

**A STUDY OF THE BIRD COMMUNITIES OF THE  
INDIAN RIVER MARSH AREA**

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**by**

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## TABLE OF CONTENTS

	Page
Introduction .....	1
Scope and Purposes of Study ....	1
Acknowledgments .....	1
Location .....	1
Climatic Factors .....	2
Temperature .....	2
Wind Velocity .....	2
The Communities .....	2
Open Water Community .....	3
Floating Plant Community .....	3
Bulrush Community .....	3
Cattail Community .....	3
Sedge Community .....	3
The Ecotones .....	4
Bulrush-Cattail Ecotone .....	4
Sedge-Cattail Ecotone .....	4
Sedge-SRrub Ecotone .....	4
Mixed Woods .....	4
Biological Relationships .....	5
Bird Species as Related to Each Community .....	5
Effect of Ecotones .....	5
Bird and Food Relationships ....	6
Bird and Animal Relationships ..	6
Interspecific and Intraspecific Relationships of Birds .....	7
Discussion .....	7
Black Tern .....	7
Pied-billed Grebe .....	8
Long-billed Marsh Wren .....	9
American Bittern .....	10
Kingbird .....	10
Northern Yellow-throat .....	11
Swamp Sparrow .....	11
Virginia Rail .....	11
Sora .....	11
Summary .....	12
References .....	14
Chart .....	15

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INTRODUCTION

The field trip out to the Indian River Marsh was conducted in order to study the ecological relationships which exist among the plant, animal, and bird life in an area having a succession of plant communities.

This study of bird communities was made by the advanced ornithology class of the University of Michigan Biological Station during the summer session of 1947. It was carried out on June twenty-eighth, and this report is based on the information obtained from 6:15 to 11:00 A.M. on that day.

I am indebted to Dr. Olin Sewall Pettingill, Jr., Dr. Theodora Nelson, and Mr. Robert Lea for their guidance in making the study, and especially to Dr. Pettingill and Mr. Lea for their assistance in preparing this report.

LOCATION

The Indian River Marsh is located in the northern part of the southern peninsula of Michigan near the southeastern shore of Burt Lake. It is from this shore that the Indian River drains Burt Lake and flows northward to Mullett Lake. The section of the country through which the river flows rises gradually to a sandbar which extends

to the town of Indian River. Until about sixty years ago "the Sturgeon River flowed behind this bar into the Indian River and choked the channel with its heavy deposits of sand." <sup>1</sup> Owing to this huge deposit of sand, that section of the land was flooded forming the Indian River Marsh. Thus, the area that sixty years ago was a lake is now a marsh. "When the necessity of navigating Indian River arose, the results of the deposition were recognized and an artificial channel was dug which turned the waters of the Sturgeon River directly into Burt Lake." <sup>1</sup> This lake is one of the chain of inland lakes of Michigan called the "Inland Route" which occurs in the Cheboygan River Basin. This entire region was once covered by the glacier, and the lakes were formed during the retreat of the ice sheet.

#### CLIMATIC FACTORS

The weather during the study was favorable for the greater portion of the time involved. The sky was overcast to clear with the temperature ranging from 75 to 80 degrees. The wind velocity was approximately five miles per hour. However, at about nine o'clock, a thunder storm temporarily interrupted the study. After the storm had passed, the class returned to the marsh and completed their observations.

#### THE COMMUNITIES

Five separate communities were present in this marshy

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1. Scott, I.D. Inland Lakes of Michigan. Wynkoop Hallenbeck Crawford Co. Lansing, Michigan. 1921 p.79.

area. The Open Water Community consisted of the main channels of the Indian River with no vegetation growing above the surface. This community is not a suitable nesting site for marsh birds, but it provides the food for such species as the Black Duck and Pied-billed Grebe, for examples. The next pure community to be recognized was the Floating Plant Community in which the dominant plants were water-lilies (Nymphaea and Castalia). I saw many water beetles and other insects here, and this is a favorite spot for the numerous Red-wing Blackbirds of the marsh to feed. In addition, the nest of a Kingbird, another insectivor, was found here. Large Bulrush (Juncus) and Cattail (Typha) Communities are located in the marsh adjoining one another. The bulrushes were growing in deeper water than were the cattails, but both species of plants are examples of deep-water vegetation. The next community to be studied was a Sedge (Carex) Community, located near the cattails. The water here when present was rarely over one foot deep, although the soil of the area was wet and muddy. This community soon gave way to a much larger ecotome of sedge and shrub, and I did not see any birds either nesting or feeding in it.

Most of the birds studied were not difinitely limited to one specific community since the communities themselves were not sharply defined. The Black Tern, for example, was seen nesting in two communities, although it seemed to

prefer the bulrush to the cattail community. Also, more species of birds were observed in ecotones than in the pure communities.

#### THE ECOTONES

In addition to the communities, areas where mixing of the communities occurred were present. One of the principal ecotones was one which consisted mainly of bulrushes and cattails. This mingling was probably due to the fact that the floor of the marsh was not level. This ecotone presented ideal conditions for nesting bitterns, and the nest of an American Bittern was discovered here. There was a similar mingling of the cattails with sedge nearer shore, and another large ecotone was composed of sedge and shrub. The latter was an excellent nesting site for the Northern Yellowthroat and Swamp Sparrow. The shrub (Myrica Gale) provided adequate and necessary support for the nests which were composed mainly of the sedges. In addition, the shrubs supplied perches for singing and roosting and shelter from all types of weather. Cattails (Typha), pitcher plants (Sarracenia purpurea), aspen (Populus), and willows (Salix) were also present. Beyond this last ecotone, the marsh receded into a boggy area of mixed coniferous woods. Here the dominant trees were pine (Pinus), cedar (Chamaecyparis), and balsam-spruce (Abies-Picea). This ecotone provided suitable living conditions for numerous species of birds.

### BIOLOGICAL RELATIONSHIPS

The birds nesting in the bulrush, cattail, and sedge communities and ecotones have and undoubtedly require more sunlight than those living in the woods. The nests found on the marsh were carefully protected from most of the sunlight, but the adults themselves are able to fly, search for food, etc. in open sunny areas.

In the bulrush community, nests of the Black Tern were found although other nests of the same species were also discovered in a cattail community. Thus, this bird requires some sort of deep-water vegetation in which to construct and hide its nest. All the nests discovered were composed of floating debris of either Juncus or Typha, depending upon the community in which they occurred. Apparently, the birds did not go great distances to gather nesting material, but depended upon the material available in their chosen community. A pied-billed Grebe was found nesting in a cattail community. The grebes, like the terns, apparently depend upon their immediate surroundings for nesting material. The floating nest of the grebe was composed of wet cattail debris which the adult had heaped together.

No effect of edge was noted, but there were several ecotones occupying considerable areas of the marsh. Here greater varieties of birds were found nesting than in the pure communities. The American and Least Bitterns and also the Kingbird were nesting in an ecotone of bulrushes and

cattails. Two Northern Yellow-throat nests were located in a sedge and cattail ecotone, while both the Virginia and Sora Rails were observed in a sedge and shrub ecotone. None of the above mentioned species were seen in the adjoining communities. However, both Black Terns and Pied-billed Grebes may frequently be found nesting in an ecotone of bulrushes and cattails as well as pure communities of these plants. Thus, here there was a mixing of both the bird and plant species of neighboring communities. This was the only instance where I noted any such mixing of bird species. In the mixed woods surrounding the marsh a great variety of birds were heard (see chart).

The birds, for the most part, were seen in communities or ecotones where their particular type of food was abundant. Most of the birds heard in the wooded area are insectivores, while the seed-eating Swamp Sparrow was seen in a shrubby area. A Black Duck and Pied-billed Grebe, both followed by young, were seen swimming on one of the main channels in the marsh. In such an open water community these fish-eating species can obtain their food. Also, Dr. Pettingill reported a Red-wing feeding upon insects in a lily-pad community.

I observed very few vertebrates other than birds in the marsh. However, I did see one Painted Turtle (Chrysemys picta) in the sedge-shrub ecotone, and Dr. Pettingill reported seeing a large field mouse in a sedge community.

According to W. A. Welter, the chief enemies of the Long-billed Marsh Wren are some of the smaller mammals such as meadow mice and jumping mice which live in marshy areas. These animals, being small, can easily enter the openings<sup>2</sup> into the nests.

Owing to the limited amount of time spent in making this study, I noted very few interspecific and intraspecific relationships among the birds seen. However, one interesting ecological relationship was observed. A Pied-billed Grebe chick was found in the water near its nest. Its eyes looked glazed and it was generally in poor condition. It is very probable that the adult followed by her young had swum too close to the nesting territory of a Black Tern and had been attacked by the bird.

#### DISCUSSION

In carrying out this study of bird communities, emphasis was placed on the nests of the various marsh birds. The first nests to be observed were those of the Black Tern. Seven nests were found with eggs, but only one containing young. These birds seemed to cup out their nests from floating debris, consisting mainly of deep-water vegetation. Most of the nests were composed of bulrushes, although cattails are frequently used by these birds. The first nest to be discovered was located in a bulrush community, twenty-

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2. Welter, W. A. The Natural History of the Long-billed Marsh Wren. Wilson Bull. 1935 47:34.

five inches above the water level. Three eggs were present in the nest. The adults loudly protested our presence, and apparently both sexes participated in the defense of the nest by means of threat displays and several attacks on members of the class. The other nests were similar to the one just described with a few exceptions. The third nest to be discovered was located in a cattail community rather than bulrushes and was composed of cattail debris. This nest seemed to be more exposed than any of the others. Another nest, also composed of cattail debris, was supported by a submerged log. The nest containing the young was a typical nest located sixteen inches above the water. The two young in the nest were very wet and unattractive.

Only one nest of a Pied-billed Grebe was found and studied. It was a floating nest situated in a cattail community. Apparently, the bird had scooped up floating cattail debris and had heaped it together. These birds may scoop up debris from the marsh bottom, but as a general rule, floating material is used. Although this particular nest was found among cattails, any type of deep water vegetation may be used by the grebe. The nesting habits of the bird are primitive and strangely reptile-like. During the incubation period when the bird leaves the nest, it covers the eggs with moist, rotting vegetation and allows the sun's rays together with the heat generated by the rotting vegetation to provide the heat for incubation.

Later in the morning, an adult grebe followed by two young was observed swimming on one of the main channels of the Indian River.

Another bird found nesting in the marsh was the Long-billed Marsh Wren. The male builds many nests although only the female's nest is used in rearing the young. Three male or dummy nests were found, located in a row fairly close together. These nests were quite conspicuous, especially when compared with a true nest. Only one was lined with cattail down, and this one only partially. These nests were located in an ecotome of sedge and cattails. The work of Welter agrees with this finding. According to him, "A cattail sedge association was greatly preferred.... by the males in selecting territories."<sup>3</sup> He also stated that, "Allen considered the sedge association the optimum condition for nesting of this species."<sup>3</sup> A true nest was also seen situated one foot off the surface of the water. In constructing the nest the adult had used a fairly large quantity of green material. She had taken growing sedge and woven it into the nest. It was supported by sedge and a few cattails. The nest was lined with cattail down, but no eggs were present. Material found nearby was used rather than bringing in things from other sections of the marsh. In another female nest of very similar construction, three young were present, together with two eggs. One of the eggs

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3. Welter, W. A. The Natural History of the Long-billed Marsh Wren. Wilson Bull. 1935 47:4

was typically colored, while the other was unpigmented. Strangely enough, no adult bird appeared to protest our presence.

The high point of the trip was the discovery of an American Bittern on her nest. The nest was situated in an ecotone of bulrushes and cattails, about 500 feet from shore. It seemed to be composed mainly of dried cattails found in the immediate vicinity, but more attention was paid to the bird's behavior than to the nest itself. Although there were approximately sixteen persons grouped around the nest and several approached and attempted to flush the bird, she froze to her nest and refused to leave. She uttered loud calls and defiantly made threat displays. In one of these displays, she lifted her body from the nest and it was determined that four eggs were present, one of which was pipped. Since this is not typical behavior, she probably sensed the thunder storm that was approaching and because the brooding instinct was very strong, refused to leave her nest. In any case, the class only succeeded in making the bird very angry and was not able to flush the bittern. An ecotone of bulrushes and cattails provides an excellent habitat for bitterns. One Least Bittern was seen flying over the area, but no nests were reported.

A pair of Kingbirds had built their nest on a stump in the river. This nest was near shore and contained three eggs. The stump was in an ecotone of cattails, bulrushes,

and water-lilies. I failed to note the material composing the nest. A stump, fence post, or dead limb seems to be a favorite spot of this bird. It does not seem to like leafy trees, but prefers open areas.

Nests of the Northern Yellow-throat were found in an ecotone which consisted mainly of sedge and shrub. Each nest was supported by a crotch of Myrica Gale. They were both lined with fine grasses, and both dead and living sedges were woven into the nest. These nests were extremely well hidden and beautifully protected. This portion of the marsh is called rising land. Many dead tree stumps were present together with an accumulation of other debris as the result of high water and winter weather. Such trees as spruce and cedar were moving into the area. This type of ecotone provides good nesting sites for Northern Yellowthroats and Swamp Sparrows. This area is not dry enough for the Short-billed Marsh Wren to be found in. These birds prefer meadows for nesting.

In the same ecotone, the class found what they thought was an old nest of the Swamp Sparrow, although there was no way of making sure. It was located in the shrub Myrica Gale and was composed mainly of sedge. Although Swamp Sparrows were common in the area, no new nests were found.

Here also, Virginia and Sora Rails were spotted flying. However, no nests were discovered by the class.

SUMMARY

1. One nest of a Pied-billed Grebe was found in a cattail community. It was a typical floating nest composed of cattail debris. The nest was empty, but one spindle-shaped egg and one young were found floating near-by.

2. An American Bittern was located on her nest which was situated in an ecotone of bulrushes and cattails about 500 feet from shore. It was determined that there were four eggs in the nest, one of which was pipped.

3. A Least Bittern was seen flying over the ecotone of bulrushes and cattails.

4. A Black Duck, followed by ten feathered young, was observed swimming on one of the main channels of the marsh.

5. The class saw one Virginia Rail and one Sora flying over an ecotone which consisted mainly of sedges and shrubs. However, no nests of these birds were located.

6. A Coot was heard on the marsh, but neither the birds themselves nor their nests were located.

7. Seven Black Tern nests containing eggs and one containing young were found. The majority of these nests were situated in bulrush communities. However, two were found in cattail communities. The nests were composed of the deep-water vegetation found in their respective communities. A typical nest was located 25 inches above the water and measured ten by 24 inches across.

8. A pair of Kingbirds had built their nest on a stump in the river near shore. It was located in an ecotone of cattails, bulrushes, and water-lilies. Three eggs were present in the nest.

9. Several nests of the Long-billed Marsh Wren were studied by the class. Two female nests, one containing three young and two eggs were found, in addition to three dummy nests. All were located in an ecotone of sedge and cattails. They were composed mainly of sedges, and only the true nests were lined with cattail down.

10. Two nests of the Northern Yellow-throat were discovered in an ecotone of sedge and shrub. These nests were beautifully protected. A typical nest was composed of both dead and living sedges and was lined with fine grasses. It was located about 11 inches from the ground and measured four and one-half inches in its outer diameter and was two and one-half inches deep. Four eggs were present in both nests found during this study.

11. In this same ecotone, Swamp Sparrows were very common, but no nests were located.

12. Black and White Warblers were dominant in the shore line of spruce and cedar which bordered the bog. Other birds seen or heard in this mixed woods area were the Crested Flycatcher, Phoebe, Least Flycatcher, Blue Jay, Crow, Black-capped Chickadee, Winter Wren, Robin, Veery, Red-eyed Vireo, Oven-bird, American Redstart, Cowbird, Scarlet Tanager, Rose-breasted Grosbeak, Purple Finch, and Chipping Sparrow.

BIBLIOGRAPHY

- Deusing, Murl  
1931 Nesting Habits of the Pied-billed Grebe. Auk,  
56:367-373.
- Hochbaum, H. A.  
1944 The Canvasback on a Prairie Marsh. American  
Wildlife Institute, Washington, D. C.
- Kendeigh, S. C.  
1945 Community Selection by Birds on the Helderberg  
Plateau of New York. Auk, 62:418-436.
- Pettingill, O. S., Jr.  
1938 Intelligent Behavior in the Clapper Rail. Auk,  
55:411-415.
- Scott, I. D.  
1921 Inland Lakes of Michigan. Wynkoop Hallenbeck  
Crawford Co., Lansing, Michigan.
- Walkinshaw, L. H.  
1935 The Virginia Rail in Michigan. Auk, 54:464-475.
- Welter, W. A.  
1935 The Natural History of the Long-billed Marsh Wren.  
Wilson Bull., 47:3-34.

DISTRIBUTION OF BIRDS IN SUCCESSIONAL COMMUNITIES

Location of area: The Indian River Marsh is located in the northern part of the southern Peninsula of Michigan, where the Indian River drains the southeastern end of Burt Lake.	Date (or dates): June 28, 1947 Number persons making study: 16 Weather rating: good (except for storm)
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General description of area: The main channels of the Indian River were surrounded by bulrush communities which then gave way to cattail and sedge communities and ecotones. at the edge of the marsh an ecotone of sedge and shrub was present. Finally, the marsh receded into a bog of pine, spruce and cedar.	Communities and Ecotones								
Species	Open Water Community	Floating Plant Community	Bulrush Community	Cattail Community	Bulrush & Cattail Ecotone	Sedge & Cattail Ecotone	Sedge Community	Sedge & Shrub Ecotone	Topped Woods of Pine, Balsam Spruce & Cedar
Pied-billed Grebe	✓			✓					
American Bittern					✓				
Least Bittern					✓				
Black Duck	✓							✓	
Virginia Rail							✓		
Sora							✓		
Coot	✓								
Black Tern			✓	✓					
Black-billed Cuckoo									✓
Hairy Woodpecker									✓
Kingbird		✓			✓				
Crested Flycatcher									✓
Least Flycatcher									✓
Black-capped Chickadee									✓
Winter Wren									✓
Long-billed Marsh Wren						✓			
Robin									✓
Weary Willow Thrush									✓
Red-eyed Vireo									✓
Black and White Warbler									✓
Oven Bird									✓
Northern Yellow-throat								✓	
American Redstart									✓
Red-wing		✓							
Scarlet Tanager									✓
Rose-breasted Grosbeak									✓
Indigo Bunting									✓
Purple Finch									✓
Swamp Sparrow								✓	