

IBS # 1392-B

A COMPARISON OF BREEDING BIRD  
CENSUS RESULTS FROM A CONIFEROUS  
AND HARDWOOD FOREST.

PAUL J. MILLS

PRESENTED TO DR. FRANCIS C. JAMES

IN FULFILLMENT OF CREDIT FOR

BIOL. 5890

Independent study and Field  
Ornithology course.  
Very nice job. FCS

distributional theories, construct tables illustrating both the original and present species frequencies of the park.

Investigations of historic journals and land survey records indicate that the presettlement forests of Itasca were composed primarily of aspen (Populus tremuloides) and white birch (Betula papyrifera) with red, (Pinus resinosa) white, (Pinus strobus) and jack pine stands (Pinus banksiana). (Frissell 1971). The distribution was approximately 65% coniferous and 35% hardwood stands. In contrast the present distribution is approximately 25% coniferous and 75% hardwood (Frissell 1973).

Since the park has representatives of both original forest stands and AS information on the parks original vegetation is available, the method of censusing was decided upon to determine how such factors as fire and logging have altered the bird species distribution of Itasca State Park.

#### Methods

Two stands were selected to represent the parks coniferous and hardwood forests. The first was a 12.75 hectare portion of the Wilderness Sanctuary located west of Lake Itasca on wilderness drive. The stand originated after a major fire in 1712 (Frissell 1973), was acquired by the park in 1892 (Aasang 1976), and contains primarily red pine (53%), balsam fir (12.9%) and white birch (7.6%). The second site, located on Bear Paw Point, was originally a red pine forest when acquired by the park in 1892, but was clear cut during logging operations in 1912. The 8.75 hectare plot chosen contains primarily elm (31.8%), black ash (22%)

and white birch (13%).

Both of the areas were gridded according to the guidelines set by the National Audubon Society's breeding bird census (American Birds 1972). Teams of 4, using a tripod mounted Brunton pocket transit, set stakes at 50 meter intervals until the desired acreage was established. (appendix A) The red pine stand was gridded specifically for this study by the author and members of the field ornithology class from June 19-25. The actual census dates were June 29,30, July 2,3,5,9-11 between 0500-0900 and 1830-2130 hours. The hardwood stand was originally gridded in June 1979 by the field ornithology class <sup>FOR A CENSUS</sup> conducted July 1979 (IBS 1307-B). The data used for this study was collected by B. Bell and M. Candee for a census conducted July 1-13 between 0500-1000, 1330-1530 and 1900-2300 hours.

## Results

Frequency tables 1 and 2 list the species found in the two censused areas. Table 3 lists the species unique to each area while table 4 lists the species common to both. The comparative information of tables 3 and 4 is given in # of territorial males/km.<sup>2</sup> rather than the original # of territorial males/ area censused. This conversion provides uniformity for comparing forest stands of equivalent acreage.

All of the frequency variation among the species can be discussed in terms of the habitat similarities and differences between the two areas. For example, the nearly identical % ground cover and shrub cover (coniferous 79.3% gc, 48.5% sc ; hardwood 77.5 gc, 49.5%sc) accounts for the similarities of the ovenbird

OVENBIRD  
 RED-EYED VIREO  
 PINE WARBLER  
 BK.-THROATED GREEN  
 BK.-CAPPED CHICK.  
 RED-CRESTED NUT.  
 HERMIT THRUSH  
 E. WOOD PEWEE  
 BROWN CREEPER  
 YELLOW-BELLIED SAP.  
 GRAY JAY  
 WHITE-BREASTED NOT.  
 HAIRY WOODPECKER  
 BLUE JAY  
 VEERY  
 NORTHERN PARULA  
 CHESTNUT-SIDED W.  
 SCARLET Tanager  
 GOSHAWK  
 RUFFED GROUSE  
 BK.-BACKED 3-TOED  
 WINTER WREN  
 SWAINSON'S THRUSH  
 COMMON YELLOW-THRT.  
 RED CROSSBILL  
 PILEATED WOODPECKER

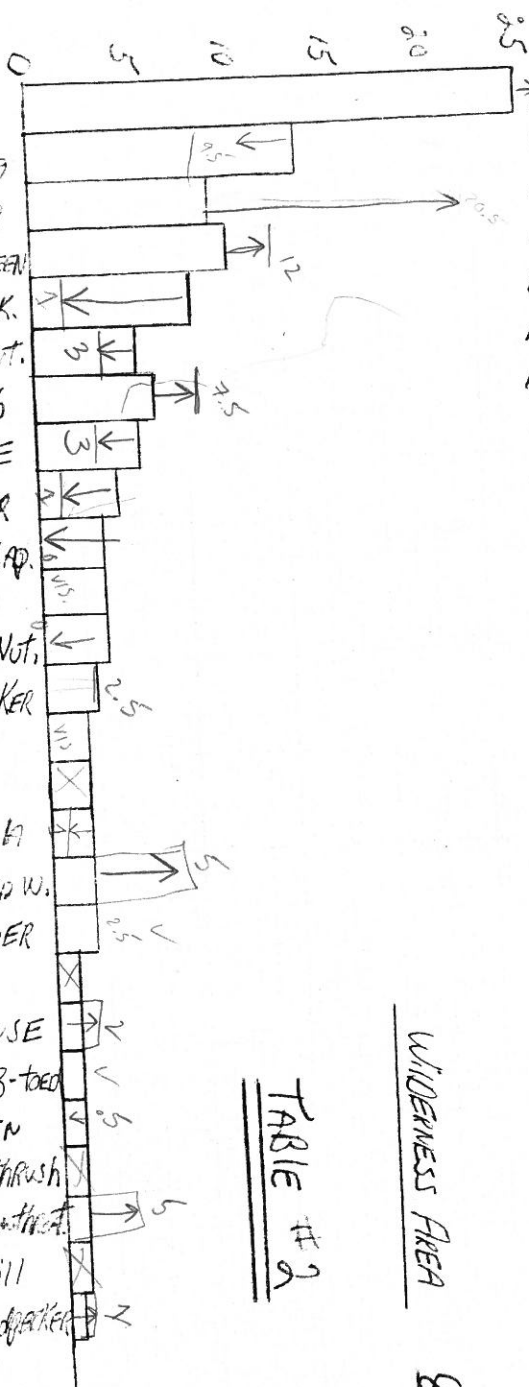


TABLE #2

WILDERNESS AREA

894 territorial ♂/km<sup>2</sup>

361/100 ACRES

26 SPECIES

RED-EYED VIREO  
 OVENBIRD  
 GREAT CRESTED FLY.  
 BLACKBURNIAN W.  
 BK.-THROATED GREEN W.  
 LEAST FLYCATCHER  
 AMERICAN REDSTART  
 WINTER WREN  
 COMMON YELLOW-THRT.  
 YELLOW-BELLIED SAP.  
 BK.-CAPPED CHICK.  
 TENNESSEE W.  
 N. PARULA WARBLER  
 YELLOW-BILLED CUCKOO  
 COMMON FLICKER  
 HAIRY WOODPECKER  
 WHITE-BREASTED NOT.  
 AMERICAN ROBIN  
 VEERY  
 BK.-AND-WHITE W.  
 YELLOW WARBLER  
 NORTHERN ORIOLE  
 PURPLE FINCH  
 BROAD-WINGED HAWK  
 BARRIED OWL  
 RUBY-THROATED HUMM.  
 DOWNY WOODPECKER  
 CEDAR WAXWING  
 CHESTNUT-SIDED W.  
 PINE WARBLER  
 EVENING GROUSE

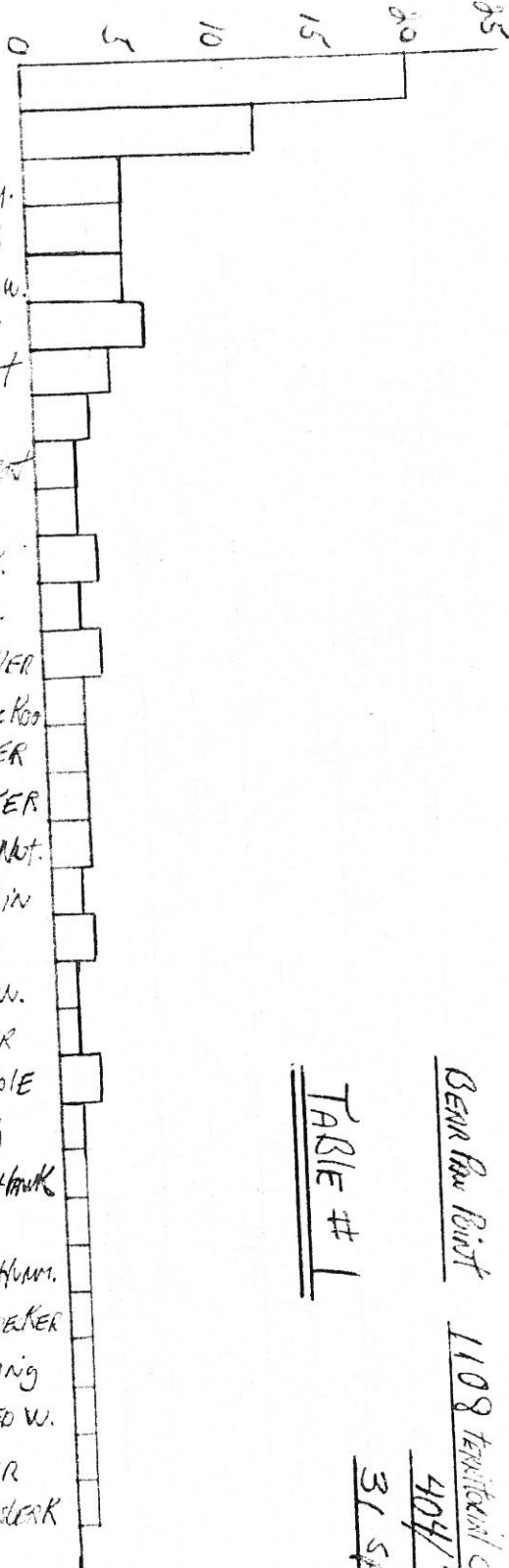


TABLE #1

BEAR RUN POINT

1108 territorial ♂/km<sup>2</sup>

404/100 ACRES

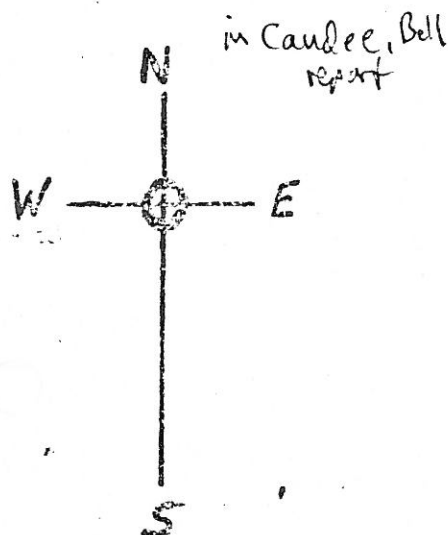
31 SPECIES

SPECIES:

Goshawk

RED PINE SPECIES  
MAPS.

(BEAR PAN PT. MAPS  
FILED SEPARATELY)



(1)

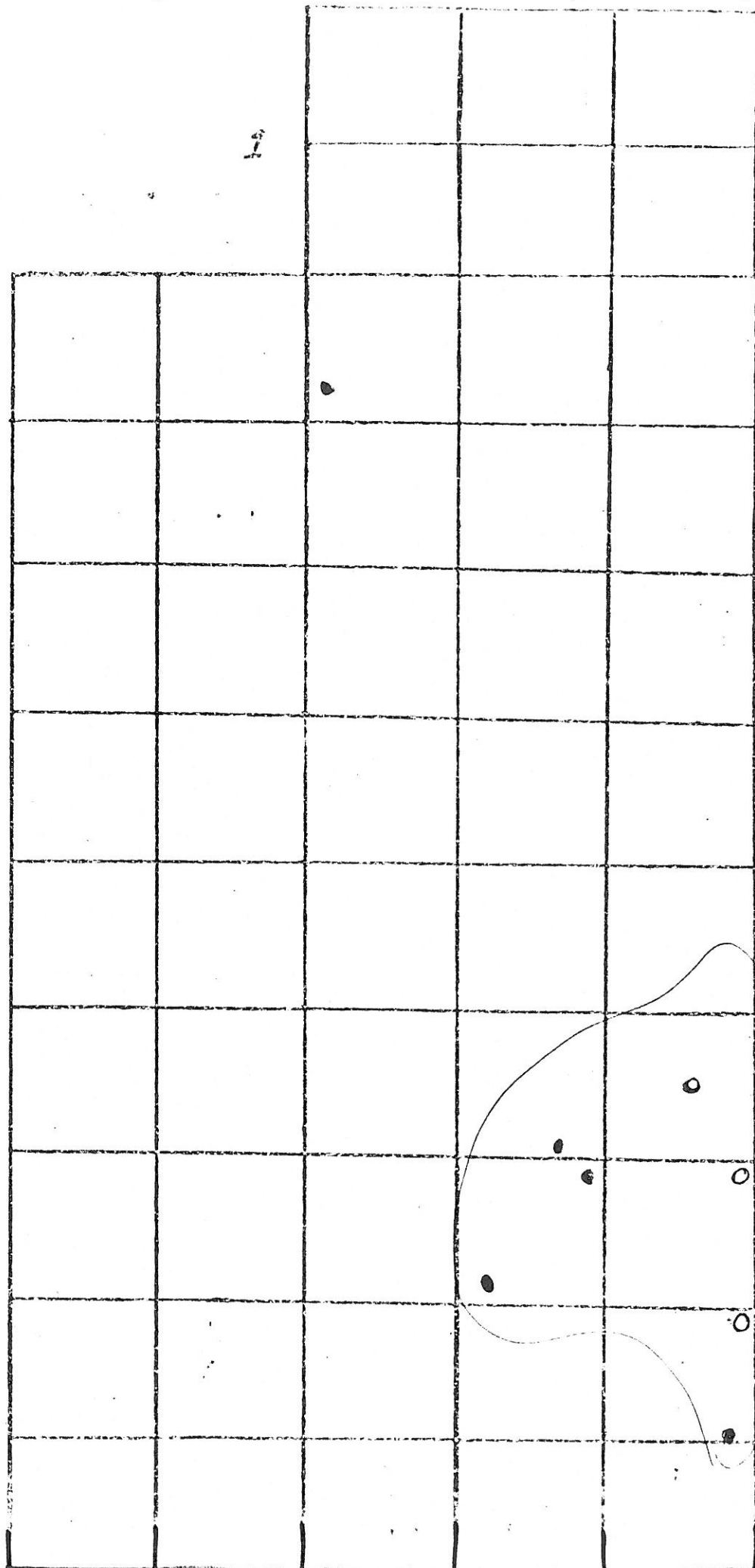
12.75 HECTARES

31.4 ACRES

51 SQUARES

0 50 M.

10



Paul Mills

Summary sheet A

Minimum Space for Tenhaare (0.4 hectare) circles

Number of Circles = 10

RED PINE WILDERNESS AREA

RED PINE WILDERNESS AREA												
Species	Density <sup>1</sup>								Total	Trees/acre (by species)	Relative Density (by species)	
	Number of trees in all circles by size class											
	A 3-6	B 6-9	C 9-12	D 12-15	E 15-21	F 21-27	G 27-33	H 33-39				
RED PINE	1	12	19	41	55	13	1		142	142	53%	
DEER TREES	29	14	4	3	2				52	52	19.7%	
BALSAM FIR	14	18	1	1					34	34	12.9%	
WHITE BIRCH	10	7	3						20	20	7.6%	
RED MAPLE	3	1	3						7	7	2.6%	
WHITE PINE			2				2		4	4	1.5%	
GRASSY PINE			1		2				3	3	1.1%	
RED OAK			1						1	1	.33%	
Total	57	52	34	45	59	13	3		263			
Percentage by size class	57	52	34	45	59	13	3					
Relative density of size class	21.6	19.7	12.9	17.1	22.2	4.9	1.1					

Percent of + readings for interception of woody vegetation < 3' d.b.h. eg. total pluses  
in 20 readings x 5.Percent of + readings for green vegetation sighted in ocular tube. eg. total pluses  
in 20 sightings x 5.

Percent of plus (+) readings. eg. total pluses in 20 sightings x 5.

43.5%

79.3%

64.5%



## Summary Sheet B

Summary Sheet B

Summary Sheet for Tenth-acre (0.4 hectare) circles

Number of Circles = 10

Trees	Basal Area <sup>5</sup>								Relative Dominance <sup>7</sup> (by species)	No. of circular which the species occurred	Frequency <sup>9</sup>
Species	Cross sectional area of the trunk at 4.5 feet from the ground (d.b.h.)										
	A (0.1)	B (0.3)	C (0.6)	D (1.0)	E (1.8)	F (3.1)	G (4.9)	H (005) <sup>2</sup>			
1 RED PINE	.1	3.6	5.9	4.1	9.9	40.3	4.9		30 %	10	100
2 DEAD TREES	2.9	4.2	2.4	3	3.6				6.6 %	10	100
3 Balsam Fir	1.4	5.4	.6	1					3.4 %	9	90
4 white Birch	1.0	2.1	1.8						2.0 %	9	90
5 RED MAPLE	.3	.3	1.8						.99 %	5	50
6 WHITE PINE			1.2		3.6		9.8		4.5 %	2	20
7 Balsam poplar			.6						1.7 %	1	10
8 RED ORCH			.6						.24 %	1	10
9											
10											
RELATIVE DOMINANCE	2.3%	6.4	60	18.5	43.8	16.6	6.0	= 100%			
TOTAL	5.9	15.6	14.7	45	106.2	40.3	14.7	242.2	100%		600
Trees/acre by size class	57	52	34	45	59	13	3				
Relative Density by size class	21.6	19.7	12.9	19.1	2.2	4.9	1.1				
Shrubs:	Percent of + readings for interception of woody vegetation < 3" d.b.h.								Eg. total pluses (+) 48.5%		
Ground Cover:	Percent of plus + readings for green vegetation sighted in ocular tube.								Eg. total pluses (+) 79.3%		
Plumage Cover:	Percent of plus (+) readings.								Eg. total pluses in 20 sightings x 5. 67.5%		

MATURE PINE-FIR-BIRCH FOREST.--Location: Minnesota; Clearwater Co., University of Minnesota Forestry and Biological Station, Itasca State Park Wilderness Sanctuary; 47°13' N, 95°12' W, USGS Itasca State Park Quadrangle. Continuity: New. Size: 12.75 ha= 31.5 acres (250x 550 m rectangle minus 110 sq. m of NW corner, surveyed). Description of Plot: The dominant canopy tree is Red Pine (Pinus Resinosa). Most prominent in the understory are Balsam Fir (Abies Balsamea)<sup>AND</sup> White Birch (Betula Papyrifera). The ground cover is primarily Beaked Hazelnut (Corylus cornuta), Early Meadow Rue (Thalictrum dioicum), Bracken Fern (Pteridium aquilinum), Wild Lily of-the-Valley (Maianthemum canadense) and Large Leaf Aster (Aster macrophyllus). A quantitative survey of the vegetation gave the following results: Trees 3- inches diameter and over, based on ten 0.1-acre circular samples, 263/acre; total basal area 242.2 ft.<sup>2</sup>/acre. Species comprising 90% of the total number of trees: (figures after each give number of trees/acre, relative density (%), relative dominance (%), frequency (%).) Red Pine, 142, 53, 80, 100; dead trees, 52, 19.7, 6.6, 100; Balsam Fir, 34, 12.9, 3.4, 90; White Birch, 20, 7.6, 2.0, 90. Trees by diameter size class: (figures after each size class give number of trees/acre, relative density (%), basal area (sq. ft./acre), relative dominance (%).) A(3-6in.) 57, 21.6, 5.7, 2.3; B(6-9in.) 52, 19.7, 15.6, 6.4; C(9-15in.) 79, 30, 59.7, 24.6; D(15-21in.) 59, 2.2, 106.2, 43.8; E(21-27in.) 13, 4.9, 40.3, 16.6; F(27-33in.) 3, 1.1, 14.7, 6.0.



Shrub cover, 48.5% (shrub stem count not taken); ground cover 79.3%; canopy cover 64.5%; average canopy height 80 ft. (range 45-110 ft.); average shrub height 6.8 ft. Plant names are from H. Gleason and A. Cronquist, Manual of Vascular Plants, 1963.

Edge: Bordered on all sides by similar forest except for a 100 m bog on the NW portion. Topography: One small rise of approximately 25 ft. at NE end. Elevation: 1475 ft. Weather: 81° to 93°F. Wind, Beaufort 0-10 mph. Clear to overcast, no precipitation. Coverage: June 29-30, July 2, 3, 5, 9-11 between 0500-0900 and 1830-2130 hours. Total man hours 26. Census: Ovenbird, 25 (196, 79); Red-eyed Vireo, 13 (101, 41); Black-throated Green Warbler, 10 (78, 32); Pine warbler, 9 (70, 28); Black-capped Chickadee, 8 (63, 25); Hermit Thrush, 6 (47, 19); Eastern Wood Pewee, 5 (39, 16); Red-breasted Nuthatch, 5 (39, 16); Brown Creeper, 4 (31, 12); Yellow-bellied Sapsucker, 3 (23, 9); Gray Jay, 3 (23, 9); White-breasted Nuthatch, 3 (23, 9); Hairy Woodpecker, 2.5 (19, 8); Blue Jay, 2; Veery, 2; Northern Parula Warbler, 2; Chestnut-sided Warbler, 2; Scarlet Tanager, 2; Goshawk, 1; Ruffed Grouse, 1; Black-backed Three-toed Woodpecker, 1; Winter Wren, 1; Swainson's Thrush, 1; Common Yellowthroat, 1; Red Crossbill, 1; Pileated Woodpecker, 0.5, +. Total: 26 species; 114 territorial males (894/km.<sup>2</sup>, 361/100 acres). Visitors: Bald Eagle, Broad-winged Hawk, Common Raven, Evening Grosbeak. Remarks: Many birds had finished nesting and territorial boundaries were breaking down. The following species

were feeding young that had fledged: Goshawk, Hairy Woodpecker, Yellow-bellied Sapsucker, Gray Jay, Blue Jay, Red-breasted Nuthatch, Black-capped Chickadee and Chestnut-sided Warbler. High % of ground and shrub cover and complete lack of pine seedlings indicate succession to a hardwood forest. Most of the dead trees were young Balsam Firs with diameters less than 10 in.. Red Squirrels (Tamiasciurus hudsonicus), White-tailed Deer (Odocoileus virginianus) and Wood Frogs (Rana sylvatica) were frequently seen. Special thanks to Barb Bell, Mary Candee, Laura Greffenius, Roberta Sorensen and Mindy Bell for assistance in surveying and habitat description,-- Paul J.J. Mills, 6800 16<sup>th</sup> Ave. S. Richfield,  
Mn. 55423.