

A POPULATION STUDY OF THE BREEDING BIRDS ON A 160 ACRES  
of BEECH\*MAPLE-HEMLOCK FOREST ON  
COLONIAL POINT, BURT LAKE,  
MICHIGAN

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## INTRODUCTION

This study of the breeding population of an area of Beech-Maple-Hemlock forest on Colonial Point, Burt Lake, Cheboygan County, Michigan was done as part of the class work in the Advanced Ornithology class during the summer of 1946. The work was done under the direction of Dr. S. Charles Kendeigh at the University of Michigan's Biological Station, Douglas Lake, Michigan. The photographs are used through the courtesy of Royal Brunson.

The purposes of the study were: (1). to gain a knowledge of the methods used in making a bird census and to acquire some skill in their use, (2). to acquire a knowledge of the type of bird community a Beech-Maple-Hemlock association is, its birds, population, and their relative abundance, (3). to attempt to place the birds in their proper ecological niches and, so, try to explain why they are found in this particular community, (4). to recognize characteristics (songs, colors, patterns, etc.) of birds. In other words to learn to recognize birds, and (5). to gain experience in writing a paper of a scientific nature.

## METHODS USED

There are several methods that are used in making a bird census. Dr. Kendeigh (1944) lists and describes the following methods. For relative abundance:

1. Index of abundance
2. Number per hour

For absolute abundance:

1. S trip census of total populations.
2. Census of the total populations in sample plots.

The relative abundance shows comparative abundance in types

of areas and while not an absolute indication of the number of birds in a specific area it does give a comparison of the populations in the different types of communities. A study of the birds per hour was made on June 29th. in the Colonial Point hardwoods.

Of the two absolute abundance methods the census of total populations in sample plots is probably the most accurate. This was the method used in the present study. To elaborate: on a bounded and marked area the breeding population of birds was determined through the counting of the singing males and mapping of their territories. Each singing male was considered as one of a pair. Each group of birds that was known to continue as a family group was considered as one pair. A further analyzation of this method and how it applied will be given in the discussion.

#### LOCATION

This Beech-Maple-Hemlock woods is located on Colonial Point on the Northwestern end of Burt Lake. It is in Burt Township, Cheboygan County on the northernmost part of the Southern Peninsula in Michigan. Its elevation is approximately 595 feet.

Phytogeographically it is located in the transition zone between the northeastern coniferous province and the central or deciduous forest province. (Gates-1926). Its biotic community is that of the Coniferous-Deciduous Forest Ecotone (Sub-Canadian). The climate is moderate and favorable for the growth of trees.

Scott (1921) states that "the area was covered by the ice of Lake Huron which moved in a southwesterly direction in this locality". This glacial action is shown in one portion of the area by a glacial moraine ridge and by a few scattered boulders. It is believed that when the ice retreated the uplands got the Tsugas. Only two of these

Tsugas were over 500 years of age, but they are the oldest trees in the cap of Michigan and so are regarded as a relic in their association. Most of the trees when the counts were made in 1926 were about 375 years of age. Lumbering went on in this general region as early as 1840 and extended in full swing into the 1870's. This woods, however, is demi-virgin as little has been cut. Fire has evidently not touched this region for a long period of time;

CLIMATIC FACTORS

As stated before, this area has a moderate climate. U.S. Weather Bureau figures for Cheboygan, Michigan, which closely approximates this region give the following figures.

Table 1.

*Better to use  
May-June-July  
as weather in May may  
determine whether birds  
begin migration & start nesting.*

Temperature °F	June	July	August
Absolute maximum	95	101	95.
Mean	61	66	65
Absolute Minimum	28	33	35
Wind	NW	NW	NW
Precipitation (inches)	1.85	3.10	2.97
Number of days with precipitation	7	8	9

Most of the days when this area was studied were warm, clear and with little wind. The following table shows the meteorological figures for these days. ( These figures were compiled at the Biologic Station by Dr. F.C. Gates).

Table 2

Date	Temperature	Solar Max.	Precip.	Barometer
June 20, 1946	61-53	61	trace	falling
29	88-68	150	-	..
July 1	70-59	134	.56	rising
3	79-57	143	-	falling
11	78-66	143	1.12	rising
17	87-59	145	-	falling
18	90-69	151	-	..
30	78-64	142	-	..
August 5	83-58	147	-	level
7	92-65	145	-	..

The soil under the Maple trees ranges from a pH of 7 for the duff on top to a 5½ in the B layer. The soil under the Hemlocks ranges from 5 in the A subl layer to 6 plus in the A sub zero layer.

THE COMMUNITY AND ECOTONES

This is a climax forests. It is a climax forest because it can grow in its own shade. A succession diagram does not necessarily explain its origin, because of a number of steps it may have gone through because of outside factors. Gates (1942) describes the result of a study of pollen found in peat samples taken from nearby bogs which indicates that some catastrophe took place which changed the flora from a predominantly coniferous type to that of a deciduous type. This is spoken of as having taken place some 8 feet ago\*. The orderly succession through which land reaches a Beech-Maple Climax is shown in the diagram below.

Diagram 1

Sand Sere

Pre-sere

Pioneer stage (scattered plants)

Heath stage

Jack-Pine

Red Pine - White Pine

Sub-sere

fire weeds

Aspen

fire

Beech - Maple

This is a mature Beech-Maple forest or one that is nearly mature. There are open spots where some cutting has been done or where old trees have died or fallen. These spots are soon filled with young trees. It is difficult to see the birds because of the denseness of the foliage and the fact that the crowns of the trees

\* Time required to make 8 feet of peat

are very high. Though the foliage is dense it is not a tangled undergrowth for there are few windfalls. Only one area seems to have the tangled undergrowth that is necessary for the Winter Wrens, and the one pair found in the woods is located here. The forest is spoken of as an all-age forest.

The number of species of ground flora is not great, nor is the number of species of birds. The dominants are, as is to be expected: Sugar Maple ( *Acer saccharum* ), Beech ( *Fagus grandifolia* ) and Hemlock ( *Tsuga canadensis* ). The following tables are taken from the class work of the Plant Ecology class (1946). These were list quadrats taken for 600 meters square ( 3 lanes of 2 meters each) for the trees and 30 square meters of ground plants.

Table 3

Species	Diameter classes							
	0/2.5	2.5/5	5/10	10/20	20/30	30/40	40/50	50/60 up
	Centimeters Diameter at base height							
<i>Acer pennsylvanicum</i>	7	3	1					
<i>Acer rubrum</i>	1	2	1		1			
<i>Acer saccharum</i>	90	21	10	2	3	1		
<i>Betula lutea</i>	2		2	1				
<i>Fagus grandifolia</i>	71	27	16	6	5	5	2	2
<i>Ostrya virginiana</i>	4		4	3				
<i>Quercus borealis</i>				1				
<i>Populus tremuloides</i>				1				
<i>Prunus serotina</i>	1							
<i>Tsuga canadensis</i>			3		1	2		2 3

Other trees that appear in the woods in some number are:

<i>Tilia americana</i>	<i>Fraxinus nigra</i>
<i>Pinus strobus</i>	<i>Betula papyrifera</i>

Table 4  
Ground Plants in Thirty Quadrats

	No. of Quadrats	No. of Individuals
<i>Carex arctata</i>	1	1
<i>Maianthemum canadense</i>	7	152
<i>Mitchella repens</i>	3	12
<i>S. milacina racemosa</i>	11	33
<i>Trientalis americana</i>	1	4
<i>Trillium grandiflorum</i>	6	8
<i>Vaccinium pennsylvanicum</i>	1	1
<i>Viola ericarpa</i>	2	3
Mosses	39,400 square centimeters	
Leaf covering	90 %	

Some of the other ground plants that appear in these woods are:

Allium tricoccum	Hepatica obtusa
Aralia nudicaulis	Lactuca spicata
Aralia racemosa	Lonicera canadensis
Carex albursina	Medeola virginiana
Carex laxiflora	Osmorrhiza polyfolia
Corallorrhiza sp.	Monotropa uniflora
Cornus canadensis	Pedicularis canadensis
Cornus stolonifera	Polygala pauciflora
Epilobium angustifolium	Polygonatum biflorum
Equisetum hyemale	Ribes cynosbati
Gallium trifidum	Rubus triflorus
Gallium triflorum	Solanum nigrum
Habenaria orbiculata	Thalictrum dioicum
Habenaria macrophylla	Rubus strigosus

Two distinct ridges are seen in the woods. One is an old lake shore and the other a glacial moraine left by a Late Wisconsin glacier. The woods are honeycombed with trails that are now being gradually overgrown. The tip of the point was once a girls camp and these trails are a relic of this period. Some of the old trail signs are still up giving such characteristic names such as "Old Hemlock Trail", "Mary Miller Trail", "Big Oak Trail", etc. The Mary Miller Trail and the Big Oak Trail are shown in the Area A map. (Map 3).

The road which leads to the old camp divides the woods into two sections which we have designated as Area A and Area B. The greatest amount of work and the most accurate has been done in Area A. (See Map 2).



AREA A

This area consists of 160 acres with Beech and Maple as the dominant trees. While Hemlock is found here it seems as though the road serves almost as a dividing line, because in this area the White Pine (*Pinus Strobus*) is the dominant conifer while in Area B the Hemlock (*Tsuga canadensis*) occupies the greater extent. The roads served as boundaries on the north, south, and west and Bust Lake on the East.

A small stream flows through this area entering into Burt Lake. It probably is of underground origin and passes across the Mary Miller trail at about 300-350 meters from the north road.

At the southeastern corner is a small area of a swampy nature that has a scattering of white pine in it. This is also the one place that Poison Ivy is abundant.

Below the first ridge is a tangle caused by a windfall and here among the roots the Winter Wren makes its home. Here also are a number of dead trees that provide dens for animals and homes for the woodpeckers and the Crested Flycatcher.

AREA B

This area is about 24 acres larger than Area A. The roads again serve as borders, but a clearing and a road on the South and a road and fields on the west provided the other boundaries. Hemlocks were grouped in several areas. They can practically be spotted on the distribution map by noting where the Black-throated Greens and the Blackburnian Warblers were seen.

In the southwest corner the land is quite wet during the early part of the summer and its undergrowth more of the bush

type. At its tip is a cleared area and a transition between the Aspen (*Populus tremuloides*)-Red Maple (*Acer rubrum*) - Cherry (*Prunus* sp.) and the Beech-Maple. Here also is an undergrowth of *Rhus glabra borealis* and *Pteris aquilina*. The census stopped at this area. Viewing the map of the area one can find two sections in which Poplar mixes with the Maple and the White Pine. Both of these areas were avoided as much as possible in the censusing.

#### BIOLOGICAL RELATIONSHIPS

In studying the biological relationships of the birds it is necessary to spend much more time in the area than was done during this study. It is necessary to note the food they are eating, the homes they have built, their activity during climatic changes, their nocturnal as well as diurnal activity, their territories, their predators, their singing perches, and their life histories. Through observations that were made during the census periods and the explorations of the woods some of their niche requirements have been noted and others were speculated upon. Some of the observations and assumptions made from the literature and from these observations are summarized under the families given below:

##### The Hawks (*Accipitridae*)

Two hawks the Coopers and the Broadwing, were found in the woods. Both of them were found in the B area. Outside of the fact that both are hawks of the woods no definite reason can be stated as to the "why" of their nesting in the Beech-Maple. It is a "heavy" forest area with plenty of suitable nesting sites and with available food nearby. In the case of the Cooper's Hawk there is also access to poultry in the nearby farm (See Map 2)

The Broadwing's nest was found in a Beech tree about 30 to 40 feet off of the ground. On July 1st. the female was seen near the nest. She flew around the area in which we stood alighting in the nearby trees giving her alarm notes. We saw no young hawks nearby so we presumed that the nest was occupied at that time though its inaccessibility prevented us from examining it.

It might be noted that two mature Bald Eagles were seen soaring over the forest. The caretaker of the Muirhead Estate (old Girls Camp) said that these Bald Eagles nested in the woods. I never did find any sign of the nest.

Grouse (Tetraonidae)

This is merely a sound record of the male "clucking". I had listened and watched one give this series of alarm notes before so was pretty sure of its identification, but at no time did I see the grouse. The caretaker did mention the "fox were getting his prairie chickens" and as no prairie chickens have been found in this area we presumed that he meant the Ruffed Grouse.

This is a bird of the leafy woodlands. The Beech-Maple provides food, nesting material, shelter, and drumming logs, yet there are few in these woods. Perhaps it is true that the fox and maybe the Cooper's Hawk have cut down the population, but they are not common in this patch of woods during the summer months.

Belongs more to  
beech stage

Cuckoos (Cuculidae)

Only the Black-billed Cuckoo was found in these woods, and this was near the edge. Forbush and May (1932) indicate that it is found in wet places. It was heard near the edge of the swampy area. There seemed to be no great abundance of its favorite food, the tent caterpillar.

### Owls (Strigidae)

One owl nested in the Beech-Maple and this one in Area A. The barred owl is a woodland bird. It usually nests in the hollow trees or sometimes in an abandoned nest of a crow or other large bird.

I watch the bird on a ridge about three hundred meters from the main road. It was perturbed over my presence as it would circle the area and land in the trees and watch me. The other birds were bothered by the owl too, as it soon attracted the Vireos, Pewees, Redstarts, and even a crow which came hurrying to the spot from the woods on the other side of the road. The owl gave its "Who cooks for you? Who cooks for you-all?" and it was answered by another owl farther in the woods. I imagined that it was the other bird of the pair as Bent intimates that both birds hoot. There was a large nest near the place the owl was sitting, but there seemed to be no activity in it. The advanced ornithology class reported young barred owls in the denser part of Area B.

Hollow trees that are large enough for a barred owl are present in the area. Food in the form of small mammals are also found here and its preference for heavily wooded ridges is also taken care of in this area.

### Ruby-throated Hummingbird (Trochillidae)

One pair of the hummingbirds was seen in the Beech-Maple. It nested on a projecting branch of the *Acer saccharum* about 30 meters from the main road, overlooking the estate road. My notes indicated that on July first the female was sitting on the nest. The nest was beautifully constructed of lichens, tiny bits of bud scales and with the bulk of the material, a cottonlike substance, probably plant down.

It is doubtful that the forest provides much more than a nesting site for the bird. There seems to be few plants except at the very edges that would provide food. Perhaps it travels quite a distance to its regular feeding area. Just where it feeds was not determined as it was seen only around its nesting site.

Sap may have provided some of its food as it is listed as an occasional item by Hickey (1943) and Saunders (1936), and the bird was observed feeding on the sap at a Yellow-bellied Sapsucker tree by the Elementary Ornithology class at the Biological Station. In the Allegheny Park region, New York, Saunders (1936) lists Bee Balm, Cardinal Flower and Spotted Jewelweed as its favorite food item. None of these were found in the Colonial Point woods. I have observed the hummingbird feed among the spruce and balsam fir. It appeared to be getting gum or insects that were caught in the gum from these trees. These trees were not found except occasionally in this area.

Probably the reason for its appearance here was the appropriateness of the area as a nesting site. Checking points from Saunders (1936) he lists: (1). a limb less than an inch in diameter. The branch the nest was on was  $\frac{3}{4}$  of an inch thick. (2). the limb slants a little downward from the tree. This limb did. (3). it is sheltered by other limbs or leafy branches. This nest was on the second branch from the bottom. (4). the Hummingbird prefers to nest on the border of an open space. This nest site overhung the road. The nesting materials were available also. Lichens grew on the trees. In fact they grew on the very tree the nest was located on. Bud scales were present and the Argiope spiders provided plenty of silk for binding the nest together. Fireweed and Canada Thistle down is

often used as the main bulk of the nest. Both of these plants were available at the edge of the forest.

#### Belted Kingfisher (Alcedinidae)

This bird is not a resident of the forest itself and is merely counted as part of the population because it regularly used the trees along the lake for perching places to sight its food and to rest.

#### Woodpeckers (Picidae)

Three woodpecker species nested and lived in the woods and it is believed that there were only three pairs of these birds. In a Beech-Maple woods there are not a great many dead or dying trees and it may be that there were not enough to support a large number in this community.

The flicker was only seen once and it might have nested near the buildings on the Muirhead estate. The Hairy and Downy were seen everyday, but only one group of each was noted. They are far ranging and the nesting period was pretty well finished by the time the study was made. Evidences of two other woodpeckers were found, but they were not seen so I believe they were absent from the population this year. They were the Pileated and the Yellow-bellied Sapsucker.

#### Flycatchers (Tyrannidae)

Three flycatchers were residents of these woods -- the Crested, the Least, and the Wood Peewee. The Wood Peewee was present in the greatest number with a population of 23 pairs in Area A. There were 9 pairs of Least Flycatchers and 2 pairs of Crested Flycatchers.

The competition between these flycatchers is not great. The Crested was found in the deep woods where few other birds were present. The Wood Peewee was scattered but seemed to be feeding in the upper levels of the forest and the Least was found only along the

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edges of the trails and roads, and in the lower levels. Its greatest food rival was probably the Redstart, but in all cases except two where the Least was found there were not many Redstarts.

The abundance of insects is probably the biggest factor in determining the flycatchers presence in the Beech-Maple woods. The delimiting factors for each: (1). The Crested Flycatcher-- too few nesting areas that contained suitable cavities unoccupied by squirrels. (2). The Least -- prefers more open woods than the Beech-Maple provides. (3). The Wood Peewee -- an ideal woods for them with the delimiting character probably only being that the woods would not support many more pairs.

#### Crows and Jays (Corvidae)

The figures for the crows and jays may be way off as the nesting season for both was over by the time the study was made. Forbush (1939) states that "wherever beeches fruit in profusion, the jays assemble in numbers in winter". Its seasonal profusion in woods is not stable so there seems to be no reason not to think that more birds nest in this area than the census indicates.

The Crow is much the same as the Jay. It is reasonable to assume that when these studies were made the Crows were out in the fields searching for food.

#### Titmice (Paridae)

It is hard to census the Black-capped Chickadee, because of their habit of traveling in groups after their nesting is over. Then, too, they cover a wide range of territory. It seemed that at every disturbance the chickadee was sure to show up. I think that two groups is a conservative number and that five chickadee pairs would be a closer number.

They nest in cavities, which are not too ample in this area. Beechnuts are used as food and of course, there is a variety of insects.

### Nuthatches (Paridae)

The White-breasted Nuthatch prefers the deciduous woods to coniferous. It is another "hole" nesting species and another of the early nesters. The Red-breasted Nuthatch prefers the coniferous woods where it can get pitch for around its nest entrance. It was heard only once in the woods and because of its preference for the conifers it was considered a chance visitor and not a resident bird. It may be a winter resident. Williams (1936) lists it as the most important non-breeding bird in his area and he indicates that it takes beechnuts with relish.

The things that were said about the Titmouse and the Woodpeckers probably hold true for the Nuthatches. Wherever I saw the Nuthatches I usually saw a Downy or the Black-capped Chickadee.

On August 7th. I watched a pair of Nuthatches with their family feeding along the Mary Miller Trail. The young, three in number, were evidently being taught the proper technique for getting food. The young did a great deal of chattering and it was noted that their "yank-yank" had a tinier quality than that of the adults.

### Wrens (Troglodytidae)

Only one Wren and only one pair of these was found in the woods. There was only one place in the area that really suited the Winter Wren's requirements and a pair nested in that place. It was near water, the woods were tangled and there were several windfalls with the roots providing a nesting place. Of the other three wrens that are commonly found <sup>What is meant?</sup> here the habitat was not suitable. The House Wren could possibly have nested here, but the available nesting holes were not on the edges and a much more suitable place was provided on the Muirhead estate.



Thrushes (Turdidae)

Willow Thrush

T There were three thrushes found in Area A -- the Veery, which was by far the most common, the Wood Thrush and one pair of Robins.

The woods were too heavy for the Robin, except at the most southerly point. Besides the denseness of the woods there were more suitable nesting places near the estate.

Kendeigh (1945) states "that the Veery is partial to the late shrub and early tree stage". Saunders (1936) did not list it at all in his mature Beech-Maple. In a Hemlock-Beech-Maple woods in New York, Kendeigh (1944) listed only one pair. He lists it as occurring in a minor amount in a Beech-Maple woods in northern Ohio. Williams (1936) does not list it as occurring in the Beech-Maple he studied in northern Ohio. In this woods it was the fifth most common breeding bird with 13 pairs on 160 acres. The habitat does not follow that which is ordinarily considered 'Veery' habitat. Roberts (1932) says that it is a bird of the "low damp woodlands preferring tamarack for swamps and thickets of poplar, willow and alder bordering streams and lakes". There are no tamarack swamps in this area and while the Veerys were found in Poplar the greater amount were found in the deep woods. Portions of this, however, were damp. Peterson (1939) lists its southern boundary as northern Ohio and Northern Indiana so it might have been a rare bird in William's and Kendeigh's areas.

The Wood Thrush is represented by four pairs all of which were found in Area A. Usually it is a deciduous forest type of bird though Root (1942) found it nesting in the coniferous bogs. Forbush and May (1939) lists its breeding habitat as moist woods and thickets as does Reed (1909). A straight line can be drawn thru three of the

nesting areas and these three areas are in or near an old stream bed that is damp though no water flows through it. The other bird was heard near the little stream that flows through the northern part of Area A. Wet leaf mold, which occurs abundantly in this area, is used for its nest.

The thrushes are mainly ground feeders and usually the rich humus of a deciduous forest contains an abundance of small animals and insects. Blake (1926) has shown that needle leaves when shed turn brown, form a thick compact layer, decompose slowly, and so, contain fewer insects and smaller animals that are useful for food.

#### Kinglets (Sylviidae)

The hemlocks and the tall White Pines that are scattered in the area probably give the answer to why the Kinglet is found at all in a deciduous woods. The only golden-crowned Kinglet was found in a cluster of White Pines.

#### Waxwings (Bombycillidae)

An edge bird. One pair was seen in the interior of Area A along the trail. The other Waxwing birds lived on the edges near the Choke Cherry trees.

#### Vireos (Vireonidae)

Two <sup>species</sup> types of Vireos were found in the woods. The Red-eyed was one of the dominents and the Yellowthroat of which, there was only one pair. The Red-eyes were found everywhere, though usually along the edges. The Yellow-throat was found along the edge where its territory crossed over into the B area.

The Red-eyes and the Yellow-throats commonly feed on the broad surfaces of the leaves near the end of the twigs. The large number of Red-eyes is probably due to the fact that a greater amount of their favorite food is found on the broad-leaved trees, and, also, a better support for feeding is offered. It may be that

the Beech-Maple presents too dense a woods for the Yellowthroat to be common.

It is noted that in the succession of the woods that, when the forest crowns began to converge, the Red-eye comes in.

Warblers (Compsothlypidae)

Seven species of warblers are found in the Beech-Maple hardwoods. Of these the Redstart is the most common. It is the most abundant bird of the area. Next is the Ovenbird and, then, the Black-throated Green and the Blackburnian. One hundred and nineteen of the 250 pairs of birds are warblers.

It is interesting to compare the warblers found in these woods with those that were reported by Saunders, Kendeigh and Williams in their territories. A comparison of the Warblers in each study is shown in the table below.

Table 5

Species	Saunders	Williams	Kendeigh	Hofslund	
Magnolia	28.8				
Black-throated Green	24.2	4.6		8.2	Pairs
Ovenbird	18.9	12.3	38	18.75	Per
Black-throated Blue	10.7			2.5	100
Blackburnian	8.7			6.25	Acres
Redstart	4.4	29.2	24	37.5	
Hooded	3.2	13.8	10		
Black and White	1.8	1.7	2	1.25	

Williams area considered mainly the Beech-Maple and Kendeigh's figures are averaged for the deciduous type of forest.

Saunders' dominant warbler, the Magnolia, was not reported in the other woods. Here in the northern part of the Lower Peninsula it is found mainly in the Spruce and Fir forests, but even there

it is not abundant. The Hooded Warbler is rare in this part of Michigan.

This area and Saunders' were probably close approximations of type. Of the warblers that are common to both areas, the Ovenbird the Blackburnian and the Black and White agreed very closely in their numbers of pairs per 100 acres. The Black-throated Green and the Redstart were quite far apart. The Black-throated Green was <sup>predominant</sup> a dominant in Saunders area. In mine it was not uncommon, but was found mainly in the Hemlock areas. The Redstart was the dominant bird in Area A, but averaged only 4.4 pairs per 100 acres in the Beech-Maple of Quaker Run Valley.

The Redstart seems to prefer the undergrowth and though it is found nearly everywhere in the woods, it is usually in the lower stratum of the tree level and in the saplings that grow profusely in the area.

The Blackburnian and the Black-throated Greens occupy the upper levels and they are found, nine times out of ten, in the Hemlock and the White Pines. The Black-throated Green was occasionally seen in the deciduous trees, but the Blackburnian never, except when greatly excited or when its curiosity was aroused.

The Black-throated Blue was the most variable of the warblers. Its singing perch was anywhere from 20 to 60 feet up, but when it was feeding it was always seen in the shrubby undergrowth or in the smaller saplings.

On August 5th. I sat on an uprooted <sup>beech tree</sup> tree so recently fallen that some of the ~~beech~~ leaves were still green. A female Black-throated Blue soon appeared and sat overhead chirping an alarm note that sounded like "tchip". I counted 74 of these in one minute.

She was very brave and at times came within 6 feet of me. I could hear the "zur, zur, zwree" of a male on my right in the top of a nearby tree. He did not approach the area at anytime. On leaving the area a male was seen feeding in the undergrowth about 3 feet from the ground. This bird was to the left of the area so I'm not sure which bird was the mate of the female that had protested so vigorously. While the female was "tchipping" an Ovenbird came to help her out. Its note was a more strident "tchap". A short while later a Black and White Warbler and a Red-eyed Vireo made their appearance. They seemed to be interested, but they did not scold. At an interval of about every six minutes the female Black-throated Blue would catch an insect and disappear into the branches of the dead tree. A few seconds later she would come out and began scolding again. I searched the tree and the area it covered, but could find no nest. One time when I was a few feet away from the tree she dropped to the ground and feigned injury, dragging her wings and fluttering, but this lasted only a matter of seconds and then she was back to her scolding.

I believe that the Black-throated Blue's particular niche in the forest was determined by the presence of areas which contained the most densely covered spots of sapling growth. The bird nests close to the ground and most of the time it feeds between 5 and 20 feet from the ground. The presence of the bigger trees nearby provided ample singing perches.

The Black and White seems to show a preference for the deciduous leaves in its nest construction. (Kendeigh 1945). Its actions are more like the Brown Creeper than the Warblers and it seems to prefer the edges. I think that if this area was less dense or was a mixed hardwood area, the populations of the Black and White would be larger.

The Ovenbird is the third most abundant bird in these woods. It is the ground warbler of the area seldom being found above 10 feet. It nests on the ground with the opening of the nest usually facing an open area. A nest in Area B was in the densest portion of the woods, but it faced a trail. This nest was composed of reetle ts and arched leaves of *Acer saccharum*. It was well hidden under the drooping leaf stems of *Pedicularis canadensis*. On July 1st. there were three young with sparse but long natal down. As yet the eyes had not opened. The broad leaves and an opening are probably the essential things required by this bird of a forest.

One other warbler was found in these woods, but it is discarded when considering it as a Beech-Maple forest. This was the Chestnut-sided warbler which was found at the edge of area B in a thicket formed by several honeysuckles. This bird shuns the dense forest and stays near the openings.

#### Blackbirds (Icteridae)

The Cowbird was the only blackbird found in this area. Just how many pairs did parasitize the area is not known. The one direct evidence of its presence in these woods for breeding purposes is a Red-eyed Vireo feeding a young cowbird.

#### Tanagers (Thraupidae)

Five pairs of Scarlet Tanagers nested in Area A. Although the males are a far ranging species, I believe that this represents an accurate count as the main count was made of the females giving their "chuck burr) call. Wherever the birds seemed to be worried about a nest they were in the more open type of woods though the males were found in the densest parts of the woods. Two nests were found one in an *Acer saccharum* 12' off the ground and the other in an *Acer rubrum* 25' off the ground.

#### Sparrows, Finches and Buntings (Frigillidae)



tall nor very close together.

Least Flycatcher Robin Red-eyed Vireo Ovenbird Redstart

These birds are present, but the birds in the above stage are not.

3. Trees 40 feet high. The crowns are closed, but open spots are found

Ruffed Grouse Scarlet Tanager Black-capped Chickadee white-breasted Nuthatch, Downy Woodpecker Wood Peewee are found. All but the Robin remain from the second group.

4. The trees are 50-60 feet high. White pine and hemlock are found.

Golden-crowned Kinglet Black-throated Green Blackburnian and in the undergrowth:

Black-throated Blue Wood Thrush are present for the first time.

The Grouse and the Scarlet Tanager are not found.

5. Very old and very large trees with numerous windfalls and dead trees.

Winter Wren and Crested Flycatchers appear as does the larger Woodpeckers. The Nuthatches and the Chickadees are likely to be found, but most of the birds of Groups 2 and 3 are gone.

The Height Level

The birds are found at various height levels thus adding weight to Saunders(1936) theory that the greater cubic volume the more birds. This diagram based on notes showing the level the birds were most often seen shows this to some extent.

Diagram 2  
ECOLOGICAL RELATIONSHIPS OF BIRDS OF THE MATURE BEECH-MAPLE-HEMLOCK FOREST, COLONIAL POINT, MICHIGAN.

Air above the forest

None of the breeding birds feed here, but Nighthawks and the swallows do.

Forest crown

Broad-leaved trees

- Robin
- Least Flycatcher
- Red-eyed Vireo
- Yellow-throated Vireo
- Scarlet Tanager
- Redstart
- Black-billed Cuckoo

} nests and feeds

Hemlock and White Pines

- Blackburnian
- Black-throated Green
- Golden-crowned Kinglet

} nest and feeds



Diagram 2 (cont'd)

Cedar Waxwing }  
Wood Peewee } nests and feeds  
Bluejay }

Broad-winged Hawk }  
Coopers Hawk } nest  
Ruby-throated Hummingbird }  
Crow }

Trunks and Large Limbs

White-breasted Nuthatch } nest  
Downy Woodpecker } and  
Black-capped Chickadee } feeds  
Black and White Warbler - feeds

Old Stubs Dead Trees and Limbs

Hairy Woodpecker }  
Flicker } nest and feeds  
Crested Flycatcher - nests

Undergrowth

Wood Thrush } nest  
Black-throated Blue } and  
Vireos } feeds

Stumps, Logs, Upturned Roots, etc.

Winter Wren-nests and feeds  
Black and White Warbler nests

Veery } feed  
Red start }

Forest Floor

Veery }  
Ovenbird } nests and feeds  
Towhee }  
Wood Thrush } Feeds  
Robin }

DISCUSSION

A study like this shows several things, especially if made for the first time. One is that to get an accurate count of the bird population the area must be small or else a great deal of time must be spent in censusing. A second point is that the study should be started early in the season to get all of the breeding birds. Therefore some of the considerations that should be made before starting the study are:

1. Start early in the season
2. Have maps of the territory made before the count is started and explore the area so that the types of difficulties, etc. are recognized. Study the various habitats.
3. Take a small area or spend a great deal of time in the area.
4. Time spent in nest hunting will clear up many difficulties.

5. Taking the census in the early part of the day will be more accurate.

Several things prevent this from being an exact figure as to the breeding population of these woods, It was started on July 1st. which was about a month too late. This left only about two weeks of the best singing period. An attempt was made to cover the whole 260 acres and that was too large an area in a limited period of time. I have discarded Area B in the figures as it was not covered as well as Area A, and the census is far from accurate. Area A was covered fairly well, though the territories are approximate. A figure of 156.25 pairs per 100 acres is close, but not exact. I do not believe, however that the population of these woods reaches the 180-200 figure that Kendeigh, Williams, and Saunders arrived at in their studies. I think that all of the species that occurred in the woods were located. Of those found, the <sup>pre-</sup>dominant species compare favorably with the figures of the dominant species in the other studies.. On examination of Table 5, the Redstart and the Ovenbird compare favorably with most of the figures. The Black-throated Green is a good deal less than that found by Saunders, but I believe that my count is less than two pairs shy of the actual number found in these woods. Probably the widest variation in the number of pairs found and the number actually in the area would be in the pairs of Veerys and Flycatchers. Only another study of this area would indicate just how close these figures are.

A variable that may have entered in to cause the discrepancy between these woods and those of the other studies quoted, is the different part of the country in which it was made. This is a <sup>ecotone</sup> transition zone, which while it might conceivably increase the numbers of birds it also might cut down the total as only a few might diffuse

*Avoid fractions!*

*as was also Saunders!*

from each zone. The Magnolia which was the most important bird in Saunders' study is entirely absent from these woods as is the Hooded Warbler and the Tufted Titmouse found in William's study to be so important. Perhaps the dominant birds in this territory require more of a breeding area than do the dominants of the other studies. The dominant birds (Magnolia, Black-throated Green, Red-eyed Vireo, and Ovenbird) of Saunders' area had 93 pairs per 100 acres compared to the dominants (Redstart, Red-eyed Vireo, Ovenbird and Wood Peewee) of this area's 102.51 pairs per 100 acres. This would leave less of a feeding area for the other types of birds. A study of the size of the territories would be necessary to prove this. Another factor that might enter in is the ratio of the mixture of the hardwoods and conifers. More conifers would mean more of the conifer loving warblers. A brushier type of undergrowth would also increase the number of pairs of birds. Little is known about the comparative age of the forests beyond the statement of "mature". Just how mature?

*Not clear.*

#### S U M M A R Y

1. A census was taken of the breeding birds of 160 acres of Beech-Maple-Hemlock Woods on Colonial Point, Burt Lake, Michigan. This was done under the direction of Dr. S. Charles Kendeigh as part of the course requirement of Advanced Ornithology during the Summer of 1946.
2. Two hundred and fifty pairs of birds were found in this area for an average of 156.25 pairs per 100 acres. In this area and in the adjoining area of 184 acres there were 33 species of birds.
3. Birds as well as flora change with the maturity of the forest.
4. The Area is located in the Coniferous-Deciduous Forest Ecotone. The climate is moderate and suitable for the growth of trees.
5. The dominant birds are the Redstart (37.5 pairs per 100 acres),

- Red-eyed Vireo (31.89), Ovenbird (18.75), and the Wood Pewee (14.37)
6. A total census counting the singing males as a pair was used.
  7. It is believed that the greater amount of edge found in Area A (due to many trails) means more birds here than in Area B.
  8. Animals are not abundant, but the squirrels are the dominant type. An abundance of squirrels may mean a smaller bird population of those types that nest in cavities.

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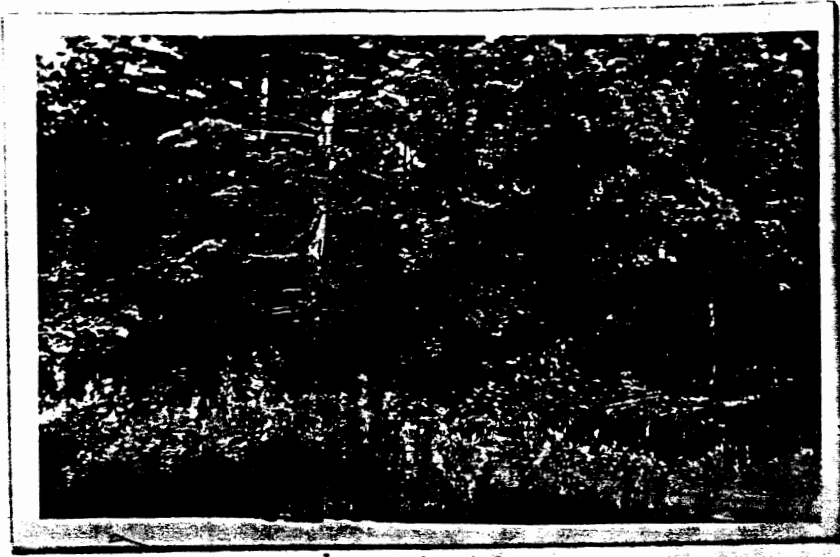


A View of Area A From the Main Road. This is the type of area where the Indigo Bunting and the Chipping Sparrow were found.

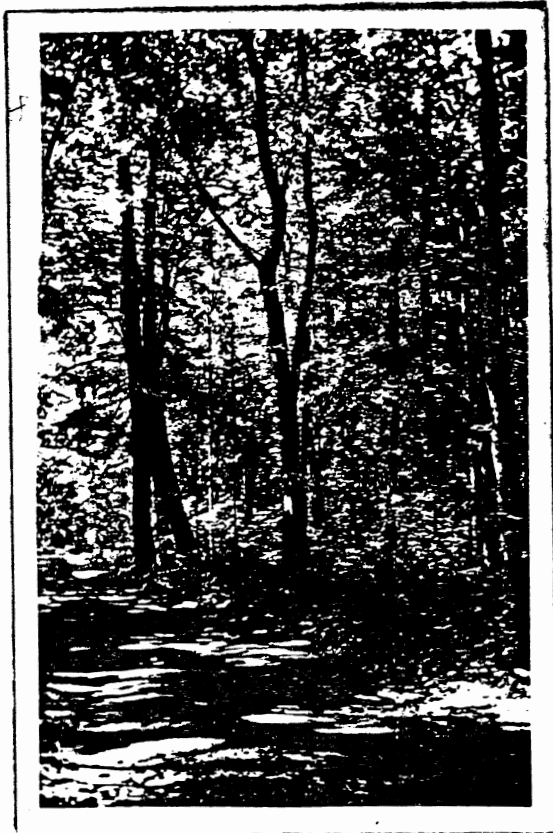


Looking into Area B From the Main Road. Here the trees are close together and the undergrowth is very thick

All photos were taken by Royal Brunson on August 7, 1946



Across the Gravel Pit. A few White Pines can be seen.



The Road Leading to the  
Muirhead Estate



On the Mary Miller Trail

Photos by Royal Brunson



A View of the Now Almost Dry Stream. It was near here that the Black-throated Blues and the Wood Thrushes were found.



Two Views of the Fallen Tree Near where the Black-throated Blue Nested

Photos by Royal Brunson





Mature Beech-Maple Forest with Dense Undergrowth



The Crowns of the Trees



The Young Beech-Maple

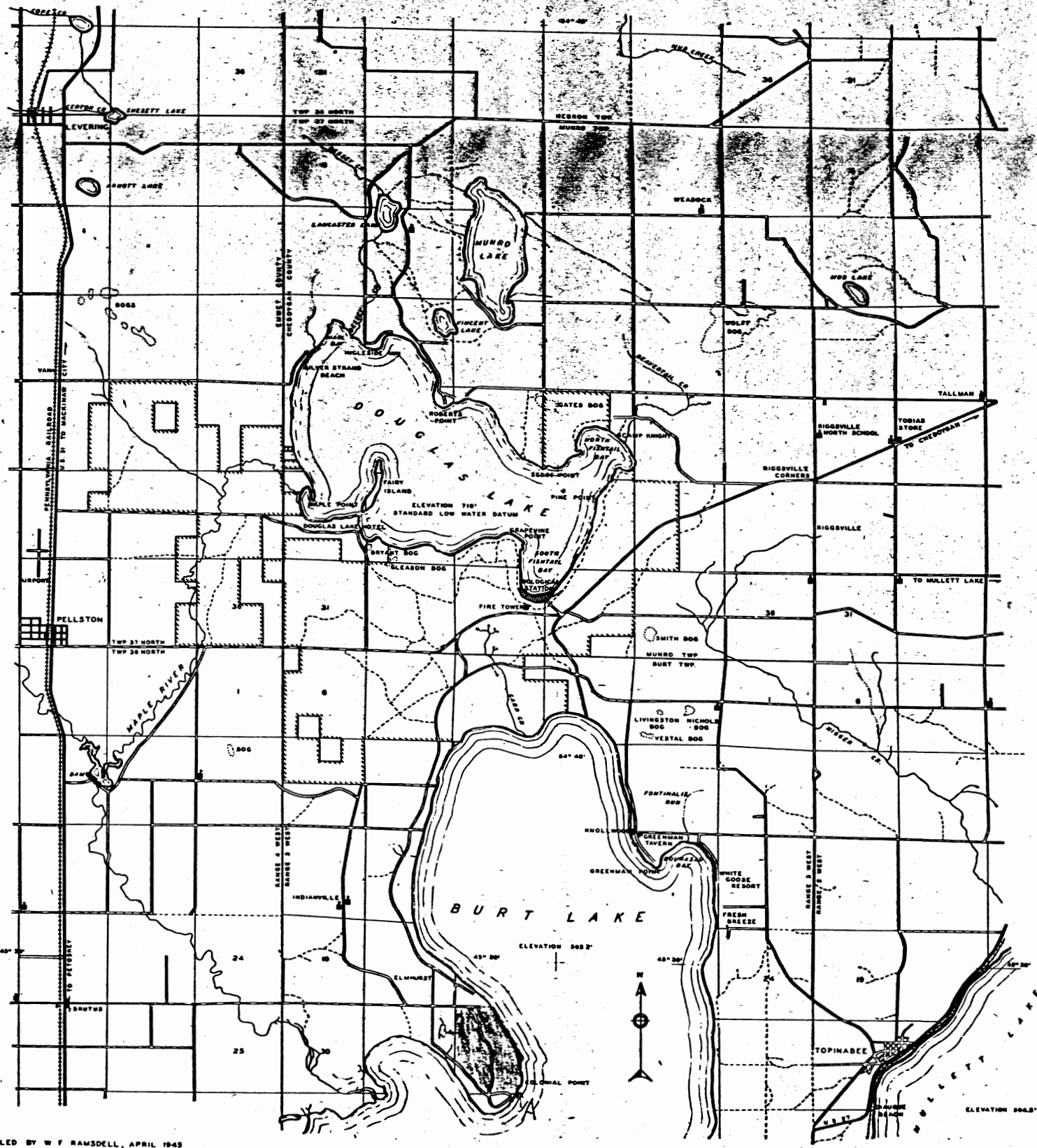
Photos by Royal Brunson

VICINITY OF  
**UNIVERSITY OF MICHIGAN BIOLOGICAL STATION  
 AND DEMONSTRATION FOREST**  
 CHEBOYGAN AND EMMET COUNTIES, MICH.

LEGEND  
 CHURCH  
 SCHOOLHOUSE  
 BOUNDARY OF  
 UNIV. LANDS  
 RAILROAD

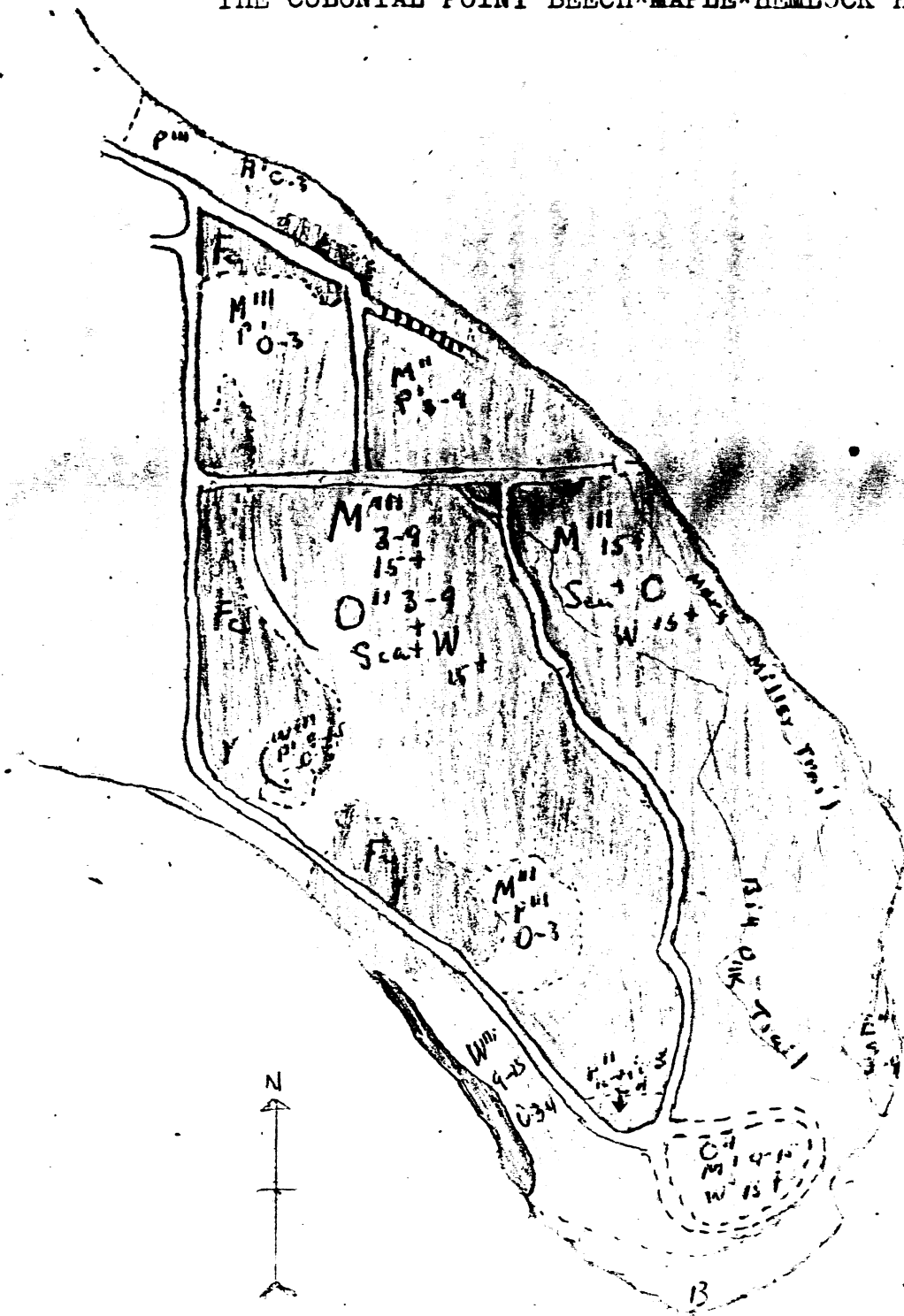
SCALE  
 0 1 2  
 MILES  
 0 1 2  
 KMS

LEGEND  
 PAVED HIGHWAY  
 GRAVELLED ROAD  
 GRADED ROAD  
 UNIMPROVED ROAD  
 TRUCK TRAIL



☼ = Beech-Maple Forest

THE COLONIAL POINT BEECH\*MAPLE\*HEMLOCK HARDWOODS



- = Forest
- = Fields
- = Farm
- = Swampy Area
- = Muirhead Estate
- = Clearing Boundary
- = point of Area B

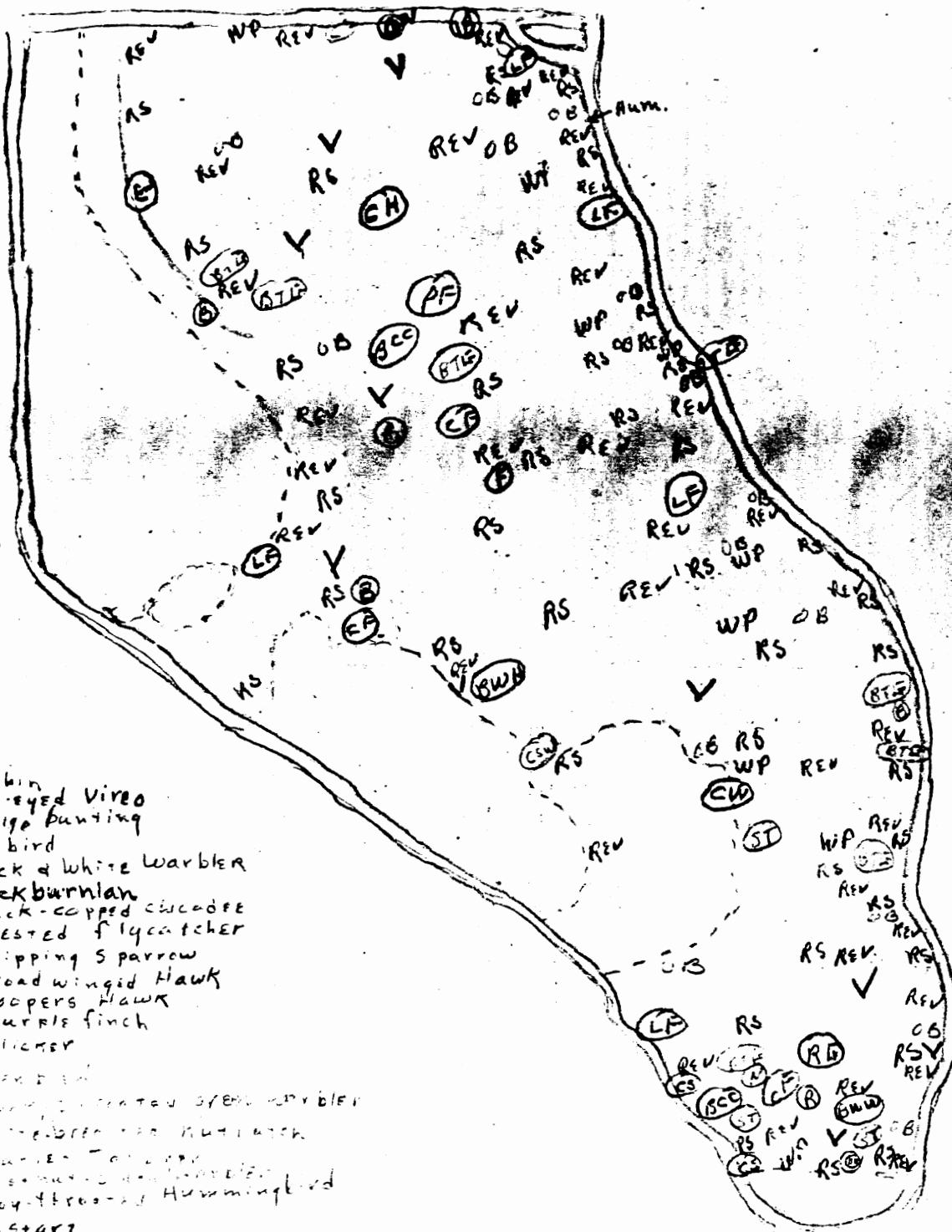
- FC = Cultivated Field
- M = Acer saccharum dominant
- P = Poplar
- O = Oak
- W = White Pine
- R-11 = Acer rubrum
- CH = Cherry

- III = Heavy Stand
- II = Medium Stand
- I = Light Stand
- 2-9 = Diameter class
- S = Salix
- C = Clearing
- A = Alder

MAP 2

Scale = 2 inches = one mile

Map 3

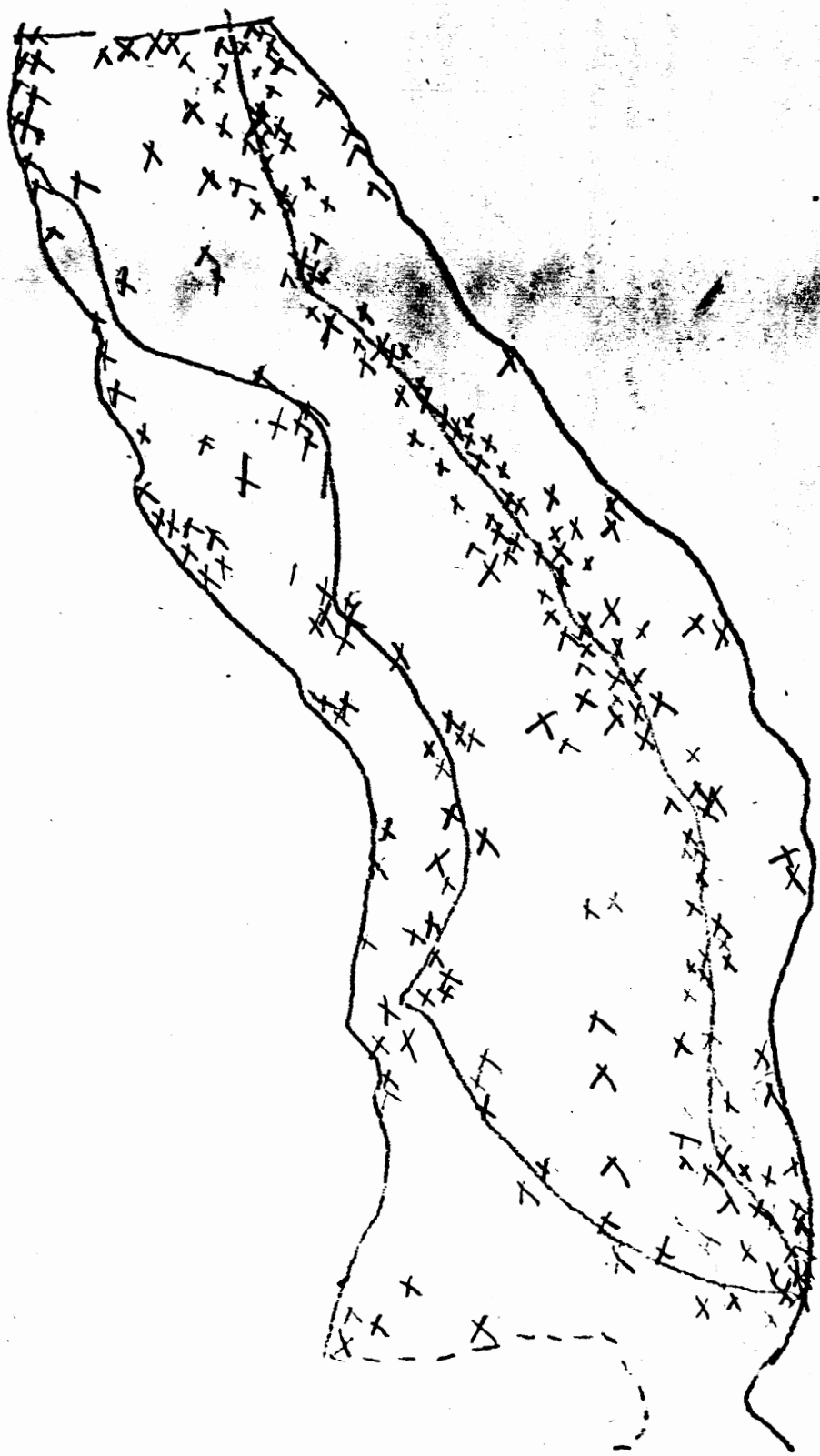


- ⊙ = Robin
- REV = Red-eyed Vireo
- LF = Indigo Bunting
- CW = Cowbird
- BWW = Black & White Warbler
- ⊙ = Blackburnian
- BCC = Black-capped Cuckoo
- CF = Crested Flycatcher
- CS = Chipping Sparrow
- BWH = Broad-winged Hawk
- CA = Cooper's Hawk
- FF = Purple Finch
- G = Flicker
- STB = Black-throated Green Warbler
- V = White-breasted Nuthatch
- W = Downy Woodpecker
- CSW = Ruby-throated Hummingbird
- R = Redstart
- LG = Least Flycatcher
- ⊙ = Ruffed Grouse
- WP = Wood Pewee
- ✓ = VEERY

LOCATION OF SOME OF THE BREEDING BIRDS IN AREA B

Scale 4 inches to 1 mile

FEEDING HEIGHTS OF THE BREEDING BIRDS IN AREA A



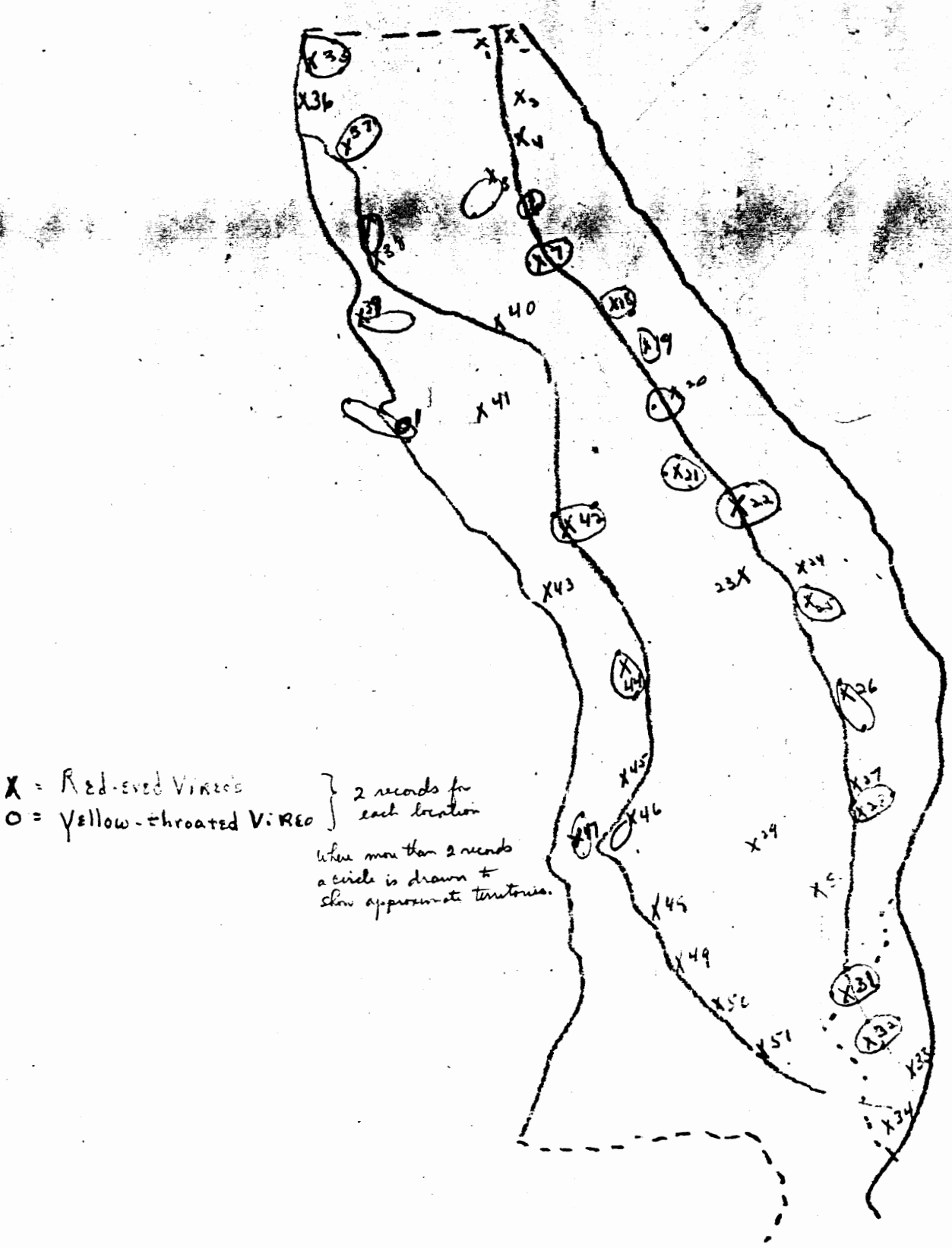
Table?

X = 0-20  
T = 30-40  
X = 40-60-up.

MAP 4

Scale 4 inches to 1 mile

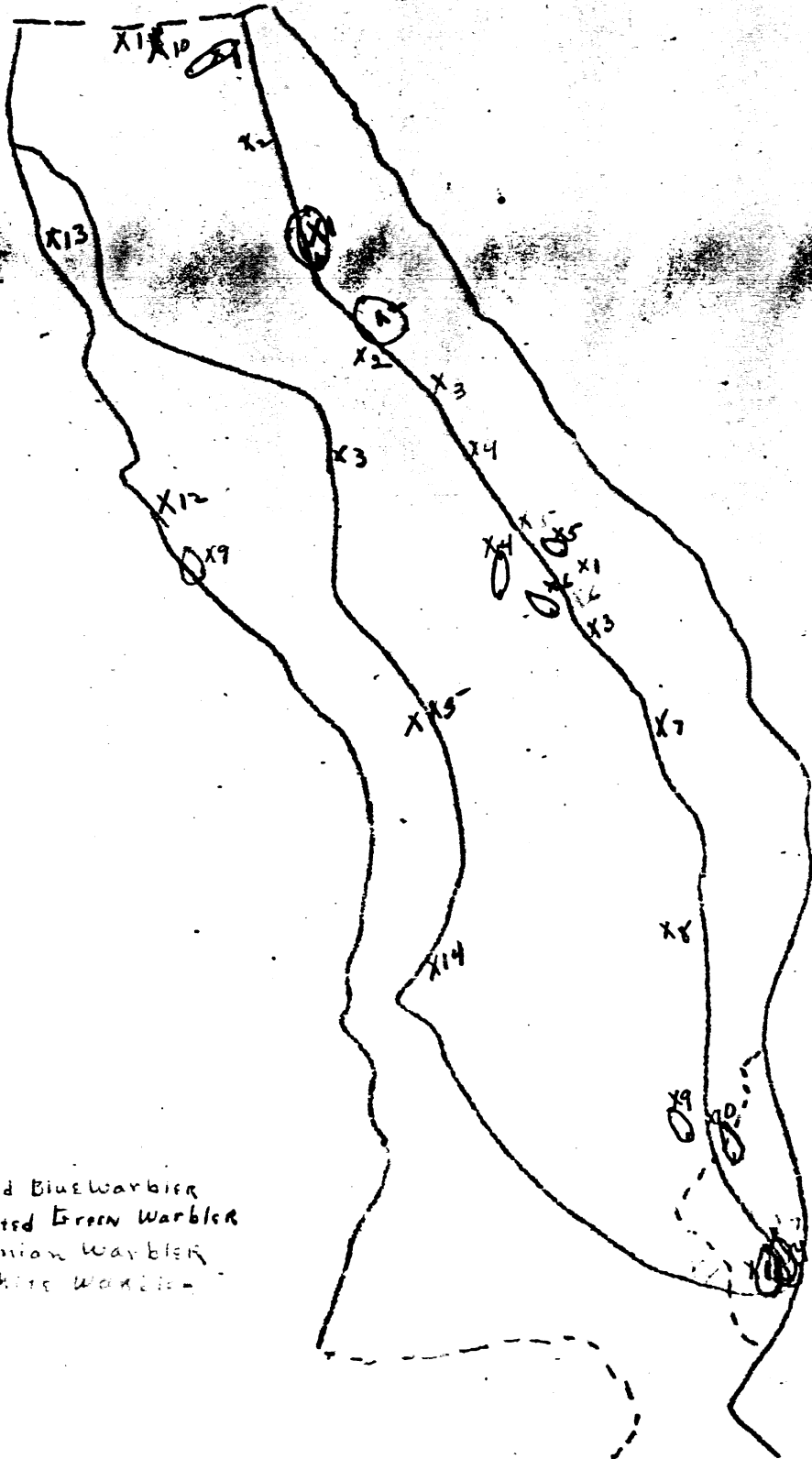
LOCATION OF THE BREEDING PAIRS OF THE RED-EYED AND YELLOW-THROATED  
VIREOS



MAP 5

Scale = 4" to mile

LOCATION OF THE BREEDING PAIRS OF SOME OF THE WARBLERS OF AREA A

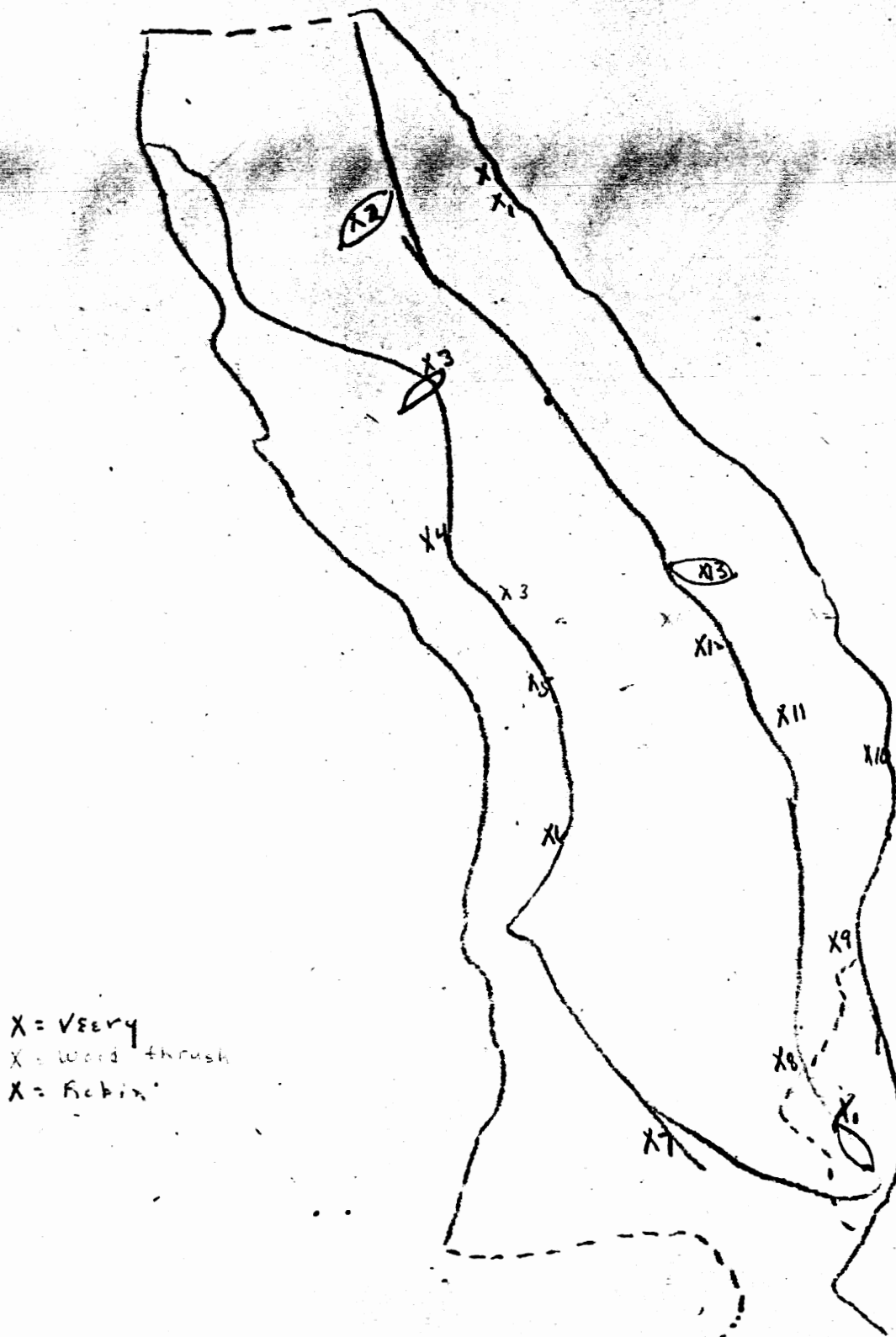


X = Black-throated Blue Warbler  
 X = Black-throated Green Warbler  
 X = Black-burnian Warbler  
 X = Black & White Warbler

MAP 6  
 Scale = 4" to 1 mile

MAP 7

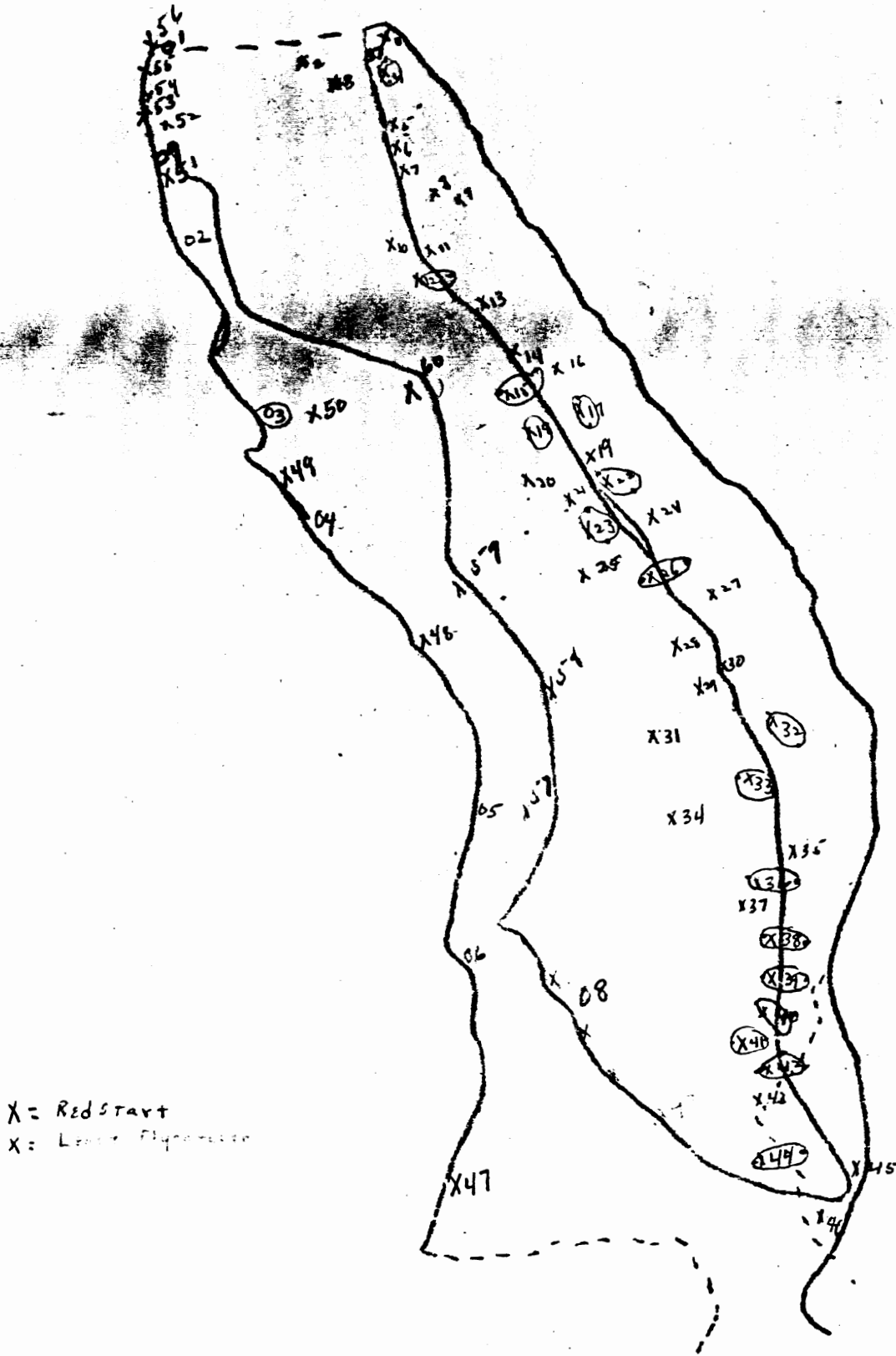
LOCATION OF BREEDING PAIRS OF THE THRUSHES IN AREA A



Scale = 4" to 1 mile



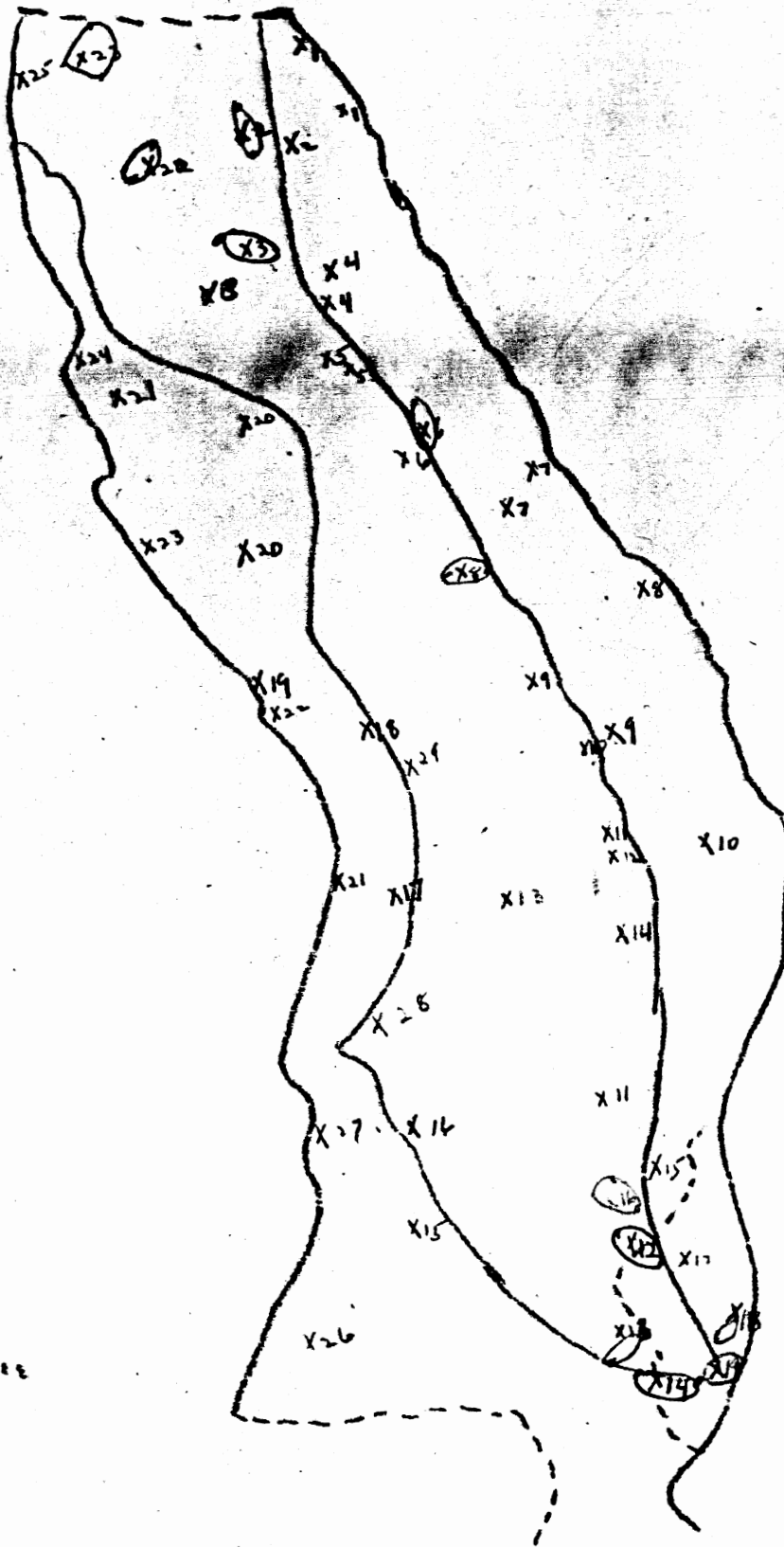
MAP 8



MAP OF AREA A SHOWING THE APPROXIMATE LOCATION OF BREEDING PAIRS  
OF REDSTARTS AND LEAST FLYCATCHERS

scale = 4" to 1 mile

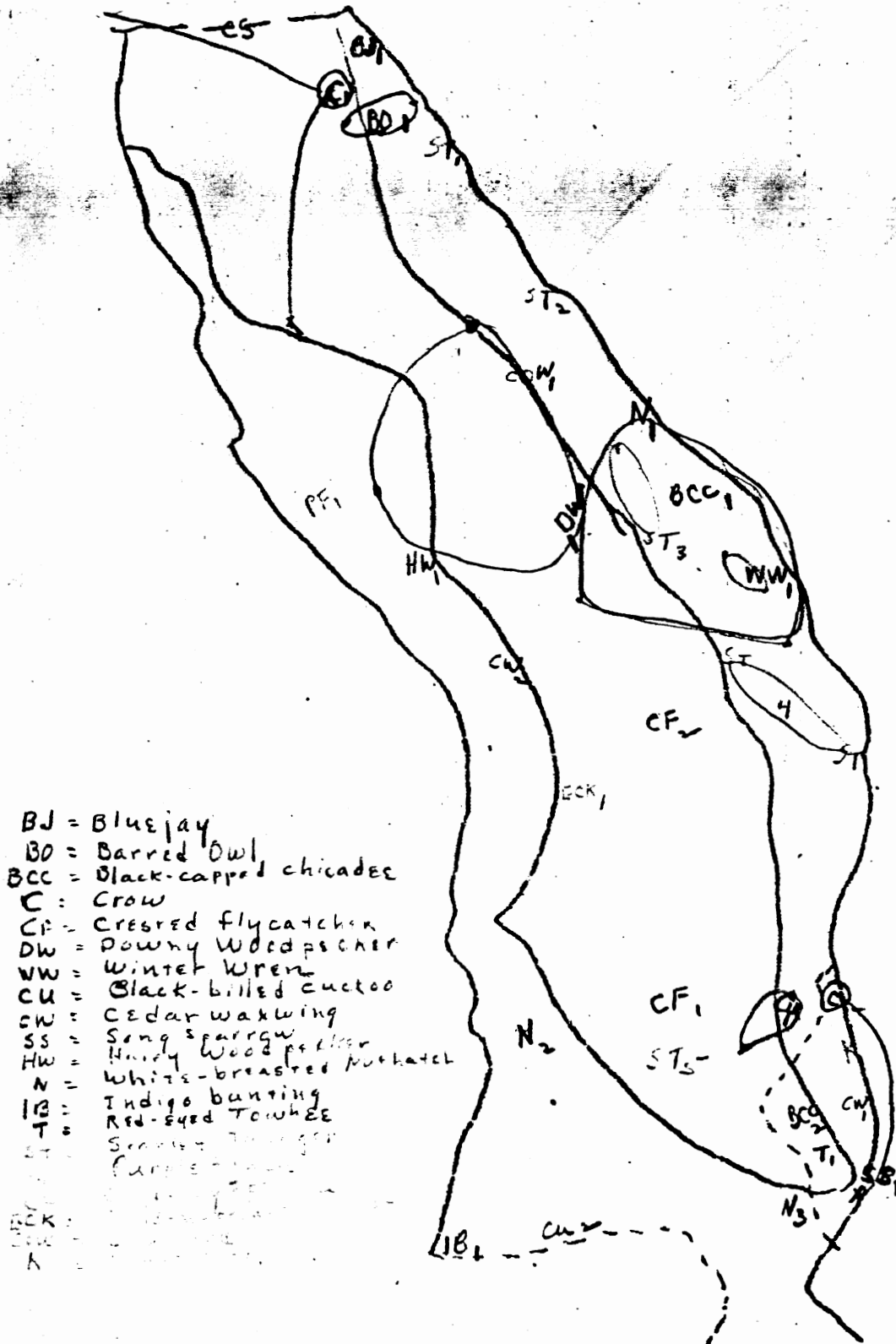
LOCATION OF THE BREEDING PAIRS OF THE WOOD PEEWEE AND OVENBIRD



X = Wood Pewee  
X = OVENBIRD

MAP 9

LOCATION OF BREEDING PAIRS OF SEVERAL SPECIES OF BIRDS IN AREA A



MAP 10

scale = 4" to 1 mile

AN ESTIMATE OF THE BREEDING BIRD POPULATION IN THE BEECH-MAPLE WOODS OF COLONIAL POINT

SPECIES	TOTAL PAIRS		PAIRS PER 100 acres
	A	B	A
Coopers Hawk-Accipiter cooperi		1	+
Broad-winged Hawk-Buteo platypterus		1	+
Ruffed Grouse-Bonasa umbellus		1	?
Black-billed Cuckoo-Coccyzus erythro-			
phtalmus	1		.62 1
Barred Owl-Strix varia varia	1		.62 1
Ruby-throated Hummingbird-Archilocus			
colubris		1	+
Belted Kingfisher-Megaceryle a. alcyon	1		.62 1
Flicker-Colaptes auratus luteus		1	+
Hairy Woodpecker-Dryobates villosus	1		.62 1
Downy Woodpecker-Dryobates pubescens	1		.62 1
C rested Flycatcher-Mylarchus crinitus			
boreus	2		1.25 1
Least Flycatcher-Empidonax minimus	9		5.62 6
Wood Peewee-Myiochane virens	23		14.37 17
Blue Jay-Cyanocitta c. cristata	1		.62 1
Crow-Corvus brachyrhynchos	2		1.25 1
Black-capped Chicadee-Penthestes a.			
atricapillus	24		1.25 3
White-breasted Nuthatch-Sitta caro-			
linensis	3		1.89 2
Winter Wren-Nannus h.hiemalis	1		.62 1
Robin-Turdus m.migratorius	1		.62 1
Wood Thrush-Hylocichla mustelina	4		2.5 2
Veery-Hylocichla fuscescens	13		8.12 8
Golden-crowned Kinglet-Regulus s.			
satrapa	1		.62 1
Cedar Waxwing-Bombycilla cedrorum	2		1.25 1
Yellow-throated Vireo-Vireo flavifrons	1		.62 1
Red-eyed Vireo-Vireo olivaceous	51		31.89 32
Black and White Warbler-Mniotilta varia	2		1.25 1
Black-throated Blue Warbler-Dendroica c.			
caerulescens	4		2.5 2
Black-throated Green Warbler-Dendroica v.			
virens	13		8.12 8
Blackburnian Warbler-Dendroica fusca	10		6.25 6
Chest-nut-sided Warbler-Dendroica pensyl-			
vanica		1	
Ovenbird-Seiurus aurocapillus	29		18.75 19
American Redstart-Setophaga ruticilla	60		37.5 37
Cowbird-Molothrus ater ater	1		.62 1
Scarlet Tanager-Piranga erythromelas	5		3.12 3
Indigo Bunting-Passerina cyanea	1		.62 1
Purple Finch-Carpodacus p. purpureus	1		.62 1
Red-eyed Towhee-Pipilo e. erythrophthalmus	1		.62 1
Chipping Sparrow-Spizella p. passerina	1		.62 1
Song Sparrow-Melospiza m. melodia	1		.62 1

Total of 250 pairs in Area A  
 Total of 156.25 pairs per 100 acres in Area A.  
 Total of 33 species of birds (both areas included)

Table 7