**Patch Occupancy Models and Black Bear Management in the Southeastern Coastal Plain: A Potential Tool?**

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**Abstract**

Habitat fragmentation in the southeastern Coastal Plain is widely regarded as a central issue in the management of black bear (*Ursus americanus*) populations. Further habitat loss and fragmentation, and increases in human density, may influence the persistence of black bears throughout this region. Therefore, tools to evaluate these impacts are needed to encourage and allow for an integrated, regional-scale approach to management. Stochastic patch occupancy models (SPOMs) represent a group of metapopulation models that are based only on the occupancy status and size and distribution (i.e., connectivity) of habitat patches. Application of such models may provide wildlife managers and landscape planners with useful tools to evaluate the potential impacts of future land-use changes (e.g., construction of new highways) on the persistence of wildlife populations at a regional scale and to determine how those impacts may be mitigated (e.g., establishing corridors). We developed a SPOM for the area encompassing the entire range of the Florida black bear (*U. a. floridanus*) and applied the model to quantify colonization and extinction rates of habitat patches across the network. We adjusted interpatch distances using least-cost distance analyses to account for characteristics of the landscape (i.e., roads and land-cover types) and their potential effects on dispersal among patches. The best-fitting model incorporated effects of land-cover type and roads, including type of road. Using the parameter estimates of the best model, we performed a 25-year simulation of patch incidence to assess the potential for natural recolonization of unoccupied patches and to identify patches that may become extinct over the 25-year period. The simulation predicted only limited population expansion but also predicted low potential for extinction, thus occupancy patterns exhibited high stability. To demonstrate the potential utility of our model to managers and landscape planners, we applied our models to hypothetical management scenarios. We demonstrated how our model could be used to guide restoration efforts by identifying those patches within an assemblage that, if restocked, would maximize recolonization potential for surrounding patches. We also demonstrated how our model could be used to assess impacts on connectivity among existing bear populations resulting from changes in landscape structure and composition (e.g., highway upgrades). Additionally, we applied the parameter estimates of the best model, tested the validity of its application, and performed simulations for the area encompassing the entire range of the federally threatened Louisiana black bear (*U. a. luteolus*) and populations of the American black bear (*U. a. americanus*) in Arkansas. Although SPOMs may prove to be a valuable tool for regional-scale management of black bears in the southeastern Coastal Plain, we caution that the methodology used to develop our model has not been attempted for large carnivores and the reliability of our predictions has not been thoroughly tested. Thus, we emphasize that our model should be used in conjunction with other available information and not provide the sole basis for making management decisions.