

**Contact rates between rangeland livestock and wild ungulates**

*Dohna, H.<sup>1</sup>, Peck, D.E.<sup>2</sup>, Johnson, B.K.<sup>3</sup>, Reeves, A.<sup>4</sup> and Schumaker, B.A.<sup>2</sup>, <sup>1</sup>University of California-Davis, USA, <sup>2</sup>University of Wyoming, USA, <sup>3</sup>Oregon Fish & Wildlife, USA, <sup>4</sup>Colorado State University, USA; [dpeck@uwyo.edu](mailto:dpeck@uwyo.edu)*

Rangeland livestock in the western U.S. interact with abundant wild-ungulate populations (e.g. elk, deer and antelope), which may complicate control of an FMD outbreak. The frequency of livestock-wildlife interactions are poorly understood though. This study estimates inter-specific contact rates using the largest known dataset on cattle-elk-deer locations, from the Starkey Project's semi-arid rangelands and forests of northeast Oregon, USA. The Starkey Project is a 10,000-hectare fenced enclosure containing 500 cow/calf pairs, 200 elk, and 200 mule deer. Each year, roughly 41 cattle, 43 elk, and 21 deer are collared, and their locations are recorded every 30-60 minutes. Between 1993 and 2007, 849,443 spatial locations were collected for cattle; 1,427,707 for elk; and 489,118 for deer. We calculate spatial and temporal distances between all observed pairs of animal locations, as well as the proportion of pairwise observations occurring within a specified distance and time from each other. Of the 130 million pairs of animal locations separated in time by six hours or less, 2.2% of intraspecies pairs, and 0.04% of interspecies pairs involved animals located less than 100 meters apart. Specifically, 5% of cow-cow pairs were within 100 m of each other at the same point in time. Less than 0.1% of cow-elk pairs, and less than 0.05% of cow-deer pairs, were within 100 m of each other. Similarly, 4% of cow-cow pairs observed 30 minutes apart were within 100 m of each other (relevant for transmission via environmental contamination). Less than 0.02% of deer locations, and less than 0.05% of elk locations, were within 100 m of a location a cow visited 30 minutes ago. Contact rates between cattle, elk, and deer are relatively low, due perhaps to inter-specific avoidance. They do in fact occur, however, and may complicate control of an FMD outbreak.