

CHRONIC WASTING DISEASE DETECTION AND MORTALITY SOURCES IN A SEMI-PROTECTED DEER POPULATION¹

Krysten L. Schuler², Jonathon A. Jenks³, Robert W. Klaver⁴, Christopher S. Jennelle⁵, R. Terry Bower⁶

ABSTRACT

Surveillance for wildlife diseases is essential for assessing population dynamics of ungulates, especially in free-ranging populations where infected animals are difficult to sample. Chronic wasting disease (CWD) is an emerging infectious disease of concern because of the potential for substantial negative effects on populations of cervids. Variability in the likelihood that CWD is detected could invalidate traditional estimators for prevalence. In some instances, deer located after death cannot be tested for infectious diseases, including CWD, because of lack of availability or condition of appropriate tissues. We used various methods to detect infectious diseases that could cause mortality for deer *Odocoileus* spp. residing in Wind Cave National Park, South Dakota, USA, and we report survival estimates for animals in this population. We included 34 monthly encounters of deer resightings and 67 mortalities. We tested live deer by tonsillar biopsy for CWD and estimated pooled prevalence (mean \pm SE) at $5.6 \pm 3.0\%$ over the three-year study. Live deer potentially had exposure to several infectious diseases, including bluetongue, epizootic hemorrhagic disease, bovine viral diarrhea, West Nile virus, and malignant catarrhal fever, but no apparent morbidity or mortality from those diseases. We tested survival and influence of covariates, including age and sex, using known-fate analysis in Program MARK. Those data best supported a model with time-invariant encounter probability and an annual survival of 72.8%. Even without direct pressure from hunting within the park, average life expectancy in this population was 3.2 years. Only 68% of mortalities contained sufficient material for CWD sampling (because of predation and scavenger activity) and >42% of these were CWD-positive. These findings underscore the possible biases in postmortem surveillance estimates of disease prevalence because of potential for subclinical infected animals to be removed by predators and not tested.

¹Wildlife Biology. 2018(1). <https://doi.org/10.2981/wlb.00437>.

²Department of Population Medicine and Diagnostic Sciences, Cornell University College of Veterinary Medicine, Ithaca, NY 14853 USA

³Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD 57007 USA

⁴US Geological Survey, Iowa Cooperative Fish and Wildlife Unit, Iowa State University, Ames, IA USA

⁵Minnesota Department of Natural Resources, Wildlife Health Program, Forest Lake, MN 55025 USA

⁶Department of Biological Sciences, Idaho State University, Pocatello, ID USA