

## **Evaluating Population-Habitat Relationships of Forest Breeding Birds at Multiple Scales Using Forest Inventory and Analysis Data**

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Multiple studies have documented declines of forest breeding birds in the eastern United States, but the temporal and spatial scales of most studies limit inference regarding large scale bird-habitat trends. A potential solution to this challenge is integrating existing long-term geographic datasets such as the U.S. Forest Service Forest Inventory and Analysis (FIA) program and U.S. Geological Survey Breeding Bird Survey (BBS). The purposes of this study are to determine if FIA metrics can be related to BBS population indices and to develop predictive models from these relationships that identify forest conditions favorable to forest songbirds. We have accumulated BBS data for four species guilds (canopy nesting, ground and shrub nesting, cavity nesting, early successional), each containing six species, and FIA data from 1965-2000 within five physiographic regions. Using these forest metrics, we are developing predictive models relating bird abundance across space and time to changes in forest structure. We are investigating a variety of modeling techniques, including logistic regression, classification and regression trees (CART), and Bayesian procedures. Results from a pilot analysis conducted at the FIA survey unit scale on the ground & shrub nesting guild using data from the 1989 FIA survey cycle indicate that the abundance of black and white warblers (*Mniotilta varia*) increased as percent forest area and average tree diameter increased (Adj  $R^2 = 0.441$ ,  $P < 0.001$ ). Black-throated blue warbler (*Dendroica caerulescens*) abundance increased with percent forest cover but decreased with increasing diversity of mature tree species (Adj  $R^2 = 0.238$ ,  $P = 0.059$ ). These results suggest that FIA forest metrics will explain variations in abundance of songbird species across large spatial and temporal scales not previously studied. We will present results for all four bird species guilds and compare the effectiveness of different modeling strategies among species.

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