

Holo-scale movement ecology of flammulated owls

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Ecological processes are often thought to manifest at one or more spatial scales, necessitating that sampling occur at the putatively operative scale(s) in order to draw accurate inference about the processes. Animal movement is one such process that manifests across spatio-temporal scales and different approaches have been suggested to accommodate the fact that animal movement and resource selection by animals occurs at different scales both within and between organisms. Recent efforts to provide a unified paradigm for movement ecology research offer promise in providing analytic frameworks that do not require researchers to make *a priori* assumptions about the behaviorally operative spatio-temporal scale(s). Instead, this holo-scale approach can simultaneously integrate analyses of behaviors at multiple spatio-temporal scales. This project's seeks to advance understanding of holo-scale movement ecology of flammulated owls in multiple behavioral contexts and to develop novel analytic techniques for accomplishing such tasks. Specifically, this project will 1) Develop an agent-based simulation modeling method for pre-data collection analysis of hypotheses to ensure appropriate experimental design and analysis; 2) Use agent-based simulation models in a hypotheses vetting framework to explore whether prey-driven movement by flammulated owls can be parsed from other potential covariates of movement (e.g., habitat type, central tendency, etc.) and evaluate analytic tools for accomplishing this task; 3) Characterize the extent to which the spatial distributions of prey resources can explain movement behaviors of breeding male flammulated owls (compared to habitat only); and , 4) Describe the spatio-temporal biogeography of flammulated owls range wide.



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