

WINTER BIRD POPULATIONS IN PINE AND PINE-HARDWOOD FOREST STANDS IN EAST TEXAS

JAMES G. DICKSON, Southern Forest Experiment Station, U.S. Forest Service, Nacogdoches, TX 75962*

CHARLES A. SEGELQUIST, Southern Forest Experiment Station, U.S. Forest Service, Nacogdoches, TX 75962

Abstract: When birds were censused in pine and pine-hardwood stands of different heights to determine the effects of stand structure on winter bird populations, the shortest stands generally had more birds than taller stands. The pine sapling stand was lower than all other stands in bird population characteristics. Pine-hardwood stands were generally similar to pine stands in number of species, but higher in species diversity, and lower in bird density than pine stands of comparable height.

Proc. Annual Conf. S.E. Assoc. Fish & Wildlife Agencies 31:134-137

To meet the increased demands for wood products from forests of the South, many natural pine-hardwood stands are being converted to even-aged pine stands and rotations are being shortened. The effects of these habitat alterations on the many birds harbored in southern forests during the critical overwinter period (Fretwell 1972) are largely undocumented. This study compared winter bird populations in pine and pine-hardwood stands of different heights in east Texas to determine the effects of stand structure on bird populations.

STUDY AREA AND PROCEDURES

We censused birds on 8 10-ha rectangular areas in 4 predominantly pine and 4 pine-hardwood stands representing four successional stages from small saplings to sawtimber (Table 1). All stands are within the loblolly pine (*Pinus taeda*)-shortleaf pine (*P. echinata*)-hardwood forests of east Texas and are near Nacogdoches.

Table 1. Characteristics of timber stands.

Stand	Years of age	Mean ht.* (m)	No. trees per ha 5-28 cm dbh		No. trees per ha > 28 cm dbh		Basal area (trees > 5 cm) m ² /ha
			Pine	Hardw.	Pine	Hardw.	
Pine small sapling	4	4.4	679	2	0	0	3
Pine-hardw. small sapl.	6	5.4	478	92	0	0	3
Pine sapling	15	13.5	1,818	30	14	0	28
Pine-hardw. sapling	14	13.9	1,013	180	10	2	20
Pine pole	26	18.9	384	16	36	0	17
Pine-hardw. pole	27	16.2	289	808	24	6	14
Pine sawtimber	65	26.2	197	234	112	14	24
Pine-hardw. sawtimber	44	27.4	224	522	96	26	24

In each stand we counted birds 4 times from 6 January to 15 March 1975. Counts were made between 1300 and sundown. The sequence of counts was determined randomly, and counts on all areas were completed before we counted birds on any 1 area again. During each count we slowly walked through the entire study area, pausing frequently to detect, identify, and plot birds on a map of the stand. Counts were not made during high winds or rain.

We calculated mean number of birds detected per count (Kolb 1965), number of species, and bird species diversity (BSD) for each study area. BSD was calculated from the information theory, $H' = \sum p_i \ln p_i$ (Shannon 1948), where p_i = the proportion of all birds of the i th species.

Tree heights and diameters were measured on 49 10 x 10m plots symmetrically located within each 10 ha study area. Scientific names of birds are given in Table 2.

*Present address: U.S. Fish and Wildlife Service, Rt. 1, Columbia, MO 65201.

Table 2. Mean number of winter birds per km² in pine and pine-hardwood stands.

Species	Small Sapling		Sapling		Pole		Sawtimber	
	Pine	Pine-hardwood	Pine	Pine-hardwood	Pine	Pine-hardwood	Pine	Pine-hardwood
Bobwhite (<i>Colinus virginiana</i>)	26	53						
American Woodcock (<i>Philohela minor</i>)		3						
Mourning Dove (<i>Zenaidra macroura</i>)								
Green Heron (<i>Butorides virescens</i>)	3					10		
Common Flicker (<i>Colaptes auratus</i>)								
Pileated Woodpecker (<i>Dryocopus pileatus</i>)							2	
Red-bellied Woodpecker (<i>Melanerpes carolinus</i>)							2	2
Yellow-bellied Sapsucker (<i>Sphyrapicus varius</i>)							5	
Hairy Woodpecker (<i>Picoides villosus</i>)					2		10	10
Downy Woodpecker (<i>P. pubescens</i>)					2			
Eastern Phoebe (<i>Sayornis phoebe</i>)					8			
Blue Jay (<i>Cyanocitta cristata</i>)	5			2	2			5
Carolina Chickadee (<i>Parus carolinensis</i>)			2				5	8
Tufted Titmouse (<i>Parus bicolor</i>)			7	20	22		30	12
Red-breasted Nuthatch (<i>Sitta canadensis</i>)			5	5	10		18	8
Brown-headed Nuthatch (<i>Sitta pusilla</i>)			2					
Brown Creeper (<i>Certhia familiaris</i>)					5		15	
Winter Wren (<i>Troglodytes troglodytes</i>)					8			
Carolina wren (<i>Thryothorus ludovicianus</i>)	10		2	2	8			2
Mockingbird (<i>Mimus polyglottos</i>)	10	10	18	5	15		32	25
Brown Thrasher (<i>Toxostoma rufum</i>)	8	7						
American Robin (<i>Turdus migratorius</i>)	10	3					42	2
Hermit Thrush (<i>Catharus guttatus</i>)		13	10	2	5	10	12	30
Eastern Bluebird (<i>Sialis sialis</i>)					50			
Golden-crowned Kinglet (<i>Regulus satrapa</i>)		10			170	15	20	45
Ruby-crowned Kinglet (<i>R. calendula</i>)	5	30	42	15	2	15	10	28
Loggerhead Shrike (<i>Lanius ludovicianus</i>)		3						
Solitary Vireo (<i>Vireo solitarius</i>)								
Black-and-white Warbler (<i>Mniotilta varia</i>)							2	
Pine Warbler (<i>Dendroica pinus</i>)							2	
Yellow-rumped Warbler (<i>D. coronata</i>)	225	65	12	10	15	2	15	10
Eastern Meadowlark (<i>Sturnella magna</i>)	26				28			
Cardinal (<i>Cardinalis cardinalis</i>)	18	30			5	8	2	
American Goldfinch (<i>Spinus tristis</i>)	5							
Dark-eyed Junco (<i>Junco cinereus</i>)		10						
Field Sparrow (<i>Spizella pusilla</i>)	39				28			
White-throated Sparrow (<i>Zonotrichia albicollis</i>)	3				8		15	5
Lincoln's Sparrow (<i>Melospiza lincolni</i>)	50							
Song Sparrow (<i>M. melodia</i>)	58							
Total	509	252	80	164	317	129	235	197

RESULTS AND DISCUSSION

Bird populations and stand height

Little relationship was apparent between number of species or species diversity and stand height, but bird density was generally higher in the small sapling stands than in the taller stands (Fig. 1). Although these results differ from results from many breeding season studies, they generally agree with the few data available on winter birds in pine stands in the South. In southeast Louisiana, bird density and diversity decreased in taller pine plantations (Noble and Hamilton 1976), whereas in North Carolina bird density changed little from the broomsedge-pine to the pine successional stage, but number of species increased (Quay 1947). Bird populations were probably more closely associated with available food in the different stands than with foliage layers. In young stands the concentration near the ground of the primary production of the ecosystem possibly allows more efficient foraging. Also, the rapidly growing plants of the young stands may funnel energy into such easily exploitable pathways as fruit production and insects.

Of the 8 stands, the pine sapling stand, which was practically devoid of non-pine vegetation, was far below all others in winter bird population characteristics. The vegetation in the pine sapling and pole stands was similar, but the pole stand had more birds, possibly because it had more grassy openings, more decayed wood and appeared to have more insects.

Comparison of pine with pine-hardwood stands

Pine stands usually had about the same number of species as pine-hardwood stands of comparable height, but were generally higher in bird density and lower in species diversity. Flocks of overwintering birds, some of which are associated with northern coniferous forests during the breeding season, were more common in the pine stands, thereby raising densities in those stands but not diversities (Table 2). More flocks or large flocks of Yellow-rumped Warblers were counted in the pine small sapling stand, more Golden-crowned Kinglets in the pine pole stand, and more American Robins in the pine saw-timber stand than in the pine-hardwood stands of comparable height.

There were more bird species in the pine than in the pine-hardwood small sapling stand, fewer in the sapling stand, and similar numbers in the pole and sawtimber stands. A few Fringillids, for example, American Goldfinches, Lincoln's Sparrows, Field Sparrows, Song Sparrows, and White-throated Sparrows, were attracted to the less dense pine small sapling stand, but the older pine sapling stand with practically no non-pine vegetation was virtually devoid of birds.

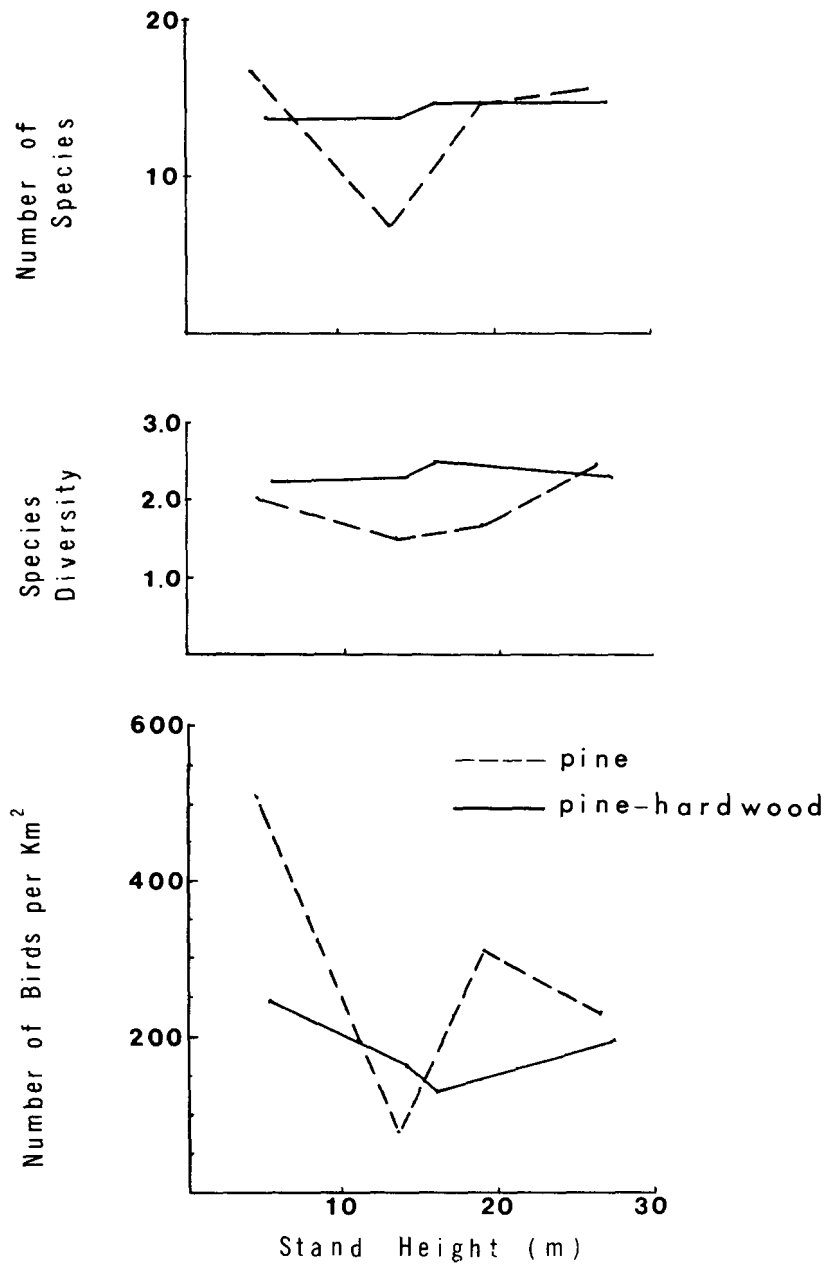


Fig. 1. Characteristics of winter birds populations.

LITERATURE CITED

- Fretwell, S. D. 1972. Populations in a seasonal environment. Monogr. Pop. Biol. No. 5, Princeton Univ. Press, Princeton, N. J. 217 pp.
- Kolb, H. 1965. The Audubon winter bird population study. Audubon Field Notes 19(3): 432-434.
- Noble, R. E., and R. B. Hamilton. 1976. Bird populations in even-aged loblolly pine forests of Southeastern Louisiana. Proc. Annual Conf. Southeastern Assoc. Game and Fish Comm. 29:441-450.
- Quay, T. L. 1947. Winter birds of upland plant communities. Auk 64(4):382-388.
- Shannon, C. E. 1948. A mathematical theory of communication. Bell Syst. Tech. J. 27:379-432, 623-656.