**Title:** **A Multi-Scale Approach to Estimating the Factors Influencing Wild Turkey Recruitment in Pennsylvania**

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**Abstract** Ecological processes and wildlife-habitat relationships are inherently scale-dependent. The concept of scale is intricately tied to both the grain size of observations and the spatial extent of the analysis. In this study, we developed a multi-scale framework by creating a series of models, each with different experimental units: a nest-site selection model, an individual movement model, and a nest success model. The nest-site selection model (with nests as the experimental unit) and the individual movement model (with animals as the experimental unit) use conditional logistic regression to examine how both nest-level factors (e.g., visual obstruction) and landscape-level classifications (e.g., agricultural land use) influence decision-making during the pre-nesting period. To enhance our understanding of nesting behavior, we incorporated a Bayesian known-fate model to quantify daily nest survival probabilities in relation to various predictors, including weather variables (e.g., daily minimum temperature), individual characteristics (e.g., disease infection status), and both nest-level and landscape-level habitat characteristics. This approach was applied to a robust dataset of female wild turkeys (Meleagris gallopavo silvestris) from Pennsylvania USA, which includes GPS data and morphometric measurements. We captured 405 hens across 4 study areas, fitting each with GPS-ACC transmitters. Using acceleration data, we identified the initiation and termination of nesting behavior. Upon the termination of nesting, we gathered fine-scale vegetation data and remotely sensed land cover data from the nest site and four alternative locations, situated 100 meters away in each cardinal direction. We further used acceleration data to determine the amount of time a hen spent off the nest to examine how individual behavior during incubation influences daily nest survival. Our study combines a suite of different data sources to provide insights into the conditional behavioral processes that influence wild turkey recruitment.