RESEARCH ARTICLE

Conservation of Neotropical migratory birds in tropical hardwood and oil palm plantations

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strategies that retain and restore secondary forest, promote the adoption of native hardwood and teak plantations, and promote the retention of tall, remnant trees in agricultural landscapes.

Introduction

Nearctic-Neotropical migratory birds are a diverse group facing conservation challenges at multiple life stages. Loss of habitat during any life stage can drive population

surveyed 273 points during the second year in native secondary forests (*n* = 60), mixed-native hardwood (*n* = 41), rubber (*n* = 60), teak (*n* = 50) and oil palm plantations (*n* = 62; Fig 1). All points were located 50-m or m0 T

year) and was included to account for probable temporal variation in abundance. Cover type was a categorical variable containing the four plantation

using the vegan package in R [51,52]. We used generalized linear models with a Poisson distribution to estimate overall migrant and priority species richness values of species detected. Similarly, we used a linear model to estimate Shannon's diversity index for the full complement of migratory species detected at each point. We did not estimate Shannon's diversity of the priority migrant group, given that it only included five species. For all species richness and diversity models, we included year and use of a playback as detection covariates. For the species richness and diversity response categories, we fit all possible subsets of the following covariates: the six habitat features, a quadratic effect

Height of the tallest tree within a 50-m radius was consistently the most significant predictor of abundance, richness, and diversity of migratory birds in all surveyed cover types. Given that each plantation had relatively uniformly sized trees or palms, height of the tallest tree serves as a metric of the vertical, structural diversity of

more vines, epiphytes, and other microhabitat features than planted trees, thereby enhancing the multiple metrics of biodiversity in agroecosystems (reviewed in [55]). In our study region, scattered remnant trees were often retained within the cover types we surveyed, especially along riparian corridors and steep slopes, and were often the tallest trees within a plot. The strong positive relationship between height of the tallest tree and our metrics of abundance, richness, and diversity strongly suggests that the retention of large trees increases the habitat value of a plantation for

conservation-priority species than simply presence of a water feature. This highlights how habitat relationshian

Cover type was a supported variable in all

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