Appendix 2. Site classification.

To classify our study sites, we first created two site by tree/shrub species matrices, one for basal area and one for stem density. Within each dataset, we excluded rare species (those which occurred on fewer than 5% of sites) and scaled the values from 0 to 1 by dividing by the maximum value in the dataset. This yielded a 74 site by 23 species matrix for stem density and a 74 site by 13 species matrix for basal area. We then combined the two datasets to form a 74 x 36 site by “species” matrix and calculated the Bray-Curtis dissimilarity matrix. We conducted an agglomerative cluster analysis of sites using Ward's minimum variance method, assessed the optimal number of clusters according to silhouette widths and Mantel statistics, and assigned sites to the newly defined clusters. Visual inspection of the resulting cluster dendrogram (Fig. A2.1), combined with silhouette widths and Mantel tests, yielded an optimal number of five vegetation categories (Fig. 2). The five successional vegetation categories corresponded to these habitat classes: early successional cottonwood-willow, Russian olive, mid-successional cottonwood forest, transitional cottonwood (containing a few large cottonwoods and various later-successional species), and post-cottonwood equilibrium ("equilibrium" sensu Johnson 1992). Analysis was conducted in R (R Core Team 2023) using the vegan package (Oksanen et al. 2020).

Vegetation classes differed in density and basal area of various shrub and tree species or species groups (Figs. A2.2, A2.3).

Figure A2.1. Cluster dendrogram of bird survey sites based on a combination of stem density and basal area of woody plant species. Colors represent the forest type and age class, based on historical aerial imagery, assigned to each site during land-use and land-cover mapping. The red dashed line shows where the dendrogram was cut to form the five habitat classes (Fig. 2) for which bird abundance was estimated (Fig. 3). Colors represent the forest type (CW = cottonwood, NonCW = Non-cottonwood) and age class each site was assigned during land-use and land-cover mapping.

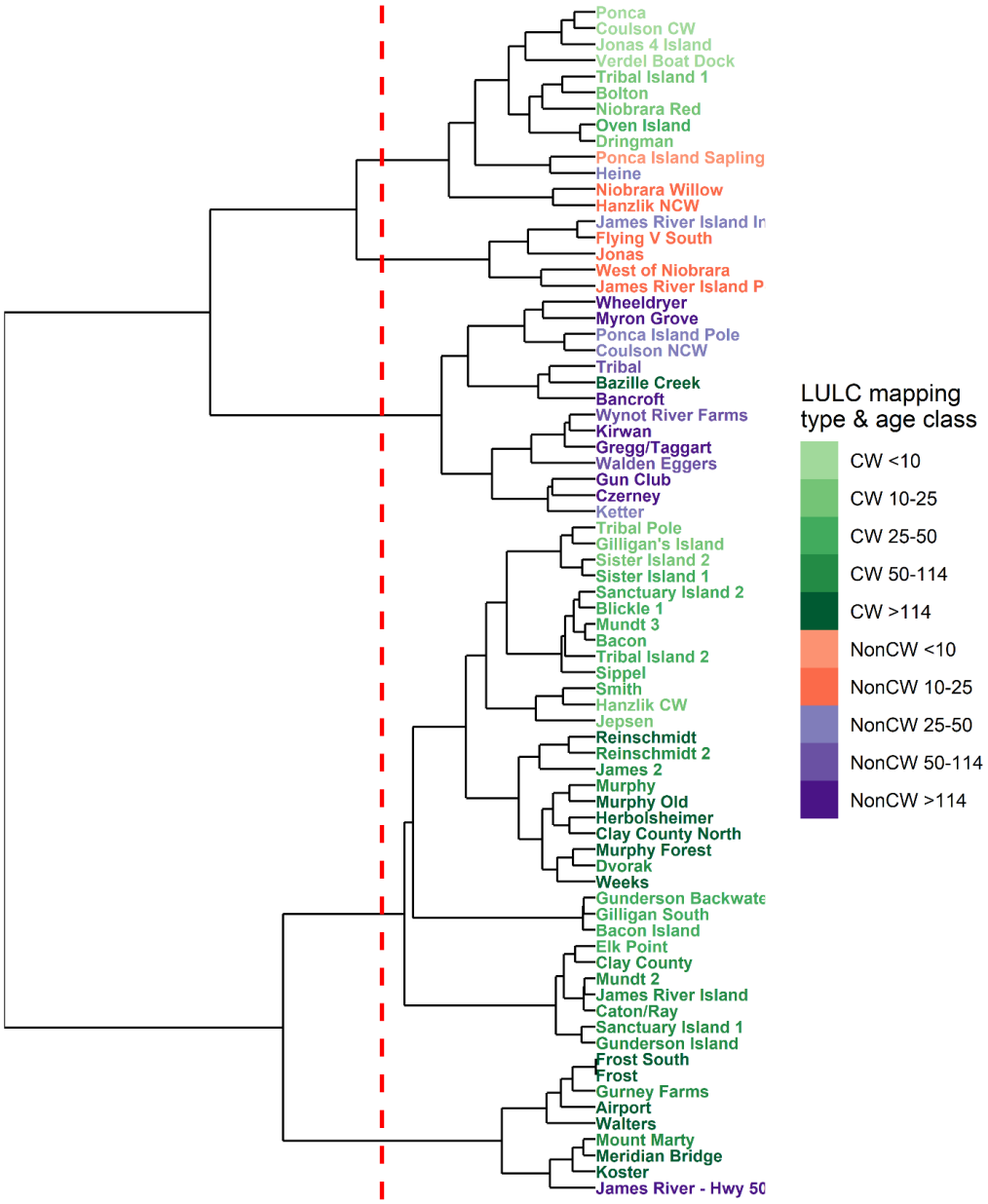

Figure A2.2. Box plots depicting stem density of six of the most common woody plant species or species groups found at bird survey sites. Densities are shown for each of the five habitat types recovered by cluster analysis.

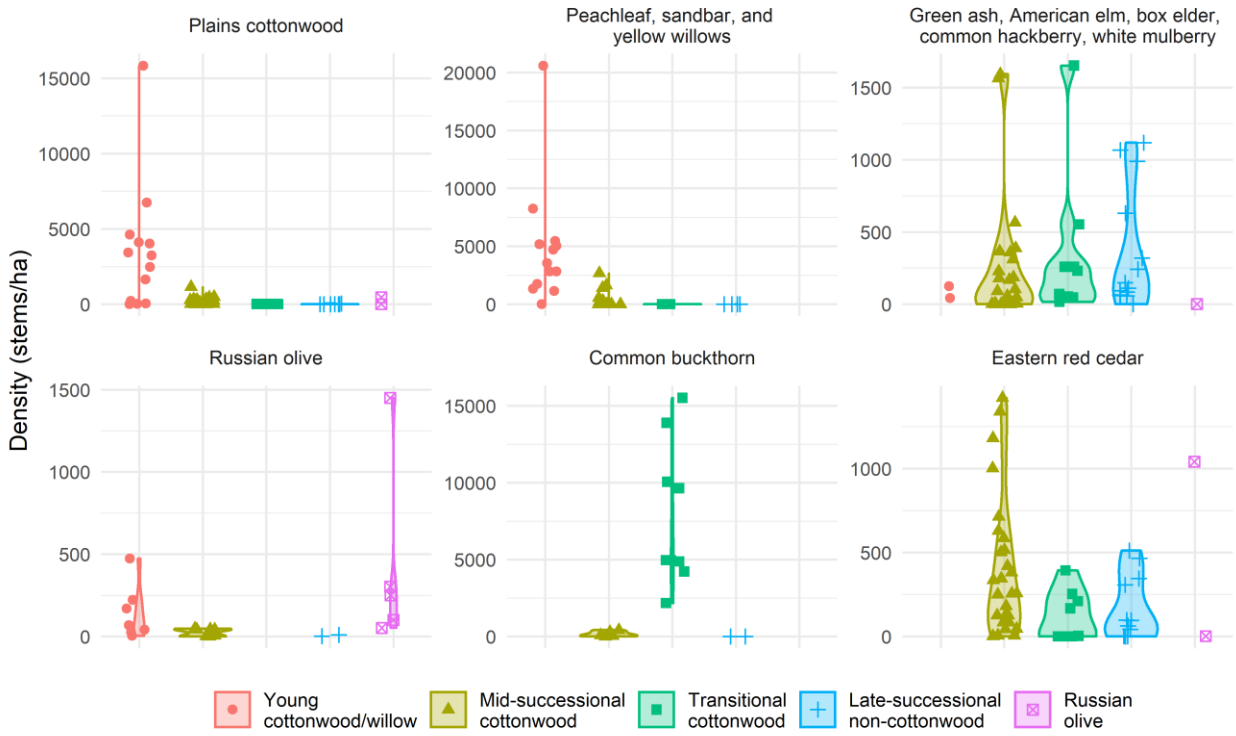

Figure A2.3. Box plots depicting basal area of six of the most common woody plant species or species groups found at bird survey sites. Basal areas are shown for each of the five habitat types recovered by cluster analysis.