2016	2017 - So Far
Number of Fawns Tracked	58	70	66
Summer Mortality	45%	56%	44%
Median Birthdate	June 10	June 13	June 16
Average Weight at Birth	3.56 (± 0.098)	3.41 (±0.093)	3.04 (±0.099)



Newborn fawns caught in 2017 were significantly lighter than newborn fawns caught in previous years (Figure 5). This was of little surprise because of the overall poor nutritional condition of pregnant females and the smaller eye diameter of fetuses measured in March 2017. With this information, we are now in a position to better evaluate the influence of birth weight and maternal condition on summer survival of fawns.

Figure 5. Average weight of fawns captured <48hours from birth. Fawns were significantly lighter in 2017 compared with the previous two years.

Cause-Specific Mortality of Fawns

To evaluate cause-specific mortality of fawns, we track daily survival of all fawns captured over the course of the summer. When a mortality is detected, we immediately investigate the event to ensure an accurate assessment of the cause of mortality. There is a breadth of various causes for fawn mortality including predation, disease, malnutrition, drowning, hypothermia, vehicle-collision, and just getting caught up in vegetation. The proportion of fawns that die because of the aforementioned causes varies from year to year (Figure 6).

So far, in summer 2017, 30% of mortalities were because fawns were stillborn. Currently, this is leading cause of death for fawns in 2017, but that will inevitably change as the summer progresses and more fawns die of other causes such as disease and predation.

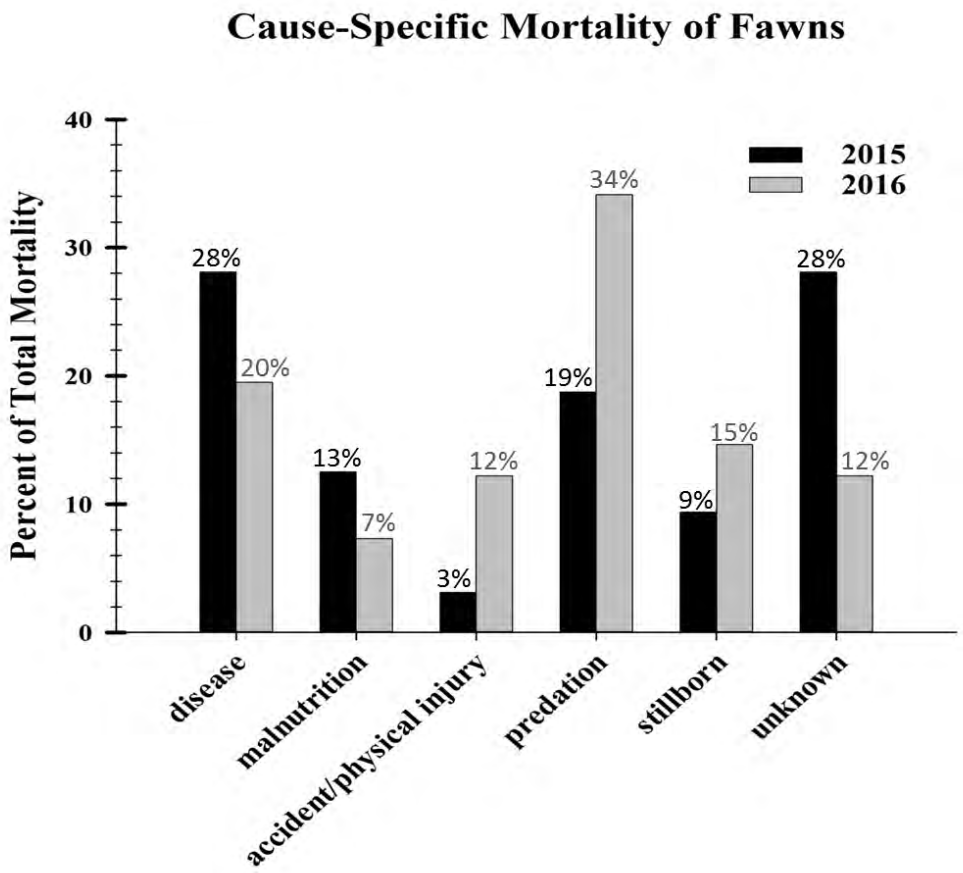


Figure 6. The relative occurrences of various causes of mortality for mule deer fawns.


Cause of Mortality: Malnutrition

Cause of Mortality: Predation

Habitat and Maternal Conditions

The condition of a female and the habitat conditions she experiences in the summer may be very important in predicting and understanding fawn survival – especially in understanding the influence of malnutrition and disease on fawn survival. Therefore, we are evaluating forage and habitat conditions within summer home ranges of collared deer. Specifically, we are measuring habitat structure and forage availability of known locations of use by collared adults that gave birth to fawns. We will then couple these data with information on maternal condition (i.e., nutritional condition) and evaluate the influence on fawn survival.

FUTURE RESEARCH EFFORTS

Throughout summer and winter of 2017, we will continue our research efforts aimed at elucidating the relative influence of predation, climate, and habitat conditions on fawn survival in the Wyoming Range. The severe winter conditions of 2017 will provide us with a unique opportunity to evaluate how severe winter weather may influence the ability of females to subsequently rear young, and thus, provide valuable insight into the factors that regulate population growth and examine the prospects for recovery of this cherished herd.

Project Partners and Funders

The Wyoming Range Deer Project is a collaborative partnership in inception, development, operations, and funding. Without all the active partners, this work would not be possible. Funds have been provided by the Wyoming Game and Fish Department, Wyoming Game and Fish Commission, Wyoming Wildlife and Natural Resource Trust, Muley Fanatic Foundation, Bureau of Land Management, Knobloch Family Foundation, U.S. Geological Survey, National Science Foundation, Wyoming Governor's Big Game License Coalition, Boone and Crockett Club, Animal Damage Management Board, Ridgeline Energy Atlantic Power, Bowhunters of Wyoming, and the Wyoming Outfitters and Guides Association. Special thanks to the Wyoming Game and Fish Department, Bureau of Land Management, and Wyoming State Veterinary Lab for assistance with logistics, lab analyses, and fieldwork. Also, thanks to the Cokeville Meadows National Wildlife Refuge and U.S. Forest Service for providing field housing.

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