Examining Seasonal Anthrax Risk in Wildlife: Comparing Home Ranges and Site Fidelity in Sero-Positive and Sero-Negative Ungulates

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Anthrax is frequently reported from wildlife and livestock in the US. While useful in reducing risk in livestock, vaccination, the primary method of prevention, is untenable for free-ranging wildlife. Because of this, accurate surveillance and carcass clean-up are the most efficacious control measures for wildlife. However, surveillance is expensive and requires significant personnel across large landscapes. Likewise, the transmission pathways are poorly understood in most species. Wildlife telemetry improves our understanding of movement patterns during risk periods. At the same time, serological surveys provide data on host exposure. Such data allow us to test hypotheses about host/pathogen interactions on the landscape. Starting in 2010, we initiated GPS telemetry and sero-prevalence studies for managed bison, *Bison bison bison*, and free-range elk (*Cervus elaphus*) in Montana. Here we will evaluate summertime home ranges in bulls from both species in western Montana. We compared home ranges and site fidelity metrics in sero-positive and sero-negative animals. Serological tests indicated that ~30% of bull elk and ~27% of unvaccinated bison were sero-positive for anthrax exposure, suggesting that low-level exposure is frequent on this landscape. Seasonal ranges can be useful for defining areas where animals may have increased likelihood of anthrax, comparing ranges to niche-based estimates of *B. anthracis*. Fidelity metrics suggest both species spent considerable time in niche-based high risk areas. Inter-annual data from elk suggest long-term range fidelity and overlap with high risk areas. These

data can be used to prioritize surveillance efforts in those areas to maximize disease control, while managing search costs.