Patuxent Wildlife Research Center
Science Brief for Resource Managers

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Habitat and breeding densities of a Swainson's Warbler source population, Bond Swamp National Wildlife Refuge, Georgia

Description:

Swainson's Warbler (*Limnothlypis swainsonii*) inhabits swamps and river floodplain forests during the breeding season in the Coastal Plain of southeastern United States. The species is ranked as high priority and in need of research to determine management needs. One swamp in particular, Bond Swamp, has been documented as a high density Swainson's Warbler population from the 1940s through the 1960s. A portion of this area is currently Bond Swamp National Wildlife Refuge (2,500 ha). The density of the bird's population is unknown on the refuge. The Ocmulgee River's pulses of flood waters provide tremendous amounts of subsidized energy to the warbler's habitat in Bond Swamp. This subsidized imported energy may be important to maintenance of optimum habitat and a high density population. Breeding bird data for Swainson's Warbler will be collected using transects and distance sampling techniques. Once Swainson's territories are located, additional bird and habitat data will be collected to determine the importance of soils, litter, cane stands (understory), overstory cover, and large trees on the presence of breeding Swainson's Warblers (compared to random unoccupied areas nearby). ANOVA and logistic regression analysis will be used to determine the importance of habitat and its structure in predicting Swainson's Warbler breeding presence. The habitat model will be verified in the second year using Swainson's Warbler territories not used in model development in 2002 in Bond Swamp and also in other areas on the Ocmulgee River bottomland forests. GIS will we used in 2002 to determine associations of flooding patterns with Swainson's Warbler territories. Patterns of flooding related to high density of Swainson's Warbler will provide important information for management recommendations and research.

Progress to Date:

Field Season 2001: In April and May, we randomly established 19 km of transect lines at 21 locations, which cover bottomland and adjacent upland forest habitat of Bond Swamp National Wildlife Refuge. The distance between the parallel transect lines was 300-400 m. We also conducted searches for singing male Swainson's Warblers on most of the bottomland forest habitat of the refuge (limited only by time). We detected 27 Swainson's Warblers on the line transects during the early morning distance sampling procedure. The distance from the line was measured for each bird detection for density estimates. During our playback sampling (recorded song played and responding Swainson's Warbler recorded), which was completed by walking back on the same transects in mid morning, we detected 44 Swainson's Warblers. Our search for singing males produced 86 Swainson's Warbler territories associated mainly with the first terrace of the Ocmulgee River and Stone Creek. We surveyed 58 of the territories with GPS during 2 hours or more of observations (12-30 singing locations per singing male). Vegetation data were collected later at the center of the 58 territories and within a 50 x 50 m plot. Areas unoccupied by Swainson's Warblers were randomly selected for vegetation data collection (58 with river cane and 58 without river cane). Distance sampling analysis indicated that the Swainson's Warbler population in Bond Swamp National Wildlife Refuge was 163 singing males (90% CI = 100-266, CV = 0.298, 39 df) in the 2001 breeding season. Further analysis of results from playback (44 males), distance sampling (27 males), and territorial searches (86 males) will be completed in 2002. We also found similar numbers of Swainson's Warblers at their highest density when compared to those densities that Brooke Meanley

found in the 1940s and 1960s. We predict that Bond Swamp is a source habitat for Swainson's Warbler and currently is maintaining a high density of breeding birds that produces annual surpluses of birds, which may disperse to other areas. Two logistic models (one for management and another for habitat description) were developed from 2001 data. For wildlife managers, a model using four variables (density of cane stems, density of shrub-understory stems - including vines, litter depth, and water cover) predicted Swainson's Warbler habitat with high degree of accuracy (97%). Another model with 11 variables described the warblers habitat features in detail and was even more accurate (99% predicted as observed) but not as efficient for use by managers. Verification of these models will be done in 2002. Further model development will be done also using GIS and water data (flooding patterns, periodicity, height, and time flooded).

Management Implications:

Habitat and census data for a source population of Swainson's Warbler will be useful for maintaining or increasing the species's population. Forest management practices that produce understory and overstory characteristics similar to the habitat model for Swainson's Warbler should produce adequate habitat for the species. Information on this species association with naturally flooded bottomland forests may lead to its use as an ecological indicator for proper water management in southeastern U. S. rivers.

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