

Grassland Breeding Bird Survey in the Carleton College Cowling Arboretum

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Introduction

As the Carleton College Cowling Arboretum grassland area grows and prairie is restored to a healthy condition through burning and other management techniques, study of prairie fauna becomes increasingly important as a tool for measuring the success of prairie restoration efforts. This Grassland Breeding Bird Survey will serve as an indicator of prairie health, establish what birds are breeding in the prairie and explore how they respond to management techniques in the Arboretum so that management of the prairie is well informed.

Methods

A route was devised that runs along the edges of management units providing coverage of the entire Lower Arboretum prairie (**Figure 1**). The route was intended to provide roughly equal coverage to all management units, with the goal of providing enough time and coverage of the unit to count all birds occurring within them. Sampling consisted of listening and watching for species of interest while walking the edges of management units. Species of interest are those that rely on open, grassland habitat for reproduction, excluding woodland edge species, wetland species (e.g., Red-winged Blackbird (*Agelaius phoeniceus*)), and species nesting in nest boxes (e.g. Tree Swallow (*Tachycineta bicolor*) and Eastern Bluebird (*Sialia sialis*)). Sampling was conducted every Tuesday morning from 6 AM until completion from June 22nd until July 20th, and additionally from 7 AM until completion from July 27th to August 17th. Cloud cover and temperature data were also recorded.

Results

Ten grassland species of interest were detected regularly throughout the breeding season. These are listed in **Table 1** along with preferred habitat, maximum one-day detection (the highest count from any one survey for each species), and frequency (number of sites with detections). The complete data from the count are found in **Table 2** on page 6. A list of hypothetical grassland species of interest are found in **Table 3**

Table 1: Summary of the results of the 2010 Grassland Breeding Bird Survey. Preferred habitat follows Sibley 2003.

Species	Preferred Habitat	Maximum One-day Detection	Frequency
Eastern Kingbird <i>Tyrannus tyrannus</i>	Semi-open with mix of grassy fields and trees	5	9
Sedge Wren <i>Cistothorus platensis</i>	Sedge marshes and grassy meadows	6	5
Common Yellowthroat <i>Geothlypis trichas</i>	Weedy, brushy, and marshy low wet areas	14	8
Clay-colored Sparrow <i>Spizella pallida</i>	Open areas with grass among scattered bushes or trees	13	8
Field Sparrow <i>Spizella pusilla</i>	Weedy fields with scattered bushes and trees	5	6
Grasshopper Sparrow <i>Ammodramus savannarum</i>	Grasslands with scattered shrubs or trees	3	5
Song Sparrow <i>Melospiza melodia</i>	Open brushy areas	8	9
Vesper Sparrow <i>Pooectes gramineus</i>	Dry and sparsely vegetated pastures or agricultural fields	1	1
Dickcissel <i>Spiza americana</i>	Grassy fallow fields and tallgrass prairies	0	0
Eastern Meadowlark <i>Sturnella magna</i>	Open, grassy	5	7
American Goldfinch <i>Carduelis tristis</i>	Orchards, hedgerows and overgrows fields	12	9

Discussion

Changes made to the survey since last year (see McMurtrey 2009) have simplified the survey and will allow for direct comparisons of results across many years. The data gathered this year provide suggestive evidence that native grassland species respond to burning and other management practices on a year-to-year basis. The reappearance of the Sedge Wren also demonstrates that bird habitat is affected by many factors independent from fire and that native grassland birds are able to respond to such changes rapidly. For this reason, the survey ought to be conducted every year until a better understanding of short term responses to burning and climatic variation is achieved. In the more distant future, the survey should be conducted every few years to provide a better understanding of how long-term prairie health affects bird populations.

One factor that confounds analysis of management techniques is climate. According to the U.S. Drought Monitor, a project funded by the Department of Agriculture and the National Oceanic

and Atmospheric Association (NOAA), the Arboretum was within an area experiencing “abnormally dry” to “severe drought” conditions during the summers of 2006-2009. In 2010, precipitation was above normal, releasing southeastern Minnesota from the drought (**Figure 2**).

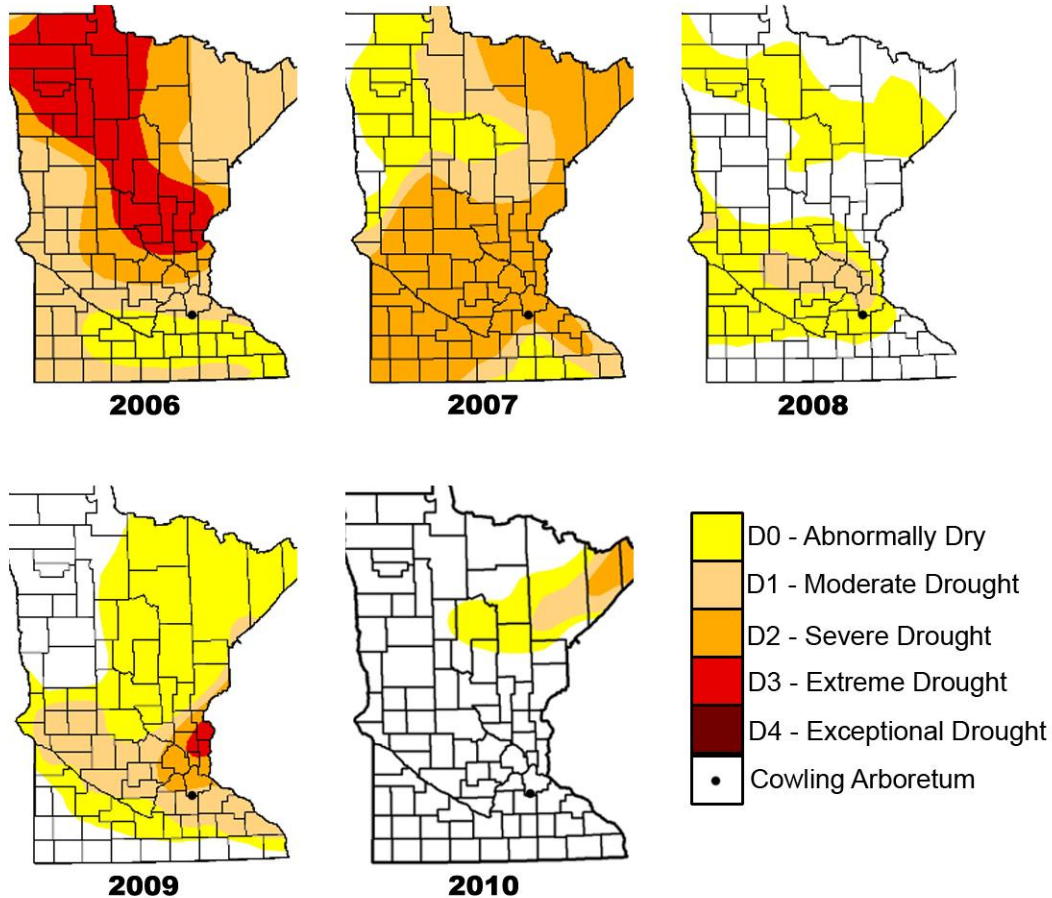


Figure 1: Hydrological conditions in Minnesota from 2006-2010. All data are from August 1st – August 7th of the respective year (drought data only released once per week). August was chosen because data through August will show trends throughout the summer season. Source: National Drought Monitor

Species Accounts

Eastern Kingbird (*Tyrannus tyrannus*)

This species occurred at more locations this year than in Summer 2009, with frequency increasing from 5 sites to 9 sites. It still occurred preferentially near trees, but this year it was most abundant near Kettle Hole Marsh and the bur oaks in unit C2 and A2, near the Von Trapp memorial. However, the location with the highest frequency of occurrences was unit C1, where it showed less association with trees than in other units. This may indicate a preference for prairie that has not been burned in the year of the count. Further

observation will benefit our understanding of the fire management preferences of this species at this site.

Sedge Wren (*Cistothorus platensis*)

There is no record of this species occurring in the Arboretum since 2005. In 2005 it was the most abundant species included in the survey. This species was not recorded during the spring bird count from 2006-2010, nor was it observed in the arboretum by experienced birders who contribute sightings to the Arboretum database. We assume that it was absent during this time. Why this species was absent from 2006 to summer 2010 is unknown. It could be that the nomadic tendencies of this species make its occurrence inconsistent across its entire geographic range. Another hypothesis is that the less than average precipitation during nesting season from 2006 through 2009 made the Arboretum prairie undesirable to this species. This hypothesis is further supported by the absence of the species during spring migration 2010 (a time when it was usually abundant prior to 2006), when the Arboretum prairie still showed the effects of the 3-year drought. During the summer, this species was not detected until the week of July 13th (though it was detected outside of the survey as early as July 8th), when the effect of high precipitation was visible in increased plant growth [qualitative observation]. The number of individuals gradually decreased after the first count of 6 individuals on July 13th and July 20th. The distribution of this species in the Arboretum prairie also changed after the first week. On July 13th, 4 of the 6 individuals counted were found in unit B2. Later in the count, more individuals were found in units C2, A2, C1, and B1. The highest frequency of occurrence was in unit C1, where a pair of individuals nested and produced at least 5 young, all of which were observed on August 17th, associating with 1 adult bird. Further study of this species will improve our understanding of its occurrence patterns and habitat preferences. Because this species is opportunistic and able to reproduce at any time during the warm season, it may re-colonize prairies burned in the year of observation after plant growth has resumed.

Common Yellowthroat (*Geothlypis trichas*)

Along with the American Goldfinch and the Clay-colored Sparrow, this species was the most abundant in the survey. It occurred throughout the survey area, but was most common in the prairie adjacent to Kettle Hole Marsh. This species preferences for recently burned vs. not recently burned areas will require further study, particularly because it will be easier to perform direct comparisons after the 2007 and 2008 planting units (both counted as unit B2 for this survey) are included in a regular burn schedule and vegetation profile is more typical of managed prairie in the rest of the Arb.

Clay-colored Sparrow (*Spizella pallida*)

This species remained one of the most abundant species included in the survey, though the pattern of its occurrence changed since last year. This species was most abundant last year in unit D3. This year, counts in D3 were much lower than in adjacent prairie not burned this year. Further study will reveal whether this truly is a preference for prairies that have not been recently burned. In moving to adjacent unburned management units, this species also became more common in unit B2 than last year. With the burning of unit A1 and B2 in future years, it will be interesting to watch this species' movements.

Field Sparrow (*Spizella pusilla*)

This species, like the Eastern Kingbird, is dependent upon the presence of trees. Its subtly loud call travels so far that double counting could have occurred. This year, like last year, this species was concentrated near trees, though its abundance in units A1 and B1 increased since last year. It continued to occur regularly in unit D1, Hillside Prairie. Further observation will reveal whether burn management affects this species' preferences or if it simply prefers open spaces near trees regardless of burn management.

Grasshopper Sparrow (*Ammodramus savannarum*)

This species declined in abundance since last year, though it occurred over a broader area. Last year, this species had its highest concentrations in units D3 and B2. This year, it occurred primarily in units C2 and A2. This suggests a preference for habitat not burned in the year of observation, though the fact that the decline in abundance in unit D3 was not matched by an increase in a neighboring field also suggests that other characteristics of unit D3 were important for breeding habitat. No firm hypotheses can be made regarding the near absence of this species in unit B2 following a year in which multiple adult males held territories in this field and at least one pair successfully reproduced.

Song Sparrow (*Melospiza melodia*)

This species was abundant throughout the count, typically favoring areas near trees or brush, but was present in the edgeless prairies as well. Perhaps because of its distinctive call, this species was identified singing after many other species had stopped, but it also tends to migrate and leave breeding grounds later than other species.

Vesper Sparrow (*Pooectes gramineus*)

Once again, this species was observed mostly outside of the count, but one individual was observed on the path between unit C2 and A2 on August 10th. This species is likely just a migrant through the Arboretum prairie, though the absence of this species and the similar Savannah Sparrow (*Passerculus sandwichensis*) is perplexing.

Dickcissel (*Spiza Americana*)

Unfortunately, this species did not occur this year.

Eastern Meadowlark (*Sturnella magna*)

This species showed a decline in overall abundance since last year. The maximum counts for this species in 2009 were in the 2007 and 2008 planting units, and in management units D3 and D2. This year, the highest counts were in units B2, C1, and A2. This may demonstrate a preference for units that have had two years to recover from the effects of burning, especially the buildup of dense ground thatch. A nest was discovered in unit C1 on August 17th containing three eggs. Observations outside of the survey indicate that no young were fledged from this nest. Still, this suggests that re-nesting occurred due either to loss of first nest or early brood success.

The survey period coincides poorly with the breeding cycle of this species. Males were detected singing in the Arboretum prairie by late April, peaking in mid to late May.

American Goldfinch (*Carduelis tristis*)

There was no detectable late-season bloom in this species' preferences this year like there was last year. This species' preferences remain difficult to track because birds are nearly always detected in flight over areas that span many observation units. Nest monitoring would likely provide better data on this species' nesting times and preferred habitat.

References:

Hedberg Maps, 2003, *Map of the Carleton College Cowling Arboretum*.

Luterra, Mark, 2005, *Breeding bird census of the Carleton College prairie restorations: Summer 2005*.

McMurtrey, Owen, 2009, *Survey of the Birds of the Cowling Arboretum Prairies: Summer 2009*.

Sibley, David, 2003, *Sibley Guide to the Birds of Eastern North America*.

Table 3: List of hypothetical species of interest.

Loggerhead Shrike	Very rare and endangered in Minnesota. Habitat preferences likely align with those of the Eastern Kingbird.
Lark Sparrow	Breeds regularly in western Minnesota. Breeding has been documented to the East and South as well.
Savannah Sparrow	Well-known resident of prairie habitats. Absence is perplexing, but tends to co-occur with Henslow's Sparrow in prairie habitat that is expansive and burned regularly.
Henslow's Sparrow	Rare and endangered in southeastern Minnesota. Recorded by Luterra 2005, so it could easily return to the Arb at any time.
Le Conte's Sparrow	Breeds mostly to the North of us and prefers wetter habitats. Could appear once trees around Kettle Hole Marsh are cleared and if wet prairie habitat is created.
Swamp Sparrow	Should only be counted if it were breeding or holding territory in Kettle Hole Marsh, once the habitat is more open. Can also occur in more forested swamp areas, but this would not be of interest.
Bob-o-link	Known to breed in hay fields. Could occur in the Arb during the summer.
Western Meadowlark	Preferences relative to congener, the Eastern Meadowlark, are not clear. Both occur in Rice and Dakota counties and both have occurred in the Arboretum. Records suggest that the Western Meadowlark was formerly the more common <i>Sturnella</i> found in the Arb. Only reliably identified by song.

Grassland Bird Monitoring



Figure 2: Map of Grassland Breeding Bird Survey route. Stars represent locations of stoppages for three-minutes of listening.

Table 2: All data from the 2010 count.

Time and Cloud Cover	Date			Cloud			Temp			Date			Cloud			Temp			Date			Cloud			Temp																									
	22-Jun			1			69			29-Jun			1			59			6-Jul			4			68			13-Jul			1			64																
Site #	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.										
Eastern Kingbird	1				2				1	4	1	1			1	1				4						1								1										1						
Sedge Wren										0										0														4				2						6						
Common Yellowthroat	2					3			2	7	2	1		3	2	1	1	3	1	14	1	1		2	3	1			2					10	1	2		3	2	3		3		14						
Clay-colored Sparrow	1				1		2			4	1	2		4		2				9	2	2	1	4		1								10	2	1	1	3		2	1			10						
Field Sparrow							1		2	3						1	1		1	3					1	1	1	1	1					5								1	1	2						
Grasshopper Sparrow		1	1							2		2								2	1	1												2		2				1				3						
Song Sparrow		1	1	1				2		5	2				1	1	2	1		7	1	1		2		1	1	1	1					8	1	1				1	1	1	1	6						
Vesper Sparrow										0										0															0										0					
Dickcissel										0										0															0										0					
Eastern Meadowlark		1				1		1		3	1	2	1		1					5	2	1	1											4	1		1	3						5						
American Goldfinch						3	2			5	1	4	3	1		2				12	1				3	2	1						7				2	3				1	6							
Total at location	4	0	2	2	5	6	5	3	3	33	8	12	4	8	5	8	4	4	3	56	8	6	2	8	7	7	3	0	2	47	5	6	2	15	6	9	2	6	2	53										
Date	20-Jul			27-Jul			3-Aug			10-Aug			17-Aug																																					
Cloud	2			3			1			4			3																																					
Temp	66			75			66			78			62																																					
C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	C2	A2	D3	B2	D2	C1	D1	B1	A1	To.	Max										
					1	1	1		3					1	1				2	3	2		1	2								5		1								1	5							
2			1		3				6	2	1				2				5	1	1			1				1				3						7*		1		1	6							
2	3		3	1	2		2	1	14	4	1			2	2			3	1	13	1				1			2	1			6	1	1			1	2		1		6	14							
3	2	2	3	1					13	1	1	1	2		2				7	1		1	1									1										0	13							
						1	2		3							1	2	1		4										1			1						1				1	5						
1	1				1				3										0													0										0	3							
2	1			1	1	1	1	1	8	1	1				1				3	2	1						1	1	1			5		1				1	1			3	8							
									0										0													1										0	1							
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	1		2		1				4	1	1								2													0				1						1	5							
2	1		2		3		2		10			2	1	2				2	7	1			3		4		2					10	1			3	1		1			6	12							
12	9	2	11	4	11	3	10	2	64	9	7	2	0	2	5	2	7	2	43	6	2	1	7	0	7	1	4	1	29	5	3	1	9	3	3	0	4	0	0	3	5	0	5	5	2	2	3	0	25	72
*Dense fog at beginning of count										*Rain during final third of count										*Includes five HY fledglings																														