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Brett G. Dickson, Barry R. Noon, Curtis H. Flather, Stephanie Jentsch, and William M. Block. 2009. Quantifying the multi-scale response of avifauna to prescribed fire experiments in the southwest United States. *Ecological Applications* 19:608–621.

Appendix C. Methods used to estimate the variance in density difference when $500 < n < 1000$, and to account for stratum-level detection probabilities estimated using the multiple covariates.

For all species ($500 < n < 1000$), we derived a modification of the delta method (see Buckland et al. 2001) to estimate $Var(\hat{\Delta}_s)$, while accounting for stratum-level detection probabilities estimated using the multiple covariates:

$$Var(\hat{\Delta}_s) = \left[\sum_{h=1}^4 (c_h \hat{D}_h cv(n_h))^2 \right] + \sum_{h=1}^4 \sum_{l=1}^4 (c_h c_l) (\hat{D}_h \hat{D}_l) \left(\frac{Cov(\hat{p}_h, \hat{p}_l)}{\hat{p}_h \hat{p}_l} \right)$$

where c_h and c_l are constants with signs that depend on the comparisons being made with the \hat{D}_h and \hat{D}_l , respectively, and where \hat{D}_h and \hat{D}_l are the estimated densities for two of four stratum levels, h and l . For the pooled number of detections, n , in each stratum level, h , we computed

$$cv(n_h) = \frac{\sqrt{\frac{T \sum_{h=1}^k t_h (n_h / t_h - n / T)^2}{k-1}}}{n}$$

where k is the total number of points within a unit, t_h is the total number of visits to a stratum, $T = \sum_{h=1}^k t_h$, and $n = \sum_{h=1}^k n_h$ (Buckland et al. 2001). Making the more conservative assumption that the correlation among any pair $\hat{p}_h, \hat{p}_l = 1$, we considered $(s\hat{e}(\hat{p}_h)s\hat{e}(\hat{p}_l))$

to be a reasonable approximation of the covariance among stratum and substituted this product for $Cov(\hat{p}_h, \hat{p}_l)$.

LITERATURE CITED

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling. Oxford University Press, London, UK.