Woodland Birds in Three Different Forest Types in Eastern Texas

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ABSTRACT.-Birds were censused along three routes through relatively mature forest in eastern Texas using the fixed circular plot technique. The routes sampled three forest types (based on tree species composition): (1) longleaf pine (*Pinus palustris)* Savannah, *(2)* mixed pine-hardwood forest, and *(3)* bottomland hardwood forest. Each route consisted of *20* plots censused twice monthly for one year. Censusing began at sunrise, included all birds seen or heard during a 3-min period at each plot and was completed within three hours. This paper includes 78 species that are regularly associated with forests (woodland species). Nearctic-Neotropical migrant birds comprised two-thirds (52) of these woodland species. Only eight species were recorded in all three forest types during all four-seasons. Three species were observed only in the longleaf pine savannah, one only in the mixed pine-hardwood forests and two only in the bottomland hardwood forests.

Introduction

The Pineywoods vegetational zone in eastern Texas is a forested area dominated by three native species of pines and numerous species of hardwoods (McWilliams and Lord 1988). This zone is divided into many different forest communities depending on various aspects of soil type, topography, vegetation cover, etc. (Gould 1969). Numerous studies have been conducted on abundances of forest or woodland birds in specific forest types (Odum 1950; Noble and Hamilton 1975; Dickson 1978; Shugart et al. 1978; Dickson et al. 1980; Johnson and Landers 1982; Conner et al. 1983). A comparison of the avian communities among the three dominant forest communities or forest types in eastern Texas might be useful in understanding why certain species are associated with a specific community or forest type and provide insight into what species components of vegetation are associated with avian habitat selection.

Study Areas and Methods

The point counts within 300 m radius circular plots were conducted in relatively mature forests in eastern Texas (Fig. 1). We selected three routes with 20 plots per route. Each plot had fairly homologous forest characteristics of that forest type. Adjacent census plots were separated by a 50 m buffer zone or by an area of disturbed forest. The routes were categorized into three forest types: (1) longleaf pine (*Pinus palustris*) Savannah, (2) mixed pine-hardwood forest, and (3) bottomland hardwood forest.

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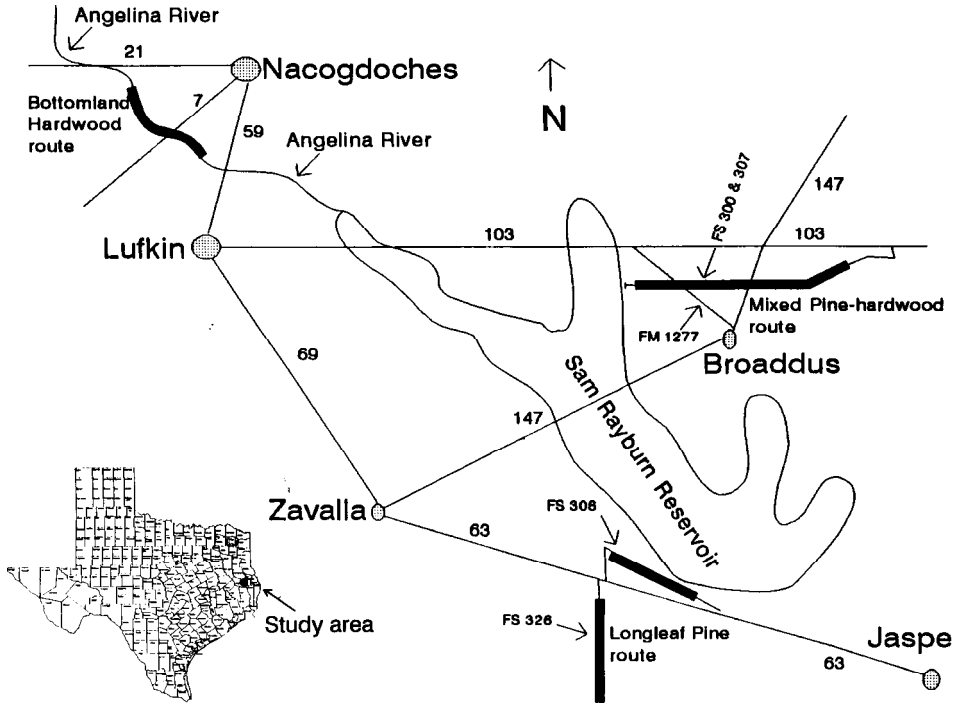

Fig. 1. Map of the study areas in eastern Texas

We used the point count method (Bibby et al. 1992) for censusing all birds seen or heard within the 300 m radius plot for a 3-min period. Censusing commenced at sunrise and continued for approximately 3 hr until all 20 plots from one route were censused in a single morning. Each of the three routes was censused twice a month for one year for a total of six counts during each season (spring, summer, fall, and winter). A census was not conducted during inclement weather, for example wind over 12 mph or rain, since it can decrease the detectability and activity of birds (International Bird Census Committee 1970).

The longleaf pine Savannah route was located in the south end of the Angelina National Forest in Jasper County (Fig. 1). The overstory of this forest is almost a pure longleaf pine type and is managed as an open, park-like, fire-climax ecosystem for Red-cockaded Woodpeckers ***(Picoides borealis).*** We censused this route from fall 1992 to fall 1993 at fixed roadside points along U.S. Forest Service roads 306 and 326 (Fig. 1).

The mixed pine-hardwood forest route was located in San Augustine County in both the Bannister Wildlife Management Area and Turkey Hill Wilderness Area on the north end of the Angelina National Forest. Forests consisted of a mixed overstory of loblolly (***Pinus taeda)*** and shortleaf ***(P. echinata***) pines and numerous species of hardwoods (mostly *Quercus, Liquidambar,* and *Nyssa*). The forest had a fairly dense midstory level, but usually a sparse understory. Censusing of this route took place from spring 1991 to spring 1992 at fixed roadside points along U.S. Forest Service roads 300 and 307 (Fig. 1).

The bottomland hardwood forest route was located along the upper Angelina

River between Nacogdoches and Angelina counties (Fig. 1). On this route, travel was completed by either motor boat or all-terrain vehicle (ATV), depending on the water level of the river. When water levels in the summer and fall impeded motor boat passage over logs that stretched across the narrow river, we used ATVs in the relatively dry river bottom along the edge of the river. The forest along this river was almost pure hardwoods (mostly *Quercus, Liquidambar* and *Nyssa*) in the overstory and midstory and almost no understory, but a ground cover comprised of leaf litter and logs which were typically washed away by periodic flooding. We censused this route from fall 1992 to fall 1993 at fixed points along the river bank.

Results and Discussion

One hundred and two species of birds of which only 78 were considered woodland birds were detected in all forest types combined (Table 1). Woodland birds were those species that utilize the forest (e.g. woodpeckers, warblers, vireos, etc.) for foraging and other daily activities (e.g. nesting, resting, etc.). Birds which were flying overhead (e.g. swallows, vultures, geese, etc.) or aquatic species (e.g. cormorants, wading birds, etc.) were not considered forest-users and will not be discussed in this paper.

Only eight species of birds occurred in all three forest types year-round: Red-bellied *(Melanerpes carolinus)* and Pileated woodpeckers *(Dryocopus pileatus),* Blue Jay *(Cyanocitta cristata),* American Crow (*Corvus brachyrhynchos), Carolina* Chickadee (*Parus carolinensis*), Tufted Titmouse (*Parus bicolor*), Carolina Wren *(Thryothorus Zudovicianus),* and Northern Cardinal *(Cardinalis cardinalis).*

Nearctic-Neotropical migrant birds comprised 61 of the original 102 species; 52 of these are woodland species. Therefore, 67% of the woodland species of birds detected were Nearctic-Neotropical migrant birds, while the majority of the rest were permanent residents.

Only a few of the more common species were detected exclusively in one forest type. Both the Northern Parula (*Parula americana)* and Yellow-throated Warbler *(Dendroica dominica)* occurred only in the bottomland hardwood forests, indicating their association with very wet mesic woodland forests. In the mixed pine-hardwood forests, the Cooper's Hawk *(Accipiter cooperii)* was the only species not detected elsewhere. The Northern Bobwhite (*Colinus virginianus),* Red-cockaded Woodpecker, and Bachman's Sparrow *(Aimophila aestivalis)* were detected only in the longleaf pine Savannah, suggesting a strong association with open pine forest habitat. None of the other regularly occurring avian species selected only a single forest type.

Of the 78 woodland species detected in the three forest types, the bottomland hardwood forests contained the greatest number of species (66). We detected almost as many species in the mixed pine-hardwood forests (63), but the longleaf pine savannah (44) had the lowest diversity of species. Both bottomland hardwood and longleaf pine forest types are among the most rapidly disappearing forest communities in North America (Noss et al. 1995). Many of the remaining longleaf pine ecosystems are severely degraded because of management practices that have excluded natural regimes of fire. Also, a short timber rotation has truncated the age distribution of pines. This is particularly significant for relatively long-lived species such as longleaf pine which can attain ages in excess of 400 years.

Table 1. Woodland birds detected in longleaf pine forests (L), mixed pine-hardwood forests (M) and bottomland hardwood forests (B) in eastern Texas.

Species	Spring			Summer			Fall			Winter		
	L	M	B	L	M	B	L	M	B	L	M	B
Yellow-crowned Night-Heron *Nyctanassa violacea*		S*	C		S*	S						
Wood Duck *Aix sponsa*		U	S			S			U		S*	U
Sharp-shinned Hawk *Accipiter striatus*†		S										
Cooper's Hawk *Accipiter cooperii*†		U			S							
Red-shouldered Hawk *Buteo lineatus*†		U	C		U	S		C	U		U	C
Broad-winged Hawk *Buteo platypterus*†	S	U			U	S		S				
Red-tailed Hawk *Buteo jamaicensis*†												S
American Kestrel *Falco sparverius*†	S	S		U			U	S		S		
Northern Bobwhite *Colinus virginianus*	S			C								
Mourning Dove *Zenaida macroura*†	S	S		U	C			S			S	
Yellow-billed Cuckoo *Coccyzus americanus*†	S	C	U	S	A	A		U	S			
Eastern Screech-Owl *Otus asio*											S	
Great Horned Owl *Bubo virginianus*								S				
Barred Owl *Strix varia*		A	A		A	C		A	A		A	C
Ruby-throated Hummingbird *Archilochus colubris*†		S	U	S	S	S						
Red-headed Woodpecker *Melanerpes erythrocephalus*	A		U	A		S	U	S	A		S	A
Red-bellied Woodpecker *Melanerpes carolinus*	A	A	A	A	A	A	A	A	A	A	A	A
Yellow-bellied Sapsucker *Sphyrapicus varius*†			S				S	S		U	U	A
Downy Woodpecker *Picoides pubescens*		U	A		U	A	S	U	A		U	A
Hairy Woodpecker *Picoides villosus*	S	U	S		U	S	S	U	U	U	U	U
Red-cockaded Woodpecker *Picoides borealis*	C			C			C			A		
Northern Flicker *Colaptes auratus*†	S	C	S	S	S		A	A	A	U	A	A
Pileated Woodpecker *Dryocopus pileatus*	A	C	A	A	C	C	A	C	A	A	C	C
Eastern Wood-Pewee *Contopus virens*†		S	S		S	U		U				
Acadian Flycatcher *Empidonax virescens*†		C	A		C	A		S	U			
Eastern Phoebe *Sayornis phoebe?*		S	S		S		U	C	A	S	C	A
Great Crested Flycatcher *Myiarchus crinitus*†	S	C	C	S	U	S	S	S	S			
Blue Jay *Cyanocitta cristata*	A	A	A	A	A	C	A	A	A	U	C	A
American Crow Corvus *brachyrhynchos*	A	A	A	A	A	A	A	A	A	A	A	A
Carolina Chickadee *Parus carolinensis*	U	A	A	C	A	A	C	A	A	C	A	A
Tufted Titmouse *Parus bicolor*	C	A	A	S	A	A	S	A	A	U	A	A
White-breasted Nuthatch *Sitta carolinensis*		S	S				S	S	S	S		S
Brown-headed Nuthatch *Sitta pusilla*	A	S		A	U		A	U		A	U	
Brown Creeper *Certhia americana*†								S			S	S

Table 1. Continued.

Species	Spring			Summer			Fall			Winter		
	L	M	B	L	M	B	L	M	B	L	M	B
Carolina Wren *Thryothorus ludovicianus*	A	A	A	A	A	A	A	A	A	A	A	A
Winter Wren ***Troglodytes troglodytes***												S
Golden-crowned Kinglet *Regulus satrapa*			S				S	U	U		S	C
Ruby-crowned Kinglet *Regulus calendula*†	U	U	C				C	A	A	A	A	A
Blue-gray Gnatcatcher *Polioptila caerulea*†	S	S	C		S	U	S	U				
Eastern Bluebird *Sialia sialis*†	S			S			U	C	S	C	U	
Swainson's Thrush *Catharus ustulatus*†		S	S									
Hermit Thrush *Catharus guttatus*†									S		C	S
Wood Thrush ***Hylocichla mustelina***†	S	U	S	S	S							
American Robin *Turdus migratorius*†							U*	C	C	A*	C	C
Gray Catbird *Dumetella carolinensis*†			S									
Brown Thrasher *Toxostoma rufum*			S					U	U		S	S
Cedar Waxwing ***Bombycilla cedrorum***†	S	S	U					S	S	S	S	S
White-eyed Vireo ***Vireo griseus***†	S	C	A	S	U	A		U	U			S
Solitary Vireo ***Vireo solitarius***†								S	S			S
Yellow-throated Vireo ***Vireo flavifrons***†		U	S		U	U		S	S			
Red-eyed Vireo ***Vireo olivaceus***†	S	A	A	S	A	A		U	S			
Tennessee Warbler ***Vermivora peregrina***†			S									
Nashville Warbler ***Vermivora ruficapilla***†			S									
Northern Parula *Parula americana*†			A			C						
Yellow-rumped Warbler ***Dendroicu coronata***†	U	S	U				U	U	S	A	C	A
Yellow-throated Warbler ***Dendroica dominica***†			A			S						
Pine Warbler ***Dendroica pinus***	A	A	S	A	A		A	A		A	A	U
Black-and-white Warbler *Mniotilta varia*†		C	U									
American Redstart *Setophaga ruticilla*†			S									
Prothonotary Warbler *Protonotaria citrea*†		S	U			C						
Worm-eating Warbler *Helmitheros vermivorus*†					S							
Swainson's Warbler ***Limnothylpis swainsonii***†						S						
Louisiana Water-thrush *Seiurus motacilla*†		S	S									
Kentucky Warbler *Oporornis formosus*†		U	S		U							
Common Yellowthroat *Geothylpis trichas*†						S						
Hooded Warbler *Wilsonia citrina*†	U	A	A	S	A	C		U	S			
Yellow-breasted Chat *Icteria virens*†	C	U	S	U	S	S		S				
Summer Tanager *Piranga rubra*†	S	A	C	S	A	U		U	S			

Table 1. Continued.

Species	Spring			Summer			Fall			Winter		
	L	M	B	L	M	B	L	M	B	L	M	B
Northern Cardinal *Cardinalis cardinalis*	A	A	A	A	A	A	C	A	C	C	A	A
Indigo Bunting *Passerina cyanea*†	A	S	S	A	U	U						
Bachman's Sparrow *Aimophila aestivalis*	A			A			S					
Chipping Sparrow *Spizella passerina*†	S			S								
White-throated Sparrow *Zonotrichia albicollis*†	S		S				S	S		S	S	U
Dark-eyed Junco *Junco hyemalis*†								S			S	
Common Grackle *Quiscalus quiscula*	S*		S					S*	S		S*	S
Brown-headed Cowbird *Molothrus ater*†		S	A		S	U						S*
Northern (Baltimore) Oriole *Icterus galbula*†									S			
American Goldfinch *Carduelis tristis*†	*u**	S	U	A*			u*	u	U		A	A

Season codes: Spring = March-May, Summer = June-August, Fall = September-November, Winter = December-February.

Relative abundance codes: A = Abundant (detected on 20 or more census dates), C = Common (detected on 1 l-19 census dates), U = Uncommon (detected on 6-10 census dates), S = Seldom seen or heard (detected on 1–5 census dates), * = Individuals not utilizing the forest (i.e. flying overhead), †=Nearctic-Neotropical migrant birds.

The availability and distribution of intact ecosystems of these three forest types throughout the landscape of eastern Texas directly affects the distributions of the avian communities associated with them. Current forest management and land use planning in eastern Texas should encourage a diversity of bird species as well as other animals and plants by leaving a diversity of ecologically intact forest types. This would include restoration of longleaf pine ecosystems to areas where type conversion to other tree species had occurred and protection of bottomland hardwood and riparian areas from lake impoundment and channelization projects. Only by providing and maintaining adequate amounts of a diversity of forest cover types will we provide a diverse avifauna for future generations.

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