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WOOD DUCK RESPONSE TO NESTING BOXES PLACED IN LOW QUALITY HABITAT 1/

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ABSTRACT

Breeding wood duck use of a large man-made reservoir in southern Illinois increased after 83 nest boxes were placed in flooded dead timber habitat. Boxes bordering open water were used at a higher rate than those placed in timber. Ash was the most prevalent dead tree standing after 10 years of inundation; consequently it provided the most suitable structure for nest boxes.

INTRODUCTION

During the past 40 years, numerous large impoundments have been created in the United States. These reservoirs have been constructed primarily by the Tennessee Valley Authority, U.S. Army Corps of Engineers and the Bureau of Reclamation for flood control, area economic development, water supply, navigation, irrigation, recreation and fish and wildlife conservation. Often these water resources have provided an oasis of managed lands where the public can hunt, fish, enjoy wildlife and the out-of-doors without trespassing on private property. Many projects now have some of the finest public hunting lands in the United States. Wildlife management practices conducted by the Federal land management agencies, often in concert with state conservation agencies, have improved wildlife production.

Providing nest boxes, where natural cavities or den sites are lacking, is a method often employed to increase wildlife reproduction. The St. Louis District, U.S. Army Corps of Engineers, has used artificial nesting boxes for squirrels (*Sciurus* spp.), wood ducks (*Aix sponsa*), purple martins (*Progne subis*), and blue birds (*Sialia sialis*) on three large man-made lakes in southern Illinois. This report describes a 5-year study of the response of wood ducks to nest boxes placed in an area lacking natural nesting cavities.

Bellrose and McGilvrey (1966) voiced the need to know more about the response of wood ducks to artificial nest structures throughout their

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range because of the failure of some wood duck nest box programs. They suggested a study of the response rate of wood ducks to nest box use in different habitats.

Emphasized in this study was a comparison of the use of boxes at the edge of open water and those located in timber away from open water. My study was intended to measure responses of wood ducks to nest boxes erected in an area of low wood duck use and to document variation of occupancy by type and location of nesting structure.

The 130-ha study site was on the upper end of Carlyle Lake, a 15,037-ha project built for flood control, navigation, water supply, recreation and fish and wildlife conservation (Gore 1972). Before creation of the lake, the site was an old backwater area off the Kaskaskia River, known locally as Speaker Lake. Surrounding this slough was a relatively young stand of bottom land timber. Predominant trees were pin oak (Quercus palustris), silver maple (Acer saccharinum), willow (Salix spp.), and ash (Fraxinus spp.). Because most trees were less than 25 cm. in d.b.h, natural tree cavities were not common.

When the basin was impounded in 1967, the area around Speaker Lake slough permanently flooded and the inundated timber died. In 1973, when this study was initiated, the flooded area was a dead timber wetland, with Speaker Lake making up the center portion.

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METHODS AND MATERIALS

Both wood and metal nest boxes were erected; the former were of rough-sawed cypress and the latter of galvanized sheet metal. The construction patterns were those recommended by Bellrose and Crompton (1972).

Eighty-three boxes (27 wood and 56 metal) attached to dead tree trunks on March 10, 1974, were placed on willow, ash, silver maple, and oak. Twenty-nine boxes, combination of both wood and metal, were placed at the edge of Speaker Lake while a combination of 54 boxes of both types, were placed in flooded timber. Most boxes, attached 3 meters above summer pool level, were grouped as recommended by Bellrose et al. (1964: 675) and averaged 1.5 boxes per ha (3.8 boxes per a.). However, groups of boxes were not evenly dispersed over the entire 130-ha area.

Breeding pair counts were made from a boat, or on foot if the lake level was too low, in mid March, April and May 1973 through 1977. This provided dated 1 year before (1973) and 4 years after box placement. Each survey was completed in 20 to 80 minutes, depending on mode of travel; average survey time was about 50 minutes. Also, each wood duck nest box was examined during July from 1974 to 1977. The presence of down and egg shells were considered evidence of use.

RESULTS

The number of wood duck pairs observed during mid-March counts ranged from 2 in 1973, to 19 in 1976 (Table 1). The mid-April inventories ranged from 1 pair in 1973, to 15 pairs in 1977. Wood ducks were not observed during the mid-May count in 1973, while 15 pairs were seen at this time in 1976. The lowest wood duck use of the area was in 1973, before nest boxes were installed while highest use was in 1976. Overall box use varied from 5 percent in 1974 to 35 percent in 1976 (Table 2). Wood boxes were used at a higher rate than were metal boxes; and in 1974 only wood boxes were used. Occupancy of wood boxes increased from 14 percent in 1974 to 37 percent in 1975, 58 percent in 1976 and to 62 percent in 1977. During this time, use of metal boxes was 0 percent, 21 percent, 29 percent and 21 percent, respectively. Squirrel predation occurred in a few of the wood boxes. Bellrose and Crompton (1972: 12) recommended metal boxes where such problems are expected.

Twenty-seven wooden boxes were available for 2 years; a few were lost because trees fell in 1976 and 1977. Sixteen of the 27 boxes were used at least once during the 4 years. Based on available nest boxes per year, there was a potential 88 years of use for wooden boxes. Thirty-eight percent use of wood boxes occurred during the 4-year study. In contrast, metal boxes provided 193 box-years of potential use, and 16 percent usage of 23 boxes that were occupied at least one nesting season during the 4 years was realized. The relationship between nest box use and location indicated that of 92 box-years of potential use at lake's edge, 35 box-years (38 percent) of use occurred. For boxes away from lake's edge with 189 potential years of use, only 30 box-years (16 percent) of use occurred.

Nesting density for the 130-ha area ranged from one nest per 20 ha in 1974 to one nest per 5.7 ha in 1976. Actual density was greater because boxes were placed in an area of not more than 65 hectares. The 130-ha area was determined to be the maximum zone of influence that boxes might reasonably affect.

Both breeding pairs and number of wood duck nests increased during the study. The spring breeding pair counts varied from none in May of 1973, before boxes were erected, to 19 in March of 1976. Also, the total number of wood ducks recorded during the breeding season increased from 1973 to 1977. The use of 4 boxes in 1974 increased to 23 in 1976.

Nest boxes placed at lake's edge were used at a higher rate than boxes placed back in flooded timber. The visibility of boxes that are exposed

on the side facing open water may have attracted the hen during nest site selection. Although the standing dead timber was not dense, tree density was sufficient to obscure visibility of and impede access to boxes placed in the timber. The number of boxes available decreased from 83 in 1974 to 55 in 1977 due to 28 trees which fell. The most durable tree for box placement was ash, as it was the most prevalent species standing in 1977. Use of boxes was high in 1976 and 1977 even though fewer boxes were available for use. Wood duck use in the study area as reflected by both types of measurements, Tables 1 and 2, was highest in 1976; a slight decline was noticed in 1977. This decline may have been due to a general decrease of wood duck numbers and/or reproduction effort in 1976 and not to local influences in 1977. Float surveys (Anonymous 1977) in southern Illinois showed a decline in wood duck reproduction between 1976 and 1977.

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TABLE 1. SPRING WOOD DUCK USE OF SPEAKER LAKE STUDY AREA AT CARLYLE LAKE, ILL

	1973		1974 a/		1975		1976		1977	
	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed	Total Birds Observed
Mid-March	6	2	8	1	17	5	46	19	42	16
Mid-April	3	1	10	4	33	9	24	10	31	15
Mid-May	0	0	12	4	13	7	43	15	22	10

a/ 83 nest boxes were put up in area on 10 March 74.

TABLE 2. RESULTS OF THE JULY WOOD DUCK NEST BOX INSPECTIONS, CARLYLE LAKE, ILL

Year	Wood Box		Metal Box		Total	
	Number Available	Percent Used	Number Available	Percent Used	Number Available	Percent Used
1974	27	14	56	0	83	5
1975	27	37	53	21	80	26
1976	19	58	45	29	64	35
1977	16	62	38	21	54	33