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Wood Duck Roosting Flights at Paint Creek, Iowa¹

DALE HEIN

Abstract. Wood duck roosting flights were studied at a marsh near the mouth of Paint Creek, Allamakee County, Iowa, during late summer and fall of 1959 and 1960. Evening roosting flight counts were superior to morning counts for estimating roosting populations. Changes in times of flights and illumination associated with flights were noted as the season advanced. The roosting population built up to a pre-migration peak in mid-September. Counts fluctuated erratically after migration started about October 1, and the roost was abandoned in early November. Data collected at Paint Creek Roost were typical in general of those collected at the other 20 roosts investigated. Comparison of pre-migration populations by annual counts made about September 20 can be expected to show year-to-year changes in the Paint Creek Roost wood duck population.

The wood duck is one of the most important waterfowl species breeding in the Mississippi Flyway states. It has received considerable attention from waterfowl management programs including provision of artificial nesting cavities, special hunting restrictions, artificial propagation, and habitat improvement. Results of these programs have been difficult to evaluate, for the wooded streams and swamps favored by wood ducks make census techniques used for other waterfowl unsatisfactory for this species. Counting concentrations at fall roosts, a relatively new technique, has been tried by several states with varying success (Smith, 1959). Roosting flight counts offered a possible method of satisfactorily estimating local wood duck populations in Iowa. Recent investigations of this technique included study of a roost near the mouth of Paint Creek, Allamakee County, Iowa, where wood ducks gathered each evening during late summer and fall of 1959 and 1960.

The proclivity of wood ducks to congregate at the same roost site each evening has long been known (Forbush, 1912) but has been intensively studied only during the last decade. Observations by Schreiner (1950) at two roosts in Louisa County were the first wood duck roosting flight count data used in Iowa. Martin (1959) observed flights in the same area and gathered data from another roost at Muskrat Lake, Louisa County. Stewart (1958) included many observations of roosts and roosting flights in his study of the wood duck in Ohio.

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THE ROOST

Paint Creek Roost is located in a small marsh in northeast Iowa near the confluence of Paint Creek and the Mississippi River. The roost is in SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 10, T 97 N, R 3W, 5th PM. Bluffs covered with oaks (*Quercus alba*, *Q. macrocarpa*, *Q. rubra*) rise 500 feet above the marsh to the north and west. Paint Creek flows along the foot of the bluffs on the west and joins the Mississippi a mile south of the roost. A low strip of land several hundred feet wide separates the marsh from Pool No. 10 of the Mississippi River on the east (Fig. 1).

Vegetation was typical of shallow marshes in the region. Willows (*Salix* spp.) rimmed the marsh. River bullrush (*Scirpus fluviatilis*) and small stands of cat-tail (*Typha* sp.) were the main emergents in the shallower water along with a few button-bush plants (*Cephalanthus occidentalis*). Approximately 1 acre of open water near the center was surrounded by about 4

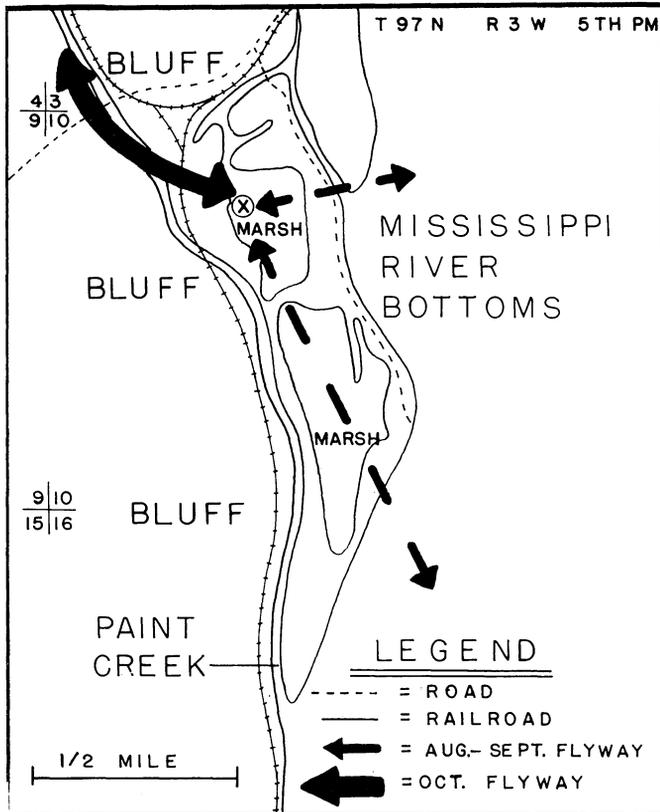


Figure 1. Paint Creek Roost area and roosting flight paths.

acres of smartweed (*Polygonum* sp.) and arrowhead (*Sagittaria* sp.).

The Mississippi River bottoms of Pool No. 10 provided nearly optimum wood duck habitat. Favorable interspersions of wooded islands, sloughs, and marshes along with the tree-covered bluffs provided all necessary habitat types for wood ducks from breeding season through fall migration.

ROOSTING FLIGHTS

Paint Creek roosting flights were first observed on September 18, 1959, following a report from Conservation Commissioner George Meyer of Elkader that wood ducks were using the roost. Thereafter, flight counts were made at approximately weekly intervals throughout the 1959 and 1960 fall roosting seasons. Data were collected from 24 morning and 16 evening flights. Conservation Officer George Kaufman and Refuge Manager Victor Hall contributed additional counts. Data from roosting flights at Paint Creek were typical in general of those procured at the other 20 wood duck roosts checked during the study.

August and September flights arrived at the roost each evening and departed the following morning via the same two flight paths to the Mississippi River. Wood ducks flew directly to feeding areas in the morning, spent most of the day loafing nearby, and fed again in late afternoon before returning to the roost. In both years flight lanes changed in early October so that morning flights departed westward from the roost and followed Paint Creek several miles inland (Fig. 1). This shift in flight direction was attributed to maturing acorn crops available up Paint Creek Valley.

A low observation point near the center of the roost was a requisite for accurate counts. The flight had to be silhouetted against a sky background to detect all birds in the dim light accompanying roosting flights. Both morning and evening flights were at altitudes of less than 200 feet. Approach to the roost and departure were direct and unhesitant with little circling. Speake (1955) reported that circling made accurate counting difficult at Alabama roosts.

On five occasions evening counts were followed by checks the following morning; in all cases evening counts were higher. Statistical analysis yielded a probability of 0.92 that morning and evening counts would give significantly different results. A heterogeneity Chi-square analysis gave a probability of 0.83 that evening counts were superior to morning tallies at Paint Creek Roost. Therefore, evening flight counts were the primary bases for estimating the roosting population.

No single climatic factor showed a significant correlation with changes in time, direction, or numbers in the roosting flights. However, time of first departure from the roost was delayed by poor visibility conditions, whereas first arrivals of evening flights were earlier on days of poor visibility. Duration of morning and evening flights shortened as the fall advanced. Mid-August departures from Paint Creek Roost started approximately 30 minutes before sunrise and were completed by 15 minutes after sunrise. By late October the morning flights departed in practically a single wave between 40 and 30 minutes before sunrise. Changes in evening flights were similar. Early season flights lasted from about 30 minutes before sunset to 30 minutes after sunset; late October flights took place entirely after sunset. These changes were similar to those described by Martin and Haugen (1950) for roosting flights at Muskrat Lake in Louisa County.

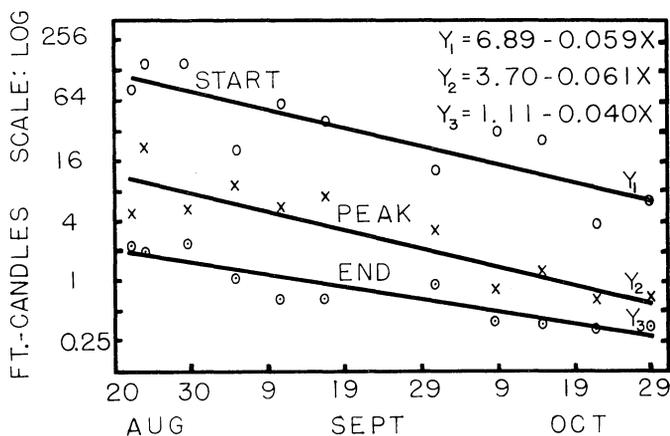


Figure 2. Linear regressions on the date of illumination associated with start, peak, and end of evening roosting flights at Paint Creek Roost, 1959 and 1960. All illumination values expressed in logarithms to base two of foot-candles of incident light.

Illumination associated with flights was measured, and important relationships were found between changes in illumination accompanying flights and the advance of the season. Linear regression equations for illumination changes associated with starts, peaks and ends of flights were computed from logarithms to the base two of foot-candles of incident light (Fig. 2). All regression coefficients were significant at the 95% confidence level. Mid-August evening roosting flight activity occurred between light values of 200 ft-c. and 2 ft-c. By late October light values concomitant with evening flights ranged from 8 ft-c. to ¼ ft-c. Thus, it became increasingly difficult to make accurate counts later in the season. Morning flights also occurred with

less light as the season progressed. By early October morning counts were practically useless in determining the number of wood ducks using the roost, for many birds left the roost while it was still too dark to distinguish them.

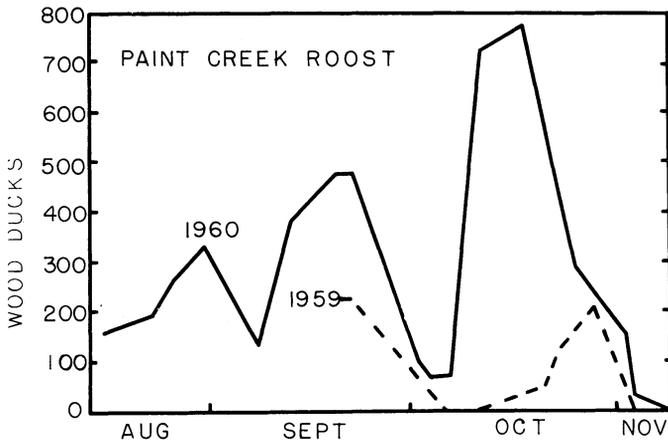


Figure 3. Changes in Paint Creek Roost wood duck population as shown by 1959 and 1960 flight counts.

POPULATION CHANGES

Wood ducks were using Paint Creek Roost by August 11, 1960, when 161 were tallied in an evening flight. Juveniles comprised most of the early season roosting population. No adults were spotted at the roost until early September even though hundreds of wood ducks at the roost were examined closely with binoculars during August. Apparently, few adults used the roost until their postnuptial molt was nearly complete. Calling was rarely heard at the roost before adults appeared in the roosting flights. With the addition of adults and late broods the roosting population rose rapidly to a mid-September peak (Fig. 3). Four counts made between September 17 and September 23 varied only from 459 to 485. This was the pre-migration peak roosting population. Migration started during the last few days of September when counts dropped to less than 100. A wave of migrants brought the population to a season high in mid-October, reaching a peak of 785 and lasting about 10 days. Then counts fluctuated erratically downward until the roost was abandoned in early November. Data from 1959 were not as complete as in 1960, but population curves for both years were similar in shape. However, the pre-migration peak count in 1959 was only 223.

certain changes in the roosting population. In early September water depth increased to 32 inches from the 20-inch depth recorded in late August. The population dropped from 335 to 148 during this high water period. Water depth dropped to 24 inches in the second week of September and the population rose correspondingly to 382. During the high water period scattered roosting by small flocks of wood ducks was observed away from the main roost. No other factor, including hunting near the roost, seemed responsible for any deviation from the normal pattern of population changes.

Paint Creek Roost was one of five roosts used by wood ducks in Pool No. 10 of the Mississippi River (Fig. 4). Changes in populations and roosting habits observed at Paint Creek coincided closely with similar changes at the other roosts in the pool. All evidence indicated that there was little if any exchange of wood ducks between Paint Creek and other roosts

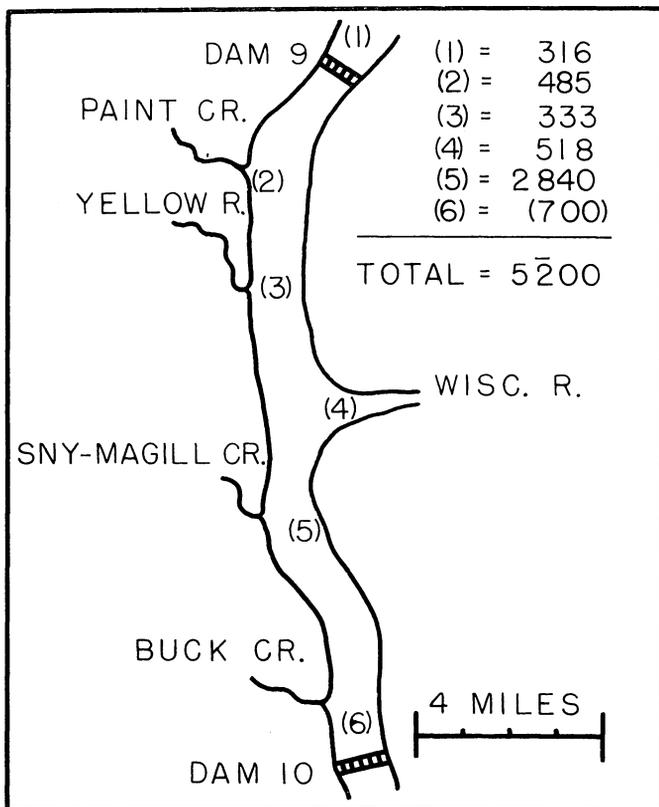


Figure 4. Locations and pre-migration peak populations of fall roosts used by wood ducks in Mississippi River Pool No. 10 in 1960.

prior to start of fall migration. Therefore, comparison of pre-migration populations by annual counts made about September 20 can be expected to show year-to-year changes in the Paint Creek Roost wood duck population.

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