



Montana Fish, Wildlife & Parks

Targeted Elk Brucellosis Surveillance Project 2018 Post-Capture Update

Elk capture and sampling efforts for the Targeted Elk Brucellosis Surveillance project occurred February 13th through March 3rd, 2018 (Figure 1). Blood was collected from all captured elk and screened for exposure to brucellosis at the Montana Department of Livestock (DOL) Diagnostic Laboratory.

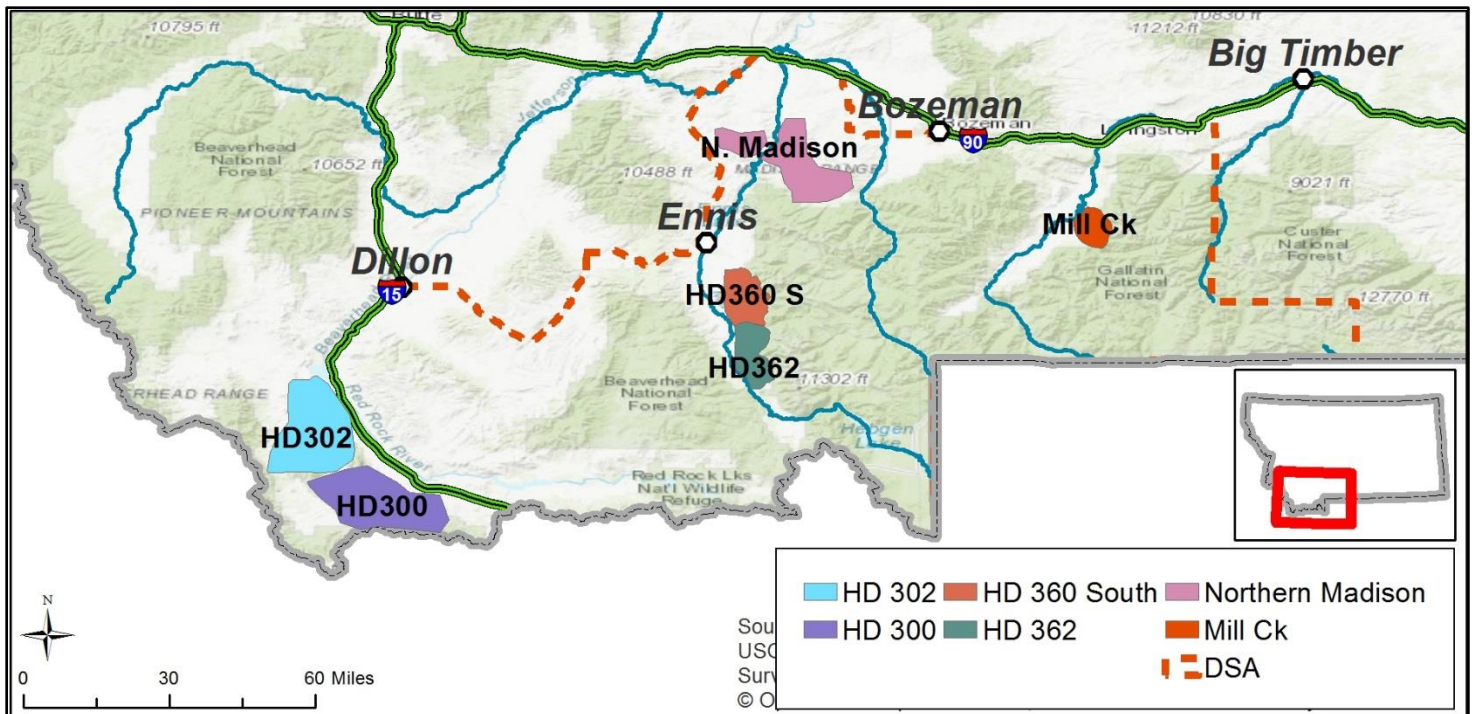


Figure 1. Elk populations sampled for exposure to brucellosis in 2018.

One hundred elk in HD302 and HD300 in the Tendoy Mountains and Lima Peaks area southwest of Dillon were captured and screened for exposure to brucellosis (Figure 2). The purpose of this effort was to assess seroprevalence and identify elk movement patterns and interchange between populations. In HD302 (north of Big Sheep Creek), 0 out of 40 elk tested seropositive giving the population an estimated seroprevalence of 0 (95% confidence intervals: 0.0 – 0.09; Table 1). In HD300 (south of Big Sheep Creek), 1 out of 60 elk tested seropositive giving the population an estimated seroprevalence of 0.02 (95% confidence intervals: 0.003 – 0.09; Table 1). Fourteen elk in HD302 and 16 elk in HD300 were outfitted with GPS radiocollars programmed to record locations every hour for 1-year. After 1-year, an automatic release mechanism will drop the radiocollars so the movement data can be retrieved.

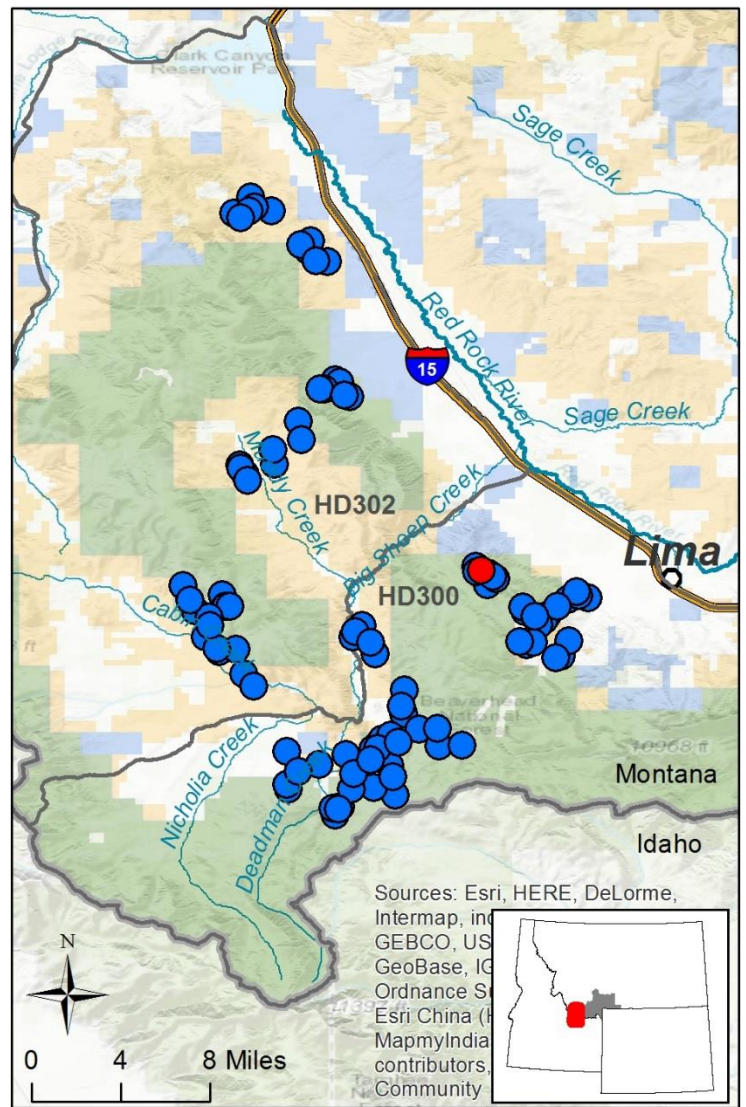


Figure 2. Capture locations of 99 seronegative elk (blue) and 1 seropositive elk (red) in the Tendoy Mountains and Lima Peaks area southwest of Dillon, MT.

Table 1. The total number of elk sampled for exposure to brucellosis, the number of seropositive elk, estimated seroprevalence, and the number of GPS collars deployed in the HD302 and HD300 elk populations in the Tendoy Mountains/Lima Peaks area in 2018. The numbers in parentheses represent the lower and upper bounds of the 95% confidence interval on the seroprevalence estimate.

Population	Total Elk	Seropositive	Seroprevalence	GPS Collars
HD302	40	0	0 (0.00, 0.09)	14
HD300	60	1	0.02 (0.003, 0.09)	16

Forty-one elk on the east side of the Madison Valley in HD360 South and HD362 were captured (Figure 3) and screened for exposure to brucellosis. The purpose of this project is to evaluate the effects of brucellosis management hazing and lethal removal or similar management actions on elk distributions and spatial overlap with livestock. In HD360 South (north of Indian Creek), 4 out of 29 elk tested seropositive giving the population an estimated seroprevalence of 0.14 (95% confidence intervals: 0.05 – 0.31; Table 2). In HD362 (south of Indian Creek), 2 out of 12 elk tested seropositive giving the population an estimated seroprevalence of 0.17 (95% confidence intervals: 0.05 – 0.45; Table 2). There is movement between these two elk populations, and several elk that were captured just north of Indian Creek have moved south into HD362. One elk from HD360 South was euthanized during capture, and the remaining 40 elk were outfitted with radiocollars.

These satellite radiocollars will document fine-scale elk movement patterns during the risk period and times of management actions. Radiocollars will record the elk’s location every 30 min from 0600 to 1800 December through April (i.e., likely management action season) and every 23 hours from May through November for three years. The hazer is concurrently keeping logs and GPS tracks of all management actions for comparison to elk distribution.

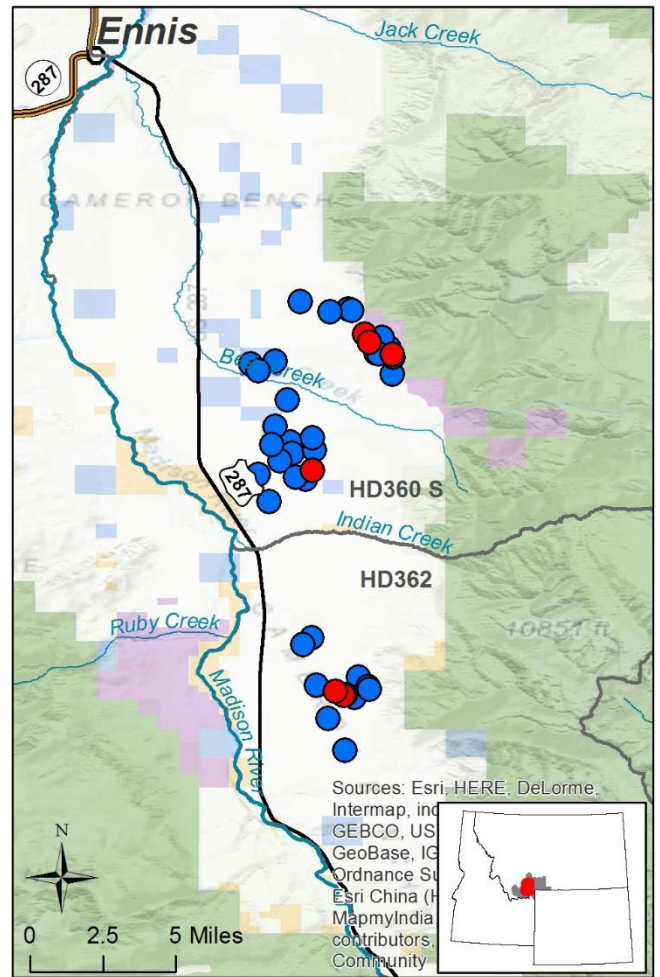


Figure 3. Capture locations of 41 elk in HD360 S and HD362 in the Madison Valley southeast of Ennis, MT.

Table 2. The total number of elk sampled for exposure to brucellosis, the number of seropositive elk, estimated seroprevalence, and the number of GPS collars deployed in HD 360 South and HD362 in the Madison Valley in 2018. The numbers in parentheses represent the lower and upper bounds of the 95% confidence interval on the seroprevalence estimate.

Population	Total Elk	Seropositive	Seroprevalence	GPS Collars
HD360 South	29	4	0.14 (0.05, 0.31)	28
HD362	12	2	0.17 (0.05, 0.45)	12

Additionally, seropositive elk captured in previous years of this project were recaptured for continued monitoring (Figure 3). Seropositive elk captured and collared during the first 5-years (2011-2015) of the Targeted Elk Brucellosis Surveillance Project are recaptured and sampled annually for five years to monitor their brucellosis serology (i.e., seropositive, seronegative), reproductive status (e.g., pregnancy, abortion, live birth), and to evaluate their ability to shed *Brucella* on the landscape. During each capture, a blood sample is collected and screened for exposure to brucellosis. Pregnancy status is determined via rectal palpation and all pregnant elk receive a Vaginal Implant Transmitter (VIT) that is used to monitor the fate of the pregnancy. VITs are expelled during the birthing process. Elk with VITs are tracked at least twice per week until the VIT is expelled. Monitoring VITs will allow biologists to determine the timing and location of birthing events and determine the potential for seropositive elk to shed *Brucella abortus* on the landscape. Following 5 years of monitoring, elk are removed from the population for biological sampling. Elk are euthanized in the field, taken to the Diagnostic lab for necropsy, and tissues are sampled to determine if the seropositive elk are actively infected with brucellosis. Active infection is determined by culturing (i.e., growing) *Brucella abortus* bacteria from tissue samples, as opposed to serology which only detects antibodies to the bacteria in the blood.

In the Northern Madison area, we recaptured the remaining 2 seropositive elk (Figure 4). One elk was pregnant and received a VIT. The pregnant elk seroreverted and tested seronegative this year. We will, however continue to treat her as a seropositive elk and monitor the pregnancy. In the Mill Creek area, we recaptured 9 seropositive elk (Figure 5). Seven out of 9 elk were pregnant and received VITs. In the Greeley area, there is 1 seropositive elk, but her radiocollar has failed and we were unable to locate her. We are currently monitoring the pregnancy status of 7 seropositive elk in Mill Creek, and 1 elk in N. Madison (Table 3).

Table 3. Seropositive elk with VITs being tracked for the 2018 parturition season.

Population	Seropositive Elk	Elk with VITs
N. Madison	2	1
Mill Creek	9	7

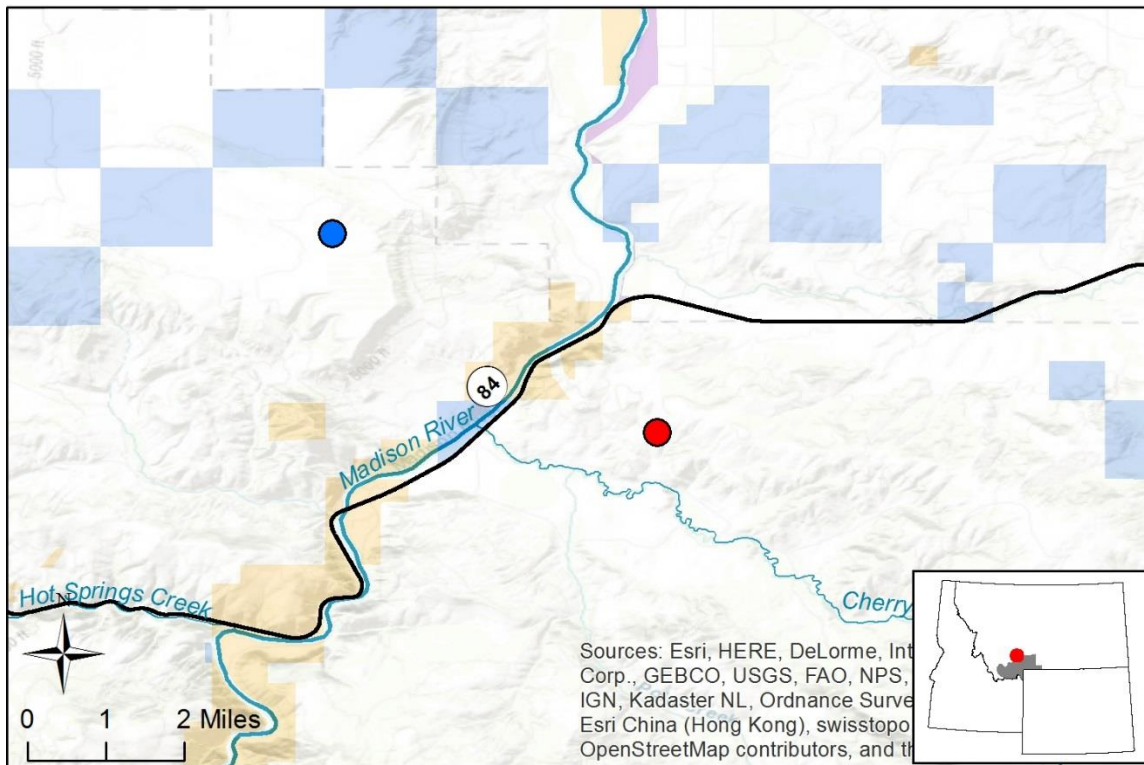


Figure 4. Capture locations of 2 seropositive elk in the Northern Madison population west of Bozeman, MT. One of the elk has tested seropositive every year since 2014, but seroreverted and tested seronegative this year (blue).

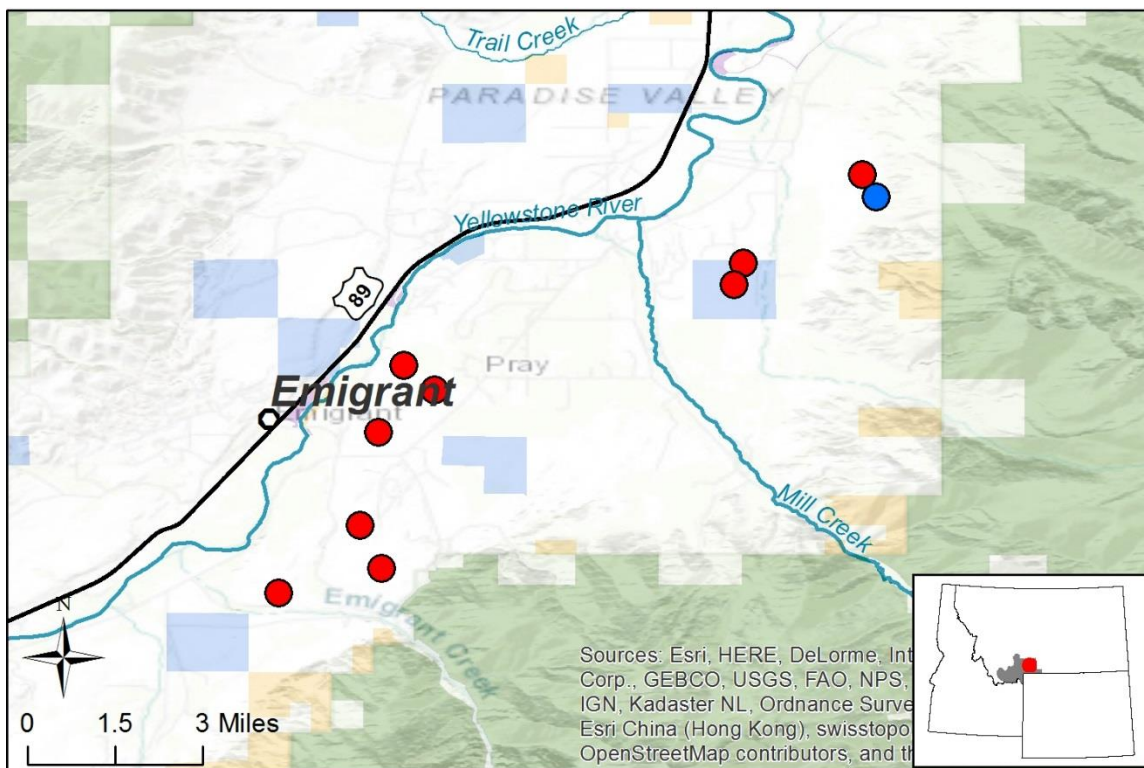


Figure 5. Capture locations of 9 seropositive (red) and 1 seronegative (blue) elk in the Mill Creek population south of Livingston, MT.

In addition to the seropositive recaptures, 1 seronegative collared elk from the Mill Creek population was recaptured to have the collar removed (Figure 5). The automatic release mechanism on this collar failed, and the collar was removed to retrieve the GPS data.

We are very thankful for the critical assistance provided by all FWP personnel, the Quicksilver helicopter capture crew, and landowners within the study areas; these captures would not have possible without their support. Funding was provided by Montana Fish, Wildlife and Parks, USDA APHIS through the Montana Department of Livestock, and the Rocky Mountain Elk Foundation. This project would not be possible without your efforts and support. For additional information, please contact Jenny Jones 406-868-2637, jennyjones@mt.gov.

