17 Effect of habitat type, sex and time of day on space use by the swamp wallaby

J. Di Stefano, M. Swan, A. Greenfield and G. Coulson

SUMMARY

Quantifying patterns of animal movement in habitats with different characteristics, and at a range of temporal and spatial scales, will help determine the range of habitats and resources required for survival and reproduction. In this study we investigated the effect of habitat type, sex and time of day on space use by the swamp wallaby (*Wallabia bicolor*) within four habitat types in a landscape modified by timber harvesting. The difference between diurnal and nocturnal space use was quantified by calculating the change in home range size attributable to night locations, and we predicted that nocturnal and diurnal space use would differ only in habitats where food and shelter resources were spatially separated. We recorded total home ranges between 3.4 and 82.6 ha. On average, the addition of nocturnal data to diurnal home ranges caused female ranges to increase by 28.9% ± 9.7% (mean ± 95% CI) while male home ranges increased by 15.2% ± 12.4%. Female home ranges increased by 39.2% ± 17.7% at five-year-old regenerating sites and by 41.9% ± 20.9% at 10-year-old sites, while much smaller increases were observed at unharvested and recently harvested (<12 months old) locations. Males demonstrated a similar pattern, although the effects were generally smaller and had larger errors. For males, we observed a negative relationship between range size increase and body weight (adj. $r^2 = 53.4\%$, $P < 0.001$), although the relationship was substantially reduced when two outliers were removed (adj. $r^2 = 11.3\%$, $P = 0.11$). There was no similar relationship for females (adj. $r^2 = 0$, $P = 0.52$). Our prediction was largely supported by the data, which indicated that the degree to which swamp wallabies used different spaces during diurnal and nocturnal periods was influenced by specific characteristics of the habitat and sex. We suggest that quantifying animal movements during different diel or seasonal periods will further conservation objectives, and propose an experimental framework within which the impact of resources on the movement of relatively large forest-dwelling species can be studied.

INTRODUCTION

Mobile animals often use multiple habitat patches at a variety of spatial and temporal scales (Orians and Wittenberger 1991; Law and Dickman 1998), and using different areas during diurnal and nocturnal periods is one example of this phenomenon. Quantifying differences between diurnal and nocturnal space use provides information about the range of habitats and resources required for survival and reproduction, which, in many cases, can be used to inform programs for conservation or management