

Mule Deer Survival in the Bitterroot Valley

Progress Report - Spring 2017

In winter 2016-2017, Montana Fish, Wildlife and Parks (MFWP), in collaboration with MPG Ranch, continued a pilot study to estimate adult female mule deer survival and to identify the sources of mortality in the northern and southern Bitterroot Valley. Additionally, this work will provide baseline information on mule deer diet, health, and spatial and dietary overlap with elk.

Project Background

Mule deer populations have recently declined in parts of Montana and portions of the northwestern United States. Biologists observed similar broad, regional declines in mule deer populations in the late 1960s, the late 1970s, and again in the early and mid-1990s, yet the complex combination of factors that drive these regional mule deer population fluctuations is not well understood. Potential causes include habitat loss or degradation, intraspecific competition, predation, disease, and/or interspecific competition (i.e. with elk and livestock). Recent intensive research efforts in Colorado and Idaho have broadly concluded that mule deer populations are limited by habitat, specifically by winter range habitat and weather that may limit the overwinter survival of fawns (Hurley et al. 2014, Monteith et al. 2014, Bergman et al. 2015). How these results translate to western Montana is unknown however, as variations in weather and predator communities may have variable effects on mule deer populations. For example, mule deer numbers have declined in the Bitterroot Valley of western Montana, but survey data do not support the hypothesis that reduced fawn survival is a driving factor (Figure 1). The cause of mule deer declines in the Bitterroot Valley is unknown and the purpose of this project is to evaluate adult female survival and better understand the factors that may be contributing to population declines.

Deer Capture and Survival

During winter 2015-2016 we ground darted 33 adult female mule deer, including 17 mule deer on the Northern Sapphire winter range (Hunting District [HD] 204) and 16 mule deer on the East Fork winter range (HD 270). During winter 2016-17 we recaptured 2 deer to replace malfunctioning collars, and captured an additional 10 adult female mule deer to deploy refurbished collars and redeploy collars that were retrieved from mule deer mortalities during the first year. Of the 10 new captures, 3 occurred in the Northern Sapphire winter range and 7

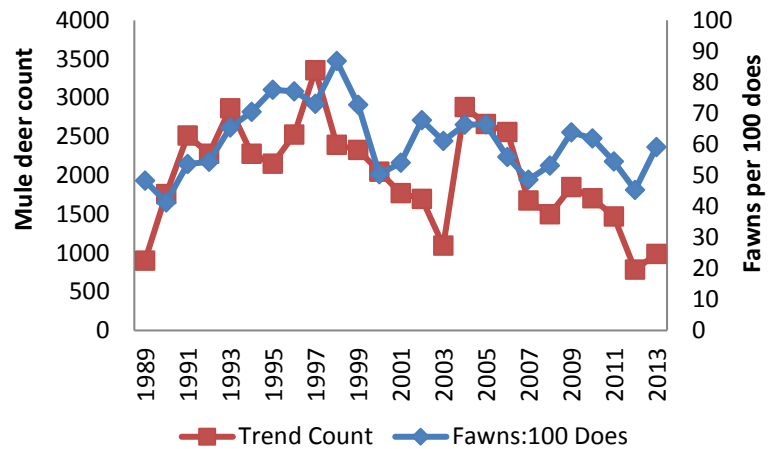


Figure 1. The number of mule deer counted and the number of fawns per 100 does counted in the southern Bitterroot survey area (HD 270) from 1989 - 2014.



Figure 2. FWP Area Biologist prepares to release an adult female deer.

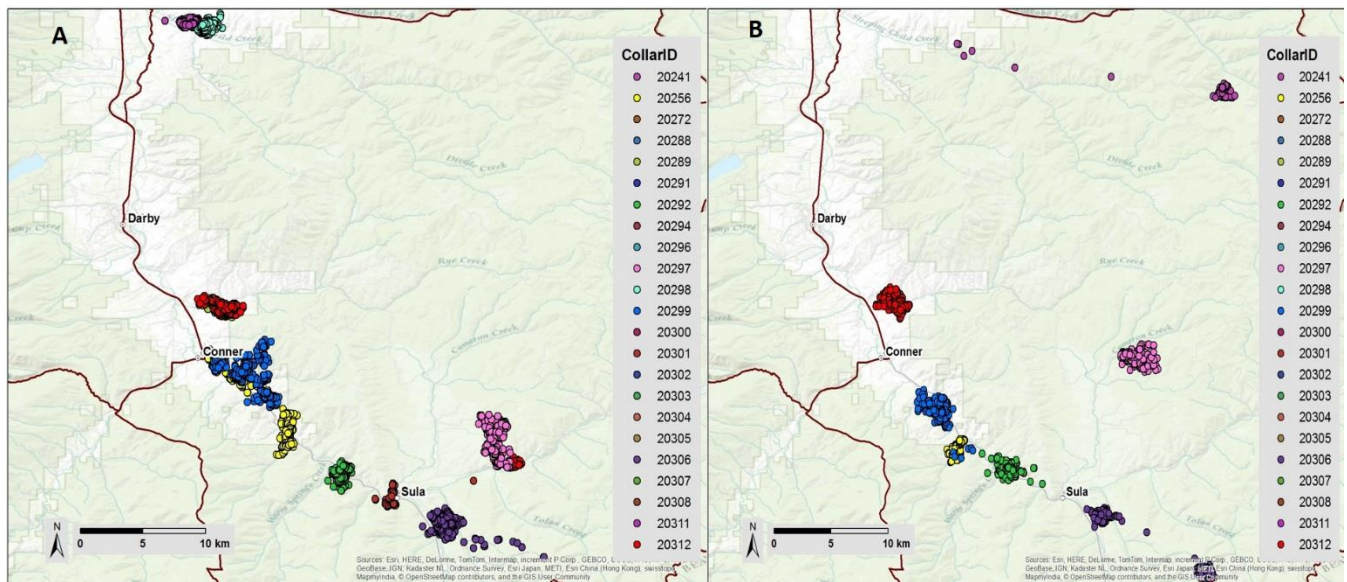


Figure 3. Winter (A) and Summer (B) locations from adult female mule deer in the East Fork area of the Bitterroot Valley.

occurred in the East Fork winter range. We estimated age based on tooth wear patterns to estimate the age structure of our collared population. We instrumented each doe with a radiocollar programmed to collect a GPS location every 4 hours and send a mortality signal if the collar becomes inactive for 8-hours, and applied ear tags for future identification.

Once a collar switched to mortality mode, a mortality alert was sent via Iridium satellite network to project staff. When a mortality alert was received, we conducted a mortality investigation and necropsy to determine cause of death. From December 2015 – April 2017, we investigated 9 mortality events: 5 in the Northern Sapphire area

Mortality Cause	Northern Sapphire	East Fork
Capture related	1	0
Coyote	1	0
Human	1	0
Lion	0	2
Natural	0	2
Unknown	2	0

Table 1. Summary of mortality events of adult female mule deer in the Bitterroot Valley from December 2015 – April 2017

and 4 in the southern East Fork area (Table 1). We are currently monitoring 15 collared mule deer in the Northern Sapphire area and 16 in the East Fork area.

The annual Kaplan-Meier survival estimate was similar in 2015 (0.84, 95% CI = 0.65 – 0.93) and 2016 (0.90, 95% CI = 0.72 – 0.97). In 2015, survival was 0.81 (95% CI = 0.51 – 0.93) in the Northern Sapphire and 0.87 (95% CI = 0.58– 0.97) in the East Fork. To this point in 2016, survival was 0.93 (95% CI = 0.61 – 0.99) in the Northern Sapphire and 0.88 (95% CI = 0.59 – 0.97) in the East Fork. In both study areas, mortalities were concentrated in winter and spring (days 202 – 304; Figure 3).

Pregnancy & Diet

To date we have collected blood samples from 42 adult female mule deer including 4 deer that were recaptured in the 2nd year. Overall, we found pregnancy rates of 95% (95% CI = 0.75 – 0.99) in the Northern Sapphire area and 91% (95% CI = 0.73 – 0.96) in the East Fork area. These rates are similar to other mule deer populations in eastern Montana, Colorado, Idaho, and Utah where pregnancy rates range from 86 – 100% (Wood et al. 1989, Andelt et al. 2004, Hurley et al. 2011, Freeman et al. 2014).

We collected winter and summer fecal samples in both the Northern Sapphire and East Fork areas to assess seasonal mule deer diet. We collected winter samples from captured deer, and summer samples from location clusters determined from GPS collar data (Figure 5). Fecal samples have been submitted to the Washington State University Wildlife Habitat Nutrition Lab for fecal plant fragment analysis. Results from this analysis will allow us to determine primary seasonal forage species of adult mule deer in each area, and assess availability of nutritional resources.

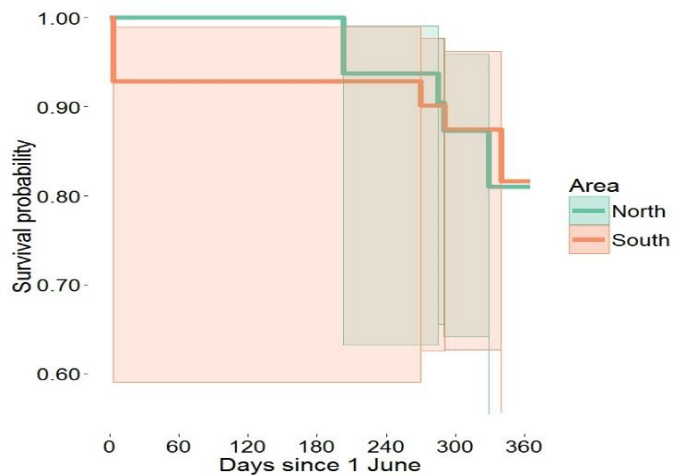


Figure 4. Kaplan-Meier survival estimates (solid line) and 95% confidence intervals (shaded bands) for adult female mule deer in the North Sapphire and East Fork areas.

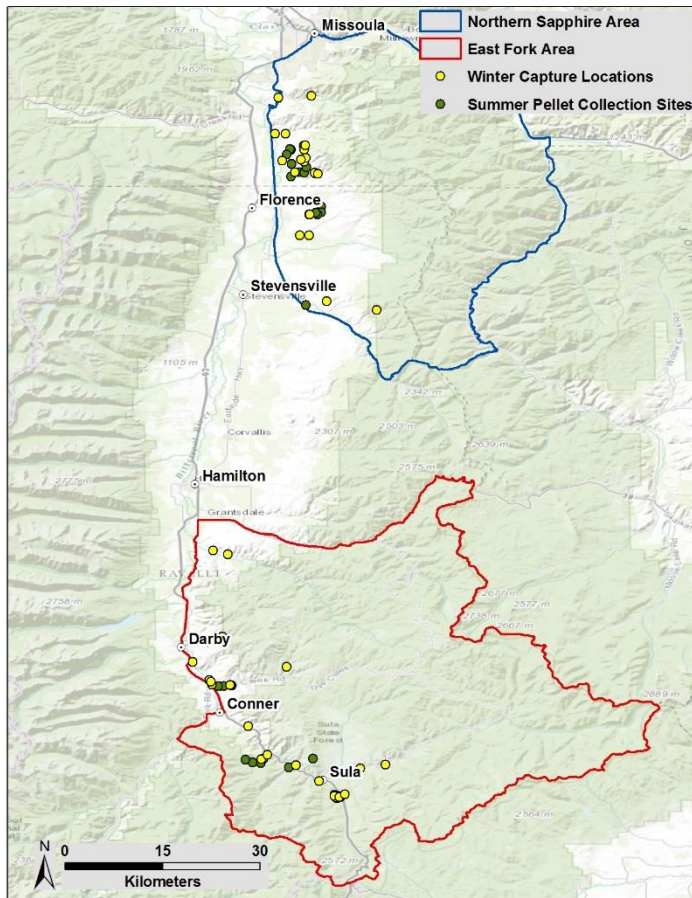


Figure 5. Fecal sample collection locations from captured mule deer and pellet sites from December 2015 – March 2017.

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