
Balancing economic costs and ability to detect change in survival for optimising capture-recapture surveys of long-lived birds

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Abstract

Population monitoring used to be considered as required to evaluate the benefit of conservation plans for endangered species. Capture-recapture surveys (CR) have become popular tools in context where managers want to implement the monitoring of a population. CR surveys proved their efficiency in quantifying change in survival rates in relation to e.g. environmental conditions or the set-up of rescue actions, and are thus highly valuable for guiding conservation plans. Many such surveys however, although being particularly costly, are implemented without an appropriate assessment of what could be an optimal design, and this may impair management success. As a consequence, monitoring could be abandoned to the required urgency to act and the reduction of conservation funds. Based on general life histories and monitoring strategies inspired from long-lived raptors, we propose here an integrative simulation experiment that combines the main components of a CR survey together with economic costs derived from existing monitoring programs. In particular, we explore the outcomes of several trade-offs between the ability of the survey to detect a given change in survival rates and the quantity of monitoring data including the number of birds ringed/year, the juvenile/adult ratio in the ringed birds together with survey duration, and alternative strategies improving the resighting of non-territorial birds. Finally, we propose a comprehensive set of guidelines ensuring efficient resource allocation strategies in a conservation context.

Keywords: Capture, Recapture surveys, Population monitoring, Conservation, Birds, Raptors, Cost, effective optimisation, Simulation

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