

Modelling the Survival of Bighorn Sheep

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As part of a 30+ year study, the Bighorn Sheep (*Ovis canadensis*) found in the Canadian Rockies of Alberta have been monitored and regularly censused in an effort to gain insight into their population dynamics and to form part of a wider study into the evolutionary ecology of large vertebrates. These censuses provide detailed information on population size, weight changes, survival, and reproduction of marked individuals. Key areas of interest in the analysis of this dataset include: the relationship between individual weight and survival, the cost of reproduction on survival and the cost of reproduction on the probability of reproducing in the following year.

Although the recapture rate for these mammals is very high, there is still the need to deal with missing time-varying individual covariate data resulting from the occasions when the sheep were not recaptured. A new method for analysing discrete life-history data with missing covariate values provides an alternative expression for the likelihood for mark-recapture data and this is applied here when modelling a sheep's yearly survival in terms of its weight at the start of the year.

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