

ABSTRACT

A Novel Simulation Methodology Merging Source-Sink Dynamics and Landscape Connectivity.

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Source-sink dynamics are an emergent property of complex species-landscape interactions. This study explores the patterns of source and sink behavior that become established across a large landscape, using a simulation model for the northern spotted owl (*Strix occidentalis caurina*) that was developed as part of the US Fish and Wildlife Service's most recent recovery planning effort for the species. Our spotted owl model was constructed with the HexSim life history simulator, and we take advantage of features in HexSim to develop maps of source and sink strength at multiple spatial scales across the range of the species. We also use HexSim to produce relatively simple matrix model representations of the full mechanistic simulation, and extract information about the fluxes of owls across the landscape from those simple models. We describe a quantity "net flux" that turns out to be well correlated with the importance of movement pathways, based on an analysis of dominant eigenvalues.

Key Words: HexSim ; Population Viability Analysis ; Connectivity