

## Forest Bird Surveys on Mt. Mansfield and Underhill State Park

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**Abstract:** Censuses of breeding bird populations on two Mount Mansfield sites were conducted for a fourth year in 1994. One site in Underhill State Park at ca. 2200 ft elevation consisted of mature northern hardwoods, while the second site on the Mt. Mansfield ridgeline at ca. 3700 ft elevation consisted of subalpine spruce-fir. Ten-minute counts at each of 5 sampling points in the two habitats were conducted twice during June. Eighteen species were recorded at Underhill State Park, with a maximum of 101 individuals (70 in 1993) on 23 June and a mean of 90.5 (67.5 in 1993) for both visits. Eleven species were recorded on Mt. Mansfield, with a maximum of 81 individuals (104 in 1993) on 10 June and a combined mean of 68 (96 in 1993). Species diversity and numerical abundance were significantly higher at Underhill State Park, and significantly lower on Mt. Mansfield in 1994 than in 1993. The reasons for these changes, whether reflecting actual changes in bird populations or an artifact of differing sampling conditions between the two years, are not entirely clear.

## Introduction

In 1994, breeding bird censuses were conducted for a fourth consecutive year on two permanent study sites on Mt. Mansfield, as part of a long-term Vermont Forest Bird Monitoring Program conducted by the Vermont Institute of Natural Science (VINS). This program was initiated in 1989 with the primary goal of conducting habitat-specific monitoring of forest interior breeding bird populations in Vermont and tracking long-term changes. As of 1994, VINS has selected, marked and censused 17 permanently protected sites of mature forest habitat in Vermont (Appendix 1). The specific objectives of the Mt. Mansfield study include: 1) adding a bird monitoring component to the integrated ecological research being conducted under the VMC; 2) adding two study sites to VINS' statewide monitoring program; and 3) sampling bird populations in the high elevation spruce-fir zone.

## Methods

Survey methods were identical to those in previous years. Each site consists of a series of five sampling points spaced 200-300 meters apart. Preliminary site visits were made in late spring to check the condition of vinyl flagging and metal tree tags. Each site was censused twice during the height of breeding activities in June. Each census consisted of 10-minute counts of all birds seen and heard at each of the five sampling points. Field data were transcribed onto standardized forms and subsequently computerized, using DBASE3. Vegetation sampling was conducted at each census point on the Mt. Mansfield plot only, using a technique modified after the James and Shugart method. This sampling technique will be used at the Underhill State Park site in 1995, as well as at VINS' 15 other monitoring sites.

## Results and Discussion

Overall numerical abundance and species diversity were at a four-year minimum on Mt. Mansfield in 1994 (Table 1). Only 11 species were recorded, with a maximum of 81 individuals (104 in 1993) on 10 June and a mean of 68 (96 in 1993) for both visits (Table 2). Numbers of three of the five most common species, Winter Wren, Blackpoll Warbler, and Bicknell's (Gray-cheeked) Thrush, fell to a four-year low (Table 1). Totals of eight species were below their 1991-1993 average. Only two species were at or above their three year average. Magnolia Warbler and Cedar Waxwing, both recorded in two of the previous three years, were absent in 1994. Adverse weather conditions on both count dates may have contributed to the low number of individuals detected.

The most pronounced declines occurred in Winter Wren, Swainson's Thrush, and Blackpoll Warbler populations. On average, Winter Wren declined 25% annually between 1991-1994 on Mt. Mansfield. This downward trend has also been recorded at VINS' other high elevation spruce-fir site on Camel's Hump, where the species declined at an average annual rate of 15% during the same period. At Underhill State Park, Winter Wrens declined at an average rate of 59% annually from 1992-1994, suggesting that the species may be experiencing widespread population losses. Blackpoll Warbler experienced a less dramatic, but steady annual decline of 11% on Mt. Mansfield. As in 1993, Swainson's Thrush was observed in low numbers in 1994, at 75% below its three-year average.

In contrast to the Mt. Mansfield site, overall numerical abundance and species diversity were at a four year maximum at Underhill State Park in 1994 (Table 3). Eighteen species were recorded, with a maximum of 101 individuals (70 in 1993) on 23 June and a mean of 90.5 (67.5) for both visits (Table 4). Only four species were below their 1991-1993 average, while 11 species were above their average for this period. Of the five species that have been recorded in each year since 1991, four were observed at levels at or above their four-year maximum. Red-eyed Vireo, Canada Warbler, and Ovenbird have all experienced a steady four-year increase.

Both the declines on Mt. Mansfield and the increases at Underhill State Park must be interpreted cautiously. With only 4 years of data available, detection of meaningful population trends is yet not possible. Changes in population trends may simply reflect natural fluctuations and/or variable detection rates. Census data may be particularly susceptible to variation in detectability on Mt. Mansfield, where weather conditions are often extreme or subject to rapid change. Natural populations are also dependent on a variety of dynamic factors, such as local prey abundance, overwinter survival, and habitat change. However, the steady decline recorded among most high elevation species on Mt. Mansfield warrants concern in light of documented threats to subalpine spruce-fir

forests throughout the Northeast. Several years of additional data collection, their correlation with other VMC data, and comparison with census data from other ecologically similar sites will be necessary to elucidate population trends of various species at the Mansfield and Underhill sites.

Future plans include continued monitoring at both sites, as well as detailed sampling of habitat characteristics at Underhill State Park. Analysis of VINS' six-year forest bird monitoring database is planned to begin in 1995. This should enable future comparisons among sites and habitat types, information that will be critical to evaluating the significance of results from Mt. Mansfield and Underhill State park. Funding for VINS' 1994 work at these two sites was provided in large part by the VMC. Support for monitoring at VINS' additional 15 Vermont forest bird study sites was provided by VINS' general operating budget.

#### Appendix 1. Vermont Forest Bird Monitoring Sites - 1994

<u>Site</u>	<u>Town</u>	<u>Habitat</u>	<u>Observer</u>
1. Sandbar WMA	Milton	Floodplain	M. LaBarr
2 Pease Mountain	Charlotte	Oak-hickory	S. Staats
3. Cornwall Swamp	Cornwall	Maple Swamp	C. Darmstadt
4. Shaw Mountain	Benson	Oak-hickory	S. Morrical
5 Galick Preserve	West Haven	Hemlock-pine	N. Swanberg
6. Sugar Hollow	Pittsford	N. Hardwoods	S. Faccio
7. The Cape	Chittenden	N. Hardwoods	S. Faccio
8. Dorset Bat Cave	E. Dorset	N. Hardwoods	R. Stewart
9. Roy Mountain WMA	Barnet	Cedar-spruce	C. Rimmer
10. Concord Woods	N. Concord	N. Hardwoods	C. Rimmer
11. May Pond Preserve	Barton	N. Hardwoods	R. Renfrew
12. Wenlock/Buxton's	Ferdinand	Spruce-fir	C. Darmstadt
13. Bear Swamp	Wolcott	Spruce-fir	B. Pfeiffer
14. Underhill S.P.	Underhill	N. Hardwoods	C. Darmstadt
15. Mt. Mansfield	Stowe	Subalpine	C. Rimmer
16. Camel's Hump	Huntington	Subalpine	C. Fichtel
17. Merck Forest	Rupert	Maple-beech-oak	T. Johansson

Table 1. Maximum counts of individual birds recorded on Mt. Mansfield site, 1991-1994.

Species	Mansfield			
	91	92	93	94
Northern Flicker			1	
Hairy Woodpecker				1
Yellow-bellied Flycatcher			2	
Blue Jay		1		
Common Raven			1	
Red-breasted Nuthatch		2	3	1
Winter Wren	20	18	14	8
Ruby-crowned Kinglet		4		
Gray-cheeked Thrush	10	23	15	9
Swainson's Thrush	6	16	2	2
American Robin	2	7	2	4
Cedar Waxwing		1	4	
Nashville Warbler	4			
Magnolia Warbler	2	4		
Yellow-rumped Warbler	22	21	16	18
Blackpoll Warbler	20	18	18	14
Ovenbird			2	
Lincoln's Sparrow	4			
White-throated Sparrow	14	28	26	21
Dark-eyed Junco	8	17	10	4
Purple Finch	2	8	2	4
Pine Siskin		1		
Evening Grosbeak		2		
Number of individuals	114	171	118	86
Number of species	12	16	15	11

Table 2. Numbers of individual birds recorded on Mt. Mansfield in 1994. Maximum count for each species represents relative abundance index to be used in future analyses.

Species	10 June	23 June
Hairy Woodpecker	1	
Red-breasted Nuthatch	1	
Winter Wren	4	8
Gray-cheeked Thrush	9	6
Swainson's Thrush	1	2
American Robin	4	
Yellow-rumped Warbler	18	7
Blackpoll Warbler	14	13
White-throated Sparrow	21	18
Dark-eyed Junco	4	1
Purple Finch	4	
Number of individuals	81	55
Number of species	11	7

Table 3. Maximum counts of individual birds recorded at Underhill State Park, 1991-1994.

Species	Underhill			
	91	92	93	94
Northern Flicker			2	
Yellow-bellied Sapsucker		2		2
Hairy Woodpecker				1
Blue Jay				1
Common Raven				4
Brown Creeper				1
Black-capped Chickadee		2	1	
Winter Wren		12	4	2
Veery	2	2		
Swainson's Thrush		2		4
Hermit Thrush		7	2	11
Wood Thrush	1	2		
Solitary Vireo	1	4		
Red-eyed Vireo	5	8	8	12
Black-throated Blue Warbler	11	17	10	12
Yellow-rumped Warbler			4	4
Black-throated Green Warbler	9	14	12	14
Black-and-white Warbler		6	4	4
American Redstart		6		
Ovenbird	7	20	22	22
Canada Warbler	5	8	8	10
Rose-breasted Grosbeak	7	3		2
White-throated Sparrow	2		2	2
Dark-eyed Junco		6	2	6
Number of individuals	52	112	83	114
Number of species	11	18	14	18

Table 4. Numbers of individual birds recorded at Underhill State Park in 1994. Maximum count for each species represents relative abundance index to be used in future analyses.

Species	10 June	23 June
Yellow-bellied Sapsucker	2	
Hairy Woodpecker	1	
Blue Jay		
Common Raven	4	
Brown Creeper		1
Winter Wren	2	2
Swainson's Thrush	4	2
Hermit Thrush	5	11
Red-eyed Vireo	2	12
Black-and-white Warbler	4	2
Black-throated Blue Warbler	10	12
Yellow-rumped Warbler	4	4
Black-throated Green Warbler	12	14
Black-and-white Warbler	6	4
Ovenbird	16	22
Canada Warbler	10	10
Rose-breasted Grosbeak	2	
White-throated Sparrow		2
Dark-eyed Junco	2	6
Number of individuals	80	101
Number of species	15	14