EVALUATING THE PERFORMANCE OF OCCUPANCY MODELS FOR WOLF MANAGEMENT IN MONTANA THROUGH SIMULATION

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Occupancy models are a popular tool for understanding species distributions, providing insight into species ecology, and are often used to inform management decisions. In Montana, decisions about wolf harvest are based, in part, on the results from a false positive occupancy model that uses observation data from hunter surveys and FWP wolf specialists. We completed a simulation study to better understand performance of the occupancy model currently being used. Simulations tested model behavior under various scenarios, including: (1) performance across a distribution of parameter values, (2) performance when latent occupancy model parameters are based on previous occupancy estimates with variable detection probabilities, and (3) performance when the 'true' observation generating process differs from that which is being modeled. Resulting parameter estimates were examined using relative bias and root mean squared error across simulation scenarios. The outcome of this work provides rigorous information about the strengths and weaknesses of occupancy analysis for wolves in Montana, using currently available data. Broadly, we aim to show the benefits of using simulation to understand the ability of modeling tools and available data to provide unbiased and accurate parameter estimates that inform decisions.