Patuxent Science Meeting 2004 Poster Abstract

Density estimates by habitats for the southeastern Painted Bunting breeding population: a comparison of detection distance, song playback, and fixed-radius sampling methods

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Based on annual Breeding Bird Survey population trends, the southeastern U.S. population of the Painted Bunting (PABU) has declined ca. 3.2% per year since 1966. This “species at risk” of endangerment, however, has not been surveyed in its major breeding habitats in the Lower Coastal Plain from North Carolina to Florida. Our objective was to determine density estimates for singing male PABUs in shrub-scrub, maritime oak, open saw-timber pine, young pine (plantation), shrub-scrub agricultural and developed habitats. We conducted 5-min point counts and 2-min PABU song playback counts using a laser rangefinder and compass (1 m and 1° accuracy) to estimate the distance and bearing from the observer to singing males (SM). We randomly selected study sites within habitats with an emphasis on the major habitats (i.e., shrub-scrub, maritime oak, young pine, and developed). A majority of the sites, 80% (n = 45) and survey points, 77% (n = 590) were in Georgia and South Carlina where the majority of breeding habitat and PABUs are found in the southeastern U.S. No differences were found between observers’ effective radial distance (62 and 74 m, P > 0.05) for point counts. We selected a half-normal/cosine distance sampling model based on AIC scores. We detected SM PABUs on 43.2% of the point counts (n = 590). Overall density for the study was 23.3 SM/km² (90% CI: 19.8 to 27.4) with an effective radial detection distance of 70 m. We detected our highest density, 30.5 SM/km² (90% CI: 23.3 to 40.1) in shrub-scrub habitat, which was higher than our density estimate of 8.8 SM/km² (90% CI: 4.3 to 18.0) in young pine plantations. In other undeveloped habitats, densities estimates were similar: maritime oak (24.3 SM/km², 90% CI: 17.6 to 33.5), shrub-scrub in agriculture (21.6 SM/km², 90% CI: 10.6 to 44.1), and open pine saw-timber (14.8 SM/km², 90% CI: 7.9 to 27.5). Similar habitat in developed and undeveloped sites had similar PABU density estimates: undeveloped (27.8, 90% CI: 22.9 to 33.7) and developed (16.5 SM/km², 90% CI: 8.0 to 34.0). Fixed-radius (70 m) sampling underestimated the density of PABUs by 4.8 to 11.7 SM/km² with the exception of young pine plantations, which where similar to distance sampling (8.8 to 8.5 SM/km² in 70-m radius circle). Song playback sampling (2 min added to 5-min point counts) density estimates in 70 m fixed-radius circles were almost identical when compared to distance sampling estimates for shrub-scrub (+1.8 SM/km²), maritime oak (+0.1 SM/km²), undeveloped (-0.4 SM/km²), and shrub-scrub agriculture (-4.0 SM/km²) habitats. Song playback sampling densities for young pine plantations and developed land overestimated densities compared to distance sampling from +4.6 to +12.0 SM/km², respectively. To maintain PABU populations in the southeastern U.S., we recommend that managers preserve all shrub-shrub and maritime oak habitat, especially near beaches and marshes. We do not recommend using young pine plantations for habitat management of PABUs. Limited sampling (based on limited funding) may have prevented our detection of density differences between developed and undeveloped lands. Future research should determine not only if a potential PABU density reduction exists in developed land, but also determine if this habitat has PABU reproductive success (nesting success) that is sufficient to maintain or increase the population in the southeastern U.S. This is especially important since developed land has increased from 4 to 8% of the area in the coastal regions of Georgia and South Carolina during the last 30 years.