

RED-EYED VIREO TERRITORIES IN A THIRTY-ACRE
TRACT OF ASPEN-YOUNG MAPLE FOREST

by

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DESCRIPTION OF AREA

The area is a 30-acre tract of aspen and young maple forest. The area is located in the ... of the entire area, and their accompa ... be considered for the following information:

A. The basic outline of the area and of the ... of the area; these were drawn from an aerial ph ... on hand in the ...

August 12, 1946

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INTRODUCTION

"The word territory is used to describe some area that a bird defends against other members of its own species." The quotation is from Hickey (1943). This paper's purpose is to summarize the results and findings of a study of the territory scheme in a red-eyed vireo population, conducted at U.M.B.S. during the summer of 1946. The area under observation consisted of thirty acres of aspen-young maple growth along the Grapevine Trail near the Biological Station. The study has been principally determinative of size, shape, location, and distribution of territories, with less conclusive data concerning their formation and disintegration. An effort has been made to correlate the findings with the life history and ecological niche requirements of the species.

Population is discussed briefly.

All field notes are appended. (DELETED)

DESCRIPTION OF AREA

The maps of the entire area, and their accompanying notes, may be consulted for the following information:

A. The basic outline of the area and of the centrally-located Grapevine Trail; these were drawn from an aerial photo designated BDH-2-56, 8-4-38 which is on hand in the Blanchard Laboratory.

B. The twenty-six stations or orientation points which were chained off at fifty-meter intervals along the trail prior to the study.

C. A scale.

- D. Compass direction.
- E. Total acreage.
- F. General nature of terrain and soil.
- G. Forestation.
 - a. General.
 - b. Localized.
 - c. Tree counts.

METHOD OF STUDY

The only special equipment used was a pair of field glasses. Observations were generally made by walking slowly along the trail until a bird was heard or sighted--usually the former--and following the sound or the bird as far as possible with the notion of locating nests, flights, and perches. (A lustily-singing vireo was found to be audible at a distance somewhat in excess of four-hundred feet, and this, together with the fact that the vireos sang practically continuously throughout the day, made the method adequate for covering the thirty-acre strip.) Locations so-discovered were marked by means of coordinates--that is, distance along trail (in meters, from the nearest station) and distance from trail (in meters, by pacing); refer to field notes for examples. After the complete total of 175 locations were plotted on Map #2, the territories were outlined according to Kendeigh (1944).

In all, eighteen trips for observation were made between June 30th and August 6th, totaling thirty-eight hours. Approximately eight hours of this were spent in a systematic search for nests, with one nest the reward.

RESULTS

The results, most of which are recorded in the preceding two tables are recorded as follows:

A. Evidence of territory. The singing birds definitely selected areas of rather small extent and sang from their confines day after day during the breeding season, and often from the same tall aspen or birch. Furthermore, the singing birds were always removed from their nearest singing neighbor by at least 100 feet.

Apparently, singing was the primary means of maintaining territory and kept intrusions down to zero or a minimum which was undetectable during the 38-hour sampling of the area. Most of the singing was done from the aspen and birch branches thirty or forty feet above the ground. No scolding, chasing, nor fighting occurred among the vireos on any occasion.

However, once (July 15th) a parent bird was observed to chase three cedar waxwings from a tree near its fledgling. This was the only inter-species clash involving the vireo. Ovenbirds and Redstarts were common along the trail, but never were observed near the vireos.

B. Size of territory. The minimum average size of the territories encircled with green on the map is 0.6 of an acre. The maximum size would of course be the total area (30 acres) divided by the total population (18 pairs), or 1.7 acres. The true size of the territory is undoubtedly between the two figures, but probably not so very far from the minimum, since some of the smaller territories could not be expanded a great deal without encroaching upon neighboring territories of other pairs. Territories G, I, and H, for example, are pretty well limited by their neighbors and by the lake shoreline.

The territories may well be contiguous except for spaces between C and D, E and F, F and G, and perhaps between P and R (Table 2, Column 2). Q seems to be a valid territory, but it was in existence probably only ten days, leaving a hole in that neighborhood most of the time.

The contiguity is most evident on the bend of Grapevine Point, and between territories A, B, and C. Perhaps this is due to the dense growth of maples in these areas. Dr. Theodora Nelson thinks the proximity might be due to the fact that the birds like company, at least as long as the company keeps its distance.

Seven of the eighteen territories are somewhat elongate, with the long axis lying along the path of the trail. There are several obvious possibilities, but it seems most likely to me that this is due to a tendency of the birds, ^{or the observer?} to follow the break or opening provided by the trail.

C. Formation, disintegration, and shifting of territory. Taking the last first, there was no shifting of territory discernible. At least one nesting site apparently was changed, but probably to another location within the same territory.--The abandoned nest with the cowbird egg in it (Nest B-1) was only 100 feet from nest B-2, where most of the nesting cycle occurred subsequent to the discovery of B-1.

The study was begun too late to learn anything about the formation of territory. Table 2 would indicate that at least 17 of the 18 territories were formed before July 4th. Territory

Q was established late, perhaps--no record of it was secured until the sixth trip out the trail. But it shows nothing beyond the fact that a territory might have been established at that late date.

There is evidence that some of the territories were beginning to disintegrate at least by July 22nd, as follows:

1. Only one stray bird was charted from thirteen trips prior to July 22nd, and three from five trips after that date (Table 1, Column 8).

2. The birds seemed to be moving about more frequently among the trees, feeding and singing closely to one singing post. This impression is not borne out too well by the figures (Table 1, Column 9), though they show a slight tendency in that direction.

3. Of five active nests, two within the studied area and three nearby, the last to contain young was empty on July 25th, and the first was empty July 9th. Old nests were found on July 18th and July 22nd, and a fledgling was seen in a tree on July 2nd.

These facts indicate that the nesting cycle was coming to an end, probably by the middle of July, and with the end of the nesting cycle would come the end of territory significance.

Forbush (1929) says that occasionally a pair may raise two broods in a season, and Barrows (1912) said that two broods seemed probable. If two broods were normal, the territories would not be breaking up by July 18th, nor even August 1st, provided the young observed during the course of this work left the nest at about the average time for the first brood. A full month at least is necessary from egg-laying until the end of parental

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care. One brood seems more logical, at least for this area.

4. Two territories disappeared early, K on July 14th and Q on July 16th.

Certain other territories may have disappeared early, with stray birds coming into the areas later to confuse the issues. This is believed to be the case in the following example: The fledgling seen on July 2nd must have belonged to the pair on territory O. There are records of that pair on each of the first five trips, exclusive of one very windy day, which would mean a well-established territory until July 8th. That is probably about the time the fledgling began caring for itself. There are no more records for ten days, till July 18th; then a break till July 25th, then another till August 6th.

Territory D, on the other hand, carried through with a dozen records from July 1st to August 6th; G did the same thing. Perhaps birds are not uniform in their reactions at the end of the nesting cycle; that is, these birds may have stayed in their territories for some time after their young were raised. Then again, perhaps a catastrophe befell the first brood, and a second was raised. There is ample room for conjecture all through the study.

It is concluded that the records after July 18th are unreliable guides in the determination of territory, because of the large number of probable stray birds. On that basis, a revised map would show the following changes:

- a. Minimum size decrease from .6 to .5 acre.
- b. Large decreases in size of territories J, R, L, I, C, and B

POPULATION COMPARISONS

A. Eighteen territories or pairs of birds are concluded to be the total population of the thirty-acre strip. This would correspond to sixty pairs per hundred acres.

B. Thirty-six trips were made over the 1.1-mile distance in 38 hours, for an average of approximately one mile per hour. Average number of pairs counted under favorable conditions was ten per trip, so the relative abundance per ten hours is 100 pairs. This figure is considerably higher than was obtained in any of the areas included in the class project this year.

C. The red-eyed vireo is very abundant in this particular area, indicating a favorable environment. For one thing, maple trees are plentiful, and in this vicinity the vireo chooses maples over any other tree for its nests. White (1944) found six nests--five in maple, one in basswood. Five more nests this year were all in red and-sugar maples. They seem to prefer maples which are somewhat scattered. They feed mostly among the leaves of the hardwoods, and sing from high in the aspens and birches in this locality.

CONCLUSIONS

The red-eyed vireo was found to be an abundant bird in the young maple-aspen tract studied--60 pairs per hundred acres.

Eighteen territories were established in the thirty-acre strip; their average minimum size was .5 acre, average maximum size 1.7.

Territory was manifested principally by singing of the male birds.

Gradual disintegration of territory became discernible about July 18th.

7:00 PM
10:30 AM
11:00 AM
11:00 AM

7/16
7/16
7/18
7/22
7/25
7/25

TABLE 1

Trip No.	Date	Weather	Time	Total Pairs	Total Terr's.	Stray Birds <i>outside known territory</i>	Moving Birds <i>used territory</i>
1	6/30	Cloudy, Calm	8:15-9:25 AM	6	FHJKMN		
1B	6/30		9:25-10:52 AM	5	LORP		1
2	6/30	Foggy, Calm	7:00-8:30 PM	1			1
3	7/1	Clear, Windy	4:00-4:45 PM	1	G		
3B	7/1		4:45-5:30 PM	2	GD		
4	7/2	Sunny, Breeze	7:15-9:30 AM	7	B		
4B	7/2		9:30-10:35 AM	7			
5	7/4	Clear, Calm	8:00-10:00 AM	13	AII		3
5B	7/4		10:00-11:00 AM	4			
6	7/6	Clear, Breeze	7:00-8:00 PM	4	Q		
7	7/8	Cloudy, Calm	4:25-5:45 AM	11	E	1	1
7B	7/8		5:45-6:30 AM	1			
8	7/11	Clear, Breeze	8:00-10:15 AM	10			3
8B	7/11		10:14-11:15 AM	4			
9	7/14	Cloudy, Breeze	7:30-10:30 AM	8			1
10	7/15	Clear, Still	7:30-9:30 AM	1			1
11	7/16	Sunny, Breeze	8:30-9:45 AM	2			2
12	7/16	" "	4:40-5:20 PM	1			
12B	7/16	" "	5:20-6:00 PM	9			
13	7/18	Cloudy, Still	7:30-10:30 AM	10			3
14	7/22	" "	8:00-10:30 AM	11			1
15	7/25	Cloudy, Breeze	9:00-10:00 AM	13			2
15B	7/25		10:00-11:00 AM	11		1	2
16	7/28	Cloudy, Calm	8:00-10:00 AM	7		1	
17	8/1	Clear, Calm	8:00-9:10 AM	10		1	3
17B	8/1		9:10-10:00 AM	6			1
18	8/6	Clear, Breeze	7:30-10:30 AM	11			3

TABLE 2

Terr.	Prob- ably Adjoin adjacent territory	Min. Size Acres	Length Meters	Width Meters	Max. Size Acres	Date 1st Rec.	Known Days Extant	Date Last Record	Total Records
A	Yes	1.0	115	30	1.7	7/4	21	7/25	6
B	Yes	.75	60	60	1.7	7/2	30	8/1	5
C	No	.75	70	50	1.7	7/1	36	8/6	6
D	Yes	.50	60	40	1.7	7/1	36	8/6	12
E	No	.40	40	35	1.7	7/6	31	8/6	6
F	Yes	.40	60	25	1.7	6/30	32	8/1	5
G	Yes	.35	45	20	1.7	7/1	36	8/6	12
H	Yes	.50	75	20	1.7	6/30	32	8/1	7
I	Yes	.50	50	40	1.7	7/4	28	8/1	5
J	Yes	1.00	85	55	1.7	6/30	32	8/1	11
K	Yes	.35	50	35	1.7	6/30	15	7/14	5
L	Yes	1.00	85	60	1.7	6/30	32	8/1	9
M	Yes	.50	70	30	1.7	6/30	26	7/25	7
N	Yes	.35	50	35	1.7	6/30	37	8/6	11
O	Yes	.80	115	35	1.7	6/30	37	8/6	7
P	Yes	.75	85	50	1.7	6/30	37	8/6	10
Q	Yes	.25	60	15	1.7	7/6	10	7/16	4
R	Yes	.50	75	30	1.7	6/30	37	8/6	11
		TOTAL	10.75		30.0				
		Av.	.6						

NESTS

Located eleven feet from ground, in small outer branches of a six-inch sugar maple. In an area of trees scattered ten or fifteen feet apart, and the nest was situated so that there was an open space below it and to the sides.

One egg was in nest on July 4th.

One fledgling left nest on July 25th.

Located six feet from ground, in small outer branches of a two-inch sugar maple. In an area of scattered small maples, sumacs, and birches, and the nest was situated so that there was an open space below it and to the sides.

The nest was abandoned sometime prior to June 24th, and contained one cowbird egg.

Located six and one-half feet from ground, in small outer branches of a two-inch red maple tree. In an area of scattered small maples, aspens, and birches, and the nest was situated so that there was an open space below it and to the sides.

At time of discovery (July 2nd), the nest contained three vireos and one cowbird eggs. All were hatched on July 4th.

The cowbird left the nest July 12th. The three vireos left the nest between the 12th and 13th. *successfully*

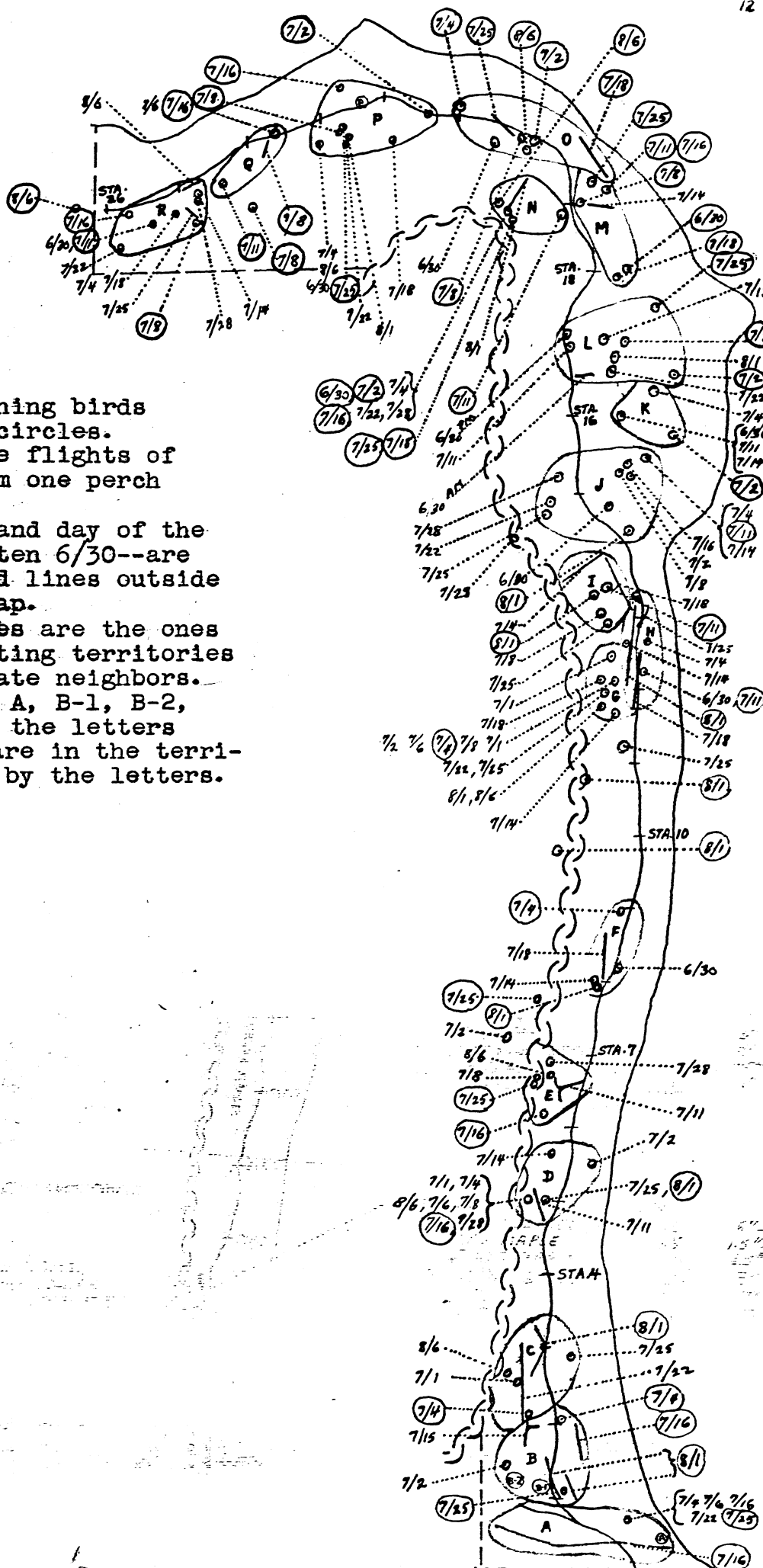
Had fallen, and was found on Ground July 18th.

Had fallen, and was found on ground July 22nd.

A MAP OF THE TERRITORIES

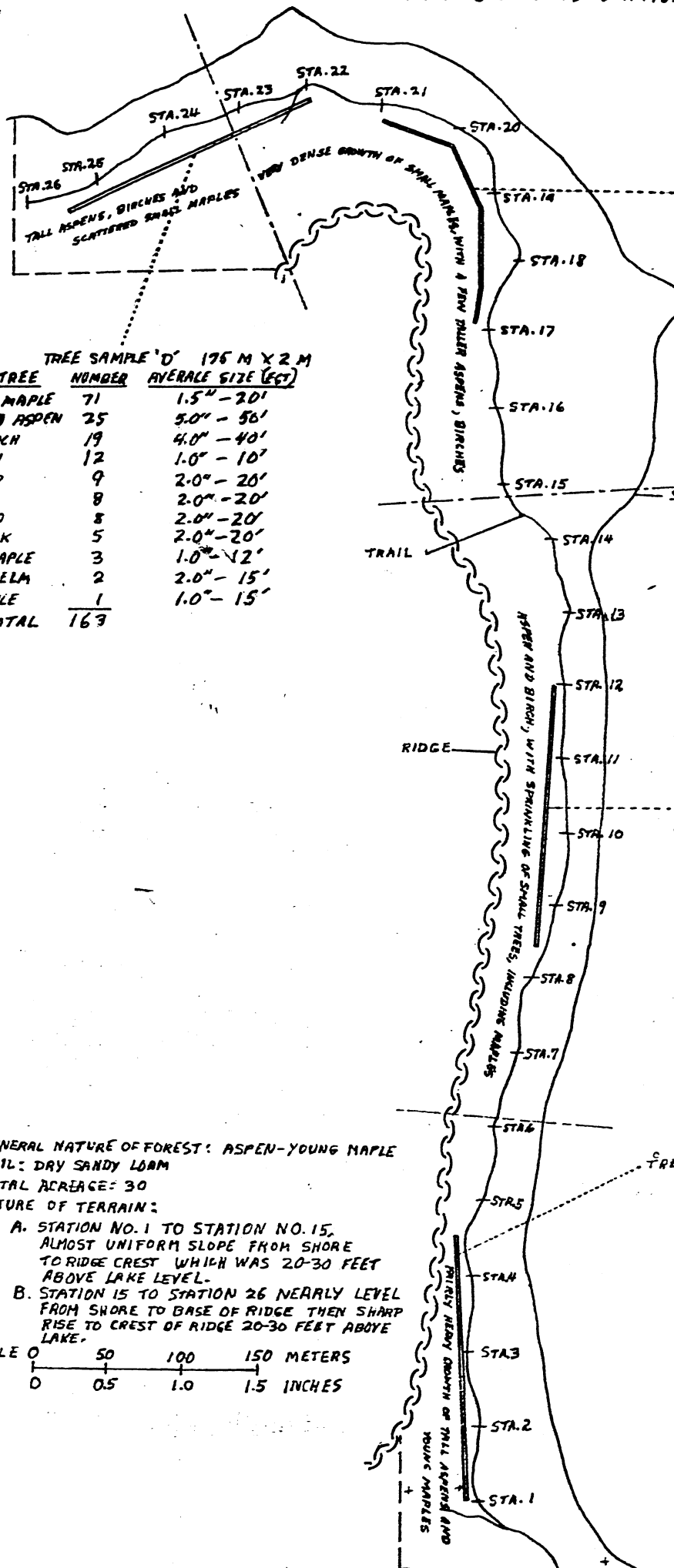
Legend:

- a. Locations of perching birds are drawn in red-circles.
- b. Red lines indicate flights of an individual from one perch to another.
- c. Dates--the month and day of the observation, written 6/30--are extended by dotted lines outside the area of the map.
- d. The encircled dates are the ones helpful in separating territories from their immediate neighbors.
- e. Nests, designated A, B-1, B-2, H and P, with all the letters encircled. They are in the territories indicated by the letters.



1. TERRITORY MAP OF THE BIRD
 2. TERRITORY MAP OF THE BIRD
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GRAPEVINE TRAIL, ALONG SHORE OF DOUGLAS LAKE, NORTH OF U. OF MICH. BIOLOGICAL STATION



TREE SAMPLE 'D' 175 M X 2 M

TREE	NUMBER	AVERAGE SIZE (EST)
SUGAR MAPLE	71	1.5" - 20'
LARGE-TOOTHED ASPEN	25	5.0" - 56'
CANOE BIRCH	19	4.0" - 40'
WHITE ASH	12	1.0" - 10'
IRONWOOD	9	2.0" - 20'
BEECH	8	2.0" - 20'
BASSWOOD	8	2.0" - 20'
RED OAK	5	2.0" - 20'
STRIPED MAPLE	3	1.0" - 12'
SLIPPERY ELM	2	2.0" - 15'
RED MAPLE	1	1.0" - 15'
TOTAL	163	

TREE SAMPLE 'C' 175 M X 2 M

TREE	NUMBER	AVERAGE SIZE
SUGAR MAPLE	175	2" - 20'
BASSWOOD	15	4" - 30'
IRONWOOD	13	3" - 20'
BLACK ASH	11	1" - 12'
CANOE BIRCH	6	4" - 30'
PIN CHERRY	6	2" - 20'
RED OAK	5	3" - 25'
LARGE-TOOTHED ASPEN	4	4" - 35'
SLIPPERY ELM	3	2" - 20'
BEECH	3	2" - 20'
TOTAL	241	

TREE SAMPLE 'B' 175 M X 2 M

LARGE-TOOTHED ASPEN	48	4" - 35'
SUGAR MAPLE	29	2" - 20'
BEECH	17	2" - 20'
RED MAPLE	14	2" - 25'
CANOE BIRCH	13	4" - 35'
IRONWOOD	11	1" - 15'
PIN CHERRY	7	1" - 15'
BLACK ASH	6	1" - 15'
SLIPPERY ELM	1	1" - 12'
RED OAK	1	3" - 25'
SERVICE BERRY	1	1" - 10'
HEMLOCK	1	18" - 60'
RED-OSIER	1	1" - 8'
TOTAL	150	

TREE SAMPLE 'A' 175 M X 2 M

LARGE-TOOTHED ASPEN	76	5" - 40'
RED MAPLE	65	1.5" - 20'
SUGAR MAPLE	26	1.5" - 20'
CANOE BIRCH	23	3" - 30'
RED OAK	20	3" - 25'
BEECH	11	2" - 25'
STRIPED MAPLE	5	1" - 12'
BLACK ASH	2	1" - 10'
SERVICE BERRY	1	1 1/2" - 15'
IRONWOOD	1	1" - 15'
RED-OSIER	1	1" - 8'
SUMAC	1	1" - 7'
TOTAL	232	

GENERAL NATURE OF FOREST: ASPEN-YOUNG MAPLE
 SOIL: DRY SANDY LOAM
 TOTAL ACREAGE: 30
 NATURE OF TERRAIN:
 A. STATION NO. 1 TO STATION NO. 15, ALMOST UNIFORM SLOPE FROM SHORE TO RIDGE CREST WHICH WAS 20-30 FEET ABOVE LAKE LEVEL.
 B. STATION 15 TO STATION 26 NEARLY LEVEL FROM SHORE TO BASE OF RIDGE THEN SHARP RISE TO CREST OF RIDGE 20-30 FEET ABOVE LAKE.

