



Research Article

Density Estimation in a Wolverine Population Using Spatial Capture–Recapture Models

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ABSTRACT Classical closed–population capture–recapture models do not accommodate the spatial information inherent in encounter history data obtained from camera–trapping studies. As a result, individual heterogeneity in encounter probability is induced, and it is not possible to estimate density objectively because trap arrays do not have a well–defined sample area. We applied newly–developed, capture–recapture models that accommodate the spatial attribute inherent in capture–recapture data to a population of wolverines (*Gulo gulo*) in Southeast Alaska in 2008. We used camera–trapping data collected from 37 cameras in a 2,140–km² area of forested and open habitats largely enclosed by ocean and glacial icefields. We detected 21 unique individuals 115 times. Wolverines exhibited a strong positive trap response, with an increased tendency to revisit previously visited traps. Under the trap–response model, we estimated wolverine density at 9.7 individuals/1,000 km² (95% Bayesian CI: 5.9–15.0). Our model provides a formal statistical framework for estimating density from wolverine camera–trapping studies that accounts for a behavioral response due to baited traps. Further, our model–based estimator does not have strict requirements about the spatial configuration of traps or length of trapping sessions, providing considerable operational flexibility in the development of field studies. © 2011 The Wildlife Society.

KEY WORDS Bayesian, capture–recapture, density, *Gulo gulo*, motion–detection cameras, spatial models, wolverine.