

Woodcock Utilization of Bottomland Hardwoods in the Mississippi Delta

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Abstract: Flush counts ($N = 182$) of American woodcock (*Scolopax minor*) wintering in the Delta region of Mississippi from 1981 to 1982 demonstrated that regeneration stands were used as diurnal coverts more often than other seral stages of bottomland hardwoods. Significant numbers of woodcock also utilized mature stands. Few birds were found in pole stands or cottonwood (*Populus deltoides*) plantations. Management suggestions and research needs are discussed.

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The majority of the continental woodcock population winters throughout the southeastern states, yet until recently, little information has been available from much of the region regarding the habitat requirements of the species. Research on woodcock wintering habitat has been conducted in the adjacent states of Louisiana (Glasgow 1958, Britt 1971, Dyer and Hamilton 1977), and Alabama (Horton and Causey 1979, Roboski and Causey 1981), but no information exists for Mississippi.

The bottomland hardwood forests of the Delta region of Mississippi have traditionally been thought to be important wintering grounds for woodcock. By 1977, only 376,873 ha of bottomland hardwood habitat remained in the Delta (MacDonald et al. 1979). Continued clearing will substantially reduce this amount during the next several decades. It is important that managers know the general habitat requirements of woodcock that winter in this region

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so steps can be taken to ensure that habitat for the species is maintained. This study was undertaken during the 1981–82 winter to compare woodcock utilization among 3 size classes of bottomland hardwood forests plus cottonwood plantations which have become widespread between the Mississippi River and the main levee.

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Methods

The study was conducted in 2 areas of the Delta: a northern area in Coahoma County and a southern area primarily on the Delta National Forest and Hillside and Panther Swamp National Wildlife Refuges. The Delta is characterized by nearly level topography and fertile, alluvial soils. Many of the soils are clays that swell when wet and become cracked and hard when dry (Pettry 1977). Elevations range from about 15 m to 60 m.

The Delta historically was covered by extensive bottomland hardwood forests, but most of the area has now been converted to the production of soybeans, cotton, and small grains. Major components of the remaining forests include oaks (*Quercus* spp.), sweetgum (*Liquidambar styraciflua*), water tupelo (*Nyssa aquatica*), baldcypress (*Taxodium distichum*), hickories (*Carya* spp.), pecan (*Carya illinoensis*), ash (*Fraxinus* spp.), sugarberry (*Celtis laevigata*), elms (*Ulmus* spp.), black willow (*Salix nigra*), boxelder (*Acer negundo*), and cottonwood (McKnight et al. 1981).

The 3 forest stand classes sampled were regeneration (≤ 10.2 cm dbh), pole (10.4 cm–22.9 cm dbh), and mature (> 22.9 cm dbh). Because of their structural similarity, data from both size classes of cottonwood plantations (saplings and poles) were combined.

Flush counts from 120 m x 27 m strip transects were used to determine relative use by woodcock. A trained dog was used to systematically search each transect in an effort to locate and flush all woodcock that were present. Searches were alternated weekly between the northern and southern areas from 11 November 1981 through 5 March 1982. Transects were randomly selected each week; however, 4 permanent transects in each habitat category (2 in each area) were run throughout the study in an effort to determine migration chronology.

The Kruskal-Wallis test was used to determine if woodcock flush counts (northern and southern areas combined) differed among the forest categories.

Table 1. Forest type utilization by woodcock in the Mississippi Delta, November 1981–March 1982.

Forest type	N (%) of located woodcock		
	Northern study area	Southern study area	Total
Regeneration	79 (59.4)	25 (51.0)	104 (57.2)
Pole	8 (6.0)	1 (2.0)	9 (4.9)
Mature	42 (31.6)	22 (45.0)	64 (35.2)
Cottonwood plantation	4 (3.0)	1 (2.0)	5 (2.7)

Although each permanent transect was run several times, only the mean number of flushes was used in the analysis. Differences were considered significant if $P \leq 0.05$.

Results

A total of 182 woodcock was located on 282 transects (Table 1). Most woodcock ($N = 133$) were found in the northern study area. Regeneration stands accounted for the majority of the flushes in that area. Approximately one-third of the transects in both regeneration and mature stands were used as diurnal coverts by woodcock (Table 2).

Fifty-two woodcock were located in the southern study area. Almost all flushes were in mature and regeneration stands. The percentage of transects that contained birds was lower than in the northern study area in all 4 categories; however, the pattern of use of forest types was similar (Table 2).

Woodcock flush counts in regeneration and mature stands were significantly higher ($P < 0.05$) than in other stand types. The 2 categories accounted for over 90% of the total number of flushes.

Discussion

This study documented that certain forest types in the Delta are differentially used by wintering woodcock as diurnal coverts. The relatively high

Table 2. Number and percent of transects from which woodcock were flushed. Permanent transects are counted only once, although each was searched several times.

Forest type	N (%) transects from which woodcock were flushed		
	Northern study area	Southern study area	Total
Regeneration	20 (42.5)	15 (27.6)	35 (33.3)
Pole	5 (13.9)	1 (3.1)	6 (8.8)
Mature	13 (30.2)	8 (19.5)	21 (25.0)
Cottonwood plantation	2 (18.2)	1 (7.1)	3 (12.0)

percentage of transects in regeneration and mature stands from which woodcock were flushed indicates a wide distribution of birds throughout suitable habitat. These results support in part the conclusions of Dyer and Hamilton (1977) and Kroll and Whiting (1977) that wintering woodcock favor young, second-growth hardwoods for diurnal coverts. Typical regeneration stands (both monotypic and mixed) were normally composed of sugarberry, boxelder, sycamore (*Platanus occidentalis*), sweetgum, cottonwood, and oaks. Some thickets of alder (*Alnus serrulata*), switchcane (*Arundinaria tecta*), buttonbush (*Cephalanthus occidentalis*), and privet (*Ligustrum sinense*) were also productive coverts. Areas with high flush rates were usually "brushy" and frequently contained a moderate to dense growth of briars (*Rubus* spp.), greenbriers (*Smilax* spp.), trumpet vine (*Campsis radicans*), peppervine (*Ampelopsis arborea*), grape (*Vitis* spp.), or poison ivy (*Toxicodendron radicans*).

It was also found that mature stands of bottomland hardwoods were utilized by wintering woodcock. More than one-third of the located birds were associated with this size class. Several of the more heavily used stands were dominated by large cottonwoods (>35 cm) with oaks and willows as codominants and a relatively open canopy that had allowed an understory of saplings, vines, and forbs to develop. Other studies (Pursglove 1974, Kroll and Whiting 1977, Horton and Causey 1979) also reported woodcock use of mature forests, although their importance has never been emphasized.

Neither pole stands nor cottonwood plantations of any size class were used appreciably by woodcock. Pole stands typically had closed canopies with a sparse understory and little ground cover. Cover close to ground level has been shown to be important for woodcock (Horton and Causey 1979, Kroll and Whiting 1977) and its absence probably precluded use of these stands. The majority of cottonwood plantations <3 years old were under cultivation; consequently little cover was available. The trees themselves are too widely spaced (3.0 m x 3.0 m) to provide adequate cover. Older plantations were commonly dominated by a rank growth of grasses, particularly Johnsongrass (*Sorghum halepense*) which apparently made them less suitable for woodcock.

The present pattern of land use in the Delta is for conversion of forests directly to agricultural production. Consequently, the early seral stage that is heavily used by woodcock is becoming more limited. Management of remaining forests may become necessary for maintaining the Delta as an important woodcock wintering area. Managers can favor woodcock by thinning pole stands as soon as possible to encourage the development of mid- and understory vegetation that is needed for high quality diurnal cover. Mature stands should be maintained with a partial canopy for the same reason. Regeneration by clearcutting in small blocks produces excellent woodcock habitat, although selective cutting can also be very beneficial. Cottonwood plantations have potential for providing suitable habitat, although current management practices that result in unfavorable understory conditions limit their value.

Among the most important needs regarding woodcock on the wintering

range is an inventory of existing habitat (Owen 1977). The use of aerial photographs to identify habitat (Fenwood and Webb 1981) appears promising; however, they considered only low, brushy areas to be suitable coverts. This study indicates that in this area, it will be necessary to develop criteria for identifying characteristics of mature stands that provide suitable woodcock habitat so they may also be included.

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