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# EXPANDING PREDICTIVE ASSESSMENT OF NORTHERN BOBWHITE COVEY CALLING RATES TO INCORPORATE REGIONAL EFFECTS

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## ABSTRACT

Many surveys based on discrete vocalizations make the invalid assumption that individuals present in the survey area are always available for detection (e.g., calling) during the survey period. Northern bobwhites (*Colinus virginianus*) are known to exhibit variable calling rates, particularly during autumn covey surveys. Adjustment of density and abundance estimates to account for calling rate may increase reliability of population metrics, and may increase our ability to effectively assess conservation management. Two previous independent studies across 4 regions used logistic regression to evaluate effects of weather, time, and density covariates on calling rates of radio-marked autumn bobwhite coveys. Results from these studies varied and there is uncertainty regarding application without further investigation into regional differences in calling rates. We combined these data sets comprising known calling rates of 279 bobwhite coveys in 4 regions (Florida, Missouri, North Carolina, and Tennessee) from 1998 to 2000. Observed calling rates averaged 69% over all sites, and ranged from 56 to 80% in the Florida and Missouri regions, respectively. We used binomial logistic regression to evaluate effects of region, adjacent calling coveys, weekly period, change in barometric pressure, percent cloud cover, temperature, and wind speed on covey calling rates. The top ranking model suggested strong effects of region and number of adjacent coveys on calling probability ( $P < 0.0001$ ) with 42% model weight relative to other candidate models. Two competing models suggested inclusion of the 6-hr change in barometric pressure (0100 – 0700 hrs) (18% model weight) or weekly period (17% model weight) might also be appropriate. Validation using the best approximating model (region + adjacent coveys) suggested calling probability estimates were within 6% of the observed calling rate in one region. This suggests the predictive model may provide a valid estimator of calling rate when applied to covey survey data in the appropriate region. However, there is uncertainty regarding application of region-specific model coefficients to survey data outside of these regions. If effects of region are important predictors of calling rate, managers must be cognizant of these prior to adjusting parameter estimates. Further, there is a research need concerning utility and ubiquity of calling rate predictors, particularly for regions that lack known calling rate data.

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**Key words:** calling rates, *Colinus virginianus*, Florida, Missouri, North Carolina, northern bobwhites, Tennessee

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