

AN IMPROVED UNDERSTANDING OF POPULATION DYNAMICS USING COUNT DATA - INSIGHTS FROM ELK IN WESTERN MONTANA

Terrill Paterson *, Ecology Department, Montana State University, Bozeman
Kelly Proffitt, Wildlife Division, Montana Fish, Wildlife & Parks, Bozeman
Robert Garrott, Ecology Department, Montana State University, Bozeman
Jay Rotella, Ecology Department, Montana State University, Bozeman

*Indicates Presenter

**Indicates Student Presentation

Understanding the dynamics of ungulate populations is a crucial goal for managers given their ecological and economic importance. In particular, the ability to evaluate the evidence for potential drivers of variation in population trajectories is important for informed management. However, the routine use of age ratio data (e.g., juveniles:100 adult females) to evaluate variation in population dynamics is hindered by a lack of statistical power and difficult interpretation. Here, we show that the use of a population model fueled by count, classification and harvest data can dramatically improve the understanding of population dynamics compared to a model using age ratio data by: 1) increasing the power to assess potential sources of variation in key vital rates, and 2) providing easily interpretable vital rates (e.g., per capita recruitment rates and population growth rates) that are useful to managers. Using a time series of spring count data (2004 to 2016) and fall harvest data from hunting districts in western Montana, we constructed a population model to assess the effects of a series of environmental covariates and indices of predator abundance on the per capita recruitment rates of elk calves. Results from this modeling approach suggest per capita recruitment rates decline in association with wet springs, dry summers and severe winters, and in interactions between predator communities and the environment. In contrast, the analysis of age ratio data failed to detect these relationships. We recommend using count data and a population modeling approach rather than interpreting estimated age ratio data as a substantial improvement in understanding population dynamics.