TIME-TO-EVENT DENSITY ESTIMATION OF LOW DENSITY SPECIES WITH REMOTE CAMERAS

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Abundance estimates can inform management policies and are used to address a variety of wildlife research questions, but reliable estimates of abundance can be difficult and expensive to obtain. For low-density, difficult to detect species, such as cougars (Puma concolor), the costs and intensive field effort required to estimate abundance can make working at broad spatial and temporal scales impractical. Remote cameras have proven effective in detecting these species, but the widely applied methods of estimating abundance from remote cameras rely on some portion of the population being marked or uniquely identifiable, limiting their utility to populations with naturally occurring marks and populations that have been collared or tagged. Methods to estimate the abundance of unmarked populations with remote cameras have been proposed, but none have been widely adopted. Working with Idaho Department of Fish and Game, we used the time-to-event model (Moeller et al. 2018) to estimate the density of two cougar populations in Idaho. The time-to-event model uses observed encounter rates at randomly or systematically placed cameras to estimate the abundance of unmarked populations. Obtaining reasonable abundance estimates for cougars from the time-to-event model shows that remote cameras may lower the costs of abundance monitoring for low density, difficult to detect species and make monitoring programs using remote camera grids applicable to a broader array of species. Future work will compare estimates of cougar abundance from the time-to-event model to estimates obtained from concurrent genetic spatial capture recapture estimates.