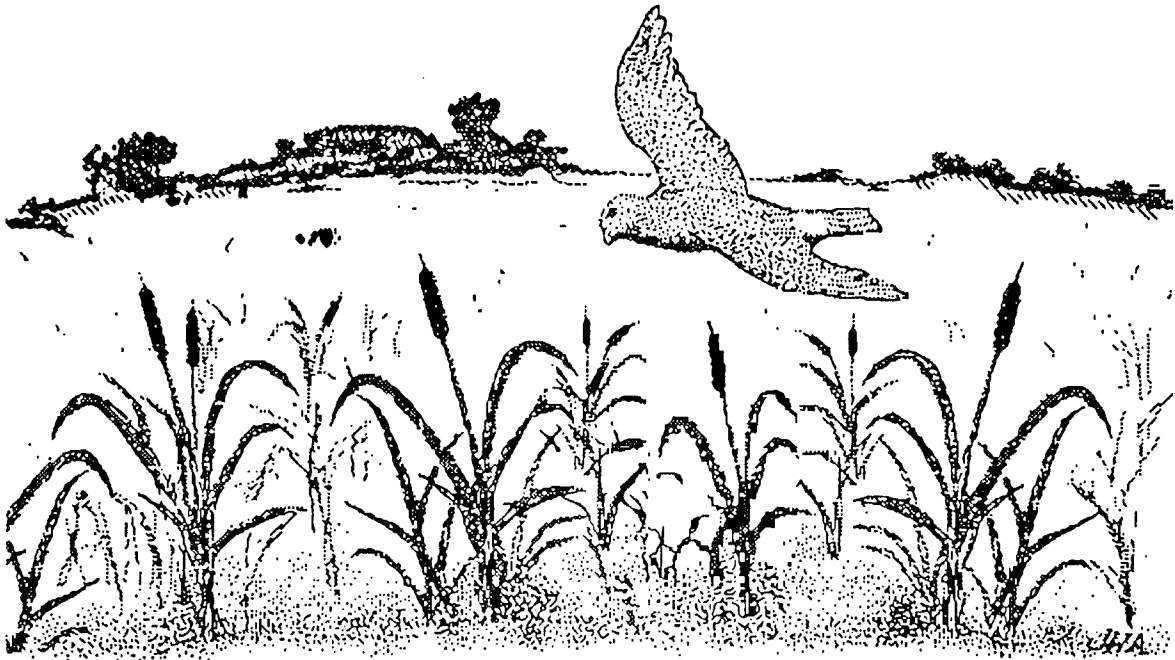
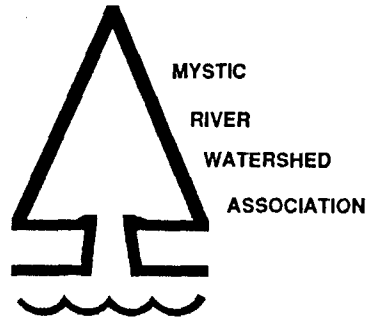


Birds  
of the  
Great Meadows  
in  
Lexington,  
Massachusetts:  
A Field Survey



John W. Andrews  
Mystic River Watershed Association  
October 1991



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#### **Acknowledgements**

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Cover: *Northern Harrier at Great Meadows* by John Andrews

### Executive Summary

A field survey was conducted to determine the bird populations of the Great Meadows area of Lexington, Massachusetts. The survey is part of an ongoing ecological study of the Great Meadows organized by the Mystic River Watershed Association. Volunteer observers made 49 visits to the area, counting all birds observed along a defined survey route. A total of 108 hours of field observation was accumulated. In addition, certain supplementary data was collected to produce a fuller picture of the avian population.

A total of 96 species was recorded in the Great Meadows. Of these, 90 species were recorded on the standard survey visits and 6 species appeared only in the supplementary data. The number of breeding birds found in the area is remarkable. It is estimated that at least 49 species of birds breed in the Great Meadows. During the height of the breeding season (in June and July) as many as 40 species of birds could be seen in a single visit.

Another noteworthy aspect of the birdlife is the number of diurnal birds of prey that make use of the Great Meadows during migration. The open habitat of the wet meadows apparently provides excellent hunting territory for these species.

Several species of birds are of routine occurrence at the Great Meadows that are found at very few locations in the surrounding towns. Among these are Northern Harrier, American Woodcock, Marsh Wren, and Willow Flycatcher.

**Birds of the Great Meadows in Lexington, Massachusetts:  
A Field Survey**

**1. Introduction**

This report describes a field survey of the birds found in the Great Meadows of Lexington, Massachusetts. The survey was conducted as a part of an ongoing ecological study of the Great Meadows [Ref. 1] organized by the Mystic River Watershed Association. It provides a picture of the abundances of all species of birds found in the Great Meadows throughout the year. Nomenclature and taxonomy for birds follow the Check-list of North American Birds (sixth edition, American Ornithologist's Union, 1983). The survey methodology was designed to allow the survey to be repeated in the future to detect changes in the avian populations.

**2. History**

The Great Meadows is an area of open space located in the Town of Lexington but owned by the Town of Arlington. It consists of approximately 177 acres, over 100 of which are wetlands. The area is entirely surrounded by suburban land. It is known to be habitat for many species of wildlife that are seldom found so far into the Greater Boston area.

The famous American naturalist William Brewster frequented the Great Meadows during the last part of the 19th century. When the Town of Arlington flooded the meadows in 1872, the areas where peat had been cut became ponds several feet deep. Brewster described the effect of the flooding as follows:

"Over considerably more than one half of its total area (about twenty-five or thirty acres) button-bushes and sweet gale sprang up in dense thickets, separated in many places, however, by pools or channels of open water. There were also floating islands, tufted with sedges or with cattail flags, and, along the course of the brook above, wide stretches of grassy meadow. A railroad passed close to the pond on the south, but the slopes of the hills which bordered it on the north and west were everywhere thickly wooded. . . . In view of these conditions it is not to be wondered at that the Great Meadow attracted at one or another season very many birds such as Snipe, Sandpipers, Rails, Herons, Bitterns, Coots, Gallinules, Grebes and Ducks of various kinds. The Pied-billed Grebes maintained a breeding colony there for at least ten successive seasons, and the Black Duck has been known to nest in the immediate neighborhood." [Ref. 2]

After the reservoir was drained in 1902, the open water largely disappeared, and with it many of the water birds mentioned by Brewster. Today the meadow contains extensive freshwater wetlands of a size that is seldom encountered in the urbanized landscape of Greater Boston. The area has attracted the attention of local residents with an interest in birds. The Great Meadows has been included as part of the Greater Boston Christmas Bird Count which is sponsored each December by the

National Audubon Society. It has been used for bird walks by local groups. However, no systematic study of the type described in this report has been previously undertaken.

### 3. Survey Techniques

The primary undertaking of the project was to produce a controlled year-round sample of the birds present and to determine the portion of the Great Meadows where each species occurred. The project did not attempt to determine population densities or to determine the total avian population present. The survey results undoubtedly underestimate the relative abundance of the inconspicuous marsh-nesting species (such as Willow Flycatcher, Marsh Wren, and Swamp Sparrow), as well as the nocturnal birds (such as American Woodcock and Screech Owl). Certain supplementary data collection efforts (see Section 4) were undertaken to better define the status of such hard-to-find species in the Great Meadows.

Observers were asked to walk a defined route and to record the numbers and locations of all bird species seen or heard. All birds overflying the area were counted (although Herring Gulls were not counted by some observers). An attempt was made to have coverage at weekly intervals. The number of observers and the persons involved varied from visit to visit. No attempt to correct for this variation has been made, although data sets that were clearly deficient were excluded from the compilation. Most visits began early in the morning (typically 6 AM during the summer months).

Far-ranging species, such as Barn Swallow and Chimney Swift, created a difficult counting problem. The same individuals of these species could be seen in several areas during a single site visit. If the sightings in each area were recorded to reflect area usage, the total number of individuals could be overestimated by double-counting. For most species, the number of individuals seen on a visit is simply the sum of the individuals sighted in the different areas. For Barn Swallow and Chimney Swift, the number of individuals was adjusted to reflect the actual number believed to be present.

#### 3.1 Route Description

The survey route completely circled the major wetlands area and provided sampling in a variety of habitat types (see Figure 1). The route began at the Waldorf School on Massachusetts Avenue in Lexington. It ran eastward along the B&M railroad right-of-way (the proposed Minuteman Bikeway), turned northeast at Fottler Brook and followed a path that led to Fottler Avenue. It then continued through residential areas on Hillcrest Avenue and Circle Road. At the end of Sheila Road it re-entered the Great Meadows, continued through an upland area. It then crossed a neck of the meadows, continued through additional upland area, rejoined the railroad right-of-way, and returned to Waldorf School. Birds seen on the residential streets (Fottler Avenue to Sheila Road) were not included on the count.

The total length of the route was approximately 1.6 miles (not counting the 0.5 miles on residential streets). If it is assumed that birds could be counted in a swath averaging 150 feet to either side of the path, then about 57 acres of land were surveyed by the route. The typical time required to make a complete circuit was about two hours.

Observers were allowed to select either a clockwise or counter-clockwise circuit.

### 3.2 Survey Area Designations

The locations of sightings were recorded in terms of 16 different areas as shown on Figure 1. Area boundaries were generally chosen to separate distinct types of habitat (e.g., wet meadows, dry upland hillside, maple swamp, etc.). Table 1 indicates the principal habitat found in each area. It also lists the lowest, average, and highest elevation found in the area (Elevations were determined from Town of Lexington topographic maps). The area of open wetlands generally conformed to the 170 feet contour (all land within this contour is shaded in Figure 1).

Table 1: Description of Survey Areas

AREA NO.	PRINCIPAL HABITATS	ELEVATION (FT)		
		Lowest	Average	Highest
1	dry upland; railroad right-of-way	164	166	170
2	parkland (playing fields, scattered tall shade trees)	165	166	170
3	small "finger" marsh	167	167	170
4	extensive wet meadows	168	168	170
5	upland	168	168	170
6	wet meadows, maple swamp	169	170	180
7	wet meadows	169	170	170
8	upland	168	170	176
9	upland	170	170	189
10	wet meadows	165	170	175
11	upland woodlots; dry grassy slopes; vernal pool	170	172	185
12	extensive wet meadow	167	172	180
13	extensive wet meadow	170	175	189
14	moist hardwood forest; small, irregular woodlots	174	175	180
15	extensive wet meadow	170	182	200
16	parkland, woodlot, pond	170	188	219

### 3.3 Data Set Acceptance Criteria

Some of the data sets submitted were found to be incomplete, either because the entire route was not covered or because of some other factor (such as lack of experienced observers), that prevented a standard count from being conducted. While these data sets did provide useful information,

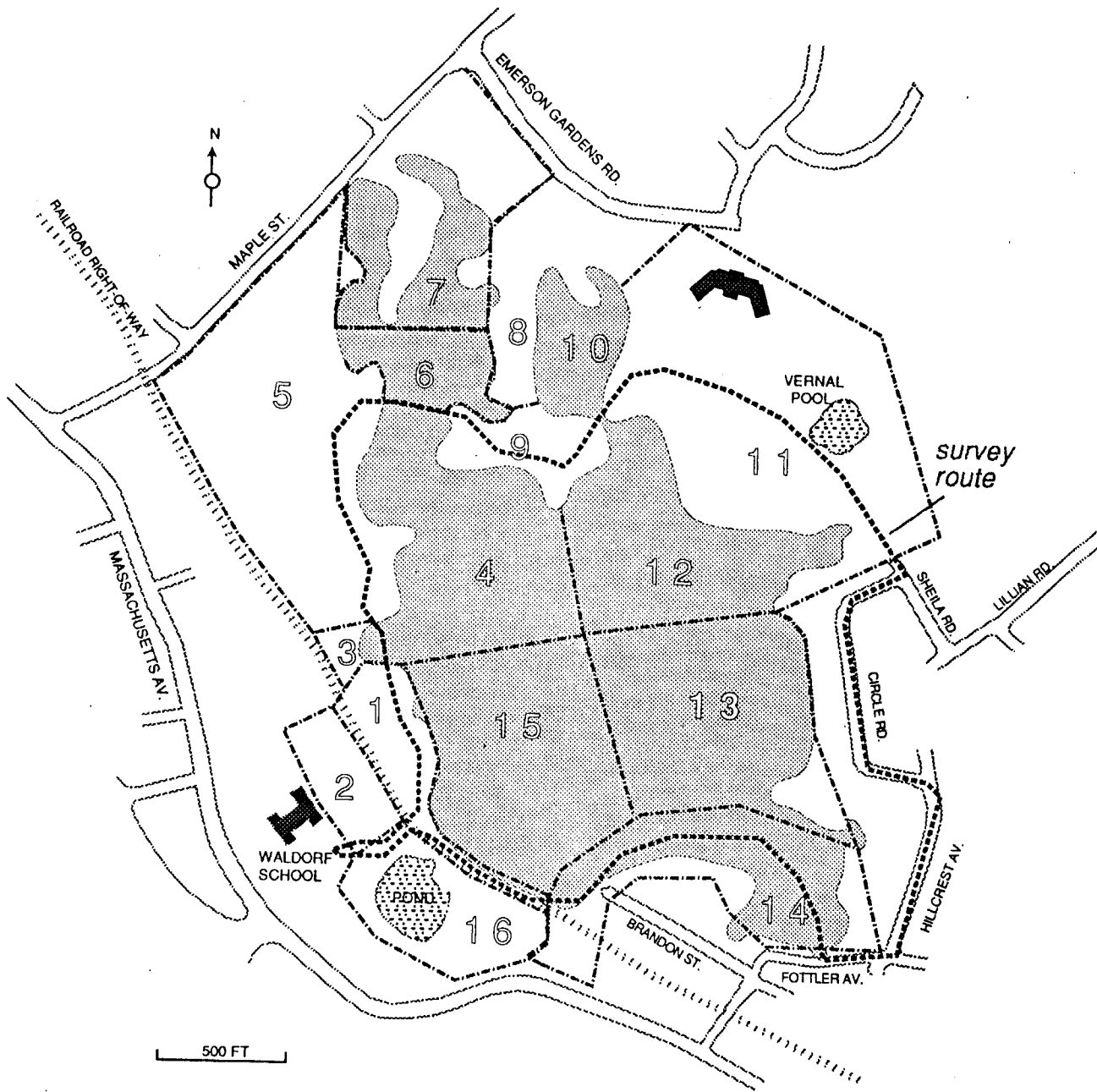


Figure 1: Survey Route and Numbered Areas



they would distort the results of any quantitative analysis. Therefore only data sets that were judged to be complete were considered to be "standard survey data" for this report. All other data sets were considered to provide only *supplementary* data. A complete listing of the data sets is provided in Appendix A.

Table 2 provides summary information on the monthly coverage (for standard data sets only). There were 49 visits with a combined time in the field of 107.9 hours. The number of visits in each month ranged from 2 to 10.

Table 2: Coverage Statistics

MONTH	NO. VISITS	TOTAL HOURS
		AFIELD
January	2	4.0
February	3	4.8
March	4	6.6
April	4	10.2
May	5	12.6
June	10	24.1
July	3	7.5
August	4	10.2
September	5	11.2
October	5	10.0
November	2	3.5
December	2	3.2
TOTAL	49	107.9

#### 4. Supplementary Data Collection

Data collected by techniques other than the standard techniques describe above will be referred to as supplementary data. Such data complements the standard data and results in a more detailed picture of the birds present in the Great Meadows. Supplementary data is of several types. It includes data collected on nocturnal visits, data collected using playback of vocalizations, and data reported as part of an incomplete data set. Supplementary records are listed in Appendix B. A description of how some of this data was collected is contained in the following sections.

##### 4.1 Nocturnal and Twilight Visits

Species that are active mostly at night were unlikely to be observed on the standard survey visits which took place only in daylight hours. Therefore nocturnal and twilight visits provided important supplementary data regarding these species. Results of these visits are described below.

Common Snipe Common Snipe were heard "winnowing" in the wet meadows during two evening visits in April 1990 and 1991.

American Woodcock Several visits were made during April and May to look for display flights of the American Woodcock. Displaying male Woodcock were observed in Areas 11, 12, and 15. From the presence of displaying males during May, it is felt that the American Woodcock breeds in the Great Meadows. The only other known Woodcock breeding area in Lexington is Dunback Meadow.

Screech Owl A visit to locate Screech Owls using playback techniques was conducted on June 28, 1991, between 9 and 11 PM. A tape recording of Screech Owl calls was played for several minutes at each of several suitable locations in Area 11 and Area 16. In Area 11, Screech Owls responded at three of nine locations. Two of the birds were of gray color phase and the color phase of the third bird was undetermined. At Area 16, no Screech Owls were found at any of four stations where attempts were made. Only a small fraction of the suitable Screech Owl habitat at Great Meadows was covered in this effort. It is reasonable to assume that Screech Owls are fairly common permanent residents of the wooded areas of the Great Meadows.

Common Nighthawk On one evening visit on 27 August 1990, an observer stood at a station with a commanding view of the meadows and scanned for migrating nighthawks. Sixty-five Common Nighthawks were observed. During this season, nighthawks migrate over a broad front, so it is not surprising that they pass over the Great Meadows. Nighthawks may be attracted to the area because it is a good place to hawk for insects.

#### **4.2 Playback for Sora and Virginia Rails**

The Great Meadows appears to contain suitable habitat for rails. However, no rails were reported on the standard surveys. A dawn visit was made in June 1990 at which taped calls of Virginia and Sora Rails were played at several spots around the meadows. These calls were also played at several locations in the interior of the wet meadows during the line transect conducted on 20 July 1991 (see below). No replies were heard. One supplementary record for a Virginia Rail was received for 20 May 1991 in Area 4. The observer felt that this bird was exhibiting territorial behavior. Since only a small part of the suitable habitat has been surveyed, it is possible that rails are present in greater numbers than indicated by these results. Additional survey work in this regard is justified.

#### **4.3 Line Transects of the Wet Meadow**

To assess breeding birds present in the interior of the wet meadows, two line transects of the wet meadows were conducted (by John Andrews) on 20 July 1991. The transect lines began at the western edge of the wet meadows and passed through Area 13 and 15 (see Figure 2). The vegetative cover observed on the transect lines consisted almost exclusively of herbaceous plants from 1.5 to 6.0 feet in height. The dominant species were Blue-joint (grass), Purple Loosestrife, and Cattail. The plant species distribution was distinctly non-homogeneous: most of the wet meadow consisted of bands and irregular regions in which one of the three species above dominated. Other species observed included sphagnum moss, ferns, and scattered shrubs. In one area, a "peninsula" of shrubs and small trees extended from the eastern edge of the wet meadows to within 150 feet of the transect line. There was no open water, although the soil was moist throughout.

Line A was traversed first, beginning at 5:50 AM. Line B was traversed second, ending at 7:05 AM. All birds detected on the ground were recorded, but birds in flight over the area (such as Barn Swallows) were not recorded. Data on distances of each sighting from the transect line was collected according to the Emlen line transect method (Ref. 3). In future analyses, this data will allow the actual area density of each species to be estimated. The total length of both transect lines (A and B) was approximately 2700 feet. The resulting count was:

1 Ring-necked Pheasant	1 Field Sparrow
1 Eastern Kingbird	5 Song Sparrow
3 Willow Flycatcher	15 Swamp Sparrow
11 Marsh Wren	2 Redwinged Blackbird
12 Common Yellowthroat	2 American Goldfinch

The most striking result of the transects was the number of Marsh Wrens found. This species was almost never reported from the standard survey route which ran around the periphery of the wet meadows. The Marsh Wrens appeared to be closely associated with the stands of cattail within the wet meadows. Preliminary application of the Emlen technique to Marsh Wren sightings indicates that approximately 14 acres of wet meadows were effectively surveyed for that species. This corresponds to an area density of 0.79 wrens/acre. The numbers of Common Yellowthroats and Swamp Sparrows found on the transect were also much greater than those recorded on the standard survey route. Red-winged Blackbirds were down dramatically from their high population levels earlier in the breeding season.

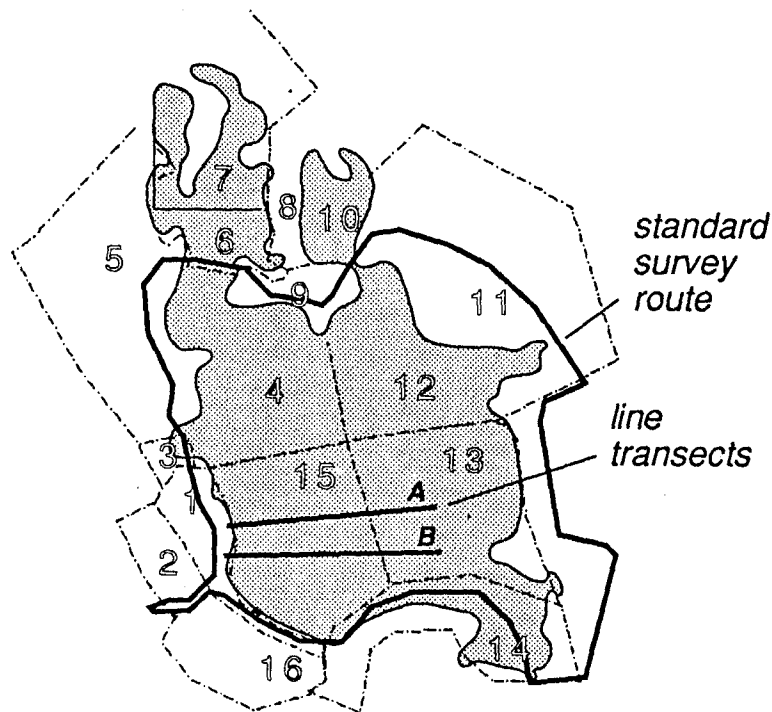


Figure 2: Locations of the Line Transects of the Wet Meadows

## 5. Analysis of Results

### 5.1 Species Observed Per Visit

Figure 3 provides a plot of the number of species recorded on each visit. The solid curve is an estimate of the maximum number of species that can be found on a given date. During the winter months (December, January, February, and March) fewer than 15 species can be expected per visit. As the spring migration begins in April, the number of species climbs steadily until it reaches a peak of almost 40 species per visit in late May and June. After July, there is a steady decline until the population stabilizes at its winter levels in December.

### 5.2 Compilation of the Data

All data from standard surveys were entered into a computer data base (see Appendix A for a listing of the raw data). These data were then analyzed using a custom software package, called Field Pack<sup>1</sup>. The computer output was then augmented by manually adding breeding status. The resulting compilation is displayed in Table 3. An explanation of the table follows.

Monthly Birds Per Visit One of the capabilities of Field Pack is to produce a birds per visit (BPV) analysis of field data. Table 3 provides the BPV results of the Great Meadows survey in tabular form. The BPV value was obtained by taking the total number of individuals of a given species recorded for each month and dividing by the number of survey visits in that month. For tabular presentation, the birds per visit value is rounded to the nearest integer value. If the species was present, but the rounded BPV value is zero (i.e., if its BPV value is greater than zero but less than 0.5), then a "+" is written. If the BPV value is 10 or more, then an "A" is written. If a species was not present in the survey data, but a reliable record exists from a supplementary source, an "x" is entered for the appropriate month or months. A listing of supplementary records is provided in Appendix B.

Breeding Status The "BR" column in Table 3 contains an evaluation of the breeding status of the species at the Great Meadows. This assessment is coded as follows:

- B Breeds at the site
- b Possible breeder, but insufficient evidence to confirm
- Does not breed on site

The assignment of breeding status was based upon observations of presence in breeding season, singing males, territoriality, nest-building, copulation, occupied nests, and recently fledged young. Knowledge of the behavior of the particular species and its breeding status in the surrounding region was considered in determining the amount of evidence needed to consider the species to be breeding.

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<sup>1</sup> Field Pack is a package of data analysis software written by John Andrews. It allows field observations to be entered using a spreadsheet program and then analyzed using different normalization techniques.

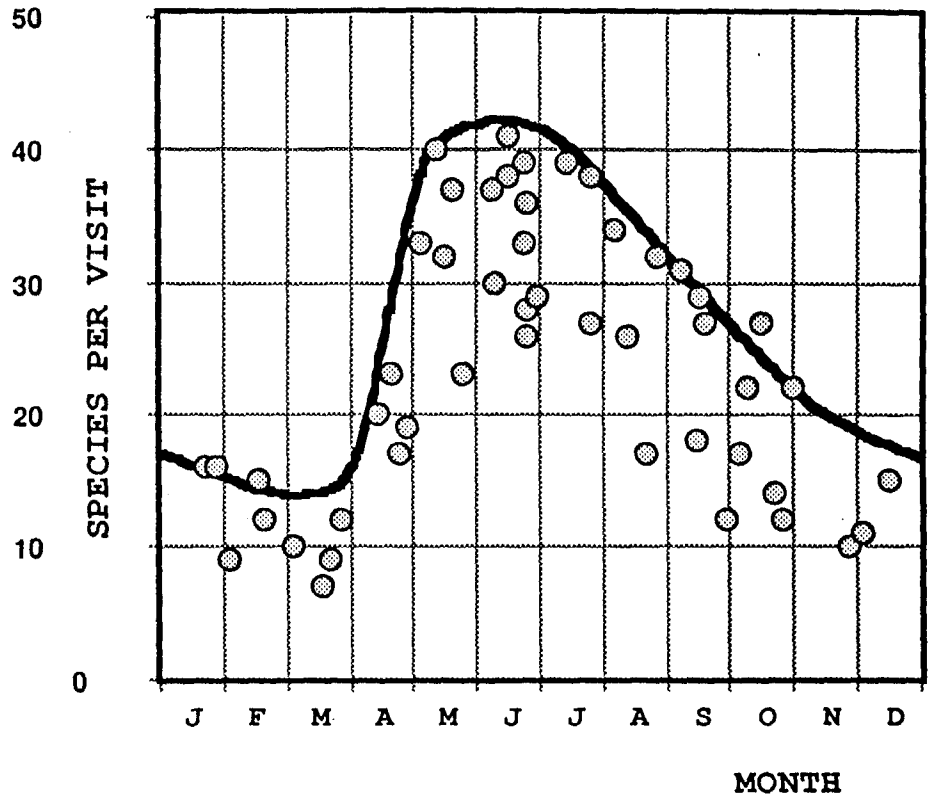


Figure 3: Number of Species Recorded on Each Visit

Table 3: Summary of Survey Results

	JFM	AMJ	JAS	OND	BR	NV	NI	BPH	max
Great Blue Heron.....			x+		-	1	1	Aug	0.097
Green-backed Heron.....		++			b	4	4	Jun	0.124
Blk-crnd. Night Heron....			1+		-	4	6	Jul	0.267
Canada Goose.....	1	11	23	A 1	-	11	84	Oct	5.166
Wood Duck.....		x		+	-	1	1	Sep	0.089
Black Duck.....				1	-	2	5	Oct	0.497
Mallard.....	117	963	211	271	B	37	167	Mar	4.242
American Wigeon.....			+		-	1	1	Aug	0.097
Northern Harrier.....		++		2	-	5	7	Dec	0.918
Broad-winged Hawk.....		x			-	-	-	-	-
Sharp-shinned Hawk.....			+	+	-	4	4	Oct	0.199
Cooper's Hawk.....			+	+	-	2	2	Oct	0.099
Red-tailed Hawk.....	111		+	11	-	10	12	Jan	0.498
American Kestrel.....			+	+	-	3	3	Sep	0.178
Ring-necked Pheasant.....	112	668	222	211	B	42	182	Jun	3.278
Virginia Rail.....		x			b	-	-	-	-
Killdeer.....		11+		1+	B	10	16	May	0.556
Common Snipe.....		x			-	-	-	-	-
American Woodcock.....		x	xx		B	-	-	-	-
Herring Gull.....	11		12+	+	-	7	18	Feb	0.854
Rock Dove.....	A3+	21	2A1	2	B	21	123	Jan	6.971
Mourning Dove.....	25+	36	943	1 4	B	34	166	Jul	3.600
Black-billed Cuckoo.....			+		b	1	1	Jul	0.133
Yellow-billed Cuckoo.....			+		b	1	1	Jun	0.041
Screech Owl.....			+		B	-	-	-	-
Common Nighthawk.....			x		-	-	-	-	-
Chimney Swift.....		13	67		B	15	80	Aug	2.825
Ruby-thr. Hummingbird....			+		-	1	1	Jul	0.133
Belted Kingfisher.....			+	1++	b	4	5	Jul	0.267
Downy Woodpecker.....	121	112	332	223	B	36	88	Dec	1.531
Hairy Woodpecker.....				+	-	1	1	Oct	0.099
Northern Flicker.....		424	665	121	B	36	141	Sep	2.396
Willow Flycatcher.....		2	1+		B	10	24	Jun	0.830
Least Flycatcher.....			+		-	1	2	May	0.159
Eastern Phoebe.....		1++	1 1	1	B	10	16	Sep	0.355
Gt. Crested Flycatcher...		++		+	B	4	5	Jun	0.124
Eastern Kingbird.....		12	54		B	16	56	Jul	1.867
Tree Swallow.....		11	+		B	8	15	May	0.397
Barn Swallow.....		85	A4		B	18	148	Jul	5.333
Blue Jay.....	111	+45	399	851	B	41	217	Oct	4.172
American Crow.....	AAA	A66	A5A	A8A	B	49	954	Dec	46.837
Black-capped Chickadee...	683	744	649	99A	B	45	309	Dec	12.551
Tufted Titmouse.....	11	112	222	216	B	30	77	Dec	3.673
White-breasted Nuthatch..	2+	+ 1	12+	11	B	20	32	Jan	0.747
House Wren.....		+11	+1+		B	13	20	May	0.556
Marsh Wren.....			+1		B	2	4	Aug	0.292
Ruby-crowned Kinglet.....				+1	-	2	2	Nov	0.284
Veery.....			+		b	1	1	Jun	0.041
Wood Thrush.....			+		b	1	1	Jun	0.041

(continued)

Table 3: Summary of Survey Results (continued)

	JFM	AMJ	JAS	OND	BR	NV	NI	BPH max	
American Robin.....	1	A84	AA2	A3	B	33	289	Oct 5.364	
Gray Catbird.....		49	996	+	B	26	204	Jun 3.610	
Mockingbird.....	2+	11	6A1	121	B	28	96	Aug 4.286	
Brown Thrasher.....		135	212		B	27	86	Jun 1.950	
Cedar Waxwing.....		2	343		B	12	55	Sep 1.420	
Starling.....	A6+	668	A43	2AA	B	32	446	Nov 24.171	
Solitary Vireo.....				+	-	1	1	Oct 0.099	
Warbling Vireo.....		11	1		B	7	13	May 0.476	
Red-eyed Vireo.....		++	1++		B	7	9	Jul 0.267	
Blue-winged Warbler.....		+1	+		B	6	10	Jun 0.332	
Nashville Warbler.....		x	+		-	1	1	Aug 0.097	
Northern Parula.....		+			-	1	1	May 0.079	
Yellow Warbler.....		76	11		B	16	104	May 2.778	
Magnolia Warbler.....		+			-	1	1	May 0.079	
Yellow-rumped Warbler....		+1	5	51	-	10	55	Oct 2.682	
Black-thr. Green Warbler.			+		-	1	1	Sep 0.089	
Prairie Warbler.....		1			B	4	6	Jun 0.249	
Palm Warbler.....		1		+	-	3	4	Oct 0.199	
Blackpoll Warbler.....		+	+		-	2	2	Sep 0.089	
Black-and-White Warbler..		+			-	2	2	May 0.159	
American Redstart.....		1	1		-	2	11	May 0.476	
Common Yellowthroat.....		A8	712	+1	B	26	168	May 4.524	
Wilson's Warbler.....		+			-	1	1	May 0.079	
Yellow-breasted Chat.....		+			-	1	1	May 0.079	
Scarlet Tanager.....		++			b	2	2	May 0.079	
Northern Cardinal.....	111	222	112	1 1	B	32	66	Jun 0.954	
Rose-breasted Grosbeak...		1+	+		B	6	8	May 0.238	
Rufous-sided Towhee.....		11	112		B	22	33	Sep 0.888	
Tree Sparrow.....	5+	+1		41	-	7	27	Jan 2.241	
Chipping Sparrow.....		1 +	1		b	3	9	Sep 0.444	
Field Sparrow.....		+	223	432	+	B	28	83	Jul 1.467
Savannah Sparrow.....		11		+1	-	5	8	Nov 0.569	
Song Sparrow.....	1+4	AAA	A45	251	B	43	326	May 6.349	
Lincoln's Sparrow.....				+	-	1	1	Oct 0.099	
Swamp Sparrow.....		2+2	321	1	B	18	51	Jul 1.200	
White-throated Sparrow...	1	11+		11	-	7	19	Nov 0.569	
White-crowned Sparrow....				+	-	1	1	Oct 0.099	
Dark-eyed Junco.....	1	+		34	-	6	25	Nov 1.991	
Red-winged Blackbird.....	1 A	AAA	A11		B	29	623	May 11.984	
Common Grackle.....	+5	4AA	42+		B	25	225	Jun 5.062	
Brown-headed Cowbird.....		543	1+	1	B	17	72	Apr 1.768	
Orchard Oriole.....		++	x		B	3	4	Jun 0.124	
Northern Oriole.....		64	32		B	21	86	May 2.460	
Purple Finch.....		+ +			-	2	3	Apr 0.098	
House Finch.....	A92	23	74+	137	B	26	170	Jan 9.461	
American Goldfinch.....	52+	654	993	227	B	39	214	Dec 3.980	
House Sparrow.....	1	1	2++		B	7	15	Jul 0.667	

Number of Visits The "NV" column provides the number of visits on which the species was seen.

Number of Individuals The "NI" column provides the number of individuals recorded for all visits combined (obtained by summing the count from each data set). The total count (for all species, all visits) is 6284.

Maximum Birds Per Hour The "BPH max" column provides the month in which the birds-per-hour abundance was greatest and the BPH value for that month. For example, "Oct 6.779" would indicate that the species was most abundant in October when 6.779 individuals were recorded for each hour afield.

In total, 90 species were observed on standard survey visits and 6 additional species are present in the supplementary list. Of these, 49 species are classified as breeding birds at the Great Meadows. Eight additional species are probable breeders.

The birds that, in their proper season, were found in the greatest numbers were American Crow, European Starling, Black-capped Chickadee, Red-winged Blackbird, House Finch, Rock Dove, Canada Goose (seen mostly as overflights), Song Sparrow, American Robin, Common Grackle, and Barn Swallow.

### 5.3 Analysis of Occurrence by Area

Table 4 provides a compilation of the areas of occurrence for selected species. The entries in the table are the total number of individuals of the given species reported from the given area when all data sets are combined. Note that these entries reflect the regularity with which the species was observed in an area as well as the number of individuals that tended to be present on a given visit. Areas that consist almost entirely of open (herbaceous) wet meadows are written in italics. This table reveals that many species show either a strong affinity or a strong aversion to wet meadows.

### 5.4 Species Commentary

The following paragraphs provide additional information on some of the more noteworthy species present in the Great Meadows:

Green-backed Heron This small heron frequents the edges of brooks and ponds. It is a probable breeding bird at the Great Meadows.

American Woodcock This inland shorebird is most readily observed when males are performing their display flights at dusk in April and May. Because Woodcock feed mostly on earthworms, they require feeding grounds where the soil remains moist throughout the summer. They also require open areas for flight displays. The only other site in Lexington where Woodcock are known to breed is Dunback Meadow.



Table 5: Occurrence of Selected Species by Area.

SPECIES	AREA															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Red-tailed Hawk	1	1	1	2			1						1	1	1	1
Willow Flycatcher	1	1	2	3					1			2				6
Gray Catbird	4	1	3		14	6	2	2	5	6	18	1	24	24	4	11
Brown Thrasher	4	1		2	21	1		2	8	3	15		4	3		1
Cedar Waxwing	2	3	1	3					3	1	4			2		3
Warbling Vireo	1					1		1	2	1	1			1		
Blue-winged Warbler					3			2	2		3					
Prairie Warbler									1		7					
Common Yellowthroat	11		2	2	12	5	1	3	8	9	16	4	2	7	8	1
Rose-br. Grosbeak		1			3				1					2		
Field Sparrow			1	1	7	2	1		6		20	3			7	
Swamp Sparrow	1			4		1						5		1	12	
Red-winged Blackbird	11	2	9	64	11	41	3	8	8	24	11	46	6	6	97	18
Orchard Oriole									1					1		1
N. Oriole	5	1	3		9	2	1	2	4	3	7	2		1		8
Tree Sparrow	1		6	1	7				3		3	2		10	1	

Note: Each entry is the sum of all records from all available site visits. Areas that consist almost entirely of open marsh are entered in italics.

Red-tailed Hawk This bird of prey is resident at the Great Meadows throughout the fall and winter. It is an occasional visitor during the breeding season.

Northern Harrier Formerly called the "marsh hawk", this hawk of marshes and grasslands courses low over the meadow in search of unwary mice or small birds. It is most often seen at Great Meadows as a fall migrant in late September and October, although in some years it remains into early winter.

Sharp-shinned Hawk The Sharp-shinned Hawk is often seen at the Great Meadows during its fall migration (in September).

Screech Owl These small woodland owls were recorded only during playback of Screech Owl calls on a nocturnal visit. They appear to be fairly common permanent residents of the more forested areas of Great Meadows (See Section 4.3.1 on nocturnal survey efforts).

Willow Flycatcher This flycatcher nests in the scattered shrubs located in the wet meadows. At least three nesting pairs have been recorded on the standard route. This species also breeds in Lexington at Tophet Swamp and Dunback Meadow.

Marsh Wren This species is closely associated with the stands of cattail in the open marsh. It is seldom observed from the uplands overlooking the marsh, and its status was determined primarily by line transects of the wet meadows (see Section 4.3.2).

American Crow Crows are found at Great Meadows throughout the year. In winter, large flocks (consisting of hundreds of birds) assemble and feed in the wet meadows before departing for a common roost.

Brown Thrasher This handsome, rusty thrasher is a conspicuous breeding bird in the upland areas where its loud, spirited song of twice-repeated phrases is often heard.

Blue-winged Warbler This striking yellow warbler nests on upland sites with scattered shrubs and an abundance of "edge" habitat. Once rare in Massachusetts, their numbers have increased in recent years. It is usually found by listening for its buzzy, sputtering, two-part song.

Prairie Warbler This attractive yellow and black warbler is found nesting on dry open hillsides with extensive "edge" habitat between forest and open areas. It is best located by listening for its song: a series of buzzy notes that ascends in pitch. It was found in 1990, but not 1991, which may indicate an irregular presence in the Great Meadows.

Red-winged Blackbird The Red-winged Blackbird is possibly the most abundant bird in the wet meadows during the height of the summer. The calling, chasing, and displaying of the male Red-winged Blackbirds provide a textbook lesson in avian territorial behavior. In August, after the breeding is over, the Blackbirds depart the area and are no longer seen in numbers.

Orchard Oriole This oriole is much less common in Massachusetts than the Northern (Baltimore) Oriole. It has been regularly recorded in early summer at the Great Meadows and can be presumed to nest there.

Swamp Sparrow Swamp Sparrows nest in good numbers in the wet meadows.

## **6. Some Thoughts on Resource Management**

The following thoughts on resource management represent the best judgment of those persons who spent time in the Great Meadows assisting in the bird survey. These comments are limited in scope to issues to which the survey results are relevant.

The Great Meadows presents a locally unique resource for observing birds for both recreational and educational purposes. It allows residents of the highly developed nearby Towns to observe wildlife without the need to travel great distances. There are walking trails that provide easy passage from one section of the Great Meadows to another. The interior of the wet meadows is readily observed from the dry knolls surrounding the wetlands.

To a large extent, the wildlife habitat of the Great Meadows has benefited from a benign neglect since it was abandoned as a water supply in 1902. The avian habitat can be maintained with a modest management effort. Land use regulations that protect soil and vegetation must be enforced. Some land abuse, such as trail bike riding on the upland knolls, has caused environmental degradation, but these problems are, for the moment, under control. The proposed Minuteman Bikeway, which will abut the southern edge of the Great Meadows, will invite a greater number of people to enjoy the area. These visitors should be encouraged to make appropriate use of the area.

Habitat requirements for American Woodcock are well understood by game management agencies in New England. At Great Meadows, the open nature of the uplands overlooking the wetlands appears to be an important habitat element. This open character may not be permanent. How to monitor it and whether actions should be taken to preserve it should be discussed in management planning.

The accessibility of the area could be improved, but this should be done in a sensitive manner. Much of the uniqueness of the area stems from the fact that it is not transected by roads, power lines, or other intrusive corridors. New trails should be for the purpose of visiting the Great Meadows, not merely transiting through it. Access for experiencing the wet meadows could be improved by the installation of boardwalks or other path improvements in one or more of the wetter areas.

Entrances to the Great Meadows are currently unlabeled. A system of signage that identifies entrances and lists regulations for land use is needed. A trail guide for the area could encourage and assist visitors. A compact bird checklist (perhaps based on an update of the list published by Citizens for Lexington Conservation) should be produced and made available to interested persons.

Use of the area as a water supply would appear to be largely compatible with preserving avian populations. Increased water retention in the low areas (below the 170 foot elevation) would probably have a positive

effect upon the diversity of the birdlife. However, if changes in local hydrology were to cause wetlands to dry out, adverse effects upon marsh-dwelling species would result.

## **7. Conclusions**

The Great Meadows provides extensive and diverse wildlife habitat which is reflected in the diversity of its birdlife. The habitat types of greatest extent are wet meadows (including marsh) and dry, relatively open upland hillsides.

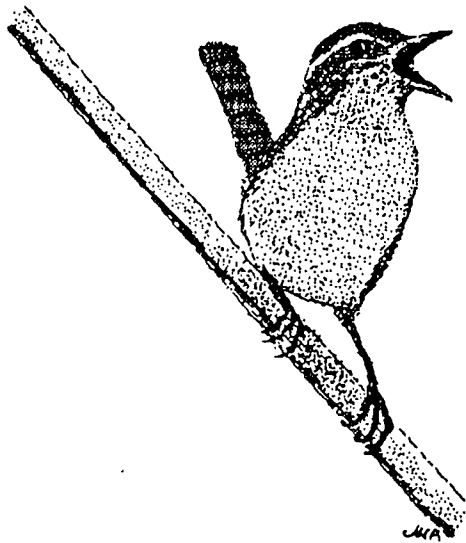
The survey has recorded 96 species of birds at the Great Meadows. The most striking aspect of the birdlife is the number of breeding species. This survey indicates that more than 49 species of birds breed in the Great Meadows. Several species of birds are of routine occurrence at the Great Meadows that are found at very few locations in the surrounding towns. Among these are Northern Harrier, American Woodcock, Marsh Wren, and Willow Flycatcher.

Another noteworthy aspect of the birdlife is the number of diurnal birds of prey that make use of the Great Meadows during migration. The open habitat of the wet meadows appears to provide excellent hunting territory for these species.

With proper sensitivity to its natural resources, the Great Meadows can continue to be a haven for a wide variety of birds. It will also be a haven for human visitors who enjoy experiencing this thriving natural world "right in their backyard."

## References

1. "Proposal for an Ecological Study of the Great Meadows of Lexington, Massachusetts," Mystic River Watershed Association, 1990
2. Brewster, William, "The Birds of the Cambridge Region," 1906
3. Ramsey, F.L., and Scott, J.M., "Analysis of Bird Survey Data Using a Modification of Emlen's Method," from *Estimating Numbers of Terrestrial Birds*, Studies in Avian Biology No. 6, Cooper Ornithological Society, Allen Press, Inc., 1981



Marsh Wren, a species found nesting in the Cattail stands of the Great Meadows marsh

## Appendix A: Raw Data from Standard Survey Visits

The following tables provide the raw data collected during the standard survey visits. In these tables, "MO" is the month of the year and "DOM" is the day of the month, "YEAR" is the last two digits of the year, and "TIME" is the time afield in minutes. The data sets are arranged in order of increasing day of the year (January to December). Supplementary data sets are not included in this appendix.

	MO	1	1	2	2	2	3	3	3	3	4
	DOM	21	27	3	17	19	3	17	20	26	13
	YEAR	91	91	91	91	91	91	91	91	91	91
	TIME	120	120	95	110	75	80	60	135	120	150
Canada Goose.....	-	-	-	-	-	-	-	-	3	2	-
Mallard.....	2	-	-	2	-	2	4	14	8	8	-
Northern Harrier.....	-	-	-	-	-	-	-	-	-	-	1
Red-tailed Hawk.....	1	1	-	1	1	-	3	-	-	-	-
Ring-necked Pheasant.....	1	-	-	3	-	-	1	1	4	6	-
Herring Gull.....	2	-	-	4	-	-	-	-	-	-	-
Rock Dove.....	25	3	1	8	-	1	-	-	-	-	-
Mourning Dove.....	-	3	1	-	15	-	-	1	-	-	-
Downy Woodpecker.....	-	2	1	5	1	1	2	-	2	2	-
Northern Flicker.....	-	-	-	-	-	-	-	-	-	-	4
Blue Jay.....	-	2	-	2	1	1	-	-	1	-	-
American Crow.....	50	45	2	26	75	5	75	19	21	20	-
Black-capped Chickadee...	6	5	1	12	12	4	-	-	6	16	-
Tufted Titmouse.....	1	1	-	3	1	-	-	-	-	2	-
White-breasted Nuthatch..	3	-	-	1	-	-	-	-	-	-	-
American Robin.....	1	-	-	-	-	-	-	-	-	-	40
Mockingbird.....	2	2	1	-	-	-	-	-	-	-	-
Starling.....	50	8	-	2	16	1	-	-	-	20	-
Palm Warbler.....	-	-	-	-	-	-	-	-	-	-	1
Northern Cardinal.....	1	1	1	-	1	2	1	-	-	2	-
Tree Sparrow.....	-	9	-	1	-	-	-	-	-	1	-
Chipping Sparrow.....	-	-	-	-	-	-	-	-	-	3	-
Field Sparrow.....	-	-	-	-	-	-	-	-	1	-	-
Song Sparrow.....	-	1	1	-	-	4	1	4	8	10	-
Swamp Sparrow.....	-	-	-	-	-	-	-	-	-	1	-
White-throated Sparrow...	-	-	-	2	-	-	-	-	-	-	-
Dark-eyed Junco.....	-	-	-	-	3	-	-	-	-	-	-
Red-winged Blackbird.....	2	-	-	-	-	4	-	19	26	30	-
Common Grackle.....	-	-	1	-	-	-	-	17	1	4	-
Brown-headed Cowbird.....	-	-	-	-	-	-	-	-	-	10	-
House Finch.....	12	26	-	16	10	-	-	7	-	-	-
American Goldfinch.....	4	5	-	-	6	-	-	-	1	8	-
House Sparrow.....	-	1	-	-	-	-	-	-	-	-	-
NO. SPECIES	16	16	9	15	12	10	7	9	12	20	-

	MO	4	4	4	5	5	5	5	5	6	6
	DOM	20	23	27	4	11	14	19	24	8	8
	YEAR	91	91	91	91	91	90	90	90	91	90
	TIME	110	200	150	165	150	120	155	165	98	165
Green-backed Heron.....	-	-	-	-	-	1	-	-	-	-	-
Canada Goose.....	4	-	-	-	3	-	-	-	-	-	-
Mallard.....	11	4	11	11	3	8	5	4	5	5	6
Northern Harrier.....	-	-	-	-	2	-	-	-	-	-	-
Red-tailed Hawk.....	-	-	-	-	-	-	-	-	-	-	1
Ring-necked Pheasant.....	4	7	7	6	8	8	4	5	5	5	11
Killdeer.....	2	2	-	2	4	-	1	-	1	-	-
Rock Dove.....	-	-	-	-	1	-	7	-	-	-	-
Mourning Dove.....	-	-	-	3	3	6	4	1	10	3	3
Yellow-billed Cuckoo.....	-	-	-	-	-	-	-	-	1	-	-
Chimney Swift.....	-	-	-	-	3	1	-	-	3	2	2
Belted Kingfisher.....	-	-	-	-	1	-	-	-	-	-	-
Downy Woodpecker.....	3	-	-	1	2	1	2	-	-	-	1
Northern Flicker.....	6	4	1	1	5	2	1	1	4	5	5
Willow Flycatcher.....	-	-	-	-	-	-	-	-	3	4	4
Least Flycatcher.....	-	-	-	-	-	-	2	-	-	-	-
Eastern Phoebe.....	1	1	-	-	1	-	-	-	-	-	-
Gt. Crested Flycatcher...	-	-	-	-	-	-	1	-	-	-	-
Eastern Kingbird.....	-	-	-	-	3	-	3	-	1	5	5
Tree Swallow.....	-	-	-	1	-	2	-	2	1	-	-
Barn Swallow.....	-	-	-	-	2	36	-	-	2	2	2
Blue Jay.....	1	-	-	6	3	2	6	2	4	2	2
American Crow.....	17	14	2	10	6	4	8	1	9	15	15
Black-capped Chickadee...	6	3	2	5	2	2	9	1	3	4	4
Tufted Titmouse.....	2	-	-	2	2	1	-	-	3	3	3
White-breasted Nuthatch..	-	-	1	-	-	-	-	-	-	-	-
House Wren.....	-	-	1	1	3	-	3	-	-	-	-
American Robin.....	8	4	1	5	8	6	20	2	6	1	1
Gray Catbird.....	-	-	-	-	-	4	6	12	5	18	18
Mockingbird.....	-	-	-	1	-	1	-	2	-	1	1
Brown Thrasher.....	1	1	2	3	4	5	1	2	2	6	6
Starling.....	2	-	-	6	7	11	4	1	14	11	11
Warbling Vireo.....	-	-	-	-	1	-	5	-	2	-	-
Red-eyed Vireo.....	-	-	-	-	-	-	2	-	1	-	-
Blue-winged Warbler.....	-	-	-	-	-	-	1	-	-	3	3
Northern Parula.....	-	-	-	-	1	-	-	-	-	-	-
Yellow Warbler.....	-	-	-	2	6	6	18	3	12	3	3
Magnolia Warbler.....	-	-	-	-	-	1	-	-	-	-	-
Yellow-rumped Warbler....	-	-	1	-	1	-	2	-	-	-	-
Palm Warbler.....	-	1	-	-	-	-	-	-	-	-	-
Blackpoll Warbler.....	-	-	-	-	-	1	-	-	-	-	-
Black-and-White Warbler..	-	-	-	1	1	-	-	-	-	-	-
American Redstart.....	-	-	-	-	-	-	6	-	-	-	-
Common Yellowthroat.....	-	-	-	2	8	8	30	9	8	9	9
Wilson's Warbler.....	-	-	-	-	-	1	-	-	-	-	-
Yellow-breasted Chat.....	-	-	-	-	-	1	-	-	-	-	-
Scarlet Tanager.....	-	-	-	-	-	-	1	-	-	-	-
Northern Cardinal.....	2	-	5	3	3	-	1	1	2	1	1
Rose-breasted Grosbeak...	-	-	-	-	1	-	2	-	1	-	-
Rufous-sided Towhee.....	-	-	-	-	1	-	1	1	1	1	1
Tree Sparrow.....	-	-	-	-	7	-	-	-	-	-	-
Field Sparrow.....	3	3	1	2	4	1	1	4	1	4	4
Savannah Sparrow.....	-	-	2	2	-	1	-	-	-	-	-
Song Sparrow.....	9	9	10	13	11	13	35	8	5	8	8
Swamp Sparrow.....	2	2	2	-	2	-	-	-	3	-	-

(continued)

(continued)

	MO	4	4	4	5	5	5	5	5	6	6
	DOM	20	23	27	4	11	14	19	24	8	8
	YEAR	91	91	91	91	91	90	90	90	91	90
	TIME	110	200	150	165	150	120	155	165	98	165
White-throated Sparrow...		-	-	4	4	-	-	-	-	-	-
Dark-eyed Junco.....		-	1	-	-	-	-	-	-	-	-
Red-winged Blackbird.....		16	20	32	32	70	20	14	15	26	15
Common Grackle.....		1	11	-	4	19	3	15	7	11	7
Brown-headed Cowbird.....		3	-	5	6	5	-	10	-	6	-
Orchard Oriole.....		-	-	-	1	-	-	-	-	1	-
Northern Oriole.....		-	-	-	2	6	1	12	10	3	10
Purple Finch.....		1	-	-	-	-	-	-	-	-	-
House Finch.....		-	-	-	1	6	1	1	-	1	-
American Goldfinch.....		7	4	3	4	4	2	12	3	6	3
House Sparrow.....		-	-	-	-	-	-	-	-	1	-
NO. SPECIES		23	17	19	33	40	31	37	23	37	30

	MO	6	6	6	6	6	6	6	6	7	7
	DOM	15	15	22	22	23	23	24	29	13	24
	YEAR	91	90	90	91	91	91	90	90	91	90
	TIME	127	165	135	180	165	165	105	140	180	100
Green-backed Heron.....		-	1	-	1	1	-	-	-	-	-
Blk-crnd. Night Heron....		2	-	-	1	-	-	-	-	-	-
Mallard.....		3	3	1	3	2	2	2	2	1	-
Red-tailed Hawk.....		-	-	-	-	1	-	-	-	1	-
Ring-necked Pheasant.....		13	7	5	8	4	4	10	12	3	2
Killdeer.....		-	-	-	-	-	-	-	-	1	-
Herring Gull.....		-	-	-	-	-	-	-	-	1	-
Rock Dove.....		3	2	-	2	-	-	-	-	-	2
Mourning Dove.....		12	4	4	12	3	3	5	3	10	3
Black-billed Cuckoo.....		-	-	-	-	-	-	-	-	1	-
Chimney Swift.....		1	2	3	9	-	-	8	-	4	9
Ruby-thr. Hummingbird....		-	-	-	-	-	-	-	-	1	-
Belted Kingfisher.....		-	-	-	-	-	-	-	-	2	-
Downy Woodpecker.....		4	3	2	7	-	-	-	-	4	1
Northern Flicker.....		1	3	4	4	7	7	4	1	6	3
Willow Flycatcher.....		3	4	2	2	-	-	2	-	2	-
Eastern Phoebe.....		-	-	-	-	2	2	-	-	-	-
Gt. Crested Flycatcher...		1	-	-	-	-	-	2	-	-	-
Eastern Kingbird.....		5	2	1	4	1	1	2	-	8	-
Tree Swallow.....		1	-	-	5	-	-	-	2	1	-
Barn Swallow.....		2	2	5	8	10	10	4	9	13	10
Blue Jay.....		7	10	1	8	2	2	3	7	2	4
American Crow.....		5	6	1	12	1	1	3	8	75	6
Black-capped Chickadee...		1	3	3	3	6	6	2	4	2	7
Tufted Titmouse.....		2	4	3	3	-	-	1	2	3	2
White-breasted Nuthatch..		1	2	-	1	3	3	-	-	1	-
House Wren.....		2	1	-	3	-	-	1	-	-	-
Marsh Wren.....		-	-	-	-	-	-	-	-	-	1
Veery.....		1	-	-	-	-	-	-	-	-	-
Wood Thrush.....		-	1	-	-	-	-	-	-	-	-
American Robin.....		5	7	4	14	-	-	6	1	10	4
Gray Catbird.....		12	8	6	14	5	5	7	7	10	5
Mockingbird.....		3	2	1	1	1	1	-	-	4	6
Brown Thrasher.....		6	2	6	7	5	5	4	4	2	3
Cedar Waxwing.....		3	1	-	5	2	2	3	-	2	-
Starling.....		10	16	-	10	6	6	3	4	20	-
Warbling Vireo.....		1	-	-	1	-	-	-	1	2	-
Red-eyed Vireo.....		-	-	-	-	-	-	1	-	-	-

(continued)



	(continued)										
	MO	6	6	6	6	6	6	6	6	7	7
	DOM	15	15	22	22	23	23	24	29	13	24
	YEAR	91	90	90	91	91	91	90	90	91	90
	TIME	127	165	135	180	165	165	105	140	180	100
Blue-winged Warbler.....		2	2	1	-	-	-	-	-	-	-
Yellow Warbler.....		8	10	5	14	-	-	7	2	1	-
Prairie Warbler.....		-	1	2	-	-	-	1	2	-	-
Common Yellowthroat.....		9	9	5	11	4	2	9	9	7	4
Scarlet Tanager.....		-	-	-	-	-	-	1	-	-	-
Northern Cardinal.....		2	4	2	5	3	3	1	-	1	-
Rose-breasted Grosbeak...		-	-	-	1	-	-	2	-	-	-
Rufous-sided Towhee.....		-	-	2	1	2	2	1	1	-	3
Chipping Sparrow.....		-	-	-	-	-	-	1	-	-	-
Field Sparrow.....		4	3	3	2	5	5	1	1	6	2
Song Sparrow.....		11	16	15	13	7	7	7	7	15	4
Swamp Sparrow.....		5	3	2	5	-	-	-	-	2	1
White-throated Sparrow...		-	-	2	-	-	-	-	-	-	-
Red-winged Blackbird.....		46	26	34	33	30	30	23	20	18	2
Common Grackle.....		32	11	1	25	6	6	2	21	-	5
Brown-headed Cowbird.....		7	3	1	6	-	-	4	1	2	1
Orchard Oriole.....		-	-	-	-	-	-	-	2	-	-
Northern Oriole.....		5	4	4	3	2	2	2	2	2	3
Purple Finch.....		-	-	-	-	-	-	-	2	-	-
House Finch.....		4	5	2	-	9	9	1	-	2	2
American Goldfinch.....		7	5	6	8	1	1	4	3	7	7
House Sparrow.....		5	-	-	-	-	-	-	1	-	-
NO. SPECIES		41	38	33	39	28	26	36	29	39	27

	MO	7	8	8	8	8	9	9	9	9	9
	DOM	24	5	12	20	25	7	14	16	21	28
	YEAR	91	90	90	90	91	91	91	90	91	90
	TIME	169	160	195	100	160	165	119	135	126	130
Great Blue Heron.....	-	-	-	-	-	1	-	-	-	-	-
Blk-crnd. Night Heron....	2	1	-	-	-	-	-	-	-	-	-
Canada Goose.....	-	-	-	-	-	6	9	-	-	4	-
Wood Duck.....	-	-	-	-	-	-	1	-	-	-	-
Mallard.....	4	3	-	-	-	2	2	-	-	2	3
American Wigeon.....	-	1	-	-	-	-	-	-	-	-	-
Northern Harrier.....	-	-	-	-	-	-	-	-	-	1	-
Sharp-shinned Hawk.....	-	-	-	-	-	-	-	1	-	1	-
Cooper's Hawk.....	-	-	-	-	-	-	-	-	1	-	-
American Kestrel.....	-	-	-	-	-	-	1	-	-	1	-
Ring-necked Pheasant.....	-	1	4	1	2	4	2	2	2	2	1
Killdeer.....	1	-	-	-	-	-	1	1	-	-	-
Herring Gull.....	1	-	-	-	-	8	-	-	-	1	-
Rock Dove.....	4	30	-	-	-	18	2	2	-	3	-
Mourning Dove.....	14	6	3	-	8	3	5	1	4	4	1
Chimney Swift.....	6	10	17	2	-	-	-	-	-	-	-
Belted Kingfisher.....	-	-	-	1	-	1	-	-	-	-	-
Downy Woodpecker.....	3	7	2	1	2	6	-	1	3	-	-
Northern Flicker.....	8	7	3	5	8	5	5	2	13	2	-
Willow Flycatcher.....	1	-	-	-	-	-	-	1	-	-	-
Eastern Phoebe.....	2	-	-	-	-	1	-	2	1	-	-
Eastern Kingbird.....	6	2	5	-	7	-	-	-	-	-	-
Barn Swallow.....	17	10	2	4	-	-	-	-	-	-	-
Blue Jay.....	3	14	3	6	13	8	7	9	19	4	-
American Crow.....	8	6	1	1	11	55	3	21	27	5	-
Black-capped Chickadee...	9	5	-	10	-	13	2	7	7	15	-
Tufted Titmouse.....	-	5	1	-	1	1	-	4	3	-	-
White-breasted Nuthatch..	2	1	1	-	4	1	-	1	-	-	-
House Wren.....	1	1	-	-	1	1	-	1	-	-	-
Marsh Wren.....	-	-	-	-	3	-	-	-	-	-	-
American Robin.....	15	28	3	8	12	1	-	3	-	7	-
Gray Catbird.....	12	14	3	7	12	14	3	5	2	6	-
Mockingbird.....	9	13	4	13	14	3	-	2	-	-	-
Brown Thrasher.....	2	3	1	-	1	3	1	4	-	-	-
Cedar Waxwing.....	7	9	2	-	3	-	16	-	-	-	-
Starling.....	20	5	2	-	8	-	-	5	10	-	-
Red-eyed Vireo.....	2	-	1	-	-	-	-	1	1	-	-
Blue-winged Warbler.....	-	-	1	-	-	-	-	-	-	-	-
Nashville Warbler.....	-	-	1	-	-	-	-	-	-	-	-
Yellow Warbler.....	2	5	-	-	-	-	-	-	-	-	-
Yellow-rumped Warbler....	-	-	-	-	-	-	-	15	8	-	-
Black-thr. Green Warbler..	-	-	-	-	-	-	-	1	-	-	-
Blackpoll Warbler.....	-	-	-	-	-	-	-	-	1	-	-
American Redstart.....	-	-	-	-	-	-	-	5	-	-	-
Common Yellowthroat.....	9	1	-	1	-	3	2	5	1	-	-
Northern Cardinal.....	1	2	-	-	3	2	-	1	5	-	-
Rose-breasted Grosbeak...	-	1	-	-	-	-	-	-	-	-	-
Rufous-sided Towhee.....	1	1	2	1	1	4	1	1	2	2	-
Chipping Sparrow.....	-	-	-	-	-	-	-	5	-	-	-
Field Sparrow.....	3	-	1	-	11	5	-	2	3	-	-
Song Sparrow.....	11	7	3	1	6	8	6	5	5	1	-
Swamp Sparrow.....	6	5	-	-	1	3	1	-	-	-	-
Red-winged Blackbird.....	12	4	1	-	-	3	-	-	-	-	-
Common Grackle.....	7	-	-	-	7	-	1	-	-	-	-
Brown-headed Cowbird.....	-	1	-	-	-	-	-	-	-	-	-
Northern Oriole.....	5	-	2	2	4	-	-	-	-	-	-
House Finch.....	16	9	-	-	5	2	-	-	-	-	-
American Goldfinch.....	14	12	3	9	12	4	-	3	2	6	-
House Sparrow.....	5	-	-	-	1	-	-	1	-	-	-
NO. SPECIES	38	34	26	17	32	31	18	29	27	12	-

	MO	10	10	10	10	10	11	11	12	12
	DOM	5	8	14	21	24	1	26	2	15
	YEAR	91	90	91	90	90	90	90	90	90
	TIME	120	150	128	105	100	100	110	90	105
Canada Goose.....	6	-	2	44	-	-	-	-	1	-
Black Duck.....	-	-	2	-	3	-	-	-	-	-
Mallard.....	-	1	9	-	-	1	12	1	-	-
Northern Harrier.....	-	-	-	-	-	-	-	1	2	-
Sharp-shinned Hawk.....	1	-	1	-	-	-	-	-	-	-
Cooper's Hawk.....	-	-	1	-	-	-	-	-	-	-
Red-tailed Hawk.....	-	-	-	-	-	-	1	-	1	-
American Kestrel.....	-	-	1	-	-	-	-	-	-	-
Ring-necked Pheasant.....	2	1	2	3	2	2	-	-	-	2
Herring Gull.....	-	-	1	-	-	-	-	-	-	-
Rock Dove.....	2	-	2	4	1	-	-	-	-	-
Mourning Dove.....	-	-	-	3	2	-	-	1	6	-
Downy Woodpecker.....	1	-	2	4	1	1	2	1	4	-
Hairy Woodpecker.....	1	-	-	-	-	-	-	-	-	-
Northern Flicker.....	-	2	2	1	-	3	-	-	-	1
Eastern Phoebe.....	-	3	-	-	-	-	-	-	-	-
Gt. Crested Flycatcher...	-	1	-	-	-	-	-	-	-	-
Blue Jay.....	17	2	18	1	4	7	2	-	-	1
American Crow.....	55	4	39	4	4	1	14	3	150	-
Black-capped Chickadee...	14	6	10	13	4	9	8	1	40	-
Tufted Titmouse.....	2	1	5	-	-	1	-	-	-	12
White-breasted Nuthatch..	1	1	2	-	-	1	1	-	-	-
Ruby-crowned Kinglet.....	-	-	1	-	-	1	-	-	-	-
American Robin.....	-	1	10	36	7	5	-	-	-	-
Gray Catbird.....	-	2	-	-	-	-	-	-	-	-
Mockingbird.....	-	1	-	2	1	3	-	1	1	-
Starling.....	4	-	4	-	-	85	-	-	-	75
Solitary Vireo.....	1	-	-	-	-	-	-	-	-	-
Yellow-rumped Warbler....	5	12	2	8	-	1	-	-	-	-
Palm Warbler.....	-	2	-	-	-	-	-	-	-	-
Common Yellowthroat.....	-	2	-	-	-	1	-	-	-	-
Northern Cardinal.....	2	-	1	-	-	-	-	1	-	-
Tree Sparrow.....	-	-	-	-	-	2	5	-	2	-
Field Sparrow.....	-	1	-	-	-	-	-	-	-	-
Savannah Sparrow.....	-	1	-	-	-	2	-	-	-	-
Song Sparrow.....	2	-	6	-	1	8	2	2	-	-
Lincoln's Sparrow.....	-	-	1	-	-	-	-	-	-	-
Swamp Sparrow.....	-	-	5	-	-	-	-	-	-	-
White-throated Sparrow...	4	1	-	-	-	2	-	-	-	-
White-crowned Sparrow....	-	1	-	-	-	-	-	-	-	-
Dark-eyed Junco.....	-	2	-	11	1	7	-	-	-	-
Rusty Blackbird.....	-	-	1	-	-	-	-	-	-	-
Brown-headed Cowbird.....	-	-	-	-	-	-	-	1	-	-
House Finch.....	-	-	4	-	-	4	2	-	13	-
American Goldfinch.....	-	1	4	6	-	4	-	-	13	-
NO. SPECIES	17	22	27	14	12	22	10	11	15	-

## Appendix B: Supplementary Records

Table B.1 contains supplementary records that are useful additions to the standard records of Appendix A. This table includes only records from the years of the survey (1990-91).

Table B.1 Supplementary Records

<u>DATE</u>	<u>SPECIES COUNT</u>	<u>OBSERVER(S) AND AREA</u>
7/20/91	1 Great Blue Heron	J. Andrews, Area 4
5/12/90	2 Wood Duck	B. Przybylska, Area 8.
9/1/91	1 Wood Duck	J. Andrews, B. Przybylska, Area 16
5/12/90	1 Northern Harrier	B. Przybylska, Area 6
9/8/90	1 Northern Harrier	M. Gearin, Area 4,6, and 12.
5/12/90	1 Broad-winged Hawk	B. Przybylska, Area 5
9/1/16	3 American Kestrel	J. Andrews, B. Przybylska, Areas 4,13
9/7/91	1 Sharp-shinned Hawk	J. Andrews, Area 15
9/7/91	1 Cooper's Hawk	J. Andrews, Area 15
5/20/91	1 Virginia Rail	K. Ohmart, Area 4
4/3/91	Common Snipe	B. Przybylska
4/7/91	Common Snipe	S. Sanders, Brookline Bird Club
3/20/91	7 American Woodcock	S. Sanders, M. Gilbert, D. White, Areas 12 and 15
5/7/91	1 American Woodcock	B. Przybylska, Area 11
6/28/91	3 Screech Owl	J. Andrews, B. Przybylska, et. al.
8/27/90	65 Common Nighthawk	B. Przybylska
5/8/91	1 Nashville Warbler	J. Andrews, Area 5
5/8/91	1 Magnolia Warbler	J. Andrews, Area 11
7/10/90	1 Orchard Oriole	B. Przybylska, Area 1

In addition, the following species were recorded at the Great Meadows in the last 15 years, but were not recorded during the survey years (1990-91): Fish Crow, Indigo Bunting, Bobolink, and Eastern Meadowlark.