Elkhorn Mountains Elk Project
Progress Report – Spring 2015

Background

In collaboration with the Elkhorn Working Group, Helena National Forest, Montana State University, and Montana Department of Military Affairs, Montana Fish, Wildlife & Parks initiated a study to evaluate the impact of mountain pine beetle (MPB) infestation on elk habitat and elk movements in the Elkhorn Mountains. Beginning in 1996, a major epidemic of MPB began affecting pine forests in western North America. Currently, western US forests are experiencing a MPB epidemic that is unprecedented in the past 100 years in extent, severity, and duration (Kayes and Tinker 2012). During the period from 2000 - 2013, MPB has caused tree mortality over 17.5 million acres of pine forest across the western United States (Hart et al. 2015). The United States Forest Service estimates that there are 6.1 million acres of beetle-killed trees in Montana, resulting in a major impact to the landscape (USDA Forest Service 2011). After the initial infestation, a decrease in canopy cover 2-4 years after infestation (Chan-McLeod 2006) and an increase in soil nitrogen associated with downed woody debris may result in increases in understory shrub and herbaceous vegetation (Saab et. al. 2014). These increases in understory vegetation may benefit wildlife species associated with early seral vegetation such as elk (*Cervus canadensis*) and deer (*Odocoileus spp.*). As infestation progresses, beetle-killed pine trees will begin to fall 3-5 years after tree death, with 25-50% of the trees falling within 10 years (Lewis and Hartley 2006). These downed trees have the potential to adversely affect movement of elk and deer (Saab et. al. 2014). Land management agencies as well as communities adjacent to forests impacted by these infestations are working to develop management strategies to deal with these issues. Wildlife managers also need to better understand the impacts of insect infestations on wildlife species and their habitat in order to develop strategies to mitigate potential impacts.

Elk capture and health screening

In January 2015, we captured elk from each of the Elkhorn Mountains area herd units. A total of 31 adult female elk and 15 bull elk were captured (Figure 1). One female was killed during the capture operation, and 30 adult female elk and 15 bull elk were radiocollared. The collars are programmed to record and transmit 1 location per day for 4 years, and are equipped with a mortality sensor that will detect if the collar has been stationary for 12 hours and send a mortality signal. Based on tooth eruption and wear patterns, the average age of adult female elk was 6.6 and the average age of bull elk was 5.6.

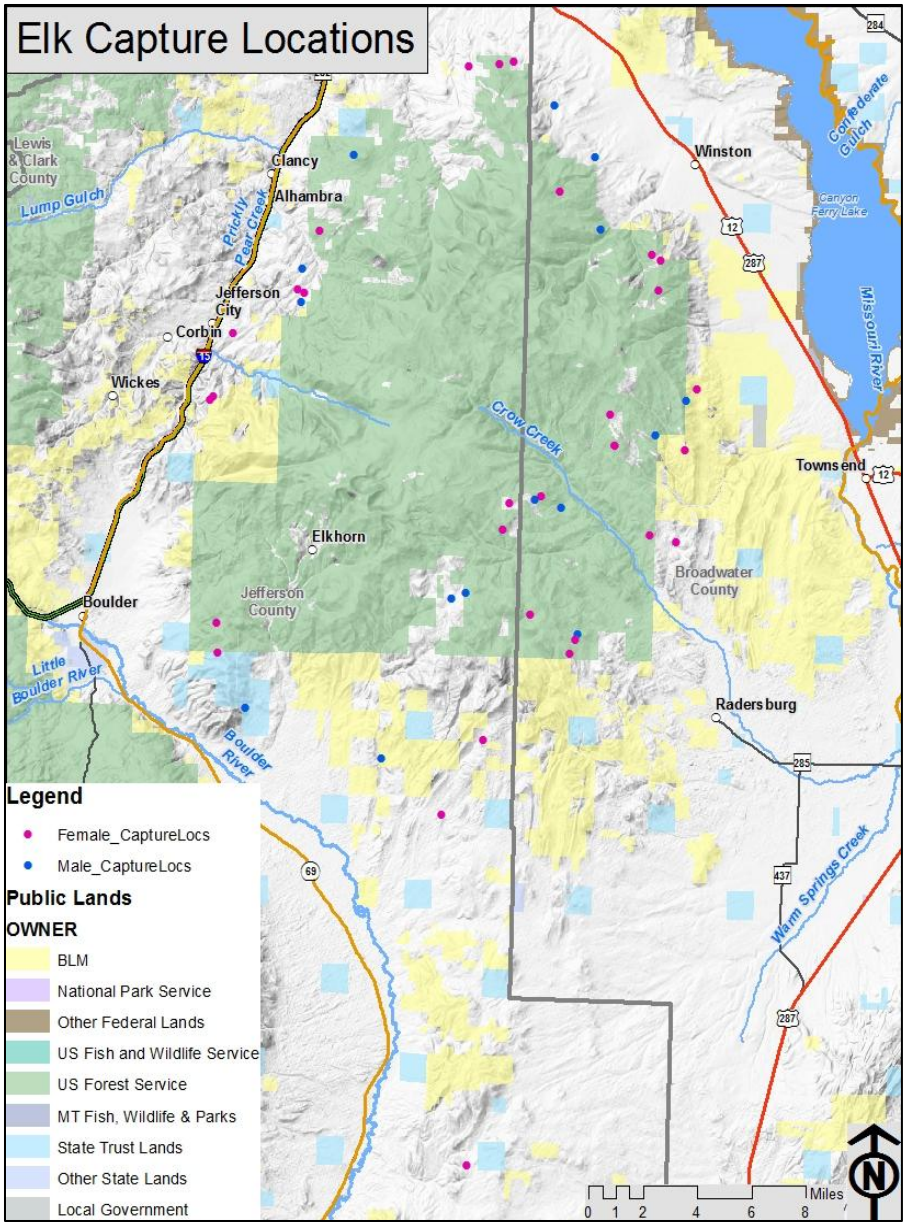

Figure 1.The capture location of adult female (pink) and bull (blue) elk in the Elkhorn Mountains.

We collected blood samples to test for pregnancy and found 28 of 31 (90.3%) of female elk were pregnant. We screened blood serum for exposure to *Brucella abortus, Leptospira spp.,* 2 strains of bovine viral diarrhea (BVD 1 and BVD 2), and infectious bovine rhinotracheitis (IBR, see Table 1 for results). We collected fecal samples and had those samples screened for parasites. The screening included screening for intestinal parasites including *Coccidial oocysts, Nematodirus sp., Strongyle,* and *Trichuris sp.* (Table 2). Winter tick loads were normal.

	Sample Size	# Exposed
Brucella	46	0
Leptospira	46	0
BVD 1	46	0
BVD 2	46	0
IBR	46	35

Table 1. Results of screening blood serum for exposure to *Brucella abortus*, *Leptospira spp*., two strains of bovine viral diarrhea (BVD I and BVD 2), and to infectious bovine rhinotracheitis (IBR).

	Sample Size	# Exposed
Coccidial oocysts	15	1
Nematodirus sp.	15	0
Strongyle type	15	3
Trichuris sp.	15	0

Table 2. Results of screening fecal samples for intestinal parasites.

We conducted a body condition asssessment to estimate percentage ingesta free body fat on all female elk. Female's averaged 5.1% body fat, the lowest reported for elk in southwest Montana (Figure 2). Mean estimated body mass was 229.8 kg.

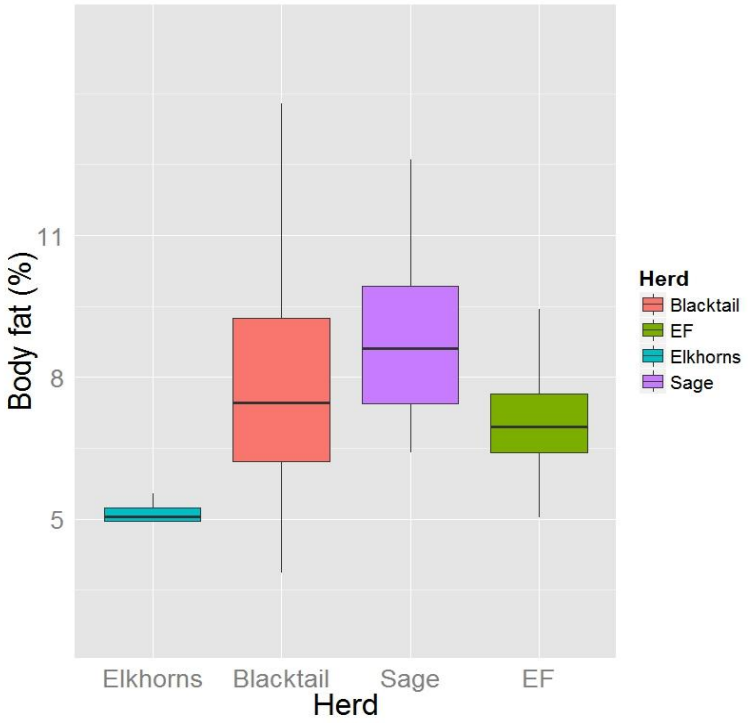

Figure 2. Comparison of adult female body fat levels between the Elkhorns elk and other herds in southwest Montana. Other herds include the Blacktail herd in HD324 sampled in 2011, the Sage Creek herd south of Dillon in HD325 sampled in 2012, and the East Fork Herd of the Bitterroot Valley in HD270 (mean during 2011-2013).

Elk Movements

As of May 1st the majority of collared elk are still on winter range, but moving upslope towards summer range. Three adult female elk have moved out of their original wintering area. One female from North Crow moved to York Island and the surrounding area along the Missouri river south of Townsend in mid-March. One female from the Sheep Creek area, in the northeast portion of the study area between East Helena and Winston, moved out of the core study area and into the Spokane Hills area east of East Helena during late March. One female from the South Crow area moved to the west side of the mountains in April and is in the Warm Springs area. Collared bull elk are beginning to move into the high country. The first bull to leave winter range was a bull from North Crow that moved into Tizer Basin the last week of March. A single collar has malfunctioned; it is no longer communicating with satellites or recording and uploading any data (position, temperature, etc.) The remaining 44 GPS radio-collars are all functioning as intended, and collecting a daily location for each collared elk.

Acknowledgements

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