

VARIANCE OF STRATIFIED SURVEY ESTIMATORS WITH PROBABILITY OF DETECTION ADJUSTMENTS¹

John Fieberg and John H. Giudice

ABSTRACT

Estimates of wildlife population sizes are frequently constructed by combining counts of observed animals from a stratified survey of aerial sampling units with an estimated probability of detecting animals. Unlike traditional stratified survey designs, stratum-specific estimates of population size will be correlated if a common detection model is used to adjust counts for undetected animals in all strata. We illustrate this concept in the context of aerial surveys, considering 2 cases: 1) a single-detection parameter is estimated under the assumption of constant detection probabilities; and 2) a logistic regression model is used to estimate heterogeneous detection probabilities. Naïve estimates of variance formed by summing stratum-specific estimates of variance may result in significant bias, particularly if there are a large number of strata, if detection probabilities are small, or if estimates of detection probabilities are imprecise.

¹Journal of Wildlife Management (2008) 72(3):837-844.

