

Winter Birds and Snags in an East Texas Clearcut

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Abstract: Winter birds were censused on snag and snagless transects during 3 winters from 1977 to 1980 in a clearcut in east Texas to assess the impact of snag retention on the bird community. For the cavity user group there was greater bird abundance, species diversity, and number of species on snag than on snagless transects. The cavity user group included: eastern bluebird (*Sialia sialis*), loggerhead shrike (*Lanius ludovicianus*), northern flicker (*Colaptes auratus*), Carolina chickadee (*Parus carolinensis*), red-bellied woodpecker (*Melanerpes carolinus*), red-headed woodpecker (*M. erythrocephalus*), and red-tailed hawk (*Buteo jamaicensis*).

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Many species of birds in North America use snags (dead or partially dead trees) for nesting, roosting, perching and foraging (Scott et al. 1977). Lack of snags may limit breeding populations of secondary cavity nesters in east Texas (Dickson et al. 1983) and elsewhere (e.g., Cunningham et al. 1980). Decayed wood, essential to primary and secondary cavity nesting birds, is being eliminated in stands intensively managed for fiber production. Hardwood elimination and shortened rotations of southern pine render stands less suitable for such birds.

Southern forests are prime winter habitat for many permanent resident birds as well as migratory birds that nest in more northerly latitudes but winter in the south (Dickson 1978, Dickson and Segelquist 1979). However, the habitat needs of these permanent resident and migratory birds during winter and the role of snags as habitat components are not completely understood.

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The objective of this study was to assess the impact of snag retention in a clearcut on the bird community during winter.

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Methods

Study Area

The study area was a large clearcut (about 500 ha) located in Nacogdoches County, Texas. The area was cleared of most woody vegetation in 1975 and planted with 1 year-old loblolly pines (*Pinus taeda*) in 1976. Some hardwood trees remained standing over parts of the area. In 1977, 4 80 × 250-m transects (2 ha each), with 14–31 standing hardwoods (23–66 cm dbh) on each were established at least 75 m away from the adjacent woods and other transects. Each tree was killed by injection with 2, 4-D and girdling. Species and numbers of killed trees on the 4 snag transects were mockernut hickory (*Carya tomentosa*) – 24, southern red oak (*Quercus falcata*) – 15, post oak (*Q. stellata*) – 12, sweetgum (*Liquidambar styraciflua*) – 10, white oak (*Q. alba*) – 5, blackjack oak (*Q. marilandica*) – 4, water oak (*Q. nigra*) – 3, blackgum (*Nyssa sylvatica*) – 1, and sweetbay (*Magnolia virginiana*) – 1. Of the 75 original snags, 16 fell by November 1979 so the study was terminated after the winter of 1979–80.

For comparison, 4 snagless transects were delineated on similar sites at least 75 m away from the woods and other transects. The few standing hardwoods within 75 m of these snagless transects were felled.

Bird Censusing

Birds were counted on each of the 8 transects 9 times December through February of each winter of 1977–78, 1978–79, and 1979–80 ($8 \times 9 \times 3 = 216$). All transects were censused for birds once each morning of censusing. Each of 3 census takers counted birds on half of the snag and snagless plots 6 times each winter. Censusing was completed within 3.5 hours after sunrise and avoided during high winds or rain. Birds were counted and marked on a transect map while the censuser slowly traversed each transect via a path along the mid-line. Number of birds detected were summed by species for each transect.

Bird Data Analysis

The bird community was divided into 2 groups: cavity users and others. For each of these groups bird abundance, number of species and species diversity (MacArthur and MacArthur 1961) were calculated for each census

transect each year ($8 \times 3 = 24$). The 9 repetitions were pooled. Treatment effects (snag versus snagless) on these variables were tested for each bird group by a Kruskal-Wallis 1-way Analysis of Variance (ANOVA) (Siegel 1956).

Results and Discussion

The Kruskal-Wallis ANOVA of the winter data showed that cavity users were higher ($P < 0.01$) in number of species, abundance (Table 1) and bird species diversity on snag transects than on snagless transects. Mean number of species per treatment (calculated from count totals for each transect each year) was 3.42 on snag vs. 0.58 on snagless transects. Mean bird abundance was 16.17 on snag vs. 4.83 on snagless transects and mean species diversity was 0.85 on snag vs. 0.07 on snagless transects.

Table 1. Birds Detected on Snag and Snagless Transects During 3 Winters in an East Texas Clearcut

Species	Number Detected	
	Snag	Snagless
Cavity users		
Eastern bluebird	113	53
Loggerhead shrike	17	4
Northern flicker	18	0
Carolina chickadee	17	1
Red-bellied woodpecker	14	0
Red-headed woodpecker	9	0
Red-tailed hawk	6	0
Total	194	58**
Others		
Yellow-rumped warbler	209	151
Song sparrow	132	157
Dark-eyed junco	190	94
American robin	169	45
Eastern meadowlark	64	31
Vesper sparrow	13	53
Northern cardinal (<i>Cardinalis cardinalis</i>)	21	37
White-throated sparrow (<i>Zonotrichia albicollis</i>)	17	19
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	10	21
Northern bobwhite (<i>Colinus virginianus</i>)	10	20
Savannah sparrow	2	19
Field sparrow	2	14
Ruby-crowned kinglet (<i>Regulus calendula</i>)	11	4
Carolina wren (<i>Thryothorus ludovicianus</i>)	8	2
Total	858	667
Species of low abundance	37	27
Total	1,089	752

** Highly significantly different ($P < 0.01$).

Cavity users, such as red-headed woodpeckers, red-bellied woodpeckers, and Carolina chickadees were commonly observed foraging in the decaying snags. Other cavity users used the snags for perches. Red-tailed hawks and loggerhead shrikes perched on snags while looking for prey. Many small rodents and rabbits were observed in the low vegetation of the clearcut. The northern flicker and eastern bluebird also were frequent users of snag perches. Northern flickers and eastern bluebirds commonly nest in snags in clearcuts (Conner et al. 1975, Pinkowski 1976). During winter, flickers commonly forage on the ground in sparsely vegetated areas (Conner 1980).

Data analysis for the group of birds other than cavity users showed no significant differences for any variables between snag and snagless habitat. These birds did not regularly use snags and several of the most abundant species, such as yellow-rumped warblers (*Dendroica coronata*), song sparrows (*Melospiza melodia*), dark-eyed juncos (*Junco hyemalis*), and American robins (*Turdus migratorius*), were associated in flocks during winter which increase census variability (Dickson 1978).

Although statistical tests were not conducted for individual species of non-cavity-users, there were decided differences for some species between snag and snagless habitat. American robins, dark-eyed juncos, and eastern meadowlarks (*Sturnella magna*), were more abundant on the snag transects, but this was probably due to chance occurrence or to unrecognizable habitat differences. Vesper sparrows (*Poocetes gramineus*), field sparrows (*Spizella pusilla*), savannah sparrows (*Passerculus sandwichensis*), and a few other species were much more abundant in the snagless habitat than in snag areas. These 3 species are seed eaters. A few small areas of shallow or sandy soil with grass on 2 of the snagless transects may have been more suitable as winter habitat for these species than areas dominated by woody vegetation.

In conclusion, several species of winter birds benefit from snags left during regeneration of pine stands. These birds use snags for foraging and perching, and probably for roosting.

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