

**A STUDY OF THE
AVIAN ECOLOGY OF THE INDIAN RIVER
MARSH**

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Rothsville, Pa.
July 6, 1948

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Introduction

A study of the ecology of the birds of the Indian River Marsh was made by the advanced ornithology class of the University of Michigan Biological Station on June 26, 1948. The study was made over a period of five hours, from 6:30 A.M. until 11:30 A.M., at which time the investigation was terminated by a medium to heavy rain.

The topography of the area is such that rowboats were necessitated in moving from place to place in the marsh. Where suitable environments were located the boats were abandoned and the cattail, bulrush, and sedge communities were studied on foot. The trip was conducted by Dr. Olin Sewall Pettingill, Jr. assisted by Mr. Robert B. Lea; The three students who participated in the investigation were Mr. William B. Heed, Mr. Richard E. Tashian, and the author.

Location of the Indian River Marsh

The region of the Indian River Marsh which was studied is located approximately two and one-half miles northwest of the village of Indian River, Cheboygan County, Michigan. The Indian River carries the waters from Burt Lake to Mullet Lake and is about three and one-half miles long with a drop of less than one foot¹. The Sturgeon River now flows from the south into Burt Lake, however, originally it flowed into the Indian River near the eastern end of the village of Indian

1 Scott, I. D. 1921. Inland Lakes of Michigan. Wynkoop.

River. It was diverted into Burt Lake "when the necessity of navigating Indian River arose"². Before its diversion the Sturgeon River carried with it great quantities of silt which deposited in the lower quiet waters of the Indian River mouth, thus forming marsh about two miles long and a mile wide.

The greater number of the some five thousand lakes of Michigan are a hangover of the continental glaciers, the last of which deposited most of the surface of the state in the comparatively recent geological Cenozoic period. Burt and Mullet Lakes are no exception to this generalization.

Climatic Conditions

June 26, 1948 started as a clear cool day with morning temperature of 45° F. at 6:30 A.M., followed by a slow steady rise in temperature to 55° to 60° F. by about 9:30 A.M. with little change during the remaining period of study. Early morning skies were clear but as the investigation progressed, heavy clouds covered from the north and at 11:15 A.M. a slow but steady rain caused us to seek shelter. The trip terminated at 11:30 A.M. at which time the rain fell at a rather rapid rate. Wind velocity at the ground and water levels was zero.

The Plant Communities

The marsh at Indian River is composed mainly of four types of communities, viz. open water, bearing a few water lily pads (*Nymphaea*) near the sides and submerged *Elodea* and other aquatic plants, bulrush (*Scirpus*), cattail (*Typha*), and sedge (*Carex*). These communities lead to a swampy area covered

2 Ibid.

with grasses, pitcher plant ((Sarracenia) and other flowering plants; then a grass and shrub (Salix and Alnus) area followed by a mixed forest of spruce (Picea), cedar (Thuja), hemlock (Tsuga) at the margins and beech (Fagus), poplar (Populus), and maple (Acer) beyond the margin.

In many areas of the marsh the communities overlap into ecotones except in the climax forest on the shore and the open waterways which are scattered throughout the marsh. In general, the open water bears mostly Elodea with water-lilies along the sides at some points but not throughout. This is followed by a bulrush community in the deeper waters. Here the water seemed rather shallow, probably because of the dense matting of the bulrush roots and the submerged logs. The bulrush area blends gradually into the community of cattails as the bottom ascends to about four feet. The cattails seemed to be in deeper water than the bulrush but here submerged logs are less frequent and the roots are less frequent and less matted.

The sedge community is in shallow water of about one foot to one and one-half feet and is comparatively clear-cut on the cattail side but blends into an ecotone with the swampy region of grasses and flowering plants near the edges of the marsh. No birds were observed nesting or feeding in the sedge nor in the neighboring swamp, scrub and forest communities.

High species

Biological Relationships

Five species of avifauna were observed nesting in the

marsh. They were: the Sora (*Porzana carolina*), the Black Tern (*Chlidonias nigra surinamensis*), the Eastern Kingbird (*Tyrannus tyrannus*), the Long-billed Marsh Wren (*Telmatedytes palustris*), and the Red-winged Blackbird (*Agelaius phoeniceus*).

One nest of the Sora was found in a bulrush-cattail community (mostly cattail). The nest was an elevated platform, about five inches above the water's surface, well hidden in a clump of cattail. It measured about seven inches in diameter with an inner cavity some four inches across and an inch deep. The structure was composed of cattail flags which were flattened and folded into a platform with live flags surrounding and supporting it. The nest contained one downy young which apparently died the previous night as evidenced by the condition of the bird when skinned later in the day. No live Soras were observed, however their calls were heard throughout the marsh.

A Black Tern nest was located on an old muskrat mound in an open water inlet which was surrounded by bulrush on three sides at a distance of about fifteen feet. The muskrat house was composed of bulrush and cattail flags and rose above the surface five to six inches. On the apex of this was a small depression bearing three eggs. The Black Tern was by far the commonest bird of the area. While we examined the nest they came from all points and in large numbers to protest our presence with dives and short screaming notes. The larger insects could occasionally be seen in the bill of the adult birds, and frequently the terns could be seen dipping to pick up an insect as they raced aimlessly over the marsh.

Some fifty feet from the tern's nest, in a post which projected about two feet above the surface of another inlet, we found the nest of the Eastern Kingbird. The nest was in a cavity in the post, about eighteen inches above the surface, where it was exposed on top and one side and supported in the post below and about two-thirds around the sides. The nest was roughly five inches in diameter and three inches deep with a deep pocket of about one and one-half inches. Its exterior was constructed of dry grass and weed stems and aside of the nest were pieces of string and cotton. The nest contained three half-grown young.

About six nests of the Long-billed Marsh Wren were found in a rather small area in the cattail community where the community of bulrush barely fringed the open water so that these nests were only fifteen to twenty-five feet from the open water. No nests were found farther back in the wide expanse of cattail. The nests were in various stages of completion, ranging from about one-third to nearly complete, thus presenting ideal subjects for a study of the construction of the nest. It is a globular structure, the hull of which is composed entirely of dried flags of cattail. These are neatly woven and meshed to live and dead cattail shoots so that the nest is quite strong and durable. On one nest we observed recent workings, revealing the fact that the flags used are taken from the water for they were thoroughly soaked; this enables the small bird to bend the stiff cattail shoots and weave them as he desires. In completed nests we found

an almost light-tight structure lined with the down of the cattail flower except for a tiny, inconspicuous opening, less than an inch in diameter, on the side of the nest. None of the nests held eggs or young.

Red-winged Blackbirds rivaled the Black Tern with respect to the number of individuals present in the marsh. They could be seen perched on the cattails and flying about over the entire marsh and on trees of the neighboring climax forest. Several females were seen hopping from lily-pad to lily-pad in search of insects. Occasionally the birds flew overhead bearing insects in their bills, apparently bent on feeding the fledglings in their nests.

The two nests discovered were deep in the cattail community where they were mounted on one of these plants. They were firmly attached to the cattails by woven strips of the same plant. The nest bore an outer shell of strips of this plant with a deeper lining of decayed grasses and an inner lining of fine grass which must have been carried for about a half mile from the shore. These nests were some six inches in diameter and about four and one-half inches high with inside dimensions of about three inches deep and two and one-half inches across. One nest was empty (many immature birds were observed flying about the marsh.) The other bore two newly hatched young and one egg.

On the open water Coots (*Fulica americana*) and Pied-billed Grebes (*Podilymbus podiceps*) swam and dived. Two of the former and about ten of the latter were seen; however

many others sounded their loud calls in other parts of the marsh. These birds usually moved quickly out of sight into the neighboring bulrush as we came upon them. No other birds were observed in the bulrush.

In the cattail community Red-winged Blackbirds and Long-billed Marsh Wrens were seen, and the Sora, Virginia Rail (Rallus limicola), and Coot were heard. From the cattail-sedge ecotone and the sedge community we flushed two American Bitterns (Botaurus lentiginosus) which were seen only in flight. (A third Bittern was flushed from a small clearing in the forest.)

The grassy swamp area produced Swamp Sparrows (Melospiza georgiana) and Song Sparrows (Melospiza melodia). These two species were present in the grass-shrub ecotone and on the conifers bordering the forest. In the conifer edge we saw the Black-capped Chickadee (Parus atricapillus), the Robin (Turdus migratorius), the Cedar Waxwing (Bombycilla cedrorum), the Black and White Warbler (Mniotilta varia), the Black-throated Green Warbler (Dendroica virens), and the Northern Yellow-throat (Geothlypis trichas brachidactyla).

In the beech-poplar-maple forest we saw or heard the following species: Black-billed Cuckoo (Coccyzus erythrophthalmus), Crested Flycatcher (Myiarchus crinitus), Wood Peewee (Contopus virens), Red-eyed Vireo (Vireo olivaceus), Ovenbird (Seiurus aurocapillus), American Redstart (Setophaga ruticilla), Scarlet Tanager (Piranga olivacea), Rose-breasted

Grosbeak (Pheucticus ludovicianus), and the Purple Finch (Carpodacus purpureus). In open areas in the forest (roadways etc.) and about the buildings of Medoc Landing the Belted Kingfisher (Megasceryle alcyon), Kingbird (Tyrannus tyrannus), Phoebe (Sayornis phoebe), Tree Swallow (Iridoprocne bicolor), Crow (Corvus brachyrhynchos), and Chipping Sparrow (Spizella p. passerina) were observed.

Flying over the marsh were Great Blue Herons (Ardea herodias), Black Ducks (Anas rubripes), Common Terns (Sterna hirundo), Caspian Terns (Hydroprogne caspia), and Tree Swallows (Iridoprocne bicolor).

Summary

Thirty-six species of birds were observed in the vicinity of the Indian River Marsh on June 26, 1948. Five of these species were found nesting in the marsh. All of these used the plants of the marsh as nesting materials. Where feeding was observed, it was on insects and plant materials of the marsh. The only feeding seen on the surface was that of the Red-winged Blackbird on the floating plant community which sparsely bordered the open water. Nests of three species (Sora, Long-billed Marsh Wren, and Red-winged Blackbird) were located in cattail communities. The nest of the Black Tern was on a muskrat mound in an open water inlet and that of the Kingbird was on a post in an open water area.

Young Red-wings were in abundance about the cattail

communities and in the swampy grass and shrub ecotone, many immature Swamp Sparrows were seen. An early season in Northern Michigan probably accounts for the surprisingly low number of nests that were found.

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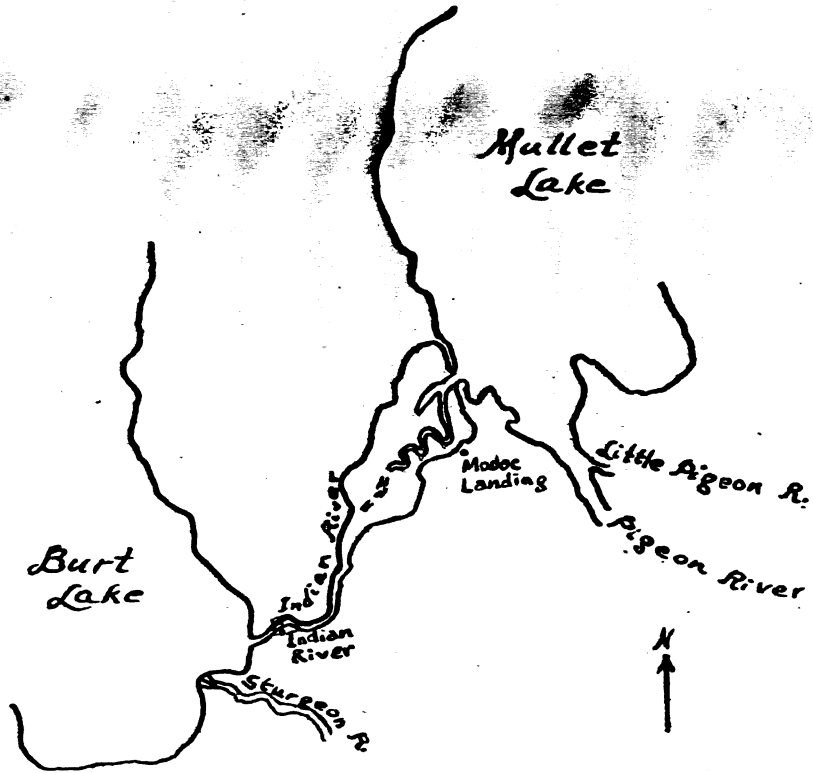
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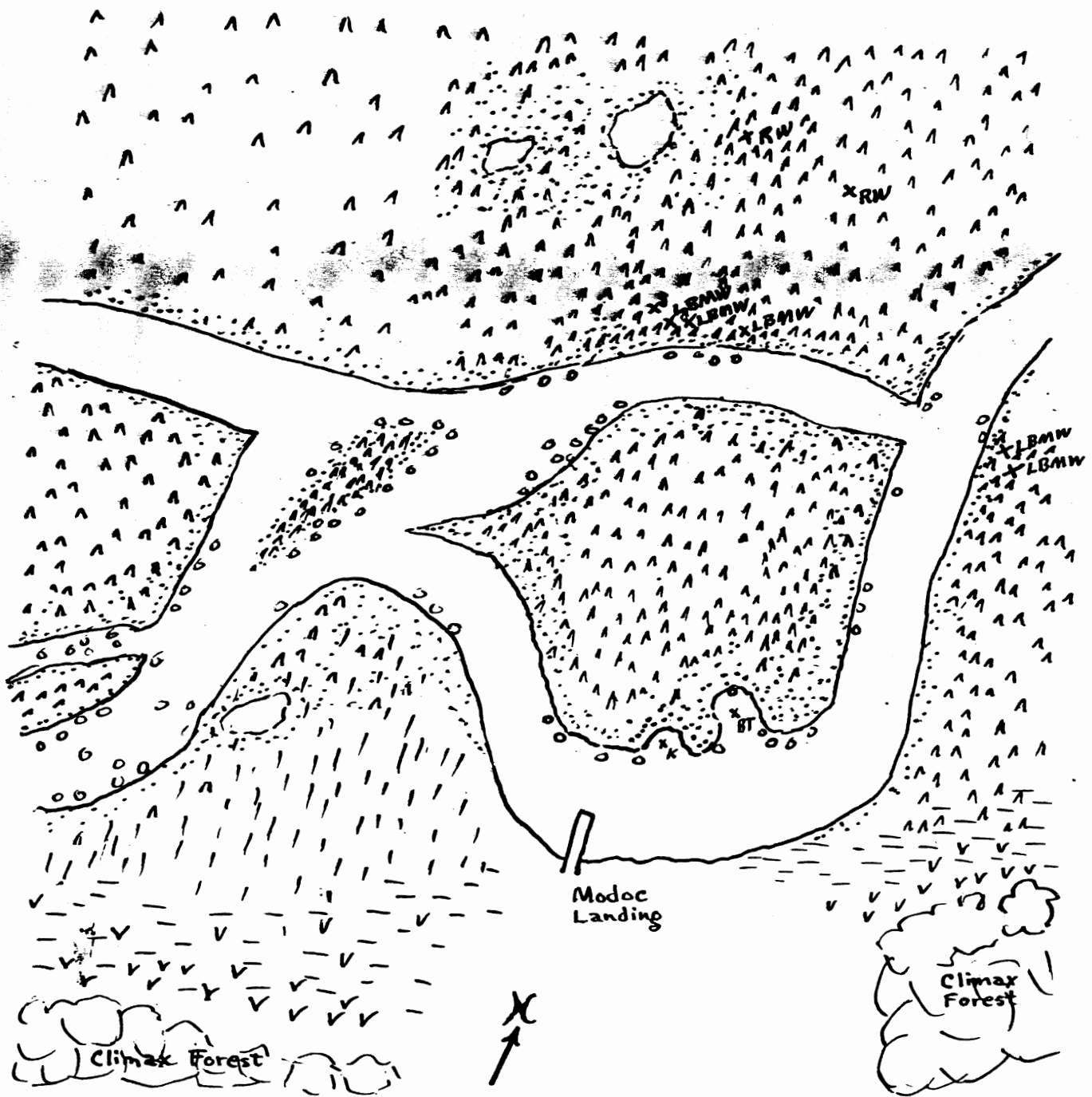
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MAP OF THE INDIAN RIVER AND INDIAN RIVER MARSH
(after Scott)



MAP SHOWING PLANT SUCCESSION AND LOCATION OF NESTS OF
THE INDIAN RIVER MARSH



Legend:

- | | |
|--------------------------------------|--------------------------------|
| ○ Water Lily | X Nest |
| ⊞ Bulrush | LBMW Long-billed
Marsh Wren |
| △ Cattail | S Sora |
| + Sedge | BT Black Tern |
| V Shrub | RW Red-wing |
| - Grasses
and Flowering
Plants | K Kingbird |