



**1997 BREEDING BIRD SURVEY AT
ISLE ROYALE NATIONAL PARK, MICHIGAN**

RESOURCE MANAGEMENT REPORT 97-3

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ABSTRACT

The importance of breeding bird surveys (BBS) has been illustrated by the popularity of the North American BBS program as well as the number of research projects that focus on declining neotropical migrant populations being conducted both in North America and abroad. Isle Royale National Park, Michigan, established a formal breeding bird survey in 1994 to integrate island population data with other studies being conducted in the region. This program continued in 1995, 1996, and 1997 with the objective of determining the size and composition of the neotropical migrant community on Isle Royale. This single objective approach represents a shift in focus from the 1994 survey.

Point counts were conducted at Isle Royale NP from 14 June to 27 June 1997, using eight park trails as transects. A total of 122 points were surveyed. Species diversity values were calculated for each transect.

A total of 58 species (1283 individuals) were recorded across the island. Three species were present at all eight transects, while 10 species were recorded at only one transect. Diversity values, by transect, ranged from 0.75 to 0.95 during the five minute counts. Comparisons between 1997 and 1996 are discussed.

Recommendations are made for 1998 and include some suggestions to assist surveyors in locating points.

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INTRODUCTION

Isle Royale National Park established a formal breeding bird survey in 1994 as a means of integrating island population data with other studies conducted within the region (Van Stappen and Doolittle 1991, 1992). Isle Royale's survey was initiated with dual objectives: 1) determine the size and composition of the neotropical migrant community, and 2) attempt to associate any observable population trends with changes in the vegetation of the island.

In 1995, a breeding bird survey was conducted at Isle Royale National Park to add to and expand on pilot data collected in 1994 (Gostomski and Oelfke, 1995). The objective was modified to focus only on determining the size and composition of the neotropical migrant community on Isle Royale.

In 1996, the breeding bird survey was conducted at Isle Royale National Park to expand on data collected in 1994 and 1995 (Beeman and Oelfke, 1996). The main objective in 1996 was to determine size and composition of the neotropical migrant community on Isle Royale. A secondary objective included standardizing the survey by permanently marking observation points. A decision was also made to reduce the observation time at each point to five minutes, based on recommendations elsewhere (Ralph, et al. 1993) and results from previous years' data which showed 92% of the species recorded were detected in the first five minutes (Gostomski and Oelfke, 1995).

In 1997, the breeding bird survey was conducted at Isle Royale National Park to expand on previously collected data. The main objective in 1997 was to determine size and composition of the neotropical migrant community at Isle Royale. A secondary objective was to make general comparisons between 1996 and 1997. The same transects were surveyed in 1997, but due to the difference in volunteer pacing only 122 points were censused. For further background and historical information regarding Isle Royale National Park's Breeding Bird Survey reference should be made to the 1996 Isle Royale Breeding Bird Survey Report.

METHODS

In an effort to have a standardized annual survey for neotropical migrant landbirds, a breeding bird survey was conducted from 14 June to 27 June 1997 at Isle Royale National Park, Michigan. The objective for the 1997 survey was to determine the size and composition of the neotropical migrant community on Isle Royale using standardized point counts conducted along transects at various locations across the island.

Selection of study sites-- Eight park trails were used as survey transects with census points located along them at intervals of

approximately .4 km (.25 mi.). Transects were established in each "region" of the park (east, west, and central), as well as at one off-shore location: Passage (PASS) Island. Transects surveyed on the main island were the Mt. Franklin Trail from Three Mile to Lane Cove (TMLC), the Mt. Ojibway loop (MTOJ), the Indian Portage Trail from Lake Richie to the Greenstone Ridge (LRGR), the Indian Portage Trail from Chippewa Harbor to Lake Richie (CHLR), the Ishpeming Trail (ISTR), the Feldtmann Lake Trail (FELK), and the Greenstone Ridge Trail at Windigo (WIND) (Figure 1). The length of the transects varied as did the number of points along them (Table 1).

Table 1: Transects surveyed, length of transects, number of census points, and number of points censused in 1997. Field names of transects given in text. Total number of points = 122.

Transect	Transect Length Km (Mi)	No. of Points	No. of Points Censused in 1997
PASS	1.3 (0.8)	4	4
TMLC	6.9 (4.3)	17	17
CHLR	6.4 (4.1)	16	16
MTOJ	8.2 (5.1)	19	19
LRGR	7.8 (5.0)	20	16
ISTR	7.0 (4.5)	18	18
FELK	7.0 (4.5)	18	14
WIND	8.3 (5.3)	21	18

Census Techniques-- Each point was visited once between sunrise (ca. 0530) and 1000 E.D.T. by one skilled observer and one recorder. Weather conditions were recorded upon arrival at each point, and no counts were conducted during periods of rain, heavy fog, or when wind speeds were >16 km/hr (10 mph). Point counts were 5 minutes in duration, during which all species seen and heard were recorded. Birds heard or seen at a census point immediately before or after the count period or while walking between points were recorded as "Miscellaneous", but were not included in the data analysis.

Analysis of data-- Non-focal species, such as Herring Gulls, mergansers, and Common Loons, and birds heard but not identified during point counts (recorded as unknown) were removed from the data. Unknowns that could be identified in a general way were not eliminated if no other individual of that species was heard at that point. For example, if a woodpecker was heard tapping, it would be recorded as an unknown woodpecker. However, if a particular species such as a Downy Woodpecker was also identified during the count period, the unknown was eliminated from the

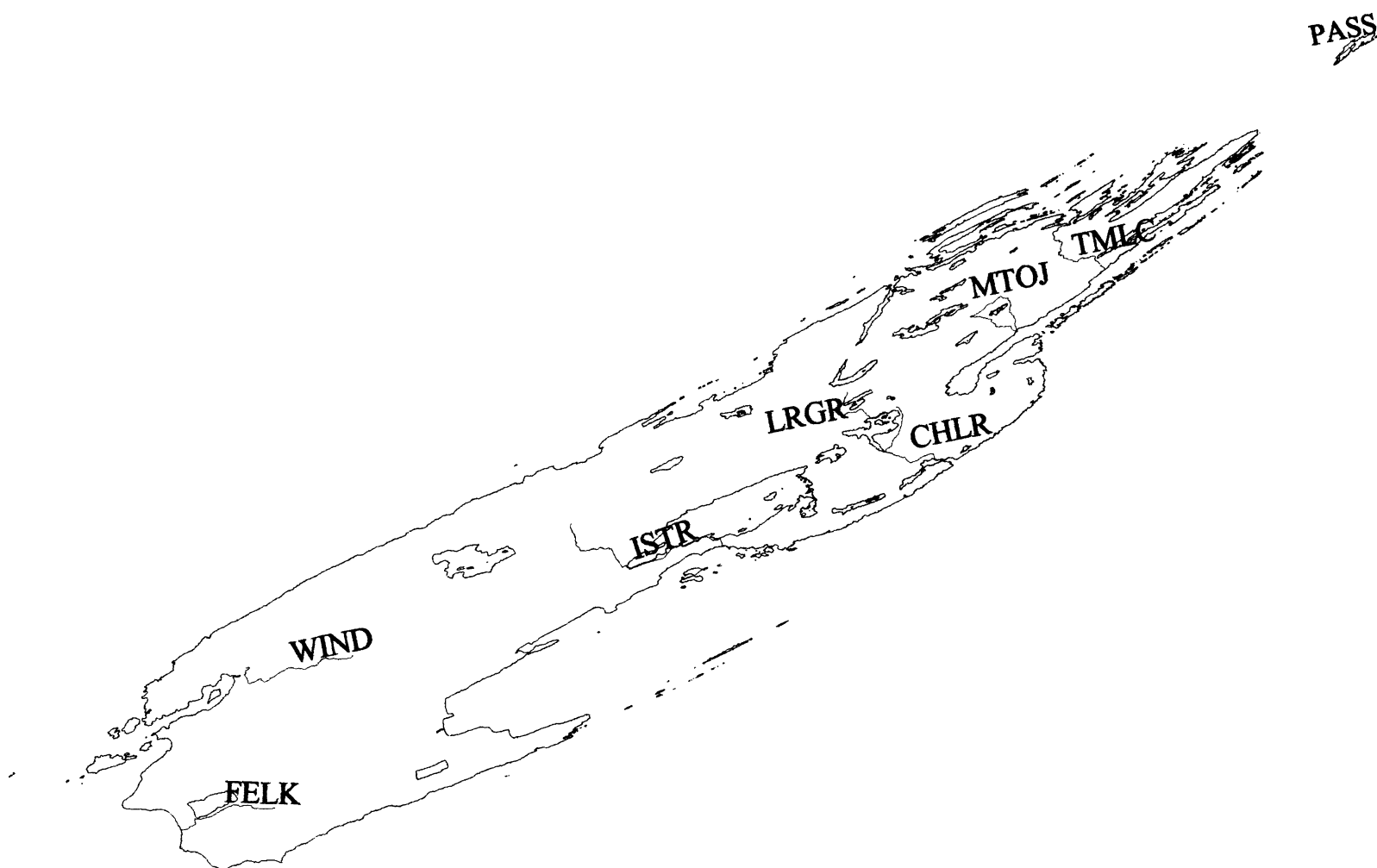


Figure 1: 1997 Breeding Bird Survey transects, Isle Royale NP

data. Only if no other woodpeckers were heard at that point would the unknown woodpecker be retained in the data. These unknowns were included in the calculation of diversity values.

In 1997, species diversity values were calculated for each transect using the Simpson's Index (Hair 1980). Values range from 0 to 1 (100%) and represent the probability that two individuals, drawn at random from a population, belong to different species.

RESULTS

A total of 58 species and 1283 individuals were recorded across the island (Table 2). Field and scientific names for all species are in Appendix 1. Six species accounted for over 50% of the total number of individuals recorded during the 5-min. counts. They were the White-throated Sparrow (12%), Ovenbird (11%), Red-eyed Vireo (9%), Winter Wren (8%), Nashville Warbler (7%), and Chestnut-Sided Warbler (5%).

Three species (5% of the total) were present at all eight transects, while 10 species (17% of the total) were recorded at only one transect (Table 2). The highest number of species (39, or 67%) was found on the TMLC transect, while the lowest number of species (11, or 19%) was recorded at the PASS transect (Table 3). Miscellaneous species, observed between sample points or after the survey time period, are listed in Appendix 2.

Table 2: Total number of species and individuals recorded and the number of transects on which they were detected, 1997.

<u>Species</u>	<u>No. of Individuals</u>	<u>No. of Transects</u>
Alder Flycatcher	11	6
American Crow	25	5
American Redstart	20	5
American Robin	26	6
Black-and-White Warbler	20	7
Black-billed Cuckoo	3	2
Bay-breasted Warbler	1	1
Black-capped Chickadee	9	5
Blackburnian Warbler	12	6
Blue Jay	11	3
Brown Creeper	3	2
Black-throated Blue Warbler	11	4
Black-throated Green Warbler	38	7
Canada Warbler	6	5
Cedar Waxwing	46	5
Chipping Sparrow	21	6
Cape May Warbler	14	4
Common Grackle	4	2
Common Raven	22	5
Common Snipe	6	3
Common Yellowthroat	2	1
Chestnut-Sided Warbler	65	6
Downy Woodpecker	6	3
Evening Grosbeak	14	5
Golden Crested Flycatcher	2	1
Golden-crowned Kinglet	8	4

<u>Species</u>	<u>No. of Individuals</u>	<u>No. of Transects</u>
Gray Jay	1	1
Hairy Woodpecker	4	3
Hermit Thrush	39	7
Indigo Bunting	3	2
Least Flycatcher	6	5
Magnolia Warbler	50	6
Mourning Warbler	15	5
Nashville Warbler	85	8
Northern Flicker	5	3
Northern Parula	4	3
Northern Waterthrush	2	2
Olive-sided Flycatcher	2	1
Ovenbird	135	7
Pileated Woodpecker	1	1
Pine Siskin	11	2
Purple Finch	2	2
Rose-breasted Grosbeak	3	3
Red-breasted Nuthatch	26	7
Ruby-crowned Kinglet	1	1
Red-eyed Vireo	111	8
Scarlet Tanager	1	1
Song Sparrow	6	3
Swamp Sparrow	10	3
Swainson's Thrush	19	5
Tennessee Warbler	6	2
Veery	6	6
Winter Wren	108	8
White-throated Sparrow	151	7
Yellow-bellied Flycatcher	12	3
Yellow-bellied Sapsucker	1	1
Yellow-breasted Chat	1	1
Yellow-rumped Warbler	28	7

58 Species	1271	
Unknowns that are included in the calculation of diversity values, but are not included with the total number of species	12	
TOTAL	1283	

A total of seven species recorded in 1996 were not observed during point counts in 1997 (Appendix 3). Similarly, 8 species recorded in 1997 on point counts were not observed in 1996 (Appendix 4).

Table 3: Total numbers of species and individuals for each transect surveyed at Isle Royale NP, 1997.

TRANSECT	NO. OF KNOWN SPP./INDIV.	NO. OF UNKNOWN INDIV.	TOTAL NO. INDIV. TO CALC. DIVERSITY VALUES
PASS	11/61	5	66
TMLC	39/214	0	214
CHLR	34/223	1	224
MTOJ	36/244	1	245
LRGR	28/124	0	124
ISTR	32/168	0	168
FELK	34/128	2	130
WIND	20/109	3	112

Diversity values for the eight transects ranged from 0.75 (PASS) to 0.95 (CHLR) in 1997 (Table 4). Table 5 shows the difference between the 1996 and 1997 diversity values. Diversity values remained very similar to 1996, although Passage Island showed a marked increase. This increase is probably due to the small number of points sampled. The 1997 survey also noted several additional species after or in between points.

Table 4: Diversity values (Simpson's Index) for transects surveyed in 1996 and 1997. Difference (in percentage points) between 1996 and 1997 diversity values are given. Number of points surveyed on transect given in parentheses.

TRANSECT	1997 DIVERSITY VALUE	TRANSECT	1996 DIVERSITY VALUE	DIFFERENCE
PASS (4)	0.75	PASS (4)	0.58	+0.17
TMLC (17)	0.94	TMLC (17)	0.93	+0.01
CHLR (16)	0.95	CHLR (16)	0.95	0.0
MTOJ (19)	0.93	MTOJ (19)	0.93	0.0
LRGR (16)	0.92	LRGR (20)	0.92	0.0
ISTR (18)	0.93	ISTR (18)	0.93	0.0
FELK (14)	0.94	FELK (18)	0.94	0.0
WIND (18)	0.86	WIND (21)	0.90	-0.04

DISCUSSION

Fifty-eight species were recorded during the 1997 survey. The total number of individuals decreased 10% from 1996 (1432) to 1997 (1283) for the 5-minute counts. This slight decrease is probably due to fewer survey points in 1997 (122) than 1996 (133), so direct comparisons for total number of individuals between the two years should not be made.

The presence or absence of a few species from year to year (as shown in Appendices 3 and 4) likely reflects the uncommon occurrence of those species on Isle Royale; observations of these species should be expected to be infrequent during the annual breeding bird surveys.

The high species diversity observed on Isle Royale is encouraging, but there seems to be no clear pattern to the range of values relative to "region" of the park (east, west, central) or the number of points surveyed on any given transect. In 1996 and 1997, there was a noticeable difference in mean diversity between the peripheral island transect and the main island transects. Van Stappen and Doolittle (1992) reported similar findings from the Apostle Islands National Lakeshore (NL) in Wisconsin. They reported a mean species diversity of 0.91 for their survey of eight transects, but a relationship between the number of species observed and the area of the island covered by the transect could not be identified.

The Chippewa Harbor to Lake Richie transect, along the Indian Portage Trail, yielded the highest mean diversity (0.95) among the eight transects.

In 1994, the low number (2) of Black-throated Blue Warblers recorded during the breeding bird survey was noted with concern due to the historic presence of the species on Isle Royale (Gostomski and Oelfke 1994). Binford (1991) listed the western third of Isle Royale first among six areas in Michigan with high Black-throated Blue Warbler concentrations. In 1995, eight Black-throated Blue Warblers were recorded among three transects: WIND (2), LRGR (3), and TMLC (3). In 1996, five Black-throated Blue Warblers were recorded at one transect (and between points at another transect). In 1997, eleven Black-throated Blue Warblers were recorded at four transects. These small increases from 1994 may reflect the inherent vagaries of sampling, but it is still advisable to watch the development of long-range data regarding this species given their high rank (3.29 on a scale of 1-to-5) among the species of management concern in the Midwest (Thompson et al. 1993).

RECOMMENDATIONS AND ACTION PLAN FOR 1998

Consideration should be given to identifying and recording species as being "in" or "out" of a 50 m radius around the point count center. Incorporating this information will allow estimates of bird density to be calculated because the area that is sampled during point counts will be measured.

In 1996, the census points were permanently marked by using discrete aluminum NPS research tags. Prior to conducting the 1998 surveys, someone should flag the transects to assist the observers in locating the survey points. It would be helpful to enter these point count locations into the park's GIS (Geographic Information System) data base to further assist survey participants in locating tags.

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Appendix 1: Field names used for bird species. Scientific names are those currently accepted by the American Ornithologist's Union (1983) and its supplements.

<u>CODE NAME</u>	<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
ALFL	Alder Flycatcher	<i>Empidonax alnorum</i>
AMBI	American Bittern	<i>Botaurus lentiginosus</i>
AMCR	American Crow	<i>Corvus brachyrhynchos</i>
AMGO	American Goldfinch	<i>Carduelis tristis</i>
AMRE	American Redstart	<i>Setophaga ruticilla</i>
AMRO	American Robin	<i>Turdus migratorius</i>
BAWW	Black-and-White Warbler	<i>Mniotilta varia</i>
BCCH	Black-capped Chickadee	<i>Parus atricapillus</i>
BKWA	Blackburnian Warbler	<i>Dendroica fusca</i>
BLJA	Blue Jay	<i>Cyanocitta cristata</i>
BRCR	Brown Creeper	<i>Certhia americana</i>
BRTH	Brown Thrasher	<i>Toxostoma rufum</i>
BTBW	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
BTGW	Black-throated Green Warbler	<i>Dendroica virens</i>
CAWA	Canada Warbler	<i>Wilsonia canadensis</i>
CEWW	Cedar Waxwing	<i>Bombycilla cedrorum</i>
CHSP	Chipping Sparrow	<i>Spizella passerina</i>
CHSW	Chimney Swift	<i>Chaetura pelagica</i>
CMWA	Cape May Warbler	<i>Dendroica tigrina</i>
COGR	Common Grackle	<i>Quiscalus quiscula</i>
CORA	Common Raven	<i>Corvus corax</i>
COSN	Common Snipe	<i>Gallinago gallinago</i>
COYE	Common Yellowthroat	<i>Geothlypis trichas</i>
CSWA	Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>
DEJU	Dark-eyed Junco	<i>Junco hyemalis</i>
DOWO	Downy Woodpecker	<i>Picoides pubescens</i>
EAWP	Eastern Wood-Pewee	<i>Contopus virens</i>
EVGR	Evening Grosbeak	<i>Coccothraustes vespertinus</i>
GCKI	Golden-crowned Kinglet	<i>Regulus satrapa</i>
GCFL	Golden-crested Flycatcher	<i>Myiarchus crinitus</i>
GRJA	Gray Jay	<i>Perisoreus canadensis</i>
HAWO	Hairy Woodpecker	<i>Picoides villosus</i>
HETH	Hermit Thrush	<i>Catharus guttatus</i>
INBU	Indigo Bunting	<i>Passerina cyanea</i>
LEFL	Least Flycatcher	<i>Empidonax minimus</i>
MAWA	Magnolia Warbler	<i>Dendroica magnolia</i>
MAWR	Marsh Wren	<i>Cistothorus palustris</i>
MOWA	Mourning Warbler	<i>Oporornis philadelphia</i>
NAWA	Nashville Warbler	<i>Vermivora ruficapilla</i>
NOFL	Northern Flicker	<i>Colaptes auratus</i>
NOPA	Northern Parula	<i>Parula americana</i>
NOWA	Northern Waterthrush	<i>Seiurus noveboracensis</i>
OSFL	Olive-sided Flycatcher	<i>Contopus borealis</i>
OVEN	Ovenbird	<i>Seiurus aurocapillus</i>
PIGR	Pine Grosbeak	<i>Pinicola enucleator</i>
PIWA	Pine Warbler	<i>Dendroica pinus</i>
PIWO	Pileated Woodpecker	<i>Dryocopus pileatus</i>
PUFI	Purple Finch	<i>Carpodacus purpureus</i>
RBGR	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
RBNU	Red-breasted Nuthatch	<i>Sitta canadensis</i>
RCKI	Ruby-crowned Kinglet	<i>Regulus calendula</i>
REVI	Red-eyed Vireo	<i>Vireo olivaceus</i>
RWBB	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
SCTA	Scarlet Tanager	<i>Piranga olivacea</i>
SOSP	Song Sparrow	<i>Melospiza melodia</i>
SOVI	Solitary Vireo	<i>Vireo solitarius</i>
SWSP	Swamp Sparrow	<i>Melospiza georgiana</i>
SWTH	Swainson's Thrush	<i>Catharus ustulatus</i>
TEWA	Tennessee Warbler	<i>Vermivora peregrina</i>
VEER	Veery	<i>Catharus fuscescens</i>
WBNU	White-breasted Nuthatch	<i>Sitta carolinensis</i>

Appendix 1 (continued)

WIWR	Winter Wren	<i>Troglodytes troglodytes</i>
WTSP	White-throated Sparrow	<i>Zonotrichia albicollis</i>
WWCR	White-winged Crossbill	<i>Loxia leucoptera</i>
YBFL	Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>
YBSA	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>
YRWA	Yellow-rumped Warbler	<i>Dendroica coronata</i>

Appendix 2: Miscellaneous species recorded before or after point counts or in between points, 1997.

<u>TRANSECT</u>	<u>SPECIES</u>
TMLC	BKWA
	BRCR
	CEWW
	CMWA
	GRJA
	SWSP
PASS	EVGR
MTOJ	BCCH
	BTBW
	BTGW
	CEWW
	COGR
	SOSP
	TEWA
	YBFL
FELK	NAWA
	PIWO
	RECR
	REVI
	SCTA
	ALFL
	AMCR
	BCCH
	BKWA
	BTGW
	WIWR
	CEWW
	CHSP
	CSWA
	GCFL
	HETH
	LEFL
ISTR	BAWW
	BCCH
	BLJA
	CEWW
	GCKI
	LEFL
	SOSP
	SWSP
	TEWA
CHLR	BRCR
	CHSP
	COYE
	EVGR
	GCKI

	GRJA
WIND	BCCH
	BTGW
	EAWP
	GRJA
	OSFL
	OVEN
	RBNU
	REVI
LRGR	AMRE
	BKWA
	BLJA
	CSWA
	EVGR
	NAWA
	OVEN
	REVI
	WIWR
	WTSP
	YBFL
	YRWA

Appendix 3: Species recorded during point counts in 1996 but not observed in 1997. See text for details.

American Bittern

American Goldfinch

Dark-eyed Junco

Eastern Wood-Pewee--Recorded as "Miscellaneous" in 1997.

Red-winged Blackbird

Solitary Vireo

White-breasted Nuthatch

White-winged Crossbill

Appendix 4: Species recorded during point counts in 1997 but not observed in 1996. See text for details.

Black-billed Cuckoo

Bay-breasted Warbler

Golden Crested Flycatcher--"Miscellaneous" in 1996

Golden-crowned Kinglet--"Miscellaneous" in 1996

Northern Parula--"Miscellaneous" in 1996

Purple Finch

Pine Siskin

Yellow-breasted Chat

Eastern Wood-Pewee--"Miscellaneous" in 1997

Red Crossbill--"Miscellaneous" in 1997

Appendix 5: Total numbers of species and individuals at transects, five minute point counts, Isle Royale NP, 1997.

SPECIES	<u>TRANSECT</u>								TOTAL
	ISTR	WIND	LRGR	CHLR	TMLC	PASS	MTOJ	FELK	
ALFL	1	0	1	4	1	0	2	2	27
AMCR	3	3	2	5	0	0	0	12	47
AMRE	7	0	1	2	0	0	9	1	47
AMRO	1	1	5	2	11	0	6	0	28
BAWW	3	2	4	3	4	0	1	3	9
BBCU	1	0	0	0	2	0	0	0	3
BBWA	0	0	0	0	0	0	0	1	1
BCCH	1	0	0	3	0	1	3	1	18
BKWA	1	1	0	6	2	0	1	1	6
BLJA	0	2	0	0	8	0	0	1	37
BRCR	2	0	0	0	1	0	0	0	1
BTBW	3	2	4	0	2	0	0	0	5
BTGW	5	9	10	7	5	0	1	-	77
CAWA	1	0	0	2	1	0	1	-	6
CEWW	0	7	2	0	7	31	4	2	20
CHSP	0	0	1	11	2	1	3	2	22
CMWA	1	0	0	6	2	0	5	0	13
COGR	0	0	1	0	3	0	0	0	20
CORA	6	0	2	9	0	3	0	2	25
COSN	1	0	0	0	1	0	4	0	8
COYE	0	0	0	0	0	0	0	2	4
CSWA	8	0	7	6	2	0	30	12	65
DOWO	3	0	1	0	2	0	0	0	11
EVGR	1	0	0	1	6	0	4	2	5
GCFL	0	0	0	2	0	0	0	0	2
GCKI	1	0	0	1	3	0	3	0	8
GRJA	0	0	0	0	1	0	0	0	4
HAWO	0	0	0	1	1	0	0	2	7
HETH	6	4	3	7	5	0	12	2	21
INBU	0	0	0	0	0	0	1	2	2
LEFL	1	1	0	0	1	0	1	2	10
MAWA	8	1	8	11	8	1	13	0	38
MOWA	1	0	0	5	4	0	4	1	22
NAWA	8	1	4	18	20	4	26	4	145
NOFL	0	0	0	0	2	0	2	1	12
NOPA	0	0	1	1	2	0	0	1	4
NOWA	0	0	0	0	0	0	1	1	3
OSFL	0	0	0	0	0	0	0	2	1
OVEN	19	31	14	16	18	0	25	12	155

Appendix 5 (Continued)

SPECIES	TRANSECT								TOTAL
	ISTR	WIND	LRGR	CHLR	TMLC	PASS	MTOJ	FELK	
PISI	0	0	1	0	0	10	0	0	11
PIWO	1	0	0	0	0	0	0	1	2
PUFI	0	0	0	0	1	0	1	0	2
RBGR	1	0	1	0	0	0	0	0	3
RBNU	0	3	1	8	4	3	1	6	28
RCKI	0	0	0	0	0	0	1	0	1
REVI	22	25	2	14	7	3	22	16	125
SCTA	0	0	0	0	0	0	0	1	1
SOSP	0	0	3	1	0	0	2	0	4
SWSP	0	0	0	4	2	0	4	0	9
SWTH	0	7	0	8	2	0	1	1	17
TEWA	0	0	1	5	1	0	0	0	6
*UNFL	0	0	0	0	0	0	0	1	1
*UNNU	0	0	0	0	0	0	1	0	1
*UNWA	0	0	0	0	0	5	0	0	5
*UNWO	0	3	0	1	0	0	0	1	3
VEER	4	1	1	1	5	0	4	0	3
WIWR	18	9	15	21	16	2	12	15	72
WTSP	24	3	24	21	37	0	32	10	159
YBCH	0	0	0	0	0	0	0	0	1
YBFL	0	2	0	8	0	2	0	0	5
YBSA	0	0	1	0	0	0	0	0	2
YRWA	5	1	4	3	11	0	1	3	28
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TOT. SPECIES/ INDIVID.	32/168	20/112	28/124	35/224	39/214	11/66	36/245	34/130	