Nest Habitat Use by Eastern Wild Turkeys in Eastern Texas

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Abstract: We studied habitat used for nesting by eastern wild turkey (*Meleagris gallopavo silvestris*) on intensively managed pine forest land in eastern Texas in 1980 and 1981. Most (89%) nests were within 100 m of a road or timber stand boundary. Nest sites had <60% canopy closure, low density of midstory trees (16 stems/0.04 ha), low basal area (9 m^2/ha), and abundant herbaceous ground and shrub cover. Retaining forest openings resulting from logging activity likely will enhance nesting habitat for turkeys in eastern Texas.

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Restoration of wild turkeys in eastern Texas has been successful, but is incomplete. The ultimate success of restoration of wild turkey populations will depend on maintaining suitable habitat and improving marginal habitat. Nesting and brood-rearing habitat may be the most important factor limiting turkey populations (Hillestad and Speake 1970). Openings, fields, clearings, pastures, and roads have been widely mentioned in describing habitat used for nesting by eastern wild turkeys. Availability of these habitats is normally limited in intensively managed pine (*Pinus* spp.) forests. Our objective was to assess those characteristics of nest habitat used by wild turkeys on intensively managed pine forests in eastern Texas.

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Study Area

The 11,000-ha study area was located on Temple-Inland Inc. property in Jasper County, Texas. Perennial streams provided water on the area. The major land use was timber with pine plantations 1–10 years old (15%), pine pole-timber and sawtimber (70%), bottomland hardwood and pine-hardwood (14%), and openings (1%). Topography on the area was gently rolling to hilly. About 800 ha were clearcut ($\bar{X}$ = 70 ha) and planted with pine, and 500 ha were burned during the study.

Pine stands primarily were loblolly pine (*P. taeda*). Oaks *Quercus* spp.), hickories (*Carya* spp.), cypress (*Taxodium distichum,*), and sweetgum (*Liquidambar styraciflua*) occurred in bottomlands. Tree midstory included flowering dogwood (*Cornus florida*), white sassafras (*Sassafras albidum*), and American holly (*Ilex opaca*). Common shrubs were yaupon holly (*Ilex vomitoria*), farkleberry (*Vaccinium arboreum*), southern wax myrtle (*Myrica cerifera*), and American beautyberry (*Callicarpa americana*). Ground cover included broomsedge bluestem (*Andropogon virginicus*), panicum (*Panicum* spp.), paspalum (*Paspalum* spp.), summer grape (*Vitis aestivalis*), lespedeza (*Lespedeza* spp.), and tickclover (*Desmodium* spp.).

Methods

We trapped 33 eastern wild turkeys (8 M, 25 F) in Louisiana and Mississippi and released them on the study area in 1979–80. Eighteen hens were monitored by radio telemetry in 1980 and 14 hens were monitored in 1981. Hens were monitored daily to determine nesting. After 12 days of continuous incubation behavior, nests were located with 3 or more bearings taken about 20 m from the nest. Nests were marked with flagging. Nesting success was calculated by dividing the number of hens that hatched a clutch by the number of hens that began incubation.

We compared vegetative cover at 19 nest sites and at 164 randomly located plots. Circular plots (0.04 ha nested within 0.1 ha), centered on each nest site and random location, were used. Thirteen habitat characteristics were recorded for each plot.

Forest types were pine, pine-hardwood, or bottomland hardwood based on percent of dominant and codominant trees in the overstory within a 0.1-ha plot. We recorded basal area (m^2/ha) with a 10-factor prism for pine and hardwood trees >10 cm diameter at breast height (DBH). Forest treatment was recorded as none, control burned, thinned, or clearcut within 3 years. Topography was recorded as upland or bottomland. Timber classes were seedling or sapling (1–10 cm), pole-timber (10–24 cm), and sawtimber (>24 cm). We classed overstory timber stocking on the basis of crown area covered as low (≤30%), medium (31%–60%), or high (>60%). Midstory tree density was recorded as total number of tree stems below the forest canopy within a 0.04-ha plot. Shrub cover was recorded as percent shrub crown area occupied within a 0.04-ha plot.

We recorded ground cover (≤0.9 m) as herbaceous, woody, or none within a 0.04-ha plot. Percent live vegetative ground cover and mean height (cm) of vegeta-

tion were recorded. Percent of 0.04-ha plots covered by plants used for food by turkeys (Korschgen 1967) bearing ripe fruits was recorded.

Random plots were located on aerial photographs; distance in the field was determined by pacing and direction by a hand-held compass. Random plots also were used to assess the amount and type of habitat available for brood habitat use (Campo et al. 1989).

Chi-square goodness of fit, family confidence intervals (Neu et al. 1974), and *t*-tests were used to analyze nest habitat and available habitat at random locations. Statistical significance was $P \leq 0.10$.

Results

Average distance between 1980 vs. 1981 nests for 13 hens was 1.8 km (range = 0.1–5.6 km). Average distance between first nests and renests for 8 hens was 2.9 km (range = 1.2–4.4 km). Eleven of the nests sampled were successful.

The majority (89%) of nests, but only 45% of random plots, were within 100 m of a logging road or timber stand boundary. Five (26%) hens nested in clearcuts (1- and 7-year-old pine regeneration areas). We found 1 nest in bottomland hardwoods. Most (57%) nests were in pine stands at the bases of pine trees with shrub and woody vine cover; however, 2 nests were not concealed by cover. The majority (84%) of nests were in upland pine forest type and were equally distributed among size classes of timber, with low and medium stocking. Herbaceous ground cover was present for all but 1 of the nests. One nest was located in a controlled burned stand. When random plots and nest plots were compared we found no significant differences between observed and expected frequencies for qualitative variables, except timber stocking and forest treatment. Hens nested in stands with closed canopy conditions resulting from high timber stocking less than expected and in thinned stands greater than expected.

Midstory tree density and pine and hardwood basal areas were less on nest plots than on random plots (Table 1). Total basal area on nest plots averaged 9 m^2/ha. Height and percent of ground cover and percent of shrub cover were greater on nest plots than on random plots. Percent cover of turkey food plants did not differ on nest vs. random plots. We also found no significant differences in habitat variables between successful (11) and unsuccessful (8) nests.

Discussion and Management Implications.

Nest habitat (94% of nests) was characterized as upland pine and pine-hardwood forest stands, with low to medium timber stocking (<60% canopy closure) and abundant herbaceous ground cover and shrub cover. Abundant herbaceous ground cover has been cited as the most important component of nesting and brood-rearing habitat (Williams et al. 1968, Speak et al. 1975, Lazarus and Porter 1985, Metzler and Speak 1985, Phalen et al. 1986). Nests generally were distributed throughout the study area, except that they were not in bottomland hardwoods. The tendency

Table 1. Comparison of eastern wild turkey nest site habitat to habitat sampled from randomly located plots in Jasper County, Texas, 1980–81.

Habitat variable	Nest Site (N = 19) $\bar{x}$	SD	Random Plot (N = 164) $\bar{x}$	SD
Midstory tree density (N stems/0.04 ha)	16[a]	15	31	22
Ground cover height (cm)	34[a]	5	30	9
Percent ground cover	71[a]	18	37	22
Pine basal area (m^2/ha)	6[a]	7	9	7
Hardwood basal area (m^2/ha)	3[a]	4	5	3
Percent shrub cover	20[a]	17	15	12
Percent turkey food plants	18	17	20	17

[a]Different ($P \leq 0.10$) from random habitat.

for hens to nest near logging roads or timber stand edges indicated the importance that road closure to minimize disturbance to nesting hens could play in increasing nesting success. The wide dispersal between successive nests indicated that suitable or acceptable habitat for nesting was distributed throughout the study area. Similar habitat characteristics to nest sites were available in most timber stands on the area because of old logging access roads and logging decks and forest openings that occurred naturally from low rate of survival of timber stock (on dry hills and in drainages). However, these areas occupied only 5% of timber stands. Nesting success (52%) in our study (Campo et al. 1984) was comparable to other studies, which indicated that the normal timber management practices on the area provided adequate sites for nesting. Nest habitat use was similar to brood habitat use (Campo et al. 1989); however, nest habitat was generally more open and with more ground cover than brood habitat. Home ranges for broods ($\bar{X}$ = 1,104 ha) in our study (Campo 1983) were greater than in other studies (Hillestad 1973, Speake et al. 1975). These data might be interpreted to indicate that the wide distribution of limited sites for nesting was not extensive enough for brood habitat.

Hens used areas with some type of forest treatment for nesting. Only 1 hen nested in a control-burned area, probably because most burned pine stands had only 1 full growing season in the study period and shrub cover was sparse. Hurst (1978) recommended a 3-or 4-year controlled burning rotation for brood habitat management, which would also provide sufficient ground cover and shrub cover for nesting. Hens showed a preference for pine stands that were thinned. Although 5 hens nested in clearcuts, only 2 were successful. Ground cover in clearcuts was attractive to hens for nesting because clearcuts represented the only major openings on the area. A larger simple size is needed to determine if indeed a difference in cover variables existed between successful and unsuccessful nests. However, 4 hens that nested in sparse cover or with no overhead cover were not successful.

Although our data are limited, the results indicate that management for nesting

habitat on intensively managed pine forest land should be directed toward maintaining abundant herbaceous ground cover and shrub cover. This can be accomplished by maintenance of moderate timber stocking and thinnings. Retaining forest openings resulting from logging activity likely will enhance nesting habitat and the quality of brood cover.

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