DISTRIBUTION OF UPLAND BIRDS IN ILLINOIS

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According to the life-zone concept of Merriam and others, distribution of birds falls into natural units consisting of great trans-continental belts. Seven of these zones have been described for North America, each bounded on the north and south by isotherms of temperature. With the recognition that different species occurred in the west as compared with the east, certain zones were subdivided at about the 100° meridian on the basis of differences in humidity and rainfall. If one follows this concept the state of Illinois falls mostly in the eastern Carolinian Faunal Area of the Upper Austral Zone. The Transition Zone enters the state on the north and the Lower Austral Zone on the south, but the extent of penetration appears to be a matter of personal judgment. Such a concept is unsatisfactory for analyzing the distribution of the three hundred or so species of birds that occur, as it presupposes a uniform occurrence of a different group of species in each section of the state with their distributional boundaries determined only by temperature.

Doubtlessly temperature does affect the distribution of birds. For instance the chuck-wills-widow, Carolina chickadee, Bewick wren, mockingbird, sycamore warbler, Kentucky warbler, hooded warbler, summer tanager, Bachman's sparrow and others are found more commonly during the breeding season in the southern portions of the state, and the black-capped chickadee, swamp sparrow, bobolink, clay-colored sparrow, and savannah sparrow are mostly confined to the northern portion. Very likely all species have limits of tolerance to extreme temperatures, but these limits vary widely between species. When temperature controls distribution there is little agreement between different species in exact limits of distribution. Likewise correlation between distributional boundaries and isotherms does not prove that temperature is the controlling factor without supporting experimental evidence. For instance, the northward dispersal of the Bewick wren appears limited by competition with the house wren, rather than by the direct influence of any physical environmental factor.

In seeking units of significance for the analysis of distributional phenomena, it is best to utilize the organisms themselves rather than any combination of environmental factors. Unless distribution limits show some harmony and correlation, then distributional units, as such, do not exist in nature. Actually, plants and animals do exhibit fundamental distributional interrelations in the form of biotic communities. These communities give the most substantial basis for interpreting distribution. Exclusive of aquatic areas, two major communities or biomes are represented in Illinois: the forest and the prairie. Their occurrence in the state is shown in fig. 1 which was prepared originally by the Illinois State Natural History Survey[1]. The limits of the constituent avian species are controlled by a complex of environmental conditions, in which moisture, light, and vegetation are especially important.

In addition to these climax communities, there are numerous disturbed areas and subclimax or developmental communities. Most of the prairie has been destroyed for purposes of agriculture or has been greatly modified. Forests have been lumbered or grazing has been permitted so that they no longer represent original conditions. Marshes, lakes, and rivers are subclimax, but if left alone, the smaller lakes and ponds will gradually become choked with vegetation and transformed into communities similar to those now on the upland. Meanwhile they have a varied and characteristic bird fauna of ducks, grebes, coots, rails, gallinules, bitterns, herons, and several species of song birds.

From studies carried out in Trelease Woods at the University of Illinois, a typical list of species occurring in an upland forest in approximate order of their abundance is as follows: indigo bunting, starling, red-eyed vireo, crested flycatch-

[1] Telford, C. J., Bull. Ill. Sta. Nat. Hist. Surv., 16, 1926: I-VI, 1-102.

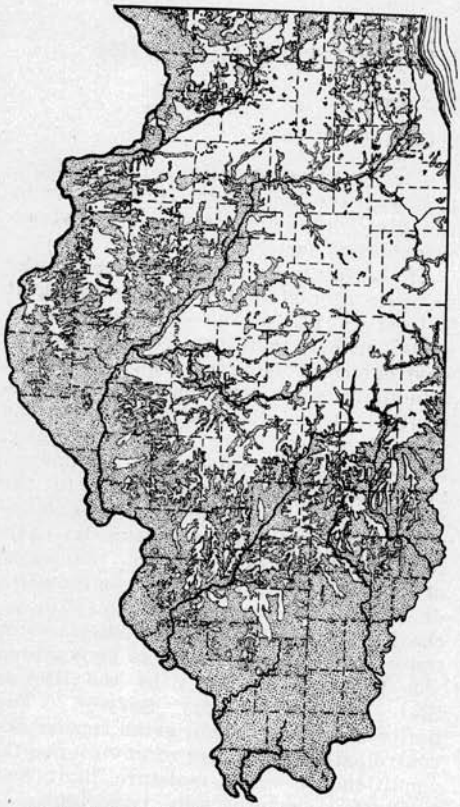

Fig. 1.—Map showing original distribution of forest (stippled areas) and prairie (clear areas) in Illinois.

er, downy woodpecker, tufted titmouse, wood pewee, red-headed woodpecker, wood thrush, cardinal, yellow-throat, yellow-billed cuckoo, white-breasted nuthatch, barred owl, and Carolina wren. In addition other species occur in irregular numbers. Total abundance of all species averages between two and three birds per acre (Twomey, Hyde, MS).

Extensive tracts of original prairie are difficult to find. Abandoned fields and railroad rights-of-way sometime resemble prairie both in appearance and composition. Representative prairie species that both feed and nest in grassy habitats include marsh hawk, ring-necked pheasant, prairie chicken, upland plover, horned lark, meadowlark, bobolink, dickcissel, and grasshopper sparrow. These are not listed in the order of their abundance. Total abundance of all species may lie between one and one and a half birds per acre[2] which is considerably less than in the forest. In disturbed farmland, pastures, plowed ground, and crops, abundance may drop to one bird per two acres.

Greatest numbers of birds may be found in the forest-edge, or ecotone where forest and open field meet and interdigitate, for here there is a greater variety of habitats, and birds may take advantage of favorable features in more than one. Many of our towns and villages, orchards, cemeteries, shrubby fields, and woodlots are essentially forest-edge habitats. Abundance commonly averages three or more birds per acre and includes, in addition to some species listed for the forest and prairie, the sparrow hawk, bobwhite, mourning-dove, flicker, red-headed woodpecker, kingbird, blue jay, house wren, catbird, brown thrasher, robin, bluebird, English sparrow, bronzed grackle, Baltimore and orchard orioles, goldfinch, and field sparrow.

The presence of extensive forest-edges was characteristic of early Illinois. Birds were probably always numerous as a consequence, and except for the starling, English sparrow, and ring-necked pheasant, were probably of the species above enumerated. The present paper is intended merely to introduce the ecological approach to the study of bird distribution in the state. There are needed many more intensive studies in all habitats to determine the occurrence of species, their actual abundance, fluctuations from year to year, interrelations for territory and food, nesting habits, rates of reproduction and mortality, migration phenomena, and relations to man.

[2] Forbes and Gross, Bull., Ill. Sta. Nat. Hist. Surv., 14, 1922, 187-218.