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ESTIMATING HABITAT SELECTION WHEN GPS FIX SUCCESS IS LESS THAN 100%

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Abstract: Inferences about habitat selection by animals derived from sequences of relocations obtained with global positioning system (GPS) collars can be influenced by GPS fix success. Environmental factors such as dense canopy cover or rugged terrain can reduce GPS fix success, making subsequent modeling problematic if fix success depends on the selected habitat. Ignoring failed fix attempts may affect estimates of model coefficients and lead to incorrect conclusions about habitat selection. We present a modified discrete choice (MDC) habitat selection model that accounts for missing locations due to habitat-induced data losses. The MDC formulation is similar to adjusting estimates of probability of occupancy when detection is less than 100% in patch occupancy sampling. We apply the MDC to GPS data collected from an adult female mule deer and discuss how to analyze data from multiple animals. Our results suggest that application of the MDC model can produce unbiased estimates of habitat selection for GPS data sets missing up to 50% of the locations.

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