**APPENDIX S2: LOCAL VEGETATION SAMPLING AND DATA PROCESSING**

We sampled vegetation in 2011 and 2013 at all sites, and a third time in 2012 in cases where the site had been visibly disturbed. During each survey we collected vegetation information centered around two points, one on the point count station itself, and another 30 m from the point count station in a randomly chosen cardinal direction. At each of the two points, we recorded tree basal area using a 2 basal-area factor forester’s prism (Cruise Master, Forestry Suppliers, Jackson, MS). We then established a 5 m radius circle around each point in which we recorded: an ocular estimate of shrub cover; canopy cover using 10 samples from a vertical viewing tube (Emlen, 1967); and leaf litter depth and vertical foliage density (VFD) from four points on the periphery of the subplot (one in each cardinal direction). We estimated VFD as the proportion of ¼ m sections of a 5 m retractable painter’s pole (Mr. LongArm #6618, A & M Products, Pleasant Hill, MO) contacted by live vegetation. We averaged all variables across the two subplots in each year. Note that we were not specifically interested in quantifying the effects of vegetation structure on breeding bird distributions, but rather in accounting for local heterogeneity among points. Thus, the information collected during these vegetation surveys was not meant to be comprehensive, but rather to provide a sample of the habitat available to birds using our point count stations.

Using the prcomp() function in R (v 3.1.2), we conducted a principal component analysis on our five local vegetation metrics to reduce the number of covariates in our models. We treated each year-by-point combination as a unique observation in the PCA, and results from the 2011 vegetation survey were applied to 2012 for sites where vegetation was not sampled that year. The first three principal components represented 77% of the total variance (Table S2.1), and we thus chose these to represent local vegetation in our models.

**References**

Emlen, J. T. (1967) A rapid method for estimating arboreal canopy cover. *Ecology*, 48, 158-160.

**Table S2.1**. Results from the principal components analysis of local vegetation variables recorded at 490 point count stations in southern Indiana between 2011 and 2013. We sampled each station two or three times, and considered each year-by-point combination a unique observation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Variable | PC1 | PC2 | PC3 | PC4 | PC5 |
|  |  |  |  |  |  |  |
| Loadings |  |  |  |  |  |  |
|  | Tree basal area | -0.39 | -0.45 | 0.44 | -0.65 | 0.16 |
|  | % shrub cover | 0.57 | -0.39 | 0.08 | -0.19 | -0.69 |
|  | % canopy cover | -0.43 | -0.45 | 0.28 | 0.69 | -0.26 |
|  | Vertical foliage density | 0.55 | -0.44 | 0.15 | 0.24 | 0.66 |
|  | Leaf litter depth | -0.19 | -0.50 | -0.84 | -0.08 | 0.05 |
|  |  |  |  |  |  |  |
| Summary |  |  |  |  |  |  |
|  | Standard deviation | 1.34 | 1.08 | 0.95 | 0.85 | 0.65 |
|  | Proportion of variance | 0.36 | 0.23 | 0.18 | 0.14 | 0.08 |
|  | Cumulative variance | 0.36 | 0.59 | 0.77 | 0.92 | 1.00 |
|  |  |  |  |  |  |  |