

BIRDS OF THE INDIAN RIVER MARSH

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Zoology 119.....Dr. O. S. Pettingill

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The study of birds in successional communities in the Indian River Marsh area was made by a group of advanced bird students under the direction of Dr. O.S. Pettingill. The group was distributed in five row boats and from these the various channels of the river were explored. Whenever possible, we waded into the beds of cat-tails, sedges and rushes to flush birds or to look for nests. The study of the marsh itself was made in three hours, with about an hour of study in the wooded marginal area.

The Indian River in Cheboygan County, Michigan, is the outlet of Burt Lake, draining it at the south end through a low sand plain. It flows to the north through a break in the uplands which is about a mile in width and extends to Mullet Lake. The stream is rather sluggish because of the small drop of less than one foot which occurs in the first mile and a half from Burt Lake. South of the town of Indian River, the stream meanders through a swampy mud-flat which is one-half mile wide. In this flat are found the various plant associations which house the birds of the marsh community. They have been affected by anthropic (man-made) factors such as building of piers, dredging of channels and continued fishing and boating.

The study of the marsh area was made on a warm sunny morning with an increasing cloudiness to the northeast resulting in a quick electrical storm which was spent in about thirty minutes. The remainder of the morning was clear and warm with but a slight breeze. The temperature ranged from 70 to 80 degrees.

THE COMMUNITIES

The Open Water Community may contain plants such as Potamogeton, Vallisneria, Ceratophyllum, Utricularia, Myriophyllum, Elodea and Algae species. In this association species were not observed as the water was turbid and would have required the use of a plant hook. The plants ordinarily harbour a supply of food for Terns and Kingfishers in the form of insect larvae, fish and invertebrates. Parts of the roots, stems, leaves and fruits are used as forage for Ducks, Coots and Grebes. The water depth is variable.

The Floating Plant Community found in water not exceeding eight feet includes species of Nymphaea, Nuphar and some of the submerged plants found in open water. Additional insect and invertebrate life is present on the upper and lower surfaces of the lily pads and their rootstocks and stems may be used as forage. This community was very restricted because of the artificial control of the stream for traffic.

The Bulrush Community found in water not more than six feet deep was present in small areas but, for the most part, was in a Cat-tail or Sedge community resulting in a variable ecotone structure. Plants of Scirpus americanus, S. occidentalis, S. validus, and a small area of Phragmites maximus were present. The seeds of Scirpus and Phragmites are eaten by water fowl and the bulbous bases of the Scirpus are used as forage.

The Cat-tail Community was by far the dominant one in the marsh area with the water in most cases under four feet, but, the bottom was uncertain and an occasional deep hole was discovered by members of the party. Typha latifolia was abundant. The Red-winged Blackbirds were common in this area. Other than insect larvae and invertebrates, small mammals such as the meadow mouse are present. This accounts for flushing such birds as Coot, Bittern and Rails from this area.

The Sedge Community merged from a Cat-tail-Sedge ecotone almost directly into one of Sedge and low shrubs. Carex was the most common species, with Sarracenia, the pitcher plant; Menyanthes, the buckbean, and Iris being invading species of herbaceous plants. Food supply in this area includes seeds and roots along with insects and small mammals.

The Shrub Community may be classified as to high and low shrub areas. The low shrubs invading the Carex include Myrica gale, Salix spp., Lysimachia and some Chamaedaphne. The high shrubs include Alnus incana, Salix spp., Cornus stolonifera, and tree saplings such as Acer rubrum and Thuja occidentalis. This area is mainly one of nesting and singing sites rather than one of feeding.

The Climax Forest Community in this area was a mixture of Thuja occidentalis, Acer rubrum, Picea mariana and Populus tremuloides. The forest fringes the marsh quite near the open water with the exception of the Carex-low shrub ecotone in which there is a gradual succession from low shrub to high shrub to trees. The birds of this area are mainly insect and seed eaters.

Plant associations by their merging with plants of an adjoining area or by their invasion of another association form a region of mixed vegetation commonly called an ecotone. In the Indian River Marsh, Cat-tail and Bulrush, Bulrush and Sedge, and Sedge and Cat-tail ecotones were found each surrounded by open water in the channel. In the marsh these ecotones were similar in appearance but provided a varied group of birds depending on their specific requirement in the area.

BIOLOGICAL RELATIONSHIPS

The birds seen in the open water were without question in search of food, namely the Black Duck and Ducklings, the Belted Kingfisher, Black Terns, Tree Swallows, and Kingbird. The Tree Swallows and Black Terns with their circling and then diving manner of flight in getting food added much activity to the marsh in general. A Kingbird nest on a post in open water was made of grasses shaped into a cup-like structure. It contained three white somewhat speckled eggs. The interspecific relationship existing here was mainly one of competition for food.

A nest of the Black Tern was found in the Bulrushes, built on a platform of debris, farther out than the Cat-tails. The three eggs were in a cup-like depression in a mass of old reeds of Scirpus. They were a buffy color with chocolate colored specks. The Herring Gull and Common Tern were seen in flight over this area apparently in search of food harbored around the rootstocks of the plants. The Bulrushes were also used as perches and illustrated the intraspecific relationships of the Black Tern in competition for food, nest sites and perches.

The ecotone of Cat-tail and Bulrushes was a popular nesting place for the Red-winged Blackbird, Pied-billed Grebe, American Bittern and Black Tern.

The Red-winged Blackbird nest, made of grasses in a cup-like structure was suspended just above the water in the Cat-tails. It was three inches in diameter, contained 4 bluish speckled eggs and was feathered with down. This area serves as a nesting and singing territory for this group of individuals and partially as a feeding ground. Their society is an amiable one and they tend to protect another birds nest.

The Pied-billed Grebe builds a large nest on a pile of floating debris. The inside diameter is about 10-12 inches with a shallow hollow in which the eggs are laid. We found one spindle-shaped white egg floating on the water. Presumably washed away by a previous heavy rain - which likewise may have washed the baby Grebe into the water. It was water-logged and had a wound on the head and back which we presume was the result of an attack by a Black Tern. The bird dried out and became fluffy but it died on the same day.

The American Bittern was found on a nest in the Cat-tails. There were 4 eggs, one of which was pipped. The bird was frozen on the nest and could not be flushed from it. A question arose as to the reason, the approaching storm or the pipped egg or both. The nest was loosely snapped to fit the body and made of Cat-tails and Bulrushes. The Bittern in this habitat could move easily between the Cat-tails and thus escape predators - protective coloration was very effective.

The Long-billed Marsh Wren gave us quite a search in the Cat-tails for its nest which was woven into a basket-shaped structure with an opening on the lower side. It

was lined with Cat-tail down and suspended about 2 feet above the water level. The nest contained 3 young birds, one chocolate brown egg and one white one. A question arose as to the color but it seems to be a question of pigmentation rather than one of parasitism.

The Black Tern nest found in this area was similar in structure to that found in the Bulrushes but was made of floating Cat-Tails and contained 2 eggs. Other birds seen as a result of flushing were the Virginia Rail, Least Bittern and Sora Rail. In the same area the Coot was heard calling. No interspecific relations were ascertained but one might deduce that competition for nesting sites and food would be a big factor.

The Sedge and Cat-tail ecotone made an excellent nesting site for the Long-billed Marsh Wren. Here we found three dummy nests of sedges without linings and one nest lined with Cat-tail down but which was unoccupied. The adult bird guarded the nest closely and scolded loudly not far away from it. A Red-wing Blackbird nest was also found in the area with the sedges used for shaping the nest, and the Cat-tails for suspension.

The Low Shrub ecotone was on the edge of the Sedge and Cat-tail ecotone. Sedge was a dominant herbaceous plant with scattered low shrubs in which we saw the Chipping Sparrow and Swamp Sparrow, The Yellow Warbler, American Redstart and the Northern Yellow Throat were heard singing. Two nests of this bird (the Northern Yellow Throat) were found. One nest in the fork of a

branch of Myrica gale was 3 inches in diameter, $2\frac{1}{2}$ inches on the inside. The cup-shaped nest was made of grassy material. It was 11 inches above the surface of the water and contained 4 speckled eggs. The other nest was at least fifty feet away, 10 inches above the water, in the fork of some dry twigs in a clump of Myrica gale and sedge. It also contained four eggs. The intra-specific relations here would include nesting and singing territory whereas the interspecific relations would more likely be one of competition for food.

The High Shrub and Woods Edge ecotones can well be synonymous in this mixed climax association. The birds heard here can scarcely be specifically placed in one or the other and no nests were recorded. The Black-billed Cuckoo, Hairy Woodpecker, Crested Flycatcher, Phoebe, Least Flycatcher, Robin, Red-eyed Vireo, Black and White Warbler, Oven Bird, American Redstart, Cowbird, Rose Breasted Grosbeak, Purple Finch, Chipping Sparrow, Song Sparrow and Indigo Bunting were heard. Interspecifically these birds compete for singing perches and nesting territories. The variations in food selection of these birds I would assume makes it possible for so many species to live in a limited area. Of the species listed, the Indigo Bunting, Swamp Sparrow, Robin and Red-eyed Vireo were seen.

The Mixed Climax association offered a wide selection of nesting sites and singing posts. The Oven Bird, Scarlet Tanager, Blue Jay, Black-capped Chickadee, Winter Wren, and Veery were heard singing in the forest. The Winter Wren was about mid-way up the trunk of a

spruce, while the Blue Jay and Oven Bird were using the tree tops.

This marsh area may be described from the standpoint of sinking land, or, to approach it from the climax forest it is a marsh area filling in as a result of accumulated organic matter and the inward migration of plant species. Communities herein described are distinctive in their vegetation and species of Birds represented in each. Because of the gradual change in plants from the shore growth of Spruce and Cedar into the lowland, and open water, there is a mixed group of birds, or overlapping of the bird species, in some of the communities. This may be explained in terms of niche requirements; namely - an adequate food supply, nesting material, nesting site and singing perch. On the basis of these factors the presence or absence of a species may be explained.

SUMMARY

1. The study of "Successional Communities" in the Indian River Marsh in Cneboygan County, Michigan, was made by the Advanced Ornithology class under the direction of Dr. O.S. Pettingill.
2. The Indian River drains Burt Lake into Mullet Lake and flows through a low mud-flat.
3. The Open Water Community in deep water harbours many insect larvae and invertebrates in its aquatic vegetation. It is used mainly as an area for song flights and flights for food.

4. The Floating Plant Community found in small limited areas was restricted as a result of anthropic factors.

5. The Bulrush Community provides a limited cover for protection, the seeds and bulbous bases of plants for food, and old stems for nesting materials.

6. The Cat-tail Community found in water under four feet deep was most extensive in the area. It provided excellent singing perches, nesting sites and food for several bird species.

7. The Sedge Community is mostly one of ecotones formed with Cat-tails and Bulrushes, and also low shrubs. As a result of this structure, a greater variety of birds were noted here.

8. The Shrub Community is quite extensive due to the invasion of low shrubs into the Sedge area. With a resulting variation in the available niche requirements, an increase in bird population was noted.

9. The Climax Forest Community presents a mixed association with a dominance of Cedar and Spruce. The population in actual numbers decreases with an increased number of conifer trees. The plants compete for light and as a result ground plants and low shrubs are absent, which means that the insect population will be decreased.

10. The ecotones proved to have the greatest number of species. This is due to the more variable specific requirements.

11. Each bird community has similar requirements for all species such as an adequate food supply, nesting material, nesting site and singing perch. The presence of a certain species in more than one community suggests either an ad-

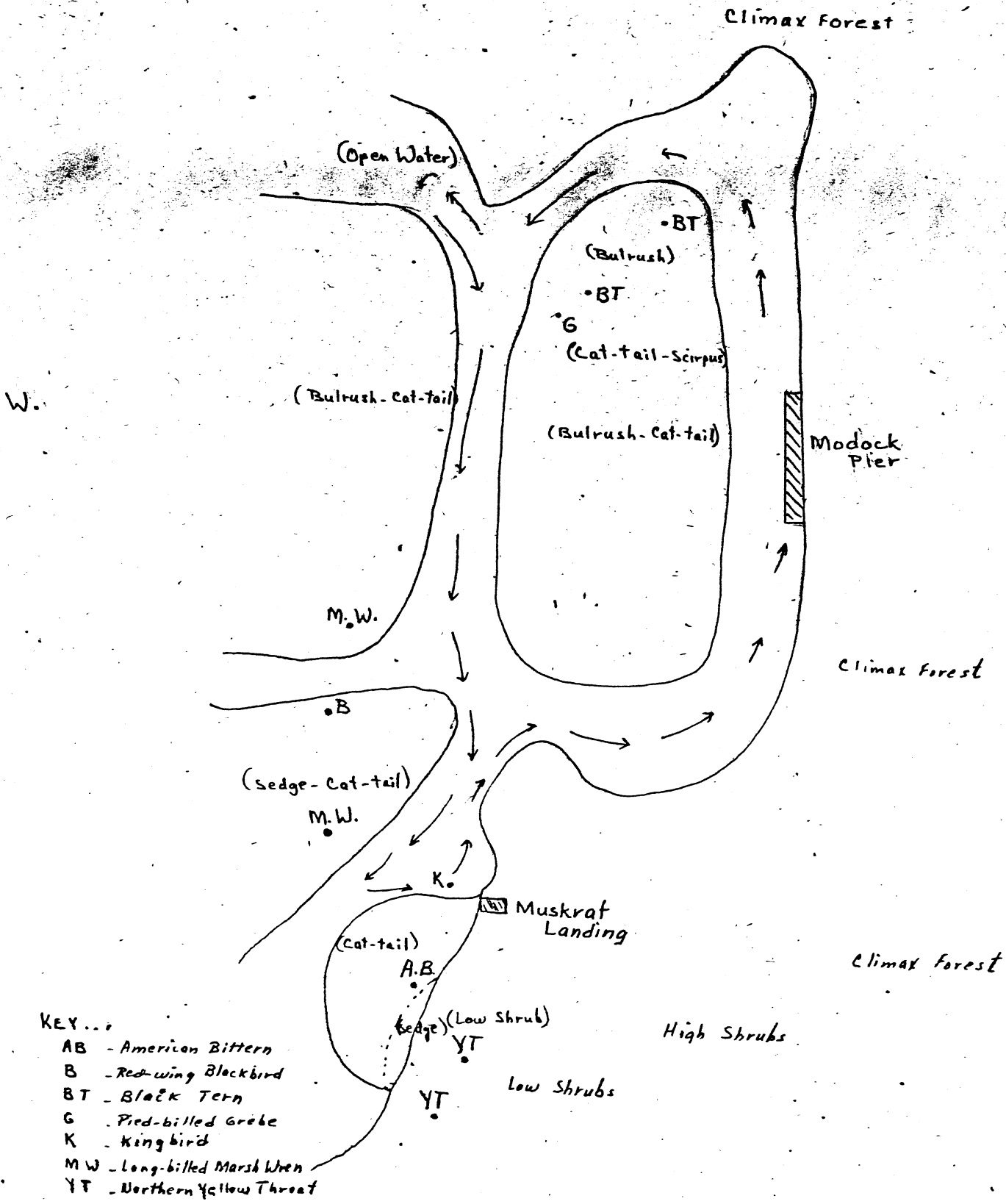
aptation to the habitat or a similarity in the requirements of that species for survival.

12. In the marsh communities the Red-wing Blackbird, Long-billed Marsh Wren and Black Tern were found in more than one plant community. In the later stages of plant succession the Red-eyed Vireo, American Redstart, Black and White Warbler, Oven Bird, Chipping Sparrow and Indigo Bunting were found in more than one community.

DISTRIBUTION OF BIRDS IN SUCCESSIONAL COMMUNITIES

Location of area: Cneboygan County, Michigan Indian River, (Between Burt & Mullet Lake)	Date (or dates): June 28, 1947 Number persons making study: 18 Weather rating: Good, except thunder- storm.
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General description of area: Channels of open water surrounding plants in the "Reed-swamp Stage". This area is filling in and is surrounded by some plants in the "Sedge-meadow Stage" developing abruptly into a "Woodland Stage" which merges with the plants of the "Climax Forest".	Communities and Ecotones								
	OPEN WATER	BULRUSH	CATTAIL & BULRUSH	BULRUSH & SEDGE	SEDS & CATTAIL	LOW SHRUB	HIGH SHRUB	* Woods EDGE	MIXED CLIMAX PICEA-THUSA
Species Pied-billed Grebe			NEST HEARD 1 YOUNG						
American Bittern			NEST 100% 4 EGGS Flushed						
Least Bittern									
Black Duck	Adult & 10 young								
Blue-winged Teal <i>in flight</i>									
Virginia Rail			Flushed						
Sora			Flushed						
Coot			HEARD						
Herring Gull <i>in flight</i>	-	-	-						
Common Tern <i>in flight</i>	-	-	-						
Black Tern		NEST 3 EGGS	NEST 2 EGGS						
Black-billed Cuckoo							HEARD		
Belted Kingfisher	<i>In flight</i>								
Hairy Woodpecker								HEARD	
Kingbird	NEST on Post	NEST 7 EGGS							
Crested Flycatcher								HEARD	
Phoebe							HEARD		
Least Flycatcher								HEARD	
Tree Swallow	<i>In flight</i>								
Blue Jay									HEARD
Crow								<i>In flight</i>	
Black-capped Chickadee									HEARD
Winter Wren									Heard
Long-billed Marsh Wren			NEST		NEST				
Robin								HEARD & SEEN	
Veery									HEARD
Cedar Waxwing									
Red-eyed Vireo								HEARD & SEEN	
<i>* Woods Edge could be same as Low Shrub-High Shrub combined (used as singing posts)</i>									



- KEY...
- AB - American Bittern
 - B - Red-wing Blackbird
 - BT - Black Tern
 - G - Pied-billed Grebe
 - K - Kingbird
 - MW - Long-billed Marsh Wren
 - YT - Northern Yellow Throat
 - - Nests
 - () - Communities

DIAGRAM OF INDIAN RIVER CHANNELS

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