



## WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4610

Web site: <http://gf.state.wy.us>

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### Interim Report 3: “Identifying Areas of High Risk for *Brucella abortus* Contamination and Reducing the Risk of Cattle Exposure”

Funded in part by the WY Dept. of Agriculture, WY Wildlife Livestock Disease Partnership

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Brandon Scurlock, Wildlife Disease Program Field Supervisor, WGFD

Eric Maichak, Brucellosis Program Biologist, WGFD

Jared Rogerson, Brucellosis Program Biologist, WGFD

John Henningsen, Brucellosis Program Biologist, WGFD

#### *Project Summary:*

The primary goal of this study is to collect information on elk movements, abortions and calving locations to develop a geospatial assessment of potential for *Brucella abortus* environmental contamination and associated exposure risk to cattle. Vaginal Implant Transmitters (VITs) and GPS collars have proven to be excellent technologies to identify abortions, parturition sites, and fine-scale movements of elk. This project is expanding upon pilot work we have already completed by deploying additional VITs and GPS collars on elk captured from different feedgrounds so that we may delineate additional areas of high potential for elk-cattle transmission. Once identified, we can suggest site-specific strategies (*e.g.*, fencing, grazing regimes, area avoidance) to land management agencies and livestock producers to minimize interspecific disease transmission risk.

#### **(i) Project Status:**

We continued this project with elk captures between January 15 and March 23, 2011 during which a total of 1098 elk were trapped and 941 newly tagged at 14 feedgrounds (Grey’s River, Dell Creek, Fall Creek, Muddy Creek, South Park, Jewett, Franz, Soda Lake, McNeel, Forest Park, Horse Creek, Patrol Cabin, Green River Lakes, and the NER) over 34 trap days. A total of 405 test-eligible female elk were bled for brucellosis evaluation. Sample sizes for 95% confidence with +/-10% error were attained at Grey’s River, Dell Creek, Fall Creek, Muddy Creek, Jewett, South Park, and Forest Park feedgrounds. Prevalence at these sites ranged from 4.3% at Fall Creek to 43.5% at Dell Creek feedground.

Among the 81 GPS collars deployed during winter 2010, 39 were on a 48 week drop, and ½ hour fix schedule. A total of 37 of the 39 collars were retrieved in January 2011; whereabouts of the remaining two are not known despite numerous hours of flight time spent trying to locate them. Figure 1 illustrates elk GPS collar locations from 2007 through 2010.

Totals of 81 VITs, 47 GPS collars, and 57 proximity-data logging collars were deployed on elk captured from 13 different feedgrounds and 1 native winter range site adjacent to feedgrounds. VITs are monitored daily by contract elk feeders while elk attend feedgrounds. After feeding terminates, WGFD personnel monitor VITs via ground and aerial surveys until the VIT is expelled during abortion or parturition. Expelled VITs are sent to the Wildlife Disease Laboratory for culture to determine presence/absence of *B. abortus*. Eight reproductive failures

were documented during winter/spring 2011 on 5 different feedgrounds between 27 March and 28 May. Subsequent bacteriologic cultured revealed *B. abortus* was present on samples from 5 of the 8 reproductive failure events. A total of 25 reproductive failures have been documented during this project (Fig. 2).

There are several ongoing brucellosis research projects in the Jackson and Pinedale Regions. Thus, we were able to integrate elk capture efforts to increase our sample size of VIT-equipped elk. In conjunction with ongoing elk GPS and proximity-logger collaring projects being conducted through the University of Wyoming Cooperative Research Unit (UW Coop), Montana State University (MSU), United States Geologic Survey (USGS) and WGFD, we deployed an additional 11 VITs via helicopter captures from the hunt area 99 elk native winter ranges adjacent to Muddy Creek feedground.

### **(ii) Recipients of expended grant funds:**

For the period 5/1/2010 through 4/30/2011, costs incurred are as follows:

\$3,705.00 was paid to LOTEK Wireless, Inc. (115 Pony Drive, Newmarket, ON L3Y 7B5; 905-836-6680) for the purchase of new batteries, drop-off mechanisms, and refurbishing kits. These materials allowed us to refurbish the GPS collars originally purchased by USGS and WGFD prior to this grant.

\$1,679.00 was paid to Advanced Telemetry Systems (470 First Ave. N., Box 398, Insanti, MI 55040; 763-444-9267) for the purchase of Vaginal Implant Transmitters.

\$8,581.00 was paid to the Wyoming Game and Fish Department (5400 Bishop Boulevard Cheyenne, WY 82006; 307-777-4618) for personnel and vehicle equipment expenses related to implementing the Project.

**Total; 5/1/2010 - 4/30/2011: \$27,927. WWLDP - \$13,965; WGFD cost share- \$13,962**

### **(iii) Hard dollar and in-kind matching funds:**

This project is one of several ongoing, integrated brucellosis research endeavors being conducted simultaneously by the WGFD, USGS, UW Coop, and MSU. In addition to this study, current projects include 1) documenting characteristics of abortion and parturition events in elk from *Brucella* strain 19 vaccinated and unvaccinated feedgrounds (WGFD lead; funded in part by the WWLDP); 2) effects of altered feeding management on elk density and intraspecific exposure rates in western Wyoming (MSU/WGFD/USGS leads; also funded in part by the WWLDP); 3) seasonal habitat use and interchange of elk on and off feedgrounds in the southern brucellosis endemic area of Wyoming (UW Coop/WGFD/USGS leads); and 4) land use and predation effects on elk aggregation and *Brucella* transmission in the Greater Yellowstone Ecosystem (MSU/USGS leads).

Because these projects are concurrent and inter-agency cooperation is excellent, investigators seized the opportunity to pool resources through combining elk captures and monitoring efforts to reduce individual project costs while increasing sample sizes. Additionally, much of the necessary infrastructure, such as personnel, vehicles, telemetry equipment, etc. was already in place when this project was implemented, maximizing operating efficiency.

**(iv) Success of the project:**

We have obtained much data on elk movements, abortions and parturition events during the two years of this project. The WGFD has also begun to update elk seasonal range delineations based upon data garnered during this project. We plan to expand our geospatial assessment of elk to cattle brucellosis transmission risk from data collected over the duration of this project.

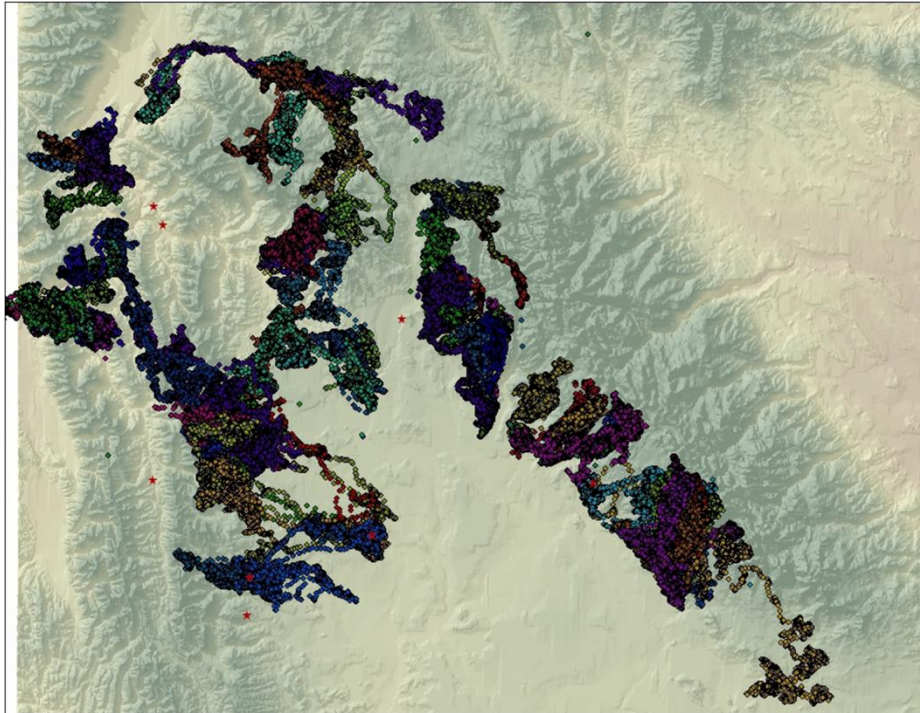


Figure 1. Elk GPS collar locations of 94 individual elk captured from 19 of 23 elk feedgrounds (red stars) in western Wyoming 2007-2010.

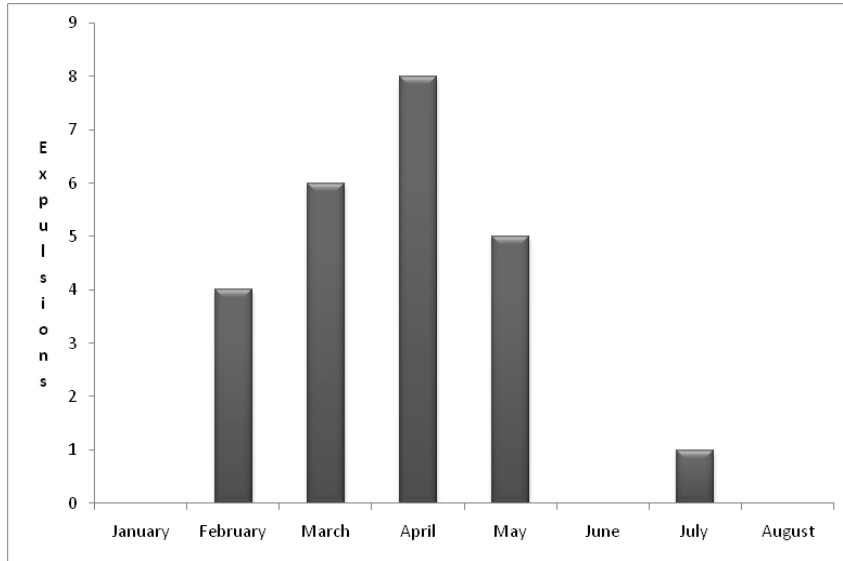


Figure 2. Histogram of reproductive failures documented in elk captured from feedgrounds 2006-2011 using Vaginal Implant Transmitters.