FROM FIELD AND STUDY

Use of Nest Boxes by Wood Ducks in the San Joaquin Valley, California.—Although the Wood Duck (*Aix sponsa*) is rather common locally in California, its ecology has not been well studied. In 1953 and 1954 the writer, in cooperation with the California Department of Fish and Game, studied the production of Wood Ducks in nest boxes in the San Joaquin Valley. This report summarizes observations made in those two breeding seasons. This work was financed in part by funds from Pitman–Robertson Project 30R under the direction of Game Biologist Wendell Miller.

The breeding range of the Wood Duck is limited primarily to the deciduous forest areas of the United States. The vast majority of the birds is found in the eastern half of the country. The relatively small breeding population inhabiting the west coast occurs in British Columbia, Washington, Oregon, and California. These ducks winter primarily in the latter two states. In California the breeding metropolis is in the Sierra Nevada foothills of the Central Valley, as far south as the Kings River. During the fall and winter months Wood Ducks congregate in the valley and are commonly found in flocks as far south as Bakersfield. The San Joaquin Valley is the southernmost extension of the western breeding range.

From personal observations and talks with residents, the seemingly most desirable local areas for nesting Wood Ducks were selected for study. The foothill sections of the Merced, San Joaquin, and Kings rivers were so chosen and several hundred hours were spent traversing them on foot and by automobile.

The Wood Duck normally nests in hollow trees or suitable substitutes, over or near water. Since the growth of such trees is rather sharply restricted in the San Joaquin Valley, and since trees are being removed at an increasing rate along river bottomlands to make way for agricultural expansion, this study was designed to measure the availability of natural nest sites and the possibilities of augmenting these with artificial nest boxes. With these objectives in mind, certain areas were carefully and systematically searched for natural nests. None was found. Since many adults and some broods were observed, nesting must have taken place undetected.

In order to have a better understanding of productivity, 39 nest boxes, of the type recommended by the Illinois Natural History Survey, were installed as follows: Merced River, 19; San Joaquin River, 3; Kings River, 6; Roeding Park in Fresno, 6; Los Banos Refuge, 3; and lower San Joaquin River near Gustine, 2.

The boxes were placed in a variety of locations. The successful nests, without exception, were in wooded areas, over or in close proximity to open water, and they were plainly visible from the waterway. None of the boxes placed in marshy areas, or along vegetation–choked streams or sloughs, was selected for use by the ducks.

The nesting period was observed to extend from the last week of March to the first of August, a longer period than has been noted by eastern investigators. Attempts at renesting may have accounted for the late records. In the nests studied, Wood Ducks laid one egg per day until the clutch was complete. The 51 eggs measured were considerably smaller than those recorded by others, averaging 46.8 mm. in length and 37.4 mm. in width. Length ranged from 43.5 to 52.4 mm., and width ranged from 34.1 to 39.4 mm. The averages given by Bent (Bull. U. S. Nat. Mus., No. 126, 1923: 162) for 99 eggs were: length, 51.1 mm., and width, 38.8 mm. Dixon (Condor, 26, 1924:56) found that 26 eggs laid by Wood Ducks in California averaged 52.4 x 39.0 mm. Incubation lasted approximately one month, although in one case in which six eggs failed to hatch, it continued for at least 72 days.

Wood Duck productivity, as determined through the use of nest boxes in the study areas, is indicated in table 1. It can be seen that there were 14 nestings in the 39 boxes for the year 1954. The clutches averaged 13.6 eggs of which 65.8 per cent hatched, with 4.8 per cent of the ducklings dying in the nests. These figures have been divided into two groups to show the distinct differences in success in "normal" and "dump" nestings (those containing eggs from several hens). The normal nests averaged 8.5 eggs per clutch of which 82.6 per cent hatched, while the dump nests averaged 20.2 eggs per clutch of which 55.9 per cent hatched. This discrepancy can be attributed to three factors: first, the time interval from the laying of the first egg to the onset of incubation in the dump nests may have been so great that the first eggs failed to develop; second, with a large clutch the hen may not have been able to cover and turn all the eggs in such a way as to maintain viability; and third,

Table 1

Wood Duck Productivity in Nest Boxes in the San Joaquin Valley, 1954

	Eggs	Hatched and left nest	Eggs left	Dead young in nest	Destroyed
			Normal Nests		
	7	6	1		
	12	12			
	1				1
	8[1]				8
	6	6			
	10	10			
	8	8			
	9	8	1		
	8	5	2	1	
Totals:	69	55	4	1	9
			Dump Nests		
	24	7	15	2	
	20	18	1	1	
	19	6	11	2	
	18	14	4		
	23	8	15		
	17	11	6		
Totals:	121	64	52	5	0

[1] Nest observed in 1953.

eggs dumped in the nest after the start of incubation, during the absence of the incubating hen, would have contained underdeveloped embryos at hatching time. The frequency of dump nesting, along with the observed use of brushy squirrel nests and buildings, is convincing evidence of the critical lack of nest sites in certain local areas.

Nest boxes provided for Wood Ducks are used by other animals as well. In some cases this usage may be such that the boxes become unavailable for use by the ducks. Some of the competing species, such as the raccoon, are known predators of Wood Duck nests. Even though there was an unexpectedly low incidence of predation in this study, the boxes were used almost as frequently by other species as by the Wood Duck.

The findings of this preliminary study suggest that nest sites for Wood Ducks are indeed in short supply in the San Joaquin Valley and that increased productivity might be stimulated by adding additional nest boxes, which would give more pairs places to nest and increase production in occupied nests by reducing dump nesting.—RICHARD H. ROBINSON, *Monterey Peninsula College, Monterey, California, December 31, 1957.*

An Osprey in Mideastern Pacific Ocean.—At 6 p.m. on October 6, 1957, coast guardsmen aboard the Coast Guard cutter *Pontchartrain* observed a large hawk-like bird circling the ship. The *Pontchartrain* on this date was occupying ocean station "November" (lat. 30°N, long. 140°W), which is the aeronavigational point of no return between the California coast and the Hawaiian Islands. The nearest landfall (Hawaii) from ocean station "November" is 1161 nautical miles. Coast guardsman Lambert D. Greenlee states that the bird, which subsequently was identified as an Osprey (*Pandion haliaetus carolinensis*), continued to circle the cutter for the next five hours, during which time it made twenty-five landings on the masts, radar antennae, and weather bridge, and on one occasion even startled a lookout on watch by attempting to land on his head. The bird was observed to be in an extreme state of exhaustion, as it would droop its head low each time it perched aboard the cutter. During the course of the bird's twenty-five perchings, Mr. Greenlee made repeated attempts to capture