

## A STUDY OF THE VERTICAL DISTRIBUTION OF BIRDS

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**INTRODUCTION** Most investigations of the spatial distribution of birds are concerned with the distribution in a horizontal plane. The introduction of mist nets as a method of capturing birds affords the possibility of observing the distribution in a vertical sense as well. This paper describes an experiment undertaken during Operation Recovery 1957 to determine the usefulness of mist nets in the study of this vertical distribution. The experiment was designed as an intensive study, that is, concentrated capture effort was made in a small geographical area for a relatively short time. Thus constancy of geographic, botanical, and meteorological environment was assured, and results assigned to these specific environments.

**STUDY AREA** The study area was located at Lat.  $39^{\circ} 50' N.$ , Long.  $74^{\circ} 5' W.$ , Island Beach State Park, New Jersey. This is one of the long narrow barrier beaches of the Atlantic coast, and in the study area was approximately 200 yards wide. The botany of the area is particularly important for the study. The shrubs and trees grow in extremely dense thickets, but in general are between 6 and 7 feet in height. When mist nets are set in narrow lanes in this brush they are in a position to intercept all birds moving through the vegetation. This is important, as it assures a sample capture of a specific segment of the population present and eliminates, for instance, those birds making flights large with respect to the study area.

The study here reported was performed on September 6, 7, and 8, a period of relatively constant weather conditions. Winds were moderate southerly, temperature 72 to 78, with overcast and light showers characterizing the period.

**METHOD OF CAPTURE** The capture technique used exclusively was that of mist-netting. Nets were strung in sets of 3 to 5 in narrow lanes in the dense vegetation. All lanes ran generally perpendicular to the length of the island. Each net was set with its lowest trammel about 1 ft. above the ground and its highest trammel about 6 or 7 ft. above ground. In each case the highest trammel was at or above the level of the top of the surrounding vegetation. In the study area of 100 by 200 yards ten nets were set. This is a relatively intensive placement, but certainly not sufficient to disrupt the normal activities of the birds. One of the proposed extensions of this study involves the determination of the highest net density which may be used without perturbing the activities of birds in a study area.

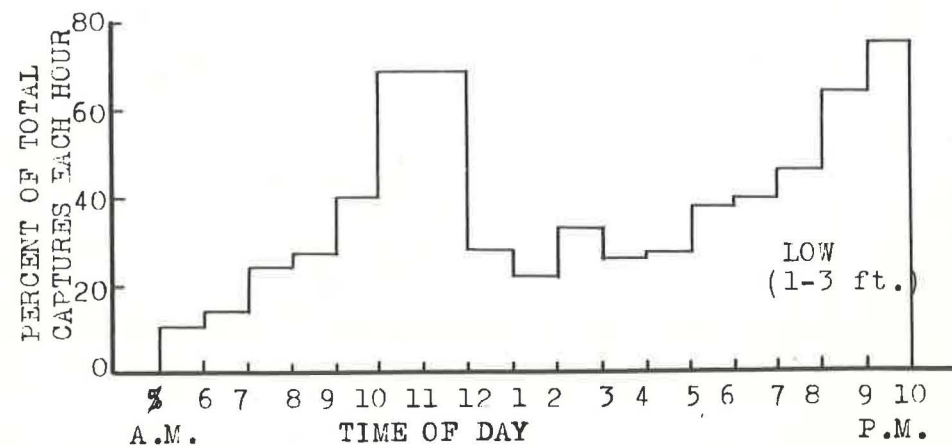
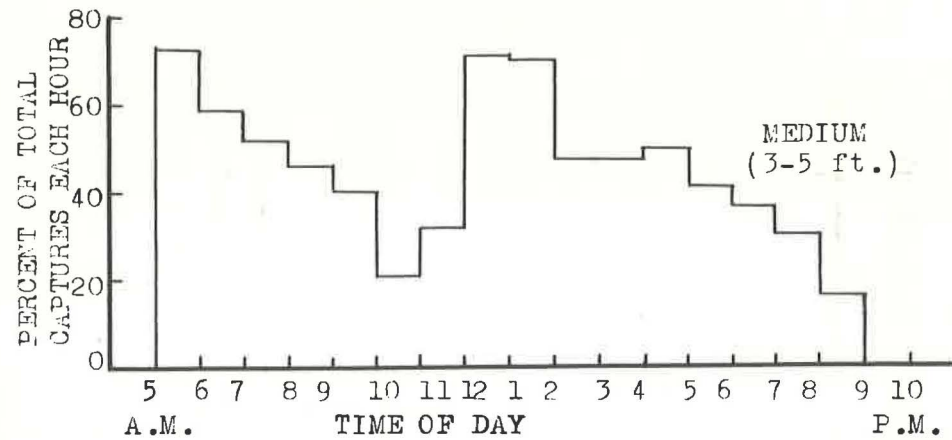
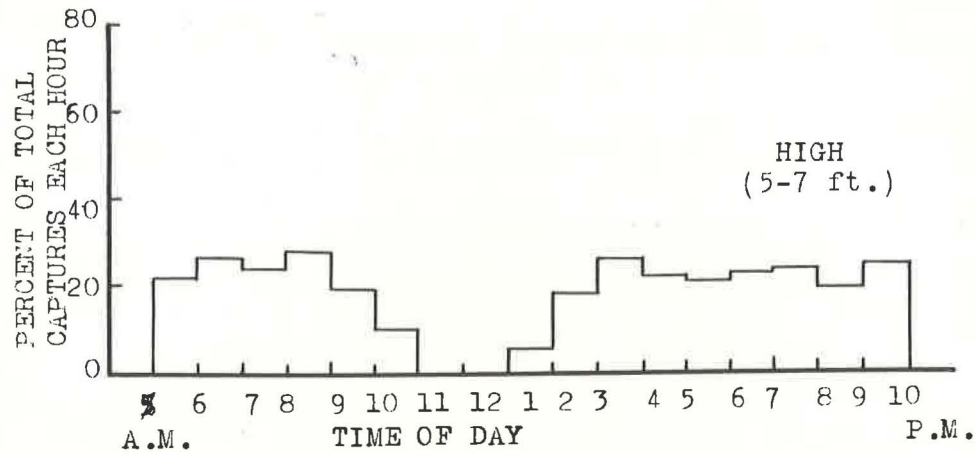


Figure 1

Nets were cleared once each hour through the day. No captures occurred during hours of darkness. As each capture was removed from the net a record was made of the height of the bay from which it was removed. Three categories were distinguished: 1-3 ft., 3-5 ft., 5-7 ft. The species, time of removal, weight, tarsus length, and wing length were also recorded.

RESULTS Since the number of birds involved in this study was small (85) some statistical smoothing of the data was necessary. This was done by plotting histograms of captures per net-hour for each of the three levels for each hour and smoothing these with a 1-2-1 distribution. The resulting histograms were used in two ways.

For each hour the percent of total captures during that hour was computed for each level. The resulting histograms demonstrate the vertical distribution of birds throughout the day, and are shown in Fig. 1.

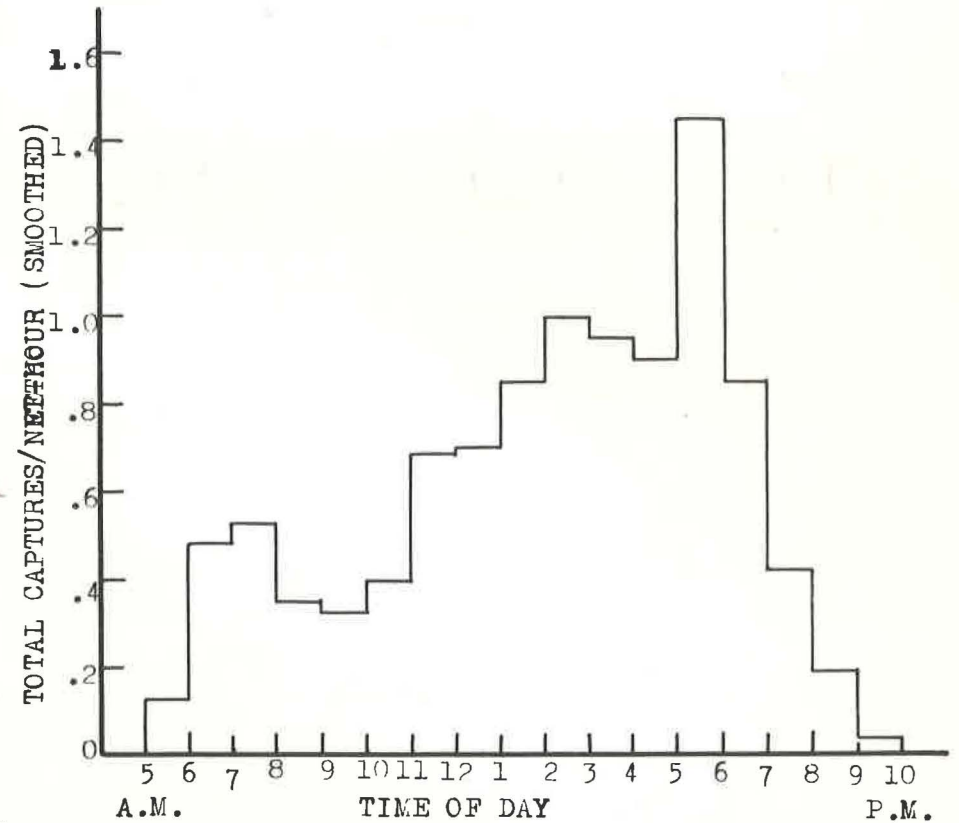


Figure 2



Note that this method of plotting eliminates effects due to variable trapping effort and total activity. Fig. 1 indicates clearly some characteristics of vertical distribution under the study conditions. The birds are high in the vegetation in the early morning, and then drop as a group to lower levels about noontime. Shortly after noon the birds rise again and then as dusk approaches, the population apparently splits, with one part dropping while a smaller portion remains high. These trends are clear, but it is too early in the study to propose explanations for this behavior. One obvious necessary extension of the study is the disclosure of the species content of the split population at the end of the day.

When the smoothed histograms above are summed for all heights a histogram of diurnal activity is obtained, Fig 2. Note that this histogram eliminates the factor of variable trapping effort throughout the day, and includes food-seeking as well as non food-seeking individuals. It is not proposed to discuss the reasons for the shape of this histogram, however it is interesting to compare it with those of Hunt and Frazier (EBBA NEWS 20:91). It is evident that the activity curves for any particular set of environmental conditions may differ very markedly from the curve of a grand average of food-seeking birds over weather and season.

**DISCUSSION** The results of this study indicate that meaningful information on the vertical distribution of birds can be obtained under appropriate conditions by the methods described. Obvious modifications are necessary for future work and plans are now being made for a continuation of this work on a larger scale in the fall of 1958.

It is a pleasure to acknowledge the assistance of Dr. Darwin Wood in the field work involved.

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WASH. BIOL. SURV.

"Saw this printed and thought EBBA NEWS readers would also get a chuckle," writes F. C. Williams of Wellesley, Mass.

The metal strips used to band birds are inscribed: "Notify Fish and Wild Life Service, Wash. D. C." and they used to read "Washington Biological Survey," abbreviated to "Wash. Biol. Surv." This was changed after a farmer shot a crow and disgustedly wrote the U. S. Government, "Dear Sirs: I shot one of your pet crows the other day and followed instructions attached to it. I washed it and biled it and surved it. It was turrible. You should stop trying to fool the people with things like this...." \*\*\*