

**Abstract:**

Patterns of dispersal behavior are often driven by the composition and configuration of suitable habitat in a matrix of unsuitable habitat. Interactions between animal behavior and landscapes can therefore influence population dynamics, population and species distributions, population genetic structure, and the evolution of behavior. Spatially explicit individual-based models (IBMs) are ideal tools for exploring the effects of landscape structure on dispersal. We developed an empirically parameterized IBM in the modeling framework SEARCH to simulate dispersal of translocated American martens in Wisconsin. We tested the hypothesis that a time-limited disperser should be willing to settle in lower quality habitat over time. To evaluate model performance, we used a pattern-oriented modeling approach. Our best model matched all empirical dispersal patterns (e.g., dispersal distance) except time to settlement. This model incorporated a required search phase as well as the mechanism for declining habitat selectivity over time, which represents the first demonstration of this hypothesis for a vertebrate species. We suggest that temporal plasticity in habitat selectivity allows individuals to maximize fitness by making a tradeoff between habitat quality and risk of mortality. Our IBM is pragmatic in that it addresses a management need for a species of conservation concern. However, our model is also paradigmatic in that we explicitly tested a theory of dispersal behavior. Linking these 2 approaches to ecological modeling can further the utility of individual-based modeling and provide direction for future theoretical and empirical work on animal behavior.

**URL:** <https://academic.oup.com/beheco/advance-article-abstract/doi/10.1093/beheco/ary193/5288455>