Survey of Vertebrates in the Steele Creek Park Grassland and the Effects of Controlled Burning on Wildlife

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To the Steele Creek Park Nature Center
And to Tennessee High School Special Problems in Biology II

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Contents

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Abstract

The Steele Creek Park grassland is a relatively new feature of the park. Because of this, little research has been conducted in it. This research project served to survey the vertebrate life of the grassland and examine the effects of a controlled burn on said vertebrates. Trapping, a heat sensing DeerCam, and simple visual observation were used to do so. It was discovered that all pre-burn grassland vertebrates moved away from the burned portions into the untouched portions of the grassland with the exception of the mourning dove that moved to the cleared area.

Introduction

The decline in the population of bird species that rely on grassland habitats has been greater than that of any other bird species in North America (Giuliano, 2002). Certain mammal species face the same threat and their habitats should be equally protected because of their status of being officially "in need of management" (Buckles, 1997). This loss of grasslands and tallgrass prairie ecosystems is not new. Extensive losses have occurred since European settlement of the continent (Delisle, 1997). Many methods of grassland conservation have been attempted. One of these methods is controlled burning to eliminate alien grasses from native warm-season and cool-season grassland areas.

The purpose of this research project is to study the effectiveness of controlled burning in the grassland area of Steele Creek Park. In studies in other parts of the country, the various species of birds were found to be in abundance in undisturbed grasses, while few species were found to inhabit freshly burned grasses (Walk, 2000). Locally, no research had been conducted on birds in the grassland with the exception of bird banding data from October of 2002. Also, the only other recent in-depth bird work that had been done concerning the rest of the park was that of a survey of owl populations in the Trinkle Hollow area of the park in 1999 (Cowan, 1999). No previous data, however, had been available concerning grassland mammals and the burning process. This demonstrated a great need for information regarding the conservation of various species of bird and mammal life in the grassland ecosystem.

Materials and Methods

In this project, several materials were used for conducting research. Sixty-four (64) Sherman live traps were used for catching small to medium-sized mammals, such as voles and mice. A medium-sized Havahart trap was also used for the purpose of trapping larger mammals than those that would be trapped by the Sherman traps like skunks and rabbits. To identify the bird and mammal species observed, two volumes of the Peterson Field Guild series were used: Birds of Eastern and Central North America, and Mammals. Another piece of equipment used was a DeerCam. This heat-sensing camera was posted in the grassland for the purpose of capturing photographic evidence of larger animals, such as deer and possibly coyotes.

The procedure involved in trapping small mammals is not difficult but must be followed diligently. To determine where traps should be placed, one must find signs of current animal activity. This could be in the form of tracks, scat, or in the case of voles, runways above the ground but beneath the grass. When one of these runways is found and determined to be active by signs such as grass clippings, traps are faced in opposite directions on the runway. During this project, the author trapped for 404.5 trap nights before the grassland burned and for 220.75 trap nights afterwards for a total of 625.25 trap nights. Because the voles are so used to traveling these paths, they run into the traps without noticing they are there. When a vole or other small mammal is trapped, measurements must be taken of the specimen. This is done by placing the animal in a zippered plastic bag that the researcher is able to see through with a small opening for air. There are 4 measurements required: the total length from nose to the end of the tail, the

length of the tail alone, the length of the right hind foot, and the length of the right ear. After these are taken, the researcher attempts to sex the animal. Only after all of these observations have been made can the animal be released.

The largest part of any research project involving a survey or inventory is simple visual and auditory observation. Quite often, different species of birds seen from a distance may have a similar appearance, but their unique vocalizations make them identifiable. The presence of animals can also be realized by the tracks and scat that they leave behind in certain areas. Even if an animal such as a deer has not been recently observed, tracks in the snow or mud and scat provide just as much proof that the animal is there as a direct sighting.

Results

Birds: (See summary chart 1) Several species of birds were observed prior to the burn. In the winter months at the beginning of research, the species observed most frequently was the dark-eyed junco (*Junco hyemalis*). A total of ninety-three (93) of these were observed during research. Other bird species that were observed frequently are the various types of sparrows. Those observed within this study are the white-throated sparrow (*Zonotrichia albicollis*), the song sparrow (*Melospiza melodia*), the field sparrow (*Spizella pusilla*), and the chipping sparrow (*Spizella passerina*). The song sparrow was the most often observed sparrow at one hundred-thirteen (113) visual sightings and/or audible observations. Three (3) white-throated sparrows and two (2) field sparrows were observed as well as an undetermined number of chipping sparrows observed in the grassland by Kevin Hamed, mentor for this research project. Other bird species were

observed in significantly smaller numbers as well. Those visually observed are two (2) eastern bluebirds (*Sialia sialis*), one (1) Carolina chickadee (*Poecile carolinensis*), seven (7) American goldfinches, twelve (12) northern rough-winged swallows (*stelgidopteryx serripennis*), one (1) northern cardinal (*Cardinalis cardinalis*), one (1) American robin (*Turdis migratorius*), an undetermined number of mourning doves (*Zenaida macroura*), two (2) mallards (*Anas platyrhynchos*), male and female, and three (3) American crows (*Corvus brachyrhyncos*) as well as a number of Canada geese (*Branta canadensis*) regularly flew over and/or walked in very close proximity to the grassland.

Mammals: (See summary chart 2) The majority of the data concerning the grassland mammals was made up of smaller mammals. The most common among these was the meadow vole (*Microtus pennsylvanicus*). A total of thirteen (13) meadow voles were trapped during the course of the study (see summary chart 3). The only other small mammal to be trapped was one (1) white-footed mouse (*Peromyscus leucopus*). Other small mammal evidence was observed however. One (1) set of eastern cottontail rabbit (*Sylvilagus floridanus*) tracks was observed and scat from this species was discovered on two (2) other occasions. A larger mammal species found to inhabit the grassland is the white-tailed deer (*Odocoileus virginianus*). Evidence collected of this species included multiple sets of tracks and scat findings. Another valuable piece of evidence is the photos of deer taken by the DeerCam. Photos were obtained of at least three (3) deer in the grassland.

Discussion

This study served to examine two focus points – the vertebrate life present in the Steele Creek Park grassland, and the effect that a controlled burn had on this life. The portion of this study regarding birds may have been affected by migratory patterns due to the seasonal change that occurred during research, which resulted in winter season birds moving out of the region and summer residents moving in, but this did not affect other findings. The time of day that most bird sightings occurred in varied from species to species. Juncos and various sparrows were seen in the afternoon and evening as well as in the early morning, but the migratory birds that moved in for the spring were mostly seen in the afternoons. The larger species of birds that mainly just flew over the grassland such as the American crows and Canada geese appeared chiefly in the early morning. During the pre-burn segment of research, song sparrows were found to congregate in and around a black locus tree approximately in the middle of the grassland (see map 1) in an area that was to be burned. After the burn, however, the song sparrows moved to an area of the grassland that had not been burned and the tall grass still remained. In contrast, mourning doves began appearing in the burned area around the locus tree, as they prefer cleared areas to those with high grasses.

Interesting information came from the mammal aspect of the study as well. Prior to the burn, trapping was conducted in several areas of the grassland (see map 2). Meadow voles were found in traps in nearly all of the areas that were trapped before the burn. After the burn was conducted, voles were trapped only in an unburned section of the grassland. As for typical catch patterns, voles were generally caught more frequently

after traps had been recently placed in new locations. This is likely due to the fact that voles are accustomed to running in unobstructed runways that the traps are placed in. After a period of time, the number of catches would dwindle as the voles most likely began to get used to the traps and began choosing alternate travel routes. Another interesting mammal find was that of the first white-footed mouse trapped in the grassland area of the park. Also, the deer determined to be in the grassland were discovered in numbers below previous estimates.

Time Log

Date	Time	Time Amount
1-23-03	1:45-2:45	1:00
1-28-03	3:05-3:35	0:30
1-29-03	8:15-8:55 AM	0:40
2-4-03	3:30-4:40	1:10
2-5-03	3:30-3:55	0:25
2-7-03	1:00-1:45	0:45
2-8-03	11:55-12:10	0:15
2-8-03	3:00-3:15	0:15
2-11-03	3:00-3:55	0:55
2-12-03	2:55-3:40	0:45
2-15-03	2:35-3:50	0:15
2-17-03	3:55-4:25	0:30
2-19-03	2:50-3:50	1:00
2-22-03	12:00-12:55	0:55
2-26-03	7:15-8:35 AM	1:20
2-26-03	3:00-4:30	1:30
3-1-03	1:35-2:05	0:30
3-3-03	7:10-8:40 AM	1:30
3-6-03	2:55-3:10	0:15
3-6-03	6:45-7:45	1:00
3-7-03	11:30-12:30	1:00
3-8-03	6:45-7:15	0:30
3-9-03	9:30-9:55	0:25
3-10-03	6:35-6:45	0:10
3-11-03	2:50-3:25	0:35
3-12-03	2:55-3:45	0:50
3-12-03	6:45-7:35	0:50
3-17-03	7:00-8:00 AM	1:00
3-18-03	6:50-7:45 AM	0:55
3-24-03	7:00-8:05 AM	1:05
3-24-03	2:45-4:40	1:55
3-25-03	6:45-7:05 AM	0:20
3-25-03	2:45-3:15	0:30
3-26-03	7:00-8:05 AM	1:05
3-26-03	3:10-3:40	0:30
3-27-03	6:45-7:05 AM	0:20
3-27-03	3:45-4:05	0:20
3-27-03	7:00-7:30	0:30
3-28-03	7:00-8:25 AM	1:25
3-28-03	2:50-5:10	2:20
3-29-03	4:15-4:35	0:20
3-31-03	3:45-4:00	0:15

4-2-03	7:05-8:15 AM	1:10
4-2-03	2:50-4:20	1:30
4-3-03	2:50-4:50	2:00
4-4-03	7:05-7:40 AM	0:35
4-4-03	2:50-3:35	0:45
4-11-03	1:25-2:00	0:35
4-12-03	9:55-10:55 AM	1:00
4-14-03	7:00-8:15 AM	1:15
4-14-03	2:50-3:35	0:45
4-14-03	9:30-9:50	0:20
4-15-03	7:05-8:25 AM	1:20
4-15-03	8:05-8:20	0:15
4-16-03	3:00-4:15	1:15
	Total	45:20

Log

1-23-03 1:45-2:45 – Observed eastern cottontail rabbit tracks, 1 white-throated sparrow

1-28-03 3:05-3:35 – No tracks/wildlife observed

1-29-03 8:15-8:55am – library research

2-4-03 3:30-4:40 – library research

2-5-03 3:30-3:55 – found deer scat, eastern cottontail scat, 20 dark-eyed junco, 2 eastern bluebirds, 3 song sparrows, 1 goldfinch

2-7-03 1:00-1:45 – Saw 16 junco

2-8-03 11:55-12:10 – Saw 4 junco, 2 song sparrows, 1 set of unidentified tracks

3:00-3:15 – Saw 6 junco, 2 song sparrows

2-11-03 3:00-3:55 – nothing observed

2-12-03 2:55-3:40 – 1 song sparrow

2-15-03 2:35-3:50 – 4 junco

2-17-03 3:55-4:25 – 12 junco, 2 song sparrows, deer scat

2-19-03 2:50-3:50 – 5 junco, 1 song sparrow, heard 1 meadow vole, eastern cottontail scat

2-22-03 12:00-12:55 – 3 junco

2-26-03 7:15-8:35am – heard 1 song sparrow, 15 junco, 5 Canada gees flew over

3:00-4:30 – dug hole for DeerCam in the rain while Kevin and Patrick sat in the car

3-1-03 1:35-2:05 – nothing observed

3-3-03 7:10-8:40am – 8 junco, 2 song sparrows, 2 white-throated sparrows, 3 crows flew over, 1 American robin

3-6-03 2:55-3:10 – picked up traps from Nature Center

6:45-7:45 – set traps

3-7-03 11:30-12:30 – checked traps with Kevin, Tracy, Gray, and Chris, no catches

3-8-03 6:45-7:15pm – checked traps, caught 1 meadow vole

3-9-03 9:30-9:55 – checked traps, caught 1 meadow vole and 1 white-footed mouse

3-10-03 6:35-6:45pm – checked traps, had already been closed by Kevin

3-11-03 2:50-3:25 – checked traps, no catches

3-12-03 2:55-3:45 – checked traps in new locations, caught 1 meadow vole

6:45-7:35 – checked traps, caught 2 meadow voles

3-17-03 7:00-8:00am – 1 song sparrow

3-18-03 6:50-7:45am – 2 mallards, 1 song sparrow

3-24-03 7:00-8:05am – nothing observed

2:45-4:40 – set 65 traps (61 small, 3 large, 1 Havahart)

3-25-03 6:45-7:05am – checked traps, nothing found

2:45-3:15 – checked traps, found them all closed

3-26-03 7:00-8:05am – set 65 traps, 2 Canada geese flew over, 1 song sparrow

3:10-3:40 – checked traps that Kevin couldn't find earlier

3-27-03 6:45-7:05am – set 65 traps

3:45-4:05 – checked traps, no catches

7:00-8:25pm – checked and closed traps, nothing caught, found deer scat

3-28-03 7:00-8:25am – opened all traps, 1 song sparrow, 1 cardinal

2:50-5:10 – grassland burn in south-east, north-central, north-west, and west sections

3-29-03 4:15-4:35 – picked up traps from Nature Center

3-31-03 3:45-4:00 – took traps back to Nature Center

4-2-03 7:05-8:15am – 1 song sparrow

2:50-4:20 – set 60 traps, 20 in NW burn, 20 near camera, 20 in SE burn, 1 song sparrow

4-3-03 2:50-4:50 – checked traps, found 1 deceased meadow vole, reseeded NW and NC burn

4-4-03 7:05-7:40am – checked traps, nothing caught, 1 song sparrow

2:50-3:35 – took up traps before spring break

4-11-03 1:25-2:00 – picked up deer picture, checked camera, informed by Kevin of field sparrows, chipping sparrows, and rough-winged swallows

4-12-03 9:55-10:55am – set 63 traps in NW burn, SE burn, W burn, and SW area

4-14-03 7:00-8:15am – set traps, 2 field sparrows

2:50-3:35 – checked traps, caught 1 meadow vole

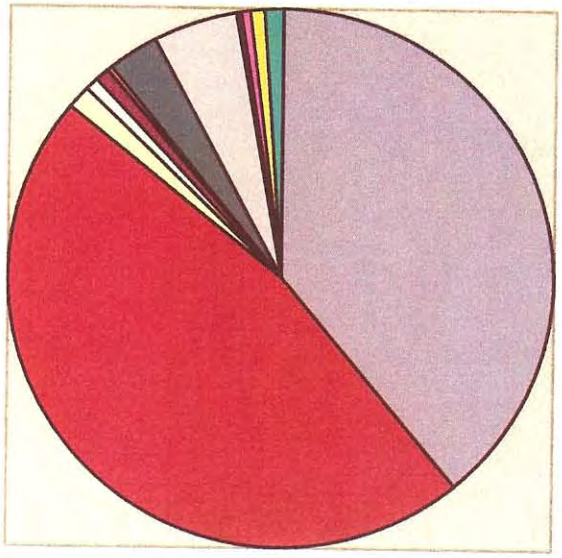
checked traps, no catches, closed traps, informed Kevin of serious damage to trap #42

4-15-03 7:05-8:25am – set traps, nothing observed

8:05-8:20pm – checked traps, no catches, closed traps

4-16-03 3:00-4:15 – took up all traps, research officially concluded

Summary Chart 1 - Definite Birds



- Junco
- Song Sparrow
- White-throated sparrow
- Field Sparrow
- Bluebird
- Chickadee
- Goldfinch
- Rough-winged swallows
- Cardinal
- Robin
- Mallard
- Crow

Summary Chart 2 - Mammals

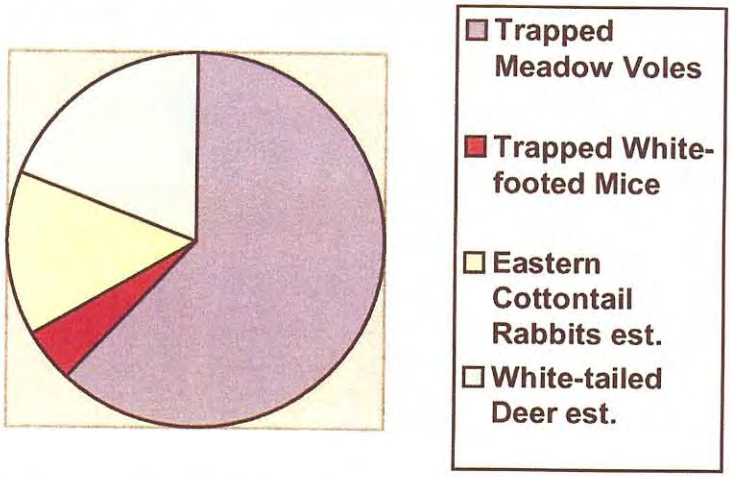
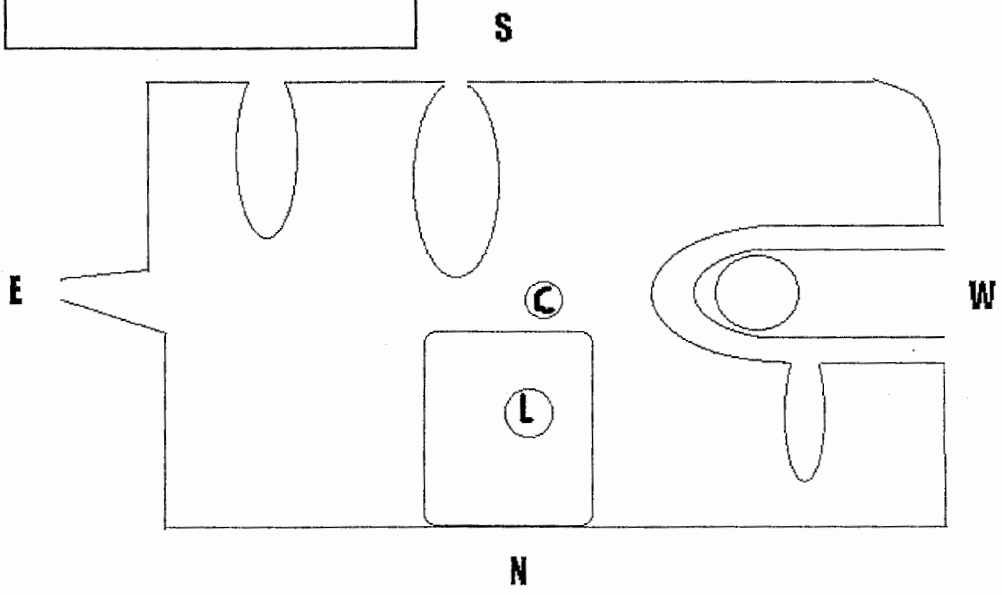


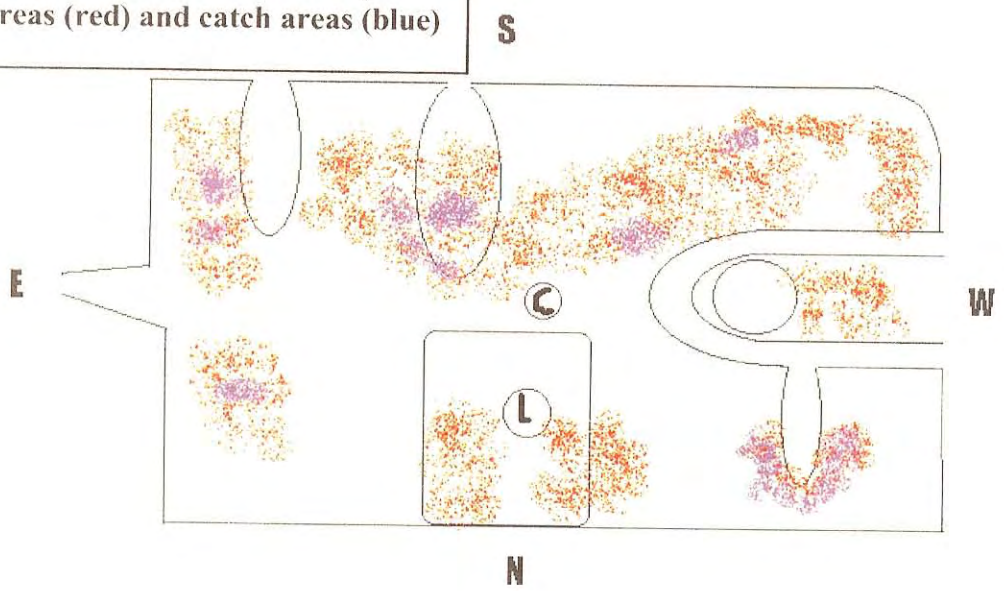
Chart 3: Vole Meas.	Total Lenth cm	Tail Length cm	Foot Length cm	Ear Length cm	Sex
1.	15.4	3.45	1.99	1.1	Female
2.	13.7	3.15	1.8	1.05	Male
3.	12.8	2.7	1.65	1.2	Male
4.	12.9	2.9	1.8	1.2	Female
5.	12.95	3.05	1.85	1.55	Male
6.	14.4	3.6	1.9	1.3	Male
7.	13.5	3.5	2	1.5	?
8.	13.5	3	1.5	1	Male
9.	11.5	2.5	2	1	Female
10.	8.5	3.75	1	.5	Female

Burn Area Trapping	Total # Caught	# Caught in burn areas before burn	# Caught in burn areas after burn
Meadow Voles	13	9	0

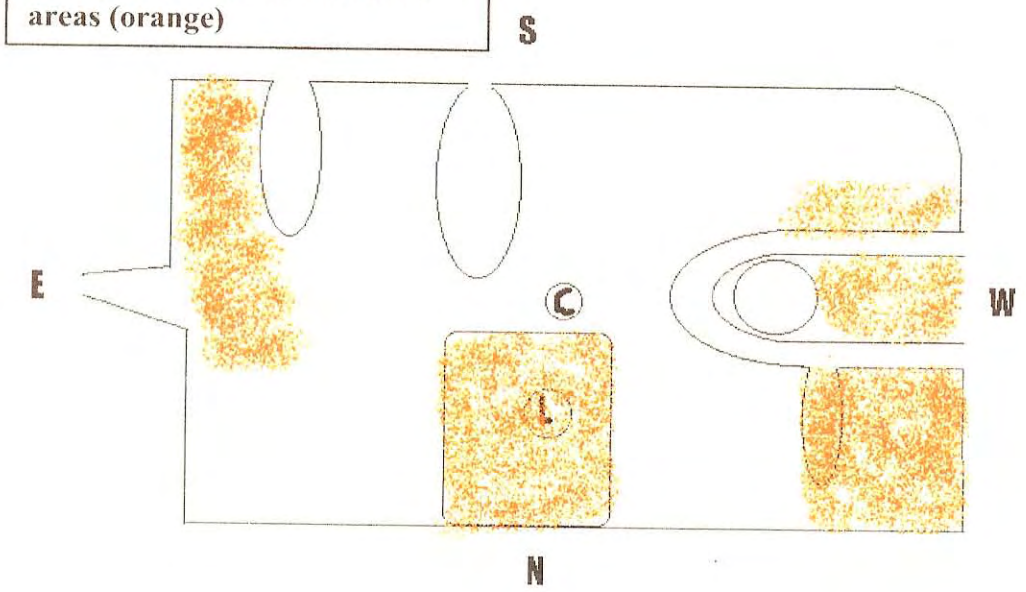
Map 1 - Grassland



Map 2 – Grassland with trap areas (red) and catch areas (blue)



Map 3 – Grassland with burn areas (orange)



Data Sheets Appendix

Date: 1-23-03

Time: 1:45-2:45

Weather:

	High	Low
Temp.	28.4	8.6
Cloud Cover (%)	100	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
white-throated sparrow	1		Eastern Cottontail Rabbit	N/A	✓	

Date: 2-5-03

Time: 3:30-3:55

Weather:

	High	Low
Temp.	51.1	21.9

Cloud Cover (%) 40

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Dark Eyed Junco	20		East. C Rabbit	N/A		✓
East. Bluebird	2					
Song Sparrow	3					
Goldfinch	1					

Date: 2-7-03

Time: 1:06-1:45

Weather:

	High	Low
Temp.	32.7	28.2
Cloud Cover (%)	100	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	16					

Date: 2-8-07

Time: 11:55-12:10 3:00-3:15

Weather:

	High	Low
Temp.	25.7	10.7

Cloud Cover (%) 100

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	10					
Song Sparrow	4					

Date: 2-12-03

Time: 2:55-3:40

Weather:

	High	Low
Temp.	46	30

Cloud Cover (%) 95

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
S. Sparrow	1					

Date: 2-15-03

Time: 8:35 - 3:50

Weather:

	High	Low
Temp.	48.2	37.4

Cloud Cover (%) 100

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	4					

Date: 2-17-03

Time: 3:55 - 4:25

Weather: High Low

Temp. 44.1 30

Cloud Cover (%) _____

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	12		Deer	N/A		✓
5 sparrow	2					

Date: 2-19-03

Time: 2:50-3:50

Weather:

	High	Low
Temp.	51.1	28.9
Cloud Cover (%)	85	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	5		meadow vole	1 heard		
9 Sparrow	1	1	rabbit			✓

Date: 2-22-03

Time: 12:00-12:55

Weather:

	High	Low
Temp.	69.1	43
Cloud Cover (%)	90	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	3					

Date: 2-26-03

Time: 7:15-8:35 3:00-4:30

Weather:

	High	Low
Temp.	39.9	28.9
Cloud Cover (%)	95	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
S Sparrow		1				
Junco	15					
Canada goose	7 (flyover)					

Date: 3-3-03

Time: 7:10-8:40

Weather:

	High	Low
Temp.	51.1	32

Cloud Cover (%) 90

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Junco	6					
9 Sparrow	2	2				
wt Sparrow	2					
Crow	3 fly over					
robin	1					

Date: 3-8-03

Time: 6:45-7:15

Weather:

	High	Low
Temp.	66.9	30
Cloud Cover (%)	20	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
			Vole	1		

Date: 3-4-07

Time: 9:30-9:55

Weather:

	High	Low
Temp.	64.4	46.4

Cloud Cover (%) dark

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
			Vole	1		
			White footed mouse	1		

Date: 3-12-03

Time: 2:55-3:45 6:45-7:35

Weather:

	High	Low
Temp.	69.8	38.2

Cloud Cover (%) 30

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
			vole	3		

Date: 3-17-03

Time: 7:08 8:00

Weather:

	High	Low
Temp.	68	42.1
Cloud Cover (%)	20	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
S. Sparrow	1					

Date: 3-18-03

Time: 6:50-7:45

Weather:

	High	Low
Temp.	62.6	53.6
Cloud Cover (%)	90	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
mallard	2					
5 sparrow	1					

Date: 3-26-03

Time: 7:00-8:05

Weather:

	High	Low
Temp.	72	37
Cloud Cover (%)	85	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
Canada goose	2. flyover					
5 sparrow	1					

Date: 3-27-03

Time: 7:00-7:30

Weather:

	High	Low
Temp.	72	35.1
Cloud Cover (%)	15	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
			deer	n/a		✓

Date: 3-28-03

Time: 7:00-8:25

Weather:

	High	Low
Temp.	73.4	50
Cloud Cover (%)	5	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
5 Sparrow	1					
Cardinal	1					

Date: 4-2-03

Time: 7:05-8:15 2:50-4:20

Weather: High Low

Temp. 72 29-9

Cloud Cover (%) 10

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
5 sparrow	2					

Date: 4-3-03

Time: 2:50-4:50

Weather:

	High	Low
Temp.	73.9	37
Cloud Cover (%)	40	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
			Vole	1 deceased		

Date: 4-4-03

Time: 7:05 - 7:40

Weather:

	High	Low
Temp.	73.9	39
Cloud Cover (%)	60	

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
5 Sparrow	1					

Date: 4-14-03

Time: 7:00-8:15 2:30-3:55

Weather:

	High	Low
Temp.	79.1	36.9

Cloud Cover (%) 30

Species Observed:

Birds:	# Observed	# Heard	**Mammals:**	# Observed	Tracks	Scat
field sparrow	2		vole	1		

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