Integrating telemetry data for improved inference about cost functions and connectivity using spatial capture-recapture.

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The relaxation of the Euclidean distance assumption for spatial capture-recapture methods allows inference to be made about how activity patterns are influenced by landscape structure through the explicit estimation of a cost function. This linking of structure (i.e., the landscape) and function (movement) is particularly appealing as it offers a statistical framework for estimating landscape connectivity. In practice, however, SCR protocols rarely generate data sufficient to estimate parameters of cost function reliably. Here we develop an integrated SCR model that simultaneously estimates the parameters of the SCR and cost function model while leveraging information from telemetry data. We evaluate the performance of the integrated model using simulation and then apply the model to data collected on the European hedgehog (*Erinaceus europaeus*). Finally, given the conceptual similarities between cost functions and resource selection functions (RSFs), we compare our model with the integrated SCR-RSF model and explore the conditions under which these models generate convergent and divergent inference about space use in structured landscapes. We will offer practical recommendations for when and why each model should be applied.