

1985

A REVIEW OF THE BIRD ECOLOGY OF INDIAN RIVER MARSH

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A study was made by the advanced ornithology class of the University of Michigan Biological Station of the Indian River Marsh. The purpose was to study bird ecology -- the relations of the birds to their environment. The main emphasis was upon the succession of bird communities with the plant communities, while other ecological relations were noted. Indian River runs from Burt Lake to Mullet Lake. The study was made of the river marshes and of the woods along the shore close to the outlet into Burt Lake. Representative areas of the different plant communities were studied by nine people. Each community was surveyed for birds and for nests. Notes were taken of nest location, size, construction and contents.

Ecological succession may be defined as a gradual series of changes in physical and biotic composition of a community until a final, comparatively stable stage, the climax, is reached. These changes are brought about primarily by the conditioning of the environment by the activities of the plants and animals. Plant succession is usually basic, that of animals depending upon it. In the Indian River region seven successional stages were recognized in the flora. Named according to their dominant plants these were: (1) open water and floating vegetation, (2) bulrushes, (3) cattails, (4) sedge (Carex), (5) cedar, (6) secondary hardwoods -- aspen and poplar, and (7) the maple-oak climax. These stages are not completely distinct, however, there being so called ecotones, or zones of tension, between them where the plants of the incoming stage compete with those of the younger stage. Here the bulrush-cattail and the cattail-sedge were definitely recognizable ecotones.

There are definite changes in the avi-fauna correlated with the successional stages in the plants. Certain species are limited to only one plant community -- for example, the Long-billed Marsh Wren, Black and White Warbler, Swamp Sparrow, and Northern Yellow-throat -- while others as the Black Tern and the Red-wing Blackbird are more ubiquitous and are found in a number of stages. These relations are clearly illustrated by

the table at the end of the paper. A check mark signifies that the bird was seen or heard in a particular community, while an N means that a nest of the species was found there. Reasons for the presence or absence of a certain species in a particular environment are usually not obvious, especially in such a cursory study as this. About all that can be said is that the ubiquitous species are more tolerant of environmental conditions (here probably nesting conditions primarily) than the more limited species. It has been suggested (Beecher, 1942) that the Pied-billed Grebe is found in the bulrush community because its poor powers of locomotion on land limit it to locations by water. The Long-billed Marsh Wren is probably confined to its habitat of cattails by the building materials and support they contribute to the nest, but why the species is not found in the bordering ecotones is not so clear.

Certain ecological relations were noted during the study, some related to the successional picture, some not.

An examination of the materials used in the nests provides corroboration, for the most part, for the above conclusions as to species distribution in the different plant communities, the limited species using available local material, the more ubiquitous species using that from other communities as well. For example, the Pied-billed Grebe brings up rotting vegetation from the bottom in the location of the nest and uses it for construction material. The Long-billed Marsh Wren uses cattails exclusively, weaving the stems to make the nest itself and using the cattail "cotton" for lining. On the other hand, the Red-wing Blackbird, a ubiquitous species, uses cattails for the outside of the nest and lines it with materials from farther afield -- fine grass and roots. The Black Tern is a wide ranging bird whose nests, however, were found in only one community (the bulrush-cattail ecotone, close to the water) unlike the Red-wing which nests through several. The Tern uses only dead bulrushes for its nesting material == presumably those from close at hand.

A more detailed knowledge of the food relations of all of the birds would no doubt be valuable in explaining their limitations or ubiquity. The Black Tern, for example, which feeds on fish has to cross the marshes to stretches of open water, while the Long

Long-billed Marsh Wren no doubt finds its food in the cattails where it was seen and its nests found.

The relation of the amount of nest concealment to the availability of the nests to predators is also secondarily related to the succession in plant communities. The early stages of the succession, being less available to the land predators, contain nests -- of the Pied-billed Grebe and Black Tern -- which are in open spaces with no suggestion of concealment. Red-wing nests, usually found in clumps of cattail, are fairly obvious, but are somewhat elevated (tops of two nests measured being 12 inches and 13 inches above the water surface). The same may be said for the Long-billed Marsh Wren, which has, moreover, another device for nest concealment. It builds several "dummy" nests, very similar to the occupied nests except they are unlined and have a slightly larger opening, for the purpose of drawing the predators attention from the real nest. The Sora and Virginia Rail nests found in the cattails and in the cattail-sedge communities, respectively, were more concealed, being quite well hidden by the surrounding vegetation, although fairly close to the water (7 3/4 inches and 3 1/2 inches from the top of nest to the surface of the water). No nests were found in the sedge or in the wood communities, bespeaking the greater degree of nest concealment in these areas which are open to predation from snakes, nest robbing birds, etc.

Certain other ecological relationships were noted between the birds themselves and <sup>are</sup> therefore not so closely related to the successional picture. In the most numerous birds -- Red-wings and wrens -- territorial relationships between individuals of the same species were noted -- singing by the males from conspicuous perches in both species, and strife between some of the blackbirds. In especially crowded cattail communities intra-specific strife has been reported -- the Long-billed Marsh Wren pipping holes in Red-wing eggs. During the morning an American Bittern was observed flying across the marsh pursued by a male blackbird, which for a time even rode on the back of the larger bird. No mammals were seen on the marsh, but muskrat houses and droppings were noted. Pied-billed Grebes occasionally nest on their houses.

An evaluation of this exercise may be valuable to demonstrate some of its broader implications. There are certain limitations to a study of only one locality for only one morning. A more extensive study might show that certain of the species which here appeared to be limited in their ~~disg~~ habitat choice are not ~~assally~~ so. This is true at least for the Song Sparrow and the Starling. It would also bring out more of the ecological relationships of the birds to both physical and biotic environments. This study is, however, very valuable as an introduction to bird ecology as it clearly demonstrates succession in bird communities as related to plant communities, and it also suggests different types of relationships of birds to their faunal environment.

#### S u m m a r y :

A day's study was made of the bird ecology of the Indian River Marsh.

The relations of the birds to their plant environment were as follows: There was a definite correlation of the bird communities with the different plant communities of this particular successional series, most species being restricted to one or two plant stages, while a few were more widely distributed. Restricted species used nesting materials from the stage where they and ~~th~~ their nests were found. The Red-wing Blackbird, the only species whose nest was found in more than one community, used materials from several regions. Food relations, if better known, could probably be similarly correlated. The degree of nest concealment increased through the successional stages, as the environment offered less natural protection from land predators.

Certain scattered relationships of the birds to their faunal environment were also noted.

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DISTRIBUTION OF BIRDS IN SUCCESSIONAL COMMUNITIES

Location of area: <i>Indian River marsh and vicinity.</i>	Date (or dates):
	Number persons making study: <i>nine</i>
	Weather rating: <i>Good</i>

General description of area:	Communities and Ecotones								
	open water and floating vegetation	Bulrushes	Bulrushes and Cattails	Cattails	Cattails and Sedge	Sedge	Cedar	Secondary (Hardwoods (aspens Poplar))	Clumped oak-maple
Species									
<i>Pied-billed Grebe</i>	✓	N							
<i>Red-wing Blackbird</i>	✓	✓	✓ N	✓	✓ N	✓			
<i>Black Tern</i>	✓	✓	✓	✓	✓	✓			
<i>Least Bittern</i>		✓	✓ N						
<i>Sora Rail</i>				N					
<i>Long-billed Marsh Wren</i>				✓ N					
<i>Virginia Rail</i>					✓ N				
<i>Swamp Sparrow</i>						✓			
<i>Northern Yellow-throated Warbler</i>						✓			
<i>Song Sparrow</i>						✓			
<i>Starling</i>							✓		
<i>Bronzed Grackle</i>							✓		
<i>Black and white Warbler</i>							✓		
<i>Red start</i>							✓	✓	
<i>Oven-bird</i>								✓	
<i>Catbird</i>									✓
<i>Wren</i>									✓
<i>Rose-breasted Grosbeak</i>									✓
<i>Indigo bunting</i>									✓
<i>Purple Finch</i>									✓
<i>Red-eyed Vireo</i>									✓
Birds occupying special niches:									
<i>Kingfisher</i>									N (near)
<i>Tree Swallow</i>									✓ (in large tree)
<i>Spotted Sandpiper</i>	On sandy spit between the successional stages.								