Stopover Use By A Migratory Ungulate During A Short Distance Migration

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Stopover use has been demonstrated among many species of migrating taxa. Stopover behavior during migration is characterized by a slower rate of movement as well as less directionality to movement that is associated with foraging behavior. Stopover sites are critical locations within the migration route that may positively influence survival. The Pacific Deer Herd is a migratory population of deer consisting of both Rocky Mountain Mule deer (Odocoileus hemionus hemionus) and Columbian Black-tailed deer (Odocoileus hemionus columbianus) located on the western slope of the Sierra Nevada Mountains, California. We hypothesize that stopover use will influence adult survival in a migratory ungulate population. Iridium satellite collars were applied to female deer within this population (n=34). Collar data was analyzed using the Brownian Bridge Movement Model (BBMM). BBMM uses consecutive GPS points to estimate stopover sites and migration routes. The collar data shows a mean migration distance of 31 km, and BBMM estimated that 58% of the individuals within the Pacific Deer Herd exhibit stopover behavior. Stopover use varied from 1 to 88 days during migration. Patterns of mortality were also assessed. Survival comparisons were made based on an individual either occupying summer or winter home range. Differences in survival probability were also examined based on whether an individual was migrating or occupying seasonal range; 5 of the 12 observed mortalities occurred during migration. However, there were no observed mortality events at stopover sites. Stopover behavior has been assessed in ungulate migrations of 160 km or more. Our data shows stopover behavior is important in a short distance migration (31 km). We examined patterns of mortality during migration and found higher survival at stopover sites when compared to the rest of the migration route. We have also found that environmental conditions may influence individuals to use stopover sites as winter range. This migratory population shows high fidelity to stopover locations and migration routes. It is important for managers to be able to identify these locations as areas of high conservation importance.