PRAIRIE INVENTORY

HERBERT HOOVER NATIONAL HISTORIC SITE

1996

Prepared by:

Paul Christiansen, PhD
554 Linn Ridge Road
Mt. Vernon, IA 52314

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Introduction

The reconstructed prairie at Herbert Hoover National Historic Site in West Branch, Iowa, has been the site of an extensive prairie inventory since 1982. Both walking transects and permanent plots have been sampled in 1982 and yearly since 1984. During this time the practice of removing accumulated litter by haying has been replaced by prescribed burning and selective brush and weed cutting.

In 1992 more than 160 prairie forb plants were labeled by staking and their location identified with coordinates in a grid system. Since that time new recruits have been marked and dead plants noted. Flowering of individual plants has also been noted each season.

Each yearly inventory has informed resource managers in the techniques likely to enhance the prairie vegetation. This report contributes to that reservoir of information, especially in the establishment scenario of the new seedings of 1992 and 1994, as well as cover and persistence information of the established prairie

Methods

Five walking transects were sampled on 19 and 21 August, 1996. Rectangular quadrats 20 X 50 cm were sampled at 10 pace intervals on predetermined routes across the prairie (Figure 1). Species furnishing cover over the quadrat were scored in one of 5 categories; 0-5%, 5-25%. 25-50%. 50-75%, 75-95%, and 95-100% (1). Mid-points for the cover category for each occurrence of each species were totaled, and divided by the number of plots on the transect to determine percent cover. *Percent relative cover* used in comparing species and sites in this report was calculated by dividing the percent cover of a species by the total percent cover of all species for the plot. This figure gave the relative importance of each species within the plot or transect and could be compared to other plots or transects to assess relative importance.

Twelve permanent plots, each 20 m long, were sampled between 16 and 21 August, 1996, at 1 m intervals using a 20 X 50 cm quadrat with the long axis perpendicular to the plot axis with the 20 cm side of the quadrat between 0.8 and 1.0 m on the left side of the measuring tape (Figure 1 and Appendix Table A4xx for plot locations). Cover was determined as described above.

Two permanent forb transects were sampled between 10 and 12 July, 1996, for presence and flowering/fruiting. These transects were set out in 1988 (2), with individual plants first marked in 1992 (3). Coordinates for individual plants were measured south from the north end of the baseline and perpendicular (east or west) of the baseline. Each forb plant encountered within 10 meters on either side of the baseline was examined for an identifying marker, an aluminum tag (placed on the north side of the plant) embossed with the year of marking, transect number, and accession number for that year. If there was no marker the plant was tagged. A few plants which

were located but not tagged in previous years were also noted. Plants were scored for flowering/non-flowering. Flowering percentage was based upon the total number of plants of the species extant for a particular year.

Results

Walking Transects and Permanent Plots

Prairie grasses and forbs dominated the vegetative cover of the prairie with approximately 94% of the vegetative cover (Tables 1 and 2). Prairie grasses accounted for 54% and 48% of cover in walking transects and permanent plots, respectively . Prairie forbs were responsible for 40% and 46% of cover, respectively. Weedy grasses had 4% cover in walking transects and 1.3% in permanent plots. Weedy forbs and weedy annuals and biennials had even less cover at 1% in walking transects and nearly 2% in permanent plots (Tables 1 and 2). Tree and shrub species were at 0.5% cover in the walking transects and 2.3% cover in permanent plots. Most of the woody cover in the permanent plots was furnished by riverbank grape in permanent plots 7 and 10 (Tables 1 and 2).

Among prairie grasses big bluestem (*Andropogon gerardii*) was the clear dominant furnishing 60% to 80% of the prairie grass cover. Indiangrass (*Sorghastrum nutans*) and switchgrass (*Panicum virgatum*) equally made up most of the remainder of the prairie grass cover. Little bluestem (*Schizachyrium scoparium*), side-oats grama (*Bouteloua curtipendulum*), and Canada wildrye (*Elymus canadensis*) were present in only a few plots and at very low cover values (Table 1 and 2).

Kentucky bluegrass (*Poa pratensis*) was the most common weedy grass being present in about one-half of the plots but at over-all cover of 1% to 2%. The area with the largest cover of weedy grasses was walking transects 1 and 2 which passed through the area seeded in 1994.

Canada goldenrod (*Solidago canadensis*) was the most abundant prairie forb with 24% to 28% cover followed by prairie ragwort (*Senecio plattensis*) at 8% cover and hairy aster (*Aster pilosus*) (4) at 3%(Tables 1 and 2). The prairie forb category furnished the greatest number of species on the prairie with 12 species in the walking transects (Table 1) and 16 in the permanent plots (Table 2).

Weedy forbs had cover values of less than 1% with Canada thistle (*Cirsium arvense*) present in only one plot (Tables 1 and 2). Annual and biennial weeds were also low in cover and restricted to a few sites, principally the 1994 seeding in walking transects 1 and 2, and permanent plot 2 in the southwest corner of the prairie (Tables 1 and 2).

Two more recently seeded sites, south of the grave site seeded in 1992 (permanent plots 11 and 12), and the low area in the northwest portion of the prairie seeded in 1994 (permanent

plots 13 and 14) had more cover by non-prairie species. Permanent plots 11 and 12 had heavy domination by Kentucky bluegrass (Table 3). Prairie grasses had about 18% cover while prairie forbs had more than 30% cover. Cover by weedy forbs and annual and biennial weeds was insignificant. No woody cover was present in the plots(Table 3). In permanent plots 13 and 14 considerable weedy cover, especially annual and biennial weeds (19%) and weedy grass cover (30%) dominated. Prairie grass cover was at 21% and prairie forb cover was 29% (Table 3). Both of these sites had a substantial number of prairie forb species present. Thirteen species were present in permanent plots 11 and 12 and 19 species were sampled in permanent plots 13 and 14 (Table 3).

Forb Transects

Two-hundred-fifty-one forb plants were tagged in two transects from 1992 to 1996 (Figure 1). Pale purple coneflower (39), rattlesnake master (30), tall cinquefoil (45), tick trefoil (26), and yellow coneflower (30) have the most specimens tagged (Table 4). Flowering was 100% in golden alexanders, lead plant, oxeye, rattlesnake master, spiderwort, and white prairie clover. A single plant of purple prairie clover also flowered in transect 1. Compass plant, pale purple coneflower, and tall cinquefoil had numerous plants which did not flower. Several species had not flowered at the time of sampling (Table 4). The results of presence and flowering for all forb plants sampled from 1992 to 1996 is given in Tables A1 and A2 in the Appendix.

Discussion

Prairie Grasses and Forbs

Prairie grasses and forbs continue to dominate the prairie. Total prairie grass cover in both walking transects and permanent plots was somewhat lower than 1995; 57% to 54% in walking transects from 1995 to 1996, and 51% to 48% in permanent plots. This continues a trend discussed in the 1995 report showing the gradual decrease in grass cover going back to 1991 (Tables 1 and 2 and (5)). Big bluestem cover increased slightly while both Indiangrass and switchgrass decreased slightly (Tables 1 and 2 and (5)). These year to year changes are likely within experimental error but the overall trend seems to be consistent.

Prairie forb cover increased in walking transects between 1995 and 1996 (35% to 40%) while it remained nearly the same in permanent plots (45% to 46%) (Tables 1 and 2 and (5)). Canada goldenrod and hairy aster increased in cover from 1995 to 1996 in walking transects . In 1995 Canada goldenrod was at 19% cover in walking transects and increased to 25% while hairy aster increased from 1.3% to 3.3% (Table 1 and(5)). The same trend was evident in the permanent plots.

Weedy Species

Most of the weedy grass cover in walking transects occurred in transects 1 and 2, especially in areas seeded in 1994, and was slightly higher than 1995 (Table 1 and (5)). Weedy grass cover was less in permanent plots and also slightly more than in 1995 (Table 2 and (5)). Weedy forbs and annuals/biennials had about the same cover as last year except walking transects 1 and 2 where cover of annuals/biennials had decreased from more than 5% cover to 1.5% to 2.5% cover (Tables 1 and 2 and (5)). Canada thistle occurred in only 2 plots at the west end of walking transect 5 (2 of 349 (0.6%) quadrat samples (Tables 1, 2, 3 and Appendix xx,). This is similar to occurrences in 1995 (5).

Meadow parsnip increased in permanent plot 2 (Figure 1) from 0% to 10.5% cover while Canada thistle decreased from 8% to 0% (Tables 1 and 2 and (5)). This area of the prairie, the southwest corner has a history of weediness which continues to persist. The only significant patch of Canada thistle also occurs in this area.

1992 Seeding

Changes over the past 5 growing seasons reflect a normal course of maturation of a prairie seeding. Perennials, both prairie and weedy, have become dominant while annuals have largely disappeared. Prairie grasses have increased from 5.0 % cover in 1993 (6) to 17.8% cover in 1996 (Table 5). Weedy grasses have increased from 31.1% to 47.4% cover in the same time frame. Prairie forbs have declined somewhat since 1993, from 44.0% to 32.3% cover in 1996. Weedy forbs increased from 4.5% in 1993 to 14.1% in 1994, then decreased to 11.3% in 1995, and decreased still further to 2.0% in 1996. Weedy annuals/biennials were at 15.6% cover in 1992 and have decreased to less than 1% cover in 1994-1996 (Table 5).

The same changes are evident in the number of species in each category. Prairie grass species have increased from 3 to 6 from 1992 to 1996 (Table 5). Weedy grass species have been even at 3 or 4 during the period. Prairie forbs have also been very stable at 13 or 14 species. Weedy forbs have decreased from 5 species to 2 species and weedy annuals/biennials have also decreased form 6 species in 1992 to 2 species in 1996 (Table 5).

The 1992 seeding has abundant forb species, not all of them sampled in this study, and prairie grasses are evident. However, Kentucky bluegrass comprises a significant portion of the cover (Table 3). Because it is low growing it is not evident to the casual observer. Quackgrass (*Agropyron repens*) is also abundant in patches and had significant cover in permanent plot 12 (Table 3). Both species are cool-season grasses and susceptible to control by late spring burning.

1994 Seeding

This seeding has progressed fairly rapidly in the three growing seasons since seeding. Prairie grass cover has gone from less than one percent to more than 20% in 1993 (Table 6). Weedy grasses have dropped from 79% in 1994 to 30% in 1996. Prairie forbs dropped somewhat from 1995 while weedy forbs dropped from 8% in 1995 to less than 1% in 1996. Weedy annuals/biennials increased form 9% in 1994 to 22% in 1995 and then decreased to 19% in 1996 (Table 6). There is great difference between permanent plots 13 and 14 in prairie grass cover. Canada wildrye and reed canary grass (*Phalaris arundinacea*) (not previously sampled on the prairie) account for all most all of the prairie grass cover (Table 3) and nearly all of it in permanent plot 13. Permanent plot 13 has less than 2% weedy grass cover. In weedy grass cover Kentucky bluegrass has increased in cover in permanent plot 14 as has quackgrass (Tables 3 and (5)). Giant ragweed is a threat to this seeding with cover of 11% and 24% in permanent plots 13 and 14 , respectively.

1992 and 1994 Seedings

Both of these seedings have been successful in introducing many forb species into the prairie. Butterfly milkweed (*Asclepias tuberosa*), black-eyed Susan (*Rudbeckia hirta*), yellow coneflower (*Ratibida pinnata*), and New England aster (*Aster novae-angliae*) are just a few of the showy forbs evident in the 1992 seeding. Brown-eyed Susan (*Rudbeckia triloba*), obedient plant (*Physostegia paraviflora*), (*Astragalus canadensis*), and sneezeweed (*Helenium autumnale*) and 15 or more other prairie forbs have been introduced into the 1994 seeding (Tables 5 and 6).

Forb Transects

Evaluation of individual forb plants over the past 5 growing seasons has revealed the habits of a number of species. Tick trefoil is rather short-lived with 5 of 31 plants extant in 1995 apparently dying. This continues the trend noted in the 1995 report (5). Flowering in compass plant, pale purple coneflower, and tall cinquefoil continues to be less than 100% in well-established plants while in several other species every plant flowers every year.

Sampling in early-mid July was too early to observe a number of species in flower, especially tick trefoil (*Desmodium canadense*), horsemint (*Monarda fistulosa*), tall bush clover (*Lespedeza capitata*), and rosinweed (*Silphium integrifolium*) (Table 3).

This project should be extended well into the future to better understand recruitment, longevity, and flowering dynamics of these prairie forbs.

Management

Staggering burning by years and by season will produce the best result in not favoring one species or group of species over another. Avoid burning adjacent burn units during the same season whenever possible. The 1992 seeding would benefit from a burn.

The 1994 seedings has a large amount of giant ragweed as well as cool-season weedy grasses. Mowing to prevent seed set of giant ragweed is the best treatment. However, opening up the canopy with mowing will favor the cool-season grasses (Kentucky bluegrass, quackgrass, and reed canary grass (7)), especially in the late summer. To treat both groups of weeds mow as required through the summer to discourage giant ragweed and burn late the next spring to discourage the cool-season grasses.

Cutting and stump treating with an appropriate herbicide will be necessary to eliminate shrubs and trees from spreading in the prairie. Fire will kill some seedlings and discourage larger plants but will not eliminate woody growth. Use of a non-registered herbicide could eliminate the need to have a licensed applicator on the job. RTU ("ready-to-use", a Dow Chemical Company product, has a reputation for spreading from one plant to another via the roots. However, on the prairie this would not be detrimental and would make this product more attractive. In my use of RTU I have not observed it affecting herbaceous vegetation unless directly applied. Cutting shrubs near the ground is also very important. Sharp stumps from improper cutting persist for years and are a hazard to anyone walking through the prairie. Disposal of cut tops is also troublesome, but normal decay and the occasional fire will eventually eliminate them.

I am convinced that a major problem for the spread of prairie species is dispersal of the seeds to adjacent or distant areas. When introduced to new areas many prairie plants are able to become established. To encourage this I recommend that volunteers be sought to pick seed heads of forbs, especially in the area south of the grave site, and carry them to some location without many forbs and spread the seeds there. The best sites would be adjacent to a trail and into an area burned in the recent past.

Although Canada thistle has diminished as a serious weed it does persist in the southwest corner of the prairie. My recommendation is to mow the area of highest infestation in August and allow the thistles to form rosettes. Then treat with a selective herbicide such as "Transline" or even a non-volatile form of 2,4-D.

Literature Cited

1. Daubenmire, Rexford. 1959. A canopy-coverage method of vegetation analysis. Northwest Science 33(1):43-64.

2. Christiansen, Paul. 1988, Prairie inventory: Herbert Hoover National Historic Site. Unpublished report. Herbert Hoover National Historic Site, West Branch, IA 52358-0607.

3. Christiansen, Paul. 1992, Prairie inventory: Herbert Hoover National Historic Site. Unpublished report. Herbert Hoover National Historic Site, West Branch, IA 52358-0607.

4. I have determined that the common white aster on the paririe is hairy aster (*Aster pilosus*) rather than heath aster (*A. ericoides*). Both species are rather common in disturbed sites but hairy aster has more weedy tendencies. Close examination of the fillaries (bracts surrounding the base of each flower head) lead to the change in species determination.

5. Christiansen, Paul. 1995, Prairie inventory: Herbert Hoover National Historic Site. Unpublished report. Herbert Hoover National Historic Site, West Branch, IA 52358-0607.

6. Percent frequency was measured in 1992, the first growing season, and is not comparable to percent cover.

7. Reed canary grass is native to Iowa prairies. However, a European cultivar is found in may drainage ways in Iowa and I would advise discouraging it from spreading in the prairie.

Table 1. Composite of walking transects, August, 1996 (%cover).

Species	Transect and number of plots					
	1--15	2--16	3--16	4--23	5--39	Total--109
Prairie grasses						
big bluestem	39.23	41.31	46.94	38.65	47.58	43.53
Indiangrass	5.01	2.99	7.12	6.17	4.69	5.15
switchgrass	2.44	8.75	0.67	4.11	5.61	4.59
Canada wildrye	0.70	0.66			0.31	0.30
					Subtotal	**53.58**
Weedy grasses						
Kentucky bluegrass		8.75		3.34	0.62	2.21
smooth bromegrass	5.82	0.66				0.90
Japanese bromegrass	4.66	1.66				0.88
					Subtotal	**3.99**
Prairie forbs						
Canada goldenrod	13.39	16.06	30.59	26.31	29.56	24.82
prairie ragwort	10.83		6.56	17.4	5.51	8.10
hairy aster	6.75	4.65	0.67	1.11	3.91	3.34
common violet		5.09				0.75
common horsetail			3.78			0.55
yellow coneflower	2.44	0.66				0.43
black-eyed Susan	0.70	1.99				0.39
rigid sunflower		0.66	1.67			0.34
horsemint	1.40	0.66		0.09		0.31
wild lettuce		0.11	1.78		0.05	0.30
bigtooth sunflower	0.70			0.51		0.20
common milkweed	1.40					0.19
field thistle	0.81	0.11				0.13
Daisy fleabane	0.12	0.66				0.11
white false indigo				0.51		0.11
tick trefoil		0.11				0.02
					Subtotal	**40.09**
Weedy forbs						
Canada thistle					1.08	0.39
dandelion	1.40	0.76		0.51		0.41
					Subtotal	**0.80**
Weedy annuals/biennials						
giant ragweed	1.40	2.33				0.53
meadow parsnip				1.29		0.27
fireweed	0.12				0.31	0.13
yellow wood-sorrel		0.66				0.10
sweetclover			0.22			0.03
					Subtotal	**1.06**
Trees and shrubs						
smooth sumac					0.77	0.28
dogwood		0.66				0.10
white mulberry	0.70					0.10
					Subtotal	**0.47**
					Total	**99.99**

Table 2. Composite of permanent plots, August, 1996 (%cover).

Species	PP1	PP2	PP3	PP4	PP5	PP6	PP7	PP10	Mean % Cover
Prairie grasses									
big bluestem	9.03	36.67	38.09	21.00	38.18	37.55	29.75	35.8	30.76
Indiangrass	9.42	5.12	0.91	16.72	2.53	25.55	6.66	21.17	11.01
switchgrass	3.27	4.48	0.46	0.95	13.25	3.02	4.26	14.24	5.49
little bluestem								4.43	0.55
side-oats grama								0.58	0.07
Canada wildrye								0.58	0.07
sedge	0.47								0.06
								Subtotal	**48.02**
Weedy grasses									
Kentucky bluegrass	2.65		2.58	2.93				1.44	1.20
smooth bromegrass			0.91						0.11
foxtail	0.08								0.01
								Subtotal	**1.32**
Prairie forbs									
Canada goldenrod	45.64	41.90	3.19	26.47	29.44	30.86	39.43	7.12	28.00
prairie ragwort	26.87		9.26	4.04	1.72	0.55	3.55	4.04	6.25
common horsetail			0.91	27.34			4.09		4.04
hairy aster	1.17		5.08	0.48	8.18	1.92	4.35	2.02	2.90
bigtooth sunflower			19.80						2.48
rigid sunflower			9.56						1.19
horsemint			3.03						0.38
clammy groundcherry					0.49			1.44	0.24
field thistle					1.72				0.21
wild letttuce			0.91						0.11
prickly lettuce					0.49				0.06
common milkweed							0.53		0.07
								Subtotal	**45.95**
Weedy forbs									
dandelion	0.93	1.28	0.53	0.08			1.15		0.50
field bindweed						0.55			0.07
								Subtotal	**0.57**
Annual/biennial forbs									
meadow parsnip		10.55			1.72				1.53
giant ragweed					2.29				0.29
fireweed			0.15						0.02
								Subtotal	**1.84**
Trees and shrubs									
riverbank grape							6.22	7.12	1.67
raspberry	0.47		3.49						0.49
honeysuckle			1.14						0.14
								Subtotal	**2.30**
								Total	**100.00**

Table 3. Composite of permanent plots in recent seedings (%cover)

Species	PP11	PP12	Mean
Prairie grasses			
Indiangrass	7.56	3.33	5.44
big bluestem	9.83		4.92
side-oats grama	5.80	3.19	4.49
little bluestem	0.44	4.30	2.37
switchgrass	0.44	0.44	0.44
muhley grass		0.44	0.22
		Subtotal	**17.88**
Weedy grasses			
Kentucky bluegrass	41.38	47.41	44.39
alta fescue		5.56	2.78
timothy	0.44		0.22
		Subtotal	**47.39**
Prairie forbs			
yellow coneflower	12.47	14.15	13.31
Canada goldenrod	7.92	9.85	8.89
rigid goldenrod	1.10	4.22	2.66
purple prairie clover	4.48	0.07	2.27
tall bushclover	2.42	1.04	1.73
tall cinquefoil		2.30	1.15
clammy ground-cherry		0.96	0.48
white prairie clover	0.88		0.44
hairy aster	0.44	0.44	0.44
oxeye	0.44	0.07	0.26
black-eyed Susan	0.44		0.22
field thistle		0.44	0.22
pale purple coneflower	0.44		0.22
		Subtotal	**32.29**
Weedy forbs			
dandelion	3.08	0.44	1.76
field bindweed		0.44	0.22
		Subtotal	**1.98**
Weedy annuals/biennials			
red clover		0.44	0.22
yellow sweetclover		0.44	0.22
		Subtotal	**0.44**

Species	PP13	PP14	Mean
Prairie grasses			
Canada wildrye	22.20		11.10
reed canary grass	16.75		8.37
big bluestem		2.48	1.24
		Subtotal	**20.71**
Weedy grasses			
Kentucky bluegrass	1.41	24.75	13.08
quackgrass		22.85	11.43
Japanese bromegrass		8.33	4.17
foxtail	1.98		0.99
orchardgrass		1.24	0.62
		Subtotal	**30.28**
Prairie forbs			
yellow coneflower	11.10	5.36	8.23
horsemint	7.53	8.09	7.81
brown-eyed Susan		3.71	1.86
hairy aster		3.47	1.73
field thistle	3.20		1.60
cup plant		2.06	1.03
sneezeweed	1.22	2.06	1.64
Canada goldenrod	1.41		0.71
black-eyed Susan	1.13	0.99	1.06
clammy ground-cherry	1.13		0.56
white avens		0.99	0.50
cup plant	0.66		0.33
hairy aster	0.66		0.33
Daisy fleabane	0.56		0.28
milkvetch	0.56		0.28
obedient plant	0.56		0.28
rigid goldenrod	0.56		0.28
tick trefoil		0.50	0.25
common horsetail	0.09		0.05
		Subtotal	**28.81**
Weedy forbs			
dandelion	0.56		0.28
field bindweed	0.56		0.28
		Subtotal	**0.56**
Weedy annuals/biennials			
giant ragweed	24.27	11.14	17.71
wild carrot	0.56	0.5	0.53
meadow parsnip	0.56		0.28
pennyroyal	0.56		0.28
horseweed	0.09		0.05
yellow woodsorrel	0.09		0.05
		Subtotal	**18.90**

Table 4. Status of species in forb transects.

Species	Transect	Tagged plants	Plants Flowering	Plants NF/NYF*	Plants not located**
compass plant	1	4	2	2 NF	
	2	7	2	5 NF	
golden alexanders	1	2	2		
	2	1	1		
golden coreopsis	1	3	0	3 NYF	
	2	0			
horsemint	1	3	0	3 NYF	1
	2	0			
lead plant	1	0			
	2	2	2		
oxeye	1	3	3		
	2	7	7		
pale purple coneflower	1	21	9	12 NF	
	2	18	12	6 NF	
purple prairie clover	1	1	1		
	2	0			
rattlesnake master	1	2	2		
	2	28	28		1
rosinweed	1	5	2	3 NYF	
	2	9	8	1 NYF	
smooth aster	1	1		1 NYF	
	2	0			
spiderwort	1	2	2		
	2	2	2		
tall bushclover	1	4	1	3 NYF	
	2	1	1		
tall cinquefoil	1	3	2	1 NF	
	2	42	22	20 NF	1
tick trefoil	1	14		14 NYF	2
	2	12		12 NYF	3
white false indigo	1	3	3		
	2	12	6	6 NYF	1
white prairie clover	1	8	8		
	2	1	1		
yellow coneflower	1	8	8		
	2	22	20	2 NF	1

*/ NF=not flowering, NYF=not yet flowering

**/ Plants located in 1995 survey but not located in 1996.

Table 5. Comparison of Prairie and Weedy Cover on 1992 Seeding.

	1992		1993		1994		1995		1996	
Cover categories	% rel freq	# spp	% cover	# spp	% cover	# spp	% cover	# spp	% cover	# spp
Prairie grasses	21.6	3	5.02	3	11.49	4	12.56	4	17.88	6
Weedy grasses	22.8	4	31.07	4	37.58	3	40.42	3	47.39	3
Prairie forbs	26.5	13	44.02	16	36.25	14	35.48	14	32.29	13
Weedy forbs	6.2	5	4.54	3	14.14	4	11.26	6	1.98	2
Weedy annuals/biennials	22.8	6	15.55	5	0.56	1	0.34	2	0.44	2

Table 6. Comparison of prairie and weedy cover on 1994 seeding.

	1994		1995		1996	
Cover categories	% cover	# spp	% cover	# spp	% cover	# spp
Prairie grasses	1.38	2	7.58	2	20.71	3
Weedy grasses	79.66	2	22.14	5	30.28	5
Prairie forbs	9.44	9	39.63	11	28.81	19
Weedy forbs	0.58	2	8.27	6	0.56	2
Weedy annuals/biennials	8.87	7	22.11	5	18.9	7

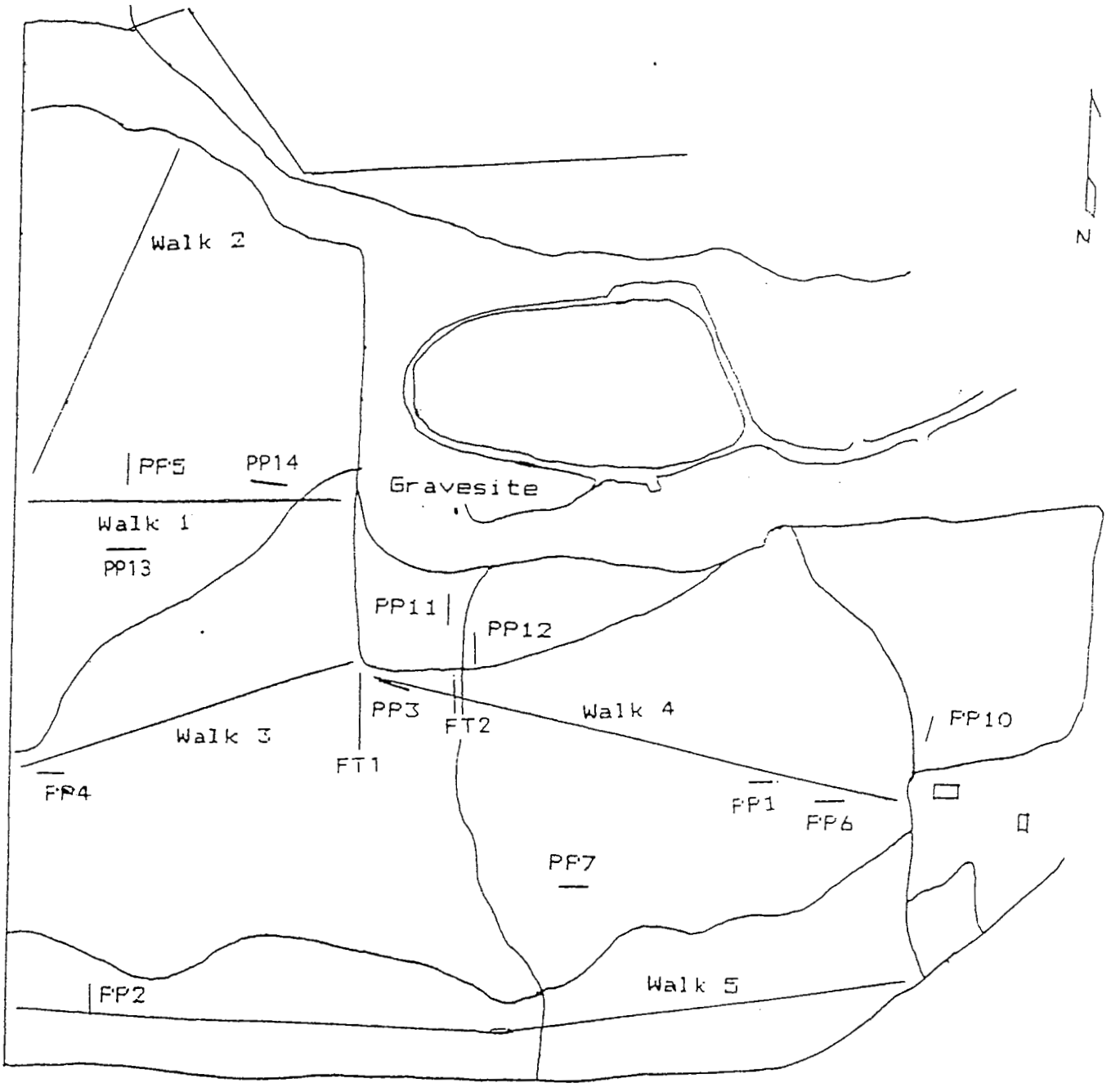

Figure 1. Locations of walking transects (Walk n), permanent plots (PP n) and forb transects (FT n) at the Herbert Hoover National Historic Site Reconstructed Prairie, West Branch, Iowa.

Appendix

Table A1	Walking transects, percent cover and percent frequency	A2
Talbe A2	Permanent plots, percent cover and percent frequency	A4
Table A3	Forb transect occurrences for 1992, 1993, 1994, and 1995	A8
Table A4	Permannent plot locations .	A16
Table A5	Plant names	A17

Table A1. Walking transects, percent cover and percent frequency.

Walking Transect # — 19 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	#	Percent Cover	Percent Rel Cover	Percent Frequency
smooth bromegrass	4	4														2	8.33	5.82	13.33
Canada goldenrod	5		3		3				2		3	3	3			7	19.17	13.39	46.67
hairy aster	2	2	3	4				3		2						5	9.67	6.75	33.33
field thistle	2				1											2	1.17	0.81	13.33
Indiangrass		2	2			3	1	3								5	7.17	5.01	33.33
prairie ragwort		5	4							5						3	15.50	10.83	20.00
horsemint			2			2										2	2.00	1.40	13.33
big bluestem				3		3	6	3	5	5	6	5	6	5	6	11	56.17	39.23	73.33
yellow coneflower				3		2										2	3.50	2.44	13.33
Japanese bromegrass				3	4											2	6.67	4.66	13.33
giant ragweed				2	2											2	2.00	1.40	13.33
Daisy fleabane				1												1	0.17	0.12	6.67
bigtooth sunflower					2											1	1.00	0.70	6.67
common milkweed					2			2								2	2.00	1.40	13.33
fireweed					1											1	0.17	0.12	6.67
white mulberry						2										1	1.00	0.70	6.67
black-eyed Susan						2										1	1.00	0.70	6.67
Canada wildrye						2										1	1.00	0.70	6.67
dandelion									2			2				2	2.00	1.40	13.33
switchgrass											3	2				2	3.50	2.44	13.33
														Total			143.17	100.00	

Walking Transect 2 — 19 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	#	Percent Cover	Percent Rel Cover	Percent Frequency
big bluestem	6	6	6	6	5	6	6	4	4	3		4	3				12	58.28	41.31	75.00
switchgrass	2	2			2		2	3	4			3					7	12.34	8.75	43.75
wild lettuce		1															1	0.16	0.11	6.25
Indiangrass			2		2						3						3	4.22	2.99	18.75
hairy aster							2			3	2				3		4	6.56	4.65	25.00
dogwood								2									1	0.94	0.66	6.25
Canada goldenrod										3	3	3	4				7	22.66	16.06	43.75
smooth bromegrass										2							1	0.94	0.66	6.25
Kentucky bluegrass										4				6	3		3	12.34	8.75	18.75
tick trefoil											1						1	0.16	0.11	6.25
dandelion												2	1				2	1.09	0.78	12.50
common violet													2	3	4		3	7.19	5.09	18.75
field thistle													1				1	0.16	0.11	6.25
Canada wildrye														2			1	0.94	0.66	6.25
yellow wood-sorrel																2	1	0.94	0.66	6.25
giant ragweed														3	2		2	3.28	2.33	12.50
black-eyed Susan														2	2	2	3	2.81	1.99	18.75
Daisy fleabane															2		1	0.94	0.66	6.25
horsemint																2	1	0.94	0.66	6.25
Japanese bromegrass																3	1	2.34	1.66	6.25
rigid sunflower																2	1	0.94	0.66	6.25
yellow coneflower																2	1	0.94	0.66	6.25
														Total				141.09	100.00	

Walking Transect 3 — 21 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	#	Percent Cover	Percent Rel Cover	Percent Frequency
big bluestem	5	6	3	6	6	6		5	6	5	3		6	4	4	2	14	65.94	46.94	87.50
Canada goldenrod	3		4	3		3	6	2	3	4	5	5	2	4	2	3	14	42.97	30.59	87.50
rigid sunflower	3																1	2.34	1.67	6.25
hairy aster		2															1	0.94	0.67	6.25
Indiangrass			3		1			3			2	2			2	3	7	10.00	7.12	43.75
prairie ragwort								2	1			4	2	3	2		6	9.22	6.56	37.50
switchgrass													2				1	0.94	0.67	6.25
wild lettuce														1	3		2	2.50	1.78	12.50
sweetclover														1	1		2	0.31	0.22	12.50
common horsetail																5	1	5.31	3.78	6.25
														Total				140.47	100.00	

Table A1. Walking transects, percent cover and percent frequency (cont.).

Walking Transect 4 — 21 August, 1996

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	#	Percent Cover	Percent Rel Cover	Percent Frequency
	Sample Number																										
big bluestem	3	4	2	4	4	5	3		5		5	4	5	2	4	6	3	6	2	3		5	4	19	49.02	38.65	82.61
prairie ragwort	5	4	4	3	3	3	2				2		3	2	3		1					4		13	22.07	17.40	56.52
bigtooth sunflower	2																							1	0.65	0.51	4.35
horsemint	1																							1	0.11	0.09	4.35
switchgrass		3	3				2											2			2			5	5.22	4.11	21.74
hairy aster		2												1	2									3	1.41	1.11	13.04
Canada goldenrod			3	3	2	2	3	6		4		3	3	2	4	3	5	2	6	4	3	3	3	18	33.37	26.31	78.26
white false indigo			2																					1	0.65	0.51	4.35
Indiangrass					2	2					2		2	3	2		2				2		3	9	7.83	6.17	39.13
meadow parsnip									3															1	1.63	1.29	4.35
Kentucky bluegrass										6														1	4.24	3.34	4.35
dandelion																			2					1	0.65	0.51	4.35
																						Total			126.85	100.00	

Walking Transect 5 — 21 August, 1996

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	Sample Number																						
big bluestem	6	5	6	6	6	2	3	6	5	5	5	5		6	3	2	4	2	3	3	3	4	6
Indiangrass	2					3	3		2		2					4					3		
Canada goldenrod	1			1	2	4	2		2			2	5	4	4	3	3	5	5	5	5	4	2
fireweed		2																					
switchgrass		3	1				3			2	2	2					3						
prairie ragwort						5			3	2	4	2	2				3						
hairy aster											1		2		2				2				
smooth sumac												3											
Kentucky bluegrass																2			2				
Canada wildrye																						2	
wild lettuce																						1	
Canada thistle																							

Species	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	#	Percent Cover	Percent Rel Cover	Percent Frequency
big bluestem	6		5	5	6	6	5	6				3	2	5	4		33	59.23	47.58	84.62
Indiangrass		2	2											2			9	5.83	4.69	23.08
Canada goldenrod	2	5	2	3			3		6	5	5	5	5	2			28	36.79	29.56	71.79
fireweed																	1	0.38	0.31	2.56
switchgrass							2						6				9	6.99	5.61	23.08
prairie ragwort																	7	6.86	5.51	17.95
hairy aster		2	3					2		3	3						9	4.87	3.91	23.08
smooth sumac																	1	0.96	0.77	2.56
Kentucky bluegrass																	2	0.77	0.62	5.13
Canada wildrye																	1	0.38	0.31	2.56
wild lettuce																	1	0.06	0.05	2.56
Canada thistle															3	2	2	1.35	1.08	5.13
															Total			124.49	100.00	

Table A2. Permanent plots, percent cover and percent frequency.

Permanent Plot 1 — 16 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
Canada goldenrod	6	6	6	6	6	6	6	6	6	6	5	4	4	4	4	4	2	4		2	19	73.25	45.64	95.00
Kentucky bluegrass					5																1	4.25	2.65	5.00
Indiangrass						4	1			2			2	2	2	4		2	4	3	10	15.13	9.42	50.00
prairie ragwort						3		3	6	6	6	6	6	5	4	2	3	3		4	13	43.13	26.87	65.00
raspberry						2															1	0.75	0.47	5.00
dandelion							2						2								2	1.50	0.93	10.00
sedge								2													1	0.75	0.47	5.00
big bluestem									2				2	3	4		6		4		6	14.50	9.03	30.00
switchgrass											2	2						3		3	4	5.25	3.27	20.00
foxtail											1										1	0.13	0.08	5.00
hairy aster																				3	1	1.88	1.17	5.00
																			Total			160.50	100.00	

Permanent Plot 2 — 16 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
Canada goldenrod	5	5	4	6	5	5	5	5	4	3		2	2		2	3	4	3	2	2	18	49.13	41.90	90.00
dandelion	2				2																2	1.50	1.28	10.00
big bluestem	2								4		4	6	6	5	5	6		4	6	6	11	43.00	36.67	55.00
Indiangrass		2			2			2			4				3			3			5	6.00	5.12	25.00
meadow parsnip			2	2	2	5	1	3	2	4	2										8	12.38	10.55	40.00
switchgrass								2		3	2			3							4	5.25	4.48	20.00
																			Total			117.25	100.00	

Permanent Plot 3 — 19 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
rigid sunflower	3	4	2	3	3	5	1	3													8	15.75	9.56	40.00
smooth bromegrass	2	2																			2	1.50	0.91	10.00
Kentucky bluegrass	5																				1	4.25	2.58	5.00
switchgrass	2																				1	0.75	0.46	5.00
raspberry		2	3	2	2	2	2	1													7	5.75	3.49	35.00
prairie ragwort		2		3							5	4	3				2	2	3		8	15.25	9.26	40.00
bigtooth sunflower		2		2	1				3	3	4	3	5	3	3	3	4	5	3	4	15	32.63	19.80	75.00
horsemint			4	3																	2	5.00	3.03	10.00
big bluestem			5	4	3	4	3	4	3	6	4	4	5	6	6	5	4	6	5	3	18	62.75	38.09	90.00
hairy aster			2		2		2	2	2	2	1			2		2	2	2	2		12	8.38	5.08	60.00
Indiangrass							2												2		2	1.50	0.91	10.00
Canada goldenrod							3					2	2							3	4	5.25	3.19	20.00
fireweed							1	1													2	0.25	0.15	10.00
dandelion							1			2											2	0.88	0.53	10.00
common horsetail									2			2									2	1.50	0.91	10.00
wild letttuce															2	2					2	1.50	0.91	10.00
honeysuckle																				3	1	1.88	1.14	5.00
																			Total			164.75	100.00	

Permanent Plot 4 — 16 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
Canada goldenrod	4	4	4	4	2	2	2	3	2	3	2	5	3	5	4	3	3	3	2	3	20	41.75	26.47	100.00
common horsetail	5	3	5	5	5	5	3	3	3	3	3	2	3	2	3	4	2		2	2	19	43.13	27.34	95.00
big bluestem	2	5	3	2	3		4	3	2	3	5	5	2	3	3	2	2	2	2		18	33.13	21.00	90.00
Kentucky bluegrass	2															2		4			3	4.63	2.93	15.00
Indiangrass				3	3	3	3	3	3	2	2	2	3	2	2	4	3	2	3	3	17	26.38	16.72	85.00
hairy aster					2																1	0.75	0.48	5.00
switchgras						2													2		2	1.50	0.95	10.00
dandelion																	1				1	0.13	0.08	5.00
prairie ragwort																		1	4	4	3	6.38	4.04	15.00
																			Total			157.75	100.00	

Table A2. Permanent plots, percent cover and percent frequency (cont.).

Permanent Plot 5	16 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
giant ragweed	3	2	2											1							4	3.50	2.29	20.00
meadow parsnip	3		2																		2	2.63	1.72	10.00
switchgrass	4	5	3		2	4	3		3	2	3				2						10	20.25	13.25	50.00
Canada goldenrod	3	3	4	5	5	5	5	5	4	4	3		3			3	2			5	15	45.00	29.44	75.00
hairy aster	2					2	3	2	2			2		2	4	2	2	2	2		12	12.50	8.18	60.00
big bluestem			4	5	3	2		5	2	5	4	6	6	6	2	6	6	5	5	4	16	58.38	38.18	80.00
clammy ground-cherry				2																	1	0.75	0.49	5.00
Indiangrass											2				4						2	3.88	2.53	10.00
field thistle													3				2				2	2.63	1.72	10.00
prickly lettuce														2							1	0.75	0.49	5.00
prairie ragwort																		3	2		2	2.63	1.72	10.00
																			Total			152.88	100.00	

Permanent Plot 6	16 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
Canada goldenrod	3	2	4	2	4	2	3	3	2	2	3	4	2		5	5	3	3	5	5	19	42.13	30.86	95.00
Indiangrass	2	5	5	6	2		4	3	3	2	3	3	4	4	3	3	3	1	2	2	18	34.88	25.55	90.00
big bluestem	6	2	2		3	6				6	5	5	5	6	4	2	6	2	3	5	16	51.25	37.55	80.00
ragwort		2																			1	0.75	0.55	5.00
hairy aster			3													2					2	2.63	1.92	10.00
switchgrass								2	4			2					2	3			4	4.13	3.02	20.00
field bindweed																	2				1	0.75	0.55	5.00
																			Total			136.50	100.00	

Permanent Plot 7	16 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
Canada goldenrod	3	4	3	3	5	3	6	3	5	5	4	5	4	3	4	3	5	3	3	4	19	55.50	39.43	95.00
switchgrass	2	3				3		2											2		5	6.00	4.26	25.00
Indiangrass	3	2		2	4				3					2		2	4	3		2	8	9.38	6.66	40.00
common horsetail	3	1	2					2	2					2				2			7	5.75	4.09	35.00
prairie ragwort	5														2						2	5.00	3.55	10.00
hairy aster		2	4					2										2		2	5	6.13	4.35	25.00
big bluestem		2	2	5	2	5	4		3	3	4	3	5	3	3	5	3	4	4	4	17	41.88	29.75	85.00
common milkweed						2															1	0.75	0.53	5.00
dandelion						1					2						2				3	1.63	1.15	15.00
riverbank grape											3	3	2	5							4	8.75	6.22	20.00
																			Total			140.75	100.00	

Permanent Plot 10	16 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
riverbank grape	5	2	5																		3	9.25	7.12	15.00
Canada goldenrod	2	3		2	2	3	2	2	2	2	2	3	4	3	2	5	4	4	5	5	3	9.25	7.12	15.00
Kentucky bluegrass	3																				1	1.88	1.44	5.00
Indiangrass	5	2	2	3	4		3	5	5	3	3		2			3					12	27.50	21.17	60.00
big bluestem		5	5	5	4	2	3	2	4	5	6	2	2		6			4	4	4	15	46.50	35.80	75.00
ragwort					2	3	3	2													4	5.25	4.04	20.00
little bluestem						5	2								2						3	5.75	4.43	15.00
side-oats grama							2														1	0.75	0.58	5.00
switchgrass												5	4	5		3	3	4			6	18.50	14.24	30.00
hairy aster												2	3								2	2.63	2.02	10.00
clammy groound-cherry																	3				1	1.88	1.44	5.00
Canada wildrye																		2			1	0.75	0.58	5.00
																			Total			129.88	100.00	

Table A2. Permanent Plots, percent cover and percent frequency (cont.).

Permanent Plot 11	19 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
Kentucky bluegrass	6	6	5	4	5	5	6	4	5	5	3	4	3	6	4	5	5	4	3	3	19	70.50	41.38	95.00
yellow coneflower	3	6	2	2	3			2	3					2	4		2	4	2		12	21.25	12.47	60.00
Indiangrass		2		3				3	2		5	3		2			2				8	12.88	7.56	40.00
tall bushclover			2	3	2			2													4	4.13	2.42	20.00
pale purple coneflower			2																		1	0.75	0.44	5.00
big bluestem			3		3	3		3	2	4			4	2					2	2	10	16.75	9.83	50.00
white prairie clover			2	2																	2	1.50	0.88	10.00
purple prairie clover			3	3		4	2														4	7.63	4.48	20.00
timothy			2																		1	0.75	0.44	5.00
dandelion				2			3	2						2							4	5.25	3.08	20.00
hairy aster					2																1	0.75	0.44	5.00
side-oats grama						2		2				3			2	2		2		5	7	9.88	5.80	35.00
switchgrass						2															1	0.75	0.44	5.00
black-eyed Susan								2													1	0.75	0.44	5.00
Canada goldenrod									2		3		4		2			4	4	2	7	13.50	7.92	35.00
rigid goldenrod										3											1	1.88	1.10	5.00
little bluestem																2					1	0.75	0.44	5.00
oxeye																	2				1	0.75	0.44	5.00
																			Total			170.38	100.00	

Permanent Plot 12	19 August, 1996																							
	Sample Number																				#	Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency
little bluestem	3		2			4	2							2							5	7.25	4.30	25.00
Kentucky bluegrass	5	6	4	6	6	3	6	5	6	5	5	5	5	5	5	3	4	5	4	5	20	80.00	47.41	100.00
Canada goldenrod	2		2		1	2	1	4	2	3	3	2			4		3	2			13	16.63	9.85	65.00
yellow coneflower		3		2	1							2	5		2	5	4	3	5	3	11	23.88	14.15	55.00
alta fescue		2		1			2				2	1	2		3		2	2	2	1	12	9.38	5.56	60.00
switchgrass			2																		1	0.75	0.44	5.00
side-oats grama			2		2	4			2												4	5.38	3.19	20.00
clammy ground-cherry				2	1														2		3	1.63	0.96	15.00
hairy aster				2																	1	0.75	0.44	5.00
Indiangrass				1	2		1	4								2	2				6	5.63	3.33	30.00
rigid goldenrod					1		1		3	4	3										5	7.13	4.22	25.00
tall bushclover					2										2			1		1	4	1.75	1.04	20.00
tall cinquefoil								2				4									2	3.88	2.30	10.00
dandelion										2											1	0.75	0.44	5.00
red clover													2								1	0.75	0.44	5.00
purple prairie clover																		1			1	0.13	0.07	5.00
yellow sweetclover																			2		1	0.75	0.44	5.00
muhley grass																			2		1	0.75	0.44	5.00
field thistle																			2		1	0.75	0.44	5.00
field bindweed																				2	1	0.75	0.44	5.00
oxeye																				1	1	0.13	0.07	5.00
																			Total			168.75	100.00	

Table A2. Permanent Plots, percent cover and percent frequency (cont.).

Permanent Plot 13 — 19 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
giant ragweed	2	2		2	5		2	2	2	3	3			3	5	2	3	5	6	3	16	32.25	24.27	80.00
yellow coneflower	3	2	3	3	3	2	5	2					2								9	14.75	11.10	45.00
horsemint	4			3	3	4															4	10.00	7.53	20.00
Canada wildrye	2	2	5	2	3	3	3	2	3	3	4		3	3	2		2	2	3	3	18	29.50	22.20	90.00
common horsetail	1																				1	0.13	0.09	5.00
obedient plant	2												2								1	0.75	0.56	5.00
rigid goldenrod	2																				1	0.75	0.56	5.00
reed canary grass		3						5		4		6				4	5		2		7	22.25	16.75	35.00
field bindweed			2																		1	0.75	0.56	5.00
sneezeweed			1				2									2					3	1.63	1.22	15.00
cup plant				2										1							2	0.88	0.66	10.00
clammy groun-cherry					2	2															2	1.50	1.13	10.00
milkvetch							2														1	0.75	0.56	5.00
Canada goldenrod							3														1	1.88	1.41	5.00
hairy aster									2								1				2	0.88	0.66	10.00
dandelion									2												1	0.75	0.56	5.00
black-eyed Susan													2				2				2	1.50	1.13	10.00
wild carrot													2								1	0.75	0.56	5.00
Kentucky bluegrass																3					1	1.88	1.41	5.00
meadow parsnip																2					1	0.75	0.56	5.00
field thistle																		5			1	4.25	3.20	5.00
foxtail																			3	2	2	2.63	1.98	10.00
yellow woodsorrel																			1		1	0.13	0.09	5.00
pennyroyal																				2	1	0.75	0.56	5.00
Daisy fleabane																				2	1	0.75	0.56	5.00
horseweed																				1	1	0.13	0.09	5.00
																			Total			132.88	100.00	

Permanent Plot 14 — 21 August, 1996

Species	Sample Number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Percent Cover	Percent Rel Cover	Percent Frequency
quackgrass	3	3	4	6	2	3			2	3	2	2	4	4	3	3	5	3			16	34.63	22.85	80.00
Japanese bromegrass	3	3	3		4														2	4	6	12.63	8.33	30.00
black-eyed Susan	2		2																		2	1.50	0.99	10.00
brown-eyed Susan	3	3						3													3	5.63	3.71	15.00
yellow coneflower		2				2		2	3	3						3		1	1		8	8.13	5.36	40.00
Kentucky bluegrass		2						3	6	5	5	5		5	5	3	3	4	3		12	37.50	24.75	60.00
horsemint			3				3				2	2				4			4	2	7	12.25	8.09	35.00
giant ragweed			2	3	3	2	3	3	2		4		4					2		1	11	16.88	11.14	55.00
hairy aster			3			3			2			2									4	5.25	3.47	20.00
sneezeweed					4																1	3.13	2.06	5.00
white avens						2	2														2	1.50	0.99	10.00
Canada wildrye						2	2													2	3	2.25	1.49	15.00
big bluestem							3		3												2	3.75	2.48	10.00
orchardgrass								3													1	1.88	1.24	5.00
cup plant										4											1	3.13	2.06	5.00
tick trefoil																		2			1	0.75	0.50	5.00
wild carrot																				2	1	0.75	0.50	5.00
																			Total			151.50	100.00	

Table A3. Forb Transect Occurrences for 1992, 1993,1994,1995, and 1996.								
Forb Transect #1							11 & 13 July, 1996	
	*=flowering/fruiting, NF=not flowering, NL=notlocated, NYF=not yet flowering							
Number	Species	1992	1993	1994	1995	1996	Transect	Lateral
							(m)	E/W (m)
94 (no tag)	Showy sunflower			*	*	NYF	0.00	2.7-11.5E
92-1-39	Pale purple coneflower	*	NF	NL	NL	NL	3.70	3.70E
95-1-1	Horsemint			*	*	NYF	3.75	7.90E
94 (no tag)	Showy sunflower			•	•	NYF	5.00	1.25-15.0+E
96-1-1	Yellow coneflower					•	5.00	7.50E
95-1-2	Horsemint				*	NYF	5.10	8.10E
92-1-28	Pale purple coneflower	*	*	*	*	*	6.60	0.90W
94 (no tag)	Rosinweed			*	?	NL	7.20	8.40W
92-1-1	Pale purple coneflower	•	NL	NF	NF	NF	7.60	1.60E
95-1-3	Horsemint				•	NL	8.75	9.15E
95-1-4	Tick trefoil			*	*	NYF	8.85	0.40E
93 (no tag)	Bigtooth sunflower		NF	NL	NL	NL	8.90?	0.75W
93 (no tag)	Bigtooth sunflower(96 EW dia 1.4 m)		NF	*	NF	NYF	9.75	1.70E
95-1-6	Tick trefoil				•	NYF	11.55	2.75E
92-1-2	Tick trefoil	*	*	*	*	NYF	11.65	4.15E
95-1-5	Tick trefoil		NF	•	*	NYF	11.90	2.00E
92-1-70	Golden alexanders	*	NL	*	*	*	12.65	0.40E
92-1-27	Golden alexanders	•	NL	NL	NL	NL	12.80	4.30W
92-1-71	Smooth aster	*	NL	•	NF	NYF	13.00	1.40E
96-1-2	Golden alexanders					*	13.05	0.10E
92-1-3	Tick trefoil	*	NF	*	•	NYF	13.45	4.50E
95-1-7	Tick trefoil			*	*	NYF	13.45	0.10W
92-1-29	Compass plant	•	NL	*	*	*	13.55	10.25E
94 (no tag)	Compass plant			*	NL	NL	16.00	9.40W
96-1-3	Pale purple coneflower					*	16.15	0.40E
95-1-29	Horsemint		*	*	•	NYF	18.30	5.50W
92-1-26	Spiderwort	*	NF	NL	*	*	19.55	0.40W
92-1-25	Pale purple coneflower	•	NF	*	*	NF	21.25	1.90W
95-1-8	Yellow coneflower		*	NF	•	*	22.35	5.60E
92-1-24	Pale purple coneflower	•	•	NF	•	NF	22.55	3.65W
92-1-68	Tall bushclover	*	*	*	*	NYF	23.35	0.70E
95-1-9	Tall bushclover		*	*	*	NYF	23.40	1.00E
92-1-69	Tall bushclover	*	*	*	*	NYF	23.70	0.90E
93 (no tag)	Dogbane		*	NL	NL	NL	24.00	9.65E
92-1-22	Pale purple coneflower	NF	*	NF	NF	*	24.35	2.55W
92-1-23	Compass plant	NF	NF	NF	•	NF	24.40	3.05W
95-1-10	Rosinweed			*	*	*	24.00	9.55E
92-1-20	Rosinweed	*	*	*	*	NYF	24.65	3.25W
92-1-4	Pale purple coneflower	*	NF	NF	NF	NF	25.20	2.50E
92-1-21	White prairie clover	*	*	*	*	*	25.30	3.45W
95-1-28	White prairie clover				*	•	25.50	3.25W

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995, and 1996 (cont.).

Forb Transect #1 (cont.)

*=flowering/fruiting, NF=not flowering, NL=not located — 11 & 13 July, 1996

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
92-1-5	Tall cinquefoil	NF	*	*	*	*	25.90	5.25E
95-1-11	Oxeye				*	*	26.05	5.65E
92-1-6	Oxeye					*	26.15	5.40E
95-1-12	White prairie clover				*	*	26.20	1.25E
95-1-13	Pale purple coneflower			*	NF	NF	26.20	8.50E
92-1-6	Oxeye	*	*	*	*	*	26.30	5.40E
95-1-14	Yellow coneflower			•	•	•	26.40	8.70E
92-1-18	Yellow coneflower	*	*	NF	*	•	26.40	2.80W
92-1-17	Rosinweed	*	*	•	*	NYF	26.40	1.10W
92-1-19	Rosinweed	*	*	*	•	NYF	26.50	3.40W
92-1-7	Rattlesnake master	NF	NF	*	*	•	26.80	1.40E
92-1-8	White prairie clover	*	*	*	*	*	26.90	0.90E
92-1-9	Pale purple coneflower	•	NF	*	NF	*	27.10	0.35E
92-1-15	Yellow coneflower	*	•	*	*	*	27.45	5.30W
92-1-16	Rattlesnake master	•	NL	*	*	*	27.75	0.95W
95-1-15	Bigtooth sunflower		•	*	•	NYF	28.10	0.85E
95-1-27	Yellow coneflower			*	*	*	28.10	2.55W
95-1-16	Tick trefoil			*	*	NYF	28.30	0.70E
95-1-17	Pale purple coneflower				*	NF	29.10	2.50E
95-1-18	White prairie clover				*	*	29.45	4.70E
92-1-12	White prairie clover	*	*	*	*	*	29.70	4.90E
92-1-13	Pale purple coneflower	NF	*	NF	NF	•	29.50	3.95E
92-1-14	Tall cinquefoil	NF	NF	*	•	NYF	29.20	5.75W
95-1-26	Spiderwort				*	*	27.40	4.75W
92-1-10	Tall cinquefoil	*	NF	*	*	*	29.65	5.95E
92-1-11	White false indigo	*	*	*	*	*	30.00	5.15E
92-1-30	Pale purple coneflower	•	NF	*	NF	*	30.30	3.70E
92-1-31	Pale purple coneflower	•	•	NF	NF	*	31.00	3.55E
92-1-32	Pale purple coneflower	•	NF	•	NF	*	31.30	2.60E
92-1-33	Pale purple coneflower	*	NF	NF	NF	•	31.30	3.15E
92-1-34	Pale purple coneflower	•	NF	•	*	*	31.60	2.95E
92-1-35	Yellow coneflower	*	*	*	*	•	32.35	2.40E
95-1-19	White prairie clover				•	*	33.05	2.40E
92-1-36	Tick trefoil	*	*	dead	NL	NF	33.30	5.55E
95-1-22	Tick trefoil			*	*	NYF	33.35	3.65E
96-1-21A	Tick trefoil			•	NL	NF	33.50	3.80E
95-1-21	Pale purple coneflower			*	*	NF	33.60	3.50E
92-1-67	Rosinweed	*	*	*	*	*	33.90	4.25W
95-1-20	Tick trefoil			*	*	NYF	34.00	3.20E
92-1-37	Tick trefoil	*	•	dead	NL	NL	34.30	7.05E
92-1-38	Tick trefoil	*	*	dead	NL	NL	34.30	7.05E

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995, and 1996 (cont.).

Forb Transect #1 (cont.)

*=flowering/fruiting, NF=not flowering, NL=not located — 11 & 13 July, 1996

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
92-1-5	Tall cinquefoil	NF	•	•	*	*	25.90	5.25E
95-1-11	Oxeye				*	*	26.05	5.65E
92-1-6	Oxeye					*	26.15	5.40E
95-1-12	White prairie clover				•	*	26.20	1.25E
95-1-13	Pale purple coneflower			*	NF	NF	26.20	8.50E
92-1-6	Oxeye	*	*	*	*	*	26.30	5.40E
95-1-14	Yellow coneflower			*	*	*	26.40	8.70E
92-1-18	Yellow coneflower	*	*	NF	*	*	26.40	2.80W
92-1-17	Rosinweed	*	*	•	*	NYF	26.40	1.10W
92-1-19	Rosinweed	*	*	•	•	NYF	26.50	3.40W
92-1-7	Rattlesnake master	NF	NF	*	•	*	26.80	1.40E
92-1-8	White prairie clover	*	*	*	*	•	26.90	0.90E
92-1-9	Pale purple coneflower	*	NF	*	NF	*	27.10	0.35E
92-1-15	Yellow coneflower	*	*	*	*	*	27.45	5.30W
92-1-16	Rattlesnake master	*	NL	*	*	*	27.75	0.95W
95-1-15	Bigtooth sunflower		•	•	•	NYF	28.10	0.85E
95-1-27	Yellow coneflower			*	*	*	28.10	2.55W
95-1-16	Tick trefoil			•	*	NYF	28.30	0.70E
95-1-17	Pale purple coneflower				*	NF	29.10	2.50E
95-1-18	White prairie clover				*	*	29.45	4.70E
92-1-12	White prairie clover	*	*	*	*	•	29.70	4.90E
92-1-13	Pale purple coneflower	NF	•	NF	NF	•	29.50	3.95E
92-1-14	Tall cinquefoil	NF	NF	•	•	NYF	29.20	5.75W
95-1-26	Spiderwort				•	*	27.40	4.75W
92-1-10	Tall cinquefoil	*	NF	*	*	•	29.65	5.95E
92-1-11	White false indigo	*	*	*	*	*	30.00	5.15E
92-1-30	Pale purple coneflower	*	NF	•	NF	•	30.30	3.70E
92-1-31	Pale purple coneflower	*	•	NF	NF	•	31.00	3.55E
92-1-32	Pale purple coneflower	•	NF	•	NF	*	31.30	2.60E
92-1-33	Pale purple coneflower	•	NF	NF	NF	•	31.30	3.15E
92-1-34	Pale purple coneflower	•	NF	*	*	•	31.60	2.95E
92-1-35	Yellow coneflower	*	*	*	*	*	32.35	2.40E
95-1-19	White prairie clover				*	•	33.05	2.40E
92-1-36	Tick trefoil	•	•	dead	NL	NF	33.30	5.55E
95-1-22	Tick trefoil			*	*	NYF	33.35	3.65E
96-1-21A	Tick trefoil			*	NL	NF	33.50	3.80E
95-1-21	Pale purple coneflower			*	*	NF	33.60	3.50E
92-1-67	Rosinweed	*	*	•	•	*	33.90	4.25W
95-1-20	Tick trefoil			•	*	NYF	34.00	3.20E
92-1-37	Tick trefoil	•	•	dead	NL	NL	34.30	7.05E
92-1-38	Tick trefoil	*	•	dead	NL	NL	34.30	7.05E

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995, and 1996 (cont).

Forb Transect #2 10 July, 1996

*=flowering/fruiting, NF=not flowering, NL=not located, NYF=not yet flowering

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
95-2-97	Tick trefoil				NF	NL	1.35	1.55E
95-2-114	Pale purple coneflower				NF	*	1.90	2.40W
96-2-1	Tick trefoil					NF	2.15	0.15W
96-2-3	Pale purple coneflower					**NF**	2.25	0.85W
96-2-7	Rattlesnake master					*	2.25	4.35E
92-2-1	Rattlesnake master	*	•	*	*	*	2.30	0.95E
96-2-2	Tick trefoil					NF	2.30	0.40W
96-2-6	Pale purple coneflower					*	2.30	4.10E
95-2-96	White false indigo				NF	•	2.60	4.20E
95-2-95	Tick trefoil				NF	•	2.70	3.60E
95-2-115	White false indigo				NF	NL	2.90	1.80W
96-2-8	Tick trefoil					NF	2.90	1.70E
96-2-4	White false indigo					NF	2.95	6.50W
95-2-94	White false indigo				NF	*	3.20	2.70E
95-2-116	White false indigo				NF	NF	3.20	1.45W
92-2-2	Rattlesnake master	*	*	*	*	*	3.40	4.00E
93-2-1	White prairie clover		*	*	*	*	3.40	3.85E
95-2-97	Tick trefoil					NF	3.45	1.50E
92-2-3	Rosinweed	*	•	•	*	NYF	3.50	4.00E
96-2-5	Tick trefoil					NF	3.50	1.35E
96-2-10	Tall cinquefoil					NF	3.50	2.25E
95-2-117	Oxeye				*	*	3.80	1.60W
95-2-118	Rattlesnake master				*	*	4.00	8.35W
96-2-9	White false indigo					NF	4.20	3.10E
95-2-100	Tick trefoil				NF	NYF	4.40	0.60E
92-2-4	Tall cinquefoil	*	*	*	•	NF	4.45	1.55E
95-2-98	White false indigo				NF	NF	4.45	1.55E
93-2-4	Oxeye		*	*	*	*	4.70	7.10E
95-2-99	Tick trefoil				NF	NYF	4.80	7.55E
93-2-2	Tall cinquefoil		*	•	NF	NF	4.85	1.90E
92-2-6	Rattlesnake master	•	NF	*	*	*	5.00	6.10E
95-2-103	Tick trefoil				NF	NYF	5.00	3.20E
93-2-3	Rattlesnake master		*	NL	NL	NL	5.15	1.40E
92-2-10	Tall cinquefoil	•	•	*	*	NF	5.20	1.00E
92-2-5	Tick trefoil	*	*	*	*	NYF	5.20	1.00E
95-2-101	Tick trefoil				NF	NL	5.35	5.50E
95-2-119	Oxeye				*	*	5.40	0.95W
95-2-104	Tall cinquefoil				NF	*	5.40	2.75E
92-2-8	Tick trefoil	*	*	•	*	NYF	5.55	2.80E
92-2-7	Pale purple coneflower	•	•	NL	NL	NL	5.60	3.28E
95-2-120	Tall cinquefoil				NF	*	5.60	2.60W
94-2-1	Tick trefoil			*	NF	NL	5.60	4.10E
92-2-95	White false indigo	*	NF	*	*	*	5.70	0.80W

Table A3. Forb Transect Occurrences for 1992, 1993, 1994,1995, and1996 (cont.).

Forb Transect #2 (cont.) 10 July, 1996

*=flowering/fruiting, NF=not flowering, NL=not located, NYF=not yet flowering

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
92-2-9	White false indigo	•	NL	NF	*	*	5.70	0.60E
96-2-11	Pale purple coneflower					*	5.70	3.85W
95-2-102	Tick trefoil				NF	NYF	5.80	3.75E
94-2-2	Tall cinquefoil			* NF	NF	NF	6.05	3.55E
94-2-3	White false indigo			NF	NF	NF	6.10	3.80E
95-2-121	Rattlesnake master		*	NL	*	*	6.20	1.02W
92-2-91	Tall cinquefoil	*	NF	*	•	•	6.20	1.80W
92-2-12	Rosinweed	*	•	*	*	*	6.20	6.90E
92-2-92	Oxeye	*	*	*	*	*	6.30	1.40W
95-2-122	Tall cinquefoil				NF	NYF	6.30	2.20W
92-2-11	Tall cinquefoil	*	NL	*	*	NF	6.40	2.40E
94-2-4	Oxeye			*	•	*	6.50	2.20E
95-2-105	Tall cinquefoil				•	•	6.55	1.10E
93 (no tags)	White false indigo--58 seedlings						6.65	1.40E
							to 7.70	2.15E
96-2-12	Pale purple coneflower					*	6.70	4.85W
92-2-14	Tall cinquefoil	•	*	*	•	*	6.80	1.65E
92-2-15	Tall cinquefoil	NF	NF	*	•	•	6.90	1.00E
92-2-89	Tall cinquefoil	*	NF	*	•	•	7.00	0.85W
95-2-106	Tall cinquefoil				NF	*	7.00	3.10E
92-2-13	Tall cinquefoil	*	•	*	•	*	7.00	2.30E
95-2-123	Tall cinquefoil				*	?	7.10	2.25W
92-2-16	White false indigo	NF	NL	NF	NF	NF	7.30	2.45E
92-2-90	Rosinweed	*	•	*	•	*	7.30	6.40W
95-2-124	Yellow coneflower				•	*	7.30	2.80W
92-2-17	Tall cinquefoil	*	*	*	•	NF	7.40	1.95E
92-2-18	White false indigo	*	*	NF	*	•	7.50	1.85E
92-2-19	Rattlesnake master	*	*	*	*	*	7.50	1.75E
92-2-88	White false indigo	NF	NL	NL	NL	NL	7.55	3.20W
95-2-107	Tall cinquefoil	*	*	*	*	*	7.60	2.40E
92-2-87	Pale purple coneflower	NF	*	NF	•	*	7.60	2.25W
92-2-86	Tall cinquefoil	*	*	*	*	*	7.60	2.70W
95-2-126	Oxeye				*	*	8.00	1.35W
92-2-93	Tall cinquefoil	*	*	NL	•	NF	8.10	0.35W
95-2-127	Pale purple coneflower				NF	NF	8.10	1.65W
92-2-21	Tall cinquefoil	*	*	•	•	NF	8.10	3.75E
95-2-125	Tall cinquefoil				•	NF	8.20	1.00W
95-2-128	Pale purple coneflower				NF	NF	8.40	1.85W
92-2-22	Tall cinquefoil	*	*	*	*	*	8.60	2.40E
95-2-108	Tall cinquefoil				*	NL	8.80	6.00E
92-2-85	Yellow coneflower	NF	NL	•	*	*	8.80	4.10W
95-2-131	Tall cinquefoil				*	NF	8.90	0.60W
92-2-84	Yellow coneflower	NF	*	•	•	*	9.00	4.10E

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995, and 1996 (cont.).

Forb Transect #2 (cont.) 10 July, 1996

*=flowering/fruiting, NF=not flowering, NL=not located, NYF=not yet flowering

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
92-2-23	Tall cinquefoil	*	*	*	*	*	9.00	0.60E
92-2-83	Yellow coneflower	NF	NF	*	*	*	9.00	2.65W
95-2-130	Tall cinquefoil				*	*	9.00	0.45W
92-2-25	Pale purple coneflower	NF	*	*	*	*	9.00	2.80E
92-2-82	Yellow coneflower	NF	NF	NL	*	Gone	9.10	2.65W
92-2-24	Tall cinquefoil	*	*	*	*	*	9.20	3.95E
95-2-132	Tall cinquefoil				*	NF	9.20	0.60W
92-2-81	Tall cinquefoil	NF	NF	NL	NF	*	9.20	2.45W
95-2-109	Tall cinquefoil					*	9.20	2.90?
92-2-76	Yellow coneflower	NF	NF	*	*	*	9.30	2.40W
92-2-79	Yellow coneflower	NF	*	*	*	*	9.40	3.30W
92-2-80	Yellow coneflower	NF	*	NL	NF	NL	9.40	3.00W
95-2-129	Yellow coneflower			*	*	*	9.40	5.50W
92-2-77	Yellow coneflower	NF	*	NL	*	*	9.50	3.10W
95-2-133	Tall cinquefoil				*	NF	9.50	1.10W
95-2-110	Yellow coneflower				*	*	9.60	5.20E
95-2-129	Yellow coneflower		*	NL	NL	*	9.60	5.46W
92-2-78	Yellow coneflower	NF	*	NL	*	NF	9.70	2.70W
92-2-26	Rosinweed	*	NL	*	*	*	9.70	0.25E
95-2-134	Tall cinquefoil		*	NL	*	NF	9.90	0.70W
95-2-135	Tall cinquefoil		*	NL	*	NF	9.80	0.90W
93-2-5	Lead plant		*	*	*	*	9.90	3.10E
92-2-27	Tall cinquefoil	*	*	*	*	NF	10.00	3.55E
95-2-136	Pale purple coneflower				*	*	10.10	0.90W
95-2-137	Pale purple coneflower		*	NL	*	*	10.20	5.40W
92-2-72	Yellow coneflower	NF	*	*	*	*	10.40	1.60W
92-2-75	Rattlesnake master	*	*	*	*	*	10.40	7.25W
92-2-28	Yellow coneflower	NF	*	*	*	*	10.50	2.35E
92-2-73	Rattlesnake master	*	*	*	*	*	10.50	0.00E/W
95-2-137	Pale purple coneflower		*	*	*	NF	11.20	5.30W
92-2-29	Lead plant	*	*	*	*	*	11.30	2.65E
92-2-74	Tall cinquefoil	*	*	*	*	*	11.50	6.65W
95-2-138	Spiderwort		*	*	*	*	11.60	2.30W
92-2-30	Rattlesnake master	*	*	*	*	*	11.70	3.25E
95-2-111	Rattlesnake master				*	*	12.40	2.30E
92-2-31	Pale purple coneflower	*	*	NF	NL	NL	12.70	3.56E
92-2-32	Tall cinquefoil	*	*	*	*	*	13.00	2.75E
92-2-70	Rosinweed	*	*	*	*	*	13.10	2.65W
92-2-71	Pale purple coneflower	*	*	*	*	*	13.50	3.90W
92-2-33	Rattlesnake master	*	NL	*	*	*	13.60	2.90E
94-2-11	Golden coreopsis			*	*	NYF	14.30	3.95W
92-2-34	Rattlesnake master	*	*	*	*	*	14.40	2.90E
92-2-69	Rattlesnake master	*	*	*	*	*	14.50	2.40W

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995. 1996 (cont.).

Forb Transect #2 (cont.) 10 July, 1996

*=flowering/fruiting, NF=not flowering, NL=not located, NYF=not yet flowering

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
95-2-114	Tall cinquefoil				*	*	14.60	4.30E
92-2-35	Rattlesnake master	*	NL	NL	NL	*	14.80	2.70E
92-2-37	Tall cinquefoil	*	NL	NL	NL	NL	14.80	2.80E
92-2-38/no tag	Spiderwort	*	*	NL	*	*	14.80	2.90E
96-2-13	Golden alexanders					*	14.85	4.60E
92-2-36	Rattlesnake master	*	*	*	*	*	14.90	2.80E
92-2-39	Tall cinquefoil	*	*	*	*	*	15.00	0.35E
94-2-10	Compass plant		*	NL	NF	*	15.00	2.35W
92-2-94	Compass plant	NF	NF	*	NF	NF	15.10	0.30W
95-2-113	Yellow coneflower				*	*	15.30	2.00E
92-2-68	White false indigo	*	NF	*	*	*	15.30	6.90W
92-2-67	Rattlesnake master	*	*	*	*	*	15.40	7.15W
94-2-9	Compass plant					*	15.60	13.10W
92-2-40	Rosinweed	*	*	*	*	*	15.80	0.20E
95-2-138	Compass plant				NF	NF	16.10	1.05W
92-2-41/tag los	Tall cinquefoil	*	*	*	*	*	16.30	2.60E
94-2-8	Golden coreopsis			?	*	NYF	16.70	1.60W
92-2-42	Rattlesnake master	*	*	*	*	*	17.60	0.80E
92-2-44	Oxeye	*	*	*	*	*	17.60	3.50E
92-2-43	Rosinweed	*	*	*	*	*	17.70	2.30E
94-2-7	Compass plant					NF	17.80	3.20W
92-2-65	Tick trefoil	*	NL	*	*	NL	18.10	1.60W
93 (no tag)	Tick trefoil		*	NL	NL	NL	18.15	1.65W
95-2-139	Pale purple coneflower				*	*	18.30	3.60W
92-2-45	Rosinweed	*	*	*	*	*	19.20	2.25E
92-2-46	Pale purple coneflower	NF	NL	NL	NL	NF	19.20	2.15E
95-2-140	Yellow coneflower				*	*	19.30	1.0W
93-2-6	Pale purple coneflower		*	NF	*	*	19.40	4.90E
92-2-63	Rattlesnake master	*	*	*	*	*	19.50	3.40W
92-2-64	Rattlesnake master	*	*	*	NL	*	19.50	3.90W
92-2-47	Rattlesnake master	*	*	*	*	*	19.70	0.40E
92-2-66	Compass plant	NF	NF	NF	*	NF	17.90	0.60W
92-2-51	Rattlesnake master	*	NF	*	*	*	20.30	5.45E
92-2-49	Rattlesnake master	*	NF	*	*	*	20.60	3.45E
92-2-48	Tall cinquefoil	*	NF	*	NF	NF	20.70	2.00E
92-2-52	Yellow coneflower	NF	NF	*	*	*	20.90	5.35E
93-2-7	Yellow coneflower		*	*	*	*	20.95	1.50E
92-2-50	Pale purple coneflower	*	NF	*	*	*	20.95	3.35E
95-2-141	Rattlesnake master		*	NL	*	*	21.00	0.90W
92-2-53	Rattlesnake master	*	NF	*	*	*	22.45	1.65E
92-2-54	Rattlesnake master	*	*	*	*	*	23.40	2.15E
93-2-12	Pale purple coneflower		*	*	*	NF	24.80	0.90W
92-2-55	Tall cinquefoil	*	NF	*	*	NF	25.40	1.15E

Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995. 1996 (cont.).

Forb Transect #2 (cont.) 10 July, 1996

*=flowering/fruiting, NF=not flowering, NL=not located, NYF=not yet flowering

Number	Species	1992	1993	1994	1995	1996	Transect (m)	Lateral E/W (m)
94-2-6	Golden coreopsis				*	NYF	26.10	2.40E
93-2-11	Yellow coneflower		*	*	*	*	26.40	5.10W
92-2-62	Yellow coneflower	NF	*	*	*	*	26.50	0.20E
93-2-8	Tall bushclover		*	*	*	*	26.70	2.00E
92-2-61	Tick trefoil	*	*	*	*	NYF	27.10	1.80W
93-2-10	Yellow coneflower		*	*	*	NF	27.10	1.30W
92-2-56	Rosinweed	*	*	*	*	*	27.80	4.40E
92-2-57	Yellow coneflower	NF	*	*	*	*	28.20	6.40E
93-2-9	Yellow coneflower		*	*	*	*	28.80	0.20E
92-2-60	Compass plant	NF	NF	*	*	NF	29.30	0.50W
92-2-59	Rattlesnake master	*	NF	*	*	*	29.40	1.80W
92-2-58	Rattlesnake master	*	*	*	*	*	30.00	0.95W

Table A4. Permanent plot locations.

Permanent plot #1. 138.3 m (453.75 ft) WNW of Miles Farmstead machine shed on line with south-most ash tree in restored prairie south of gravesite; near bottom of draw; 090° to NW corner of Miles Farm house. Plot runs east to west.

Permanent plot #2. Due north 33.5 m from a point 55 m east of SW corner of prairie Plot runs south to north.

Permanent plot #3. 19.8 m south of ash tree in SW corner of newly reconstructed prairie south of gravesite. Plot runs NW to SE.

Permanent plot #4. 201.2 m (660 ft) north of SW corner of the prairie and 9.1 m east. Plot runs ESE toward Miles Farmstead.

Permanent plot #5. 50.3 m (165 ft) east from west fence line directly west from southern-most white pine SW of gravesite. Plot runs NNE toward new city water tower.

Permanent plot #6. 61.5 m W of SW corner of Miles Farmstead barn. Plot runs east to west.

Permanent plot #7. 132.5 m north of south fence line from a point directly south of new city water tower; AMOCO service station sign bears 084° from plot. Plot runs east to west.

Permanent plot #10. 44 m , 330° from NW corner of Miles Farmstead barn. Plot runs SSW to NNE.

Permanent plot #11. about 30 m south of the gravesite on the west side of the firebreak, and on the top of the ridge. Plot runs north to south.

Permanent plot #12. about 15 m south of permanent plot #11, on the east side of the firebreak; on east facing slope near ridge top. Plot runs north to south

Permanent plot #13. west of grave site; 25 m north of railroad tie fence post in west boundary fence (near center of draw), then 50 m east. Plot runs west to east.

Permanent plot #14. 25 m west of north white pine in row west of grave site, bearing 272° to roof peak of white house. Plot runs east to west 272°.

Table A5. Plant names.

Common Name	Scientific Name
Grasses	
Barnyard grass	*Echinochloa sp.*
xKentucky bluegrass	*Poa pratensis*
Big bluestem	*Andropogon scoparius*
Little bluestem	*Schizachyrium scoparium*
xJapanese bromegrass	*Bromus japonicus*
xSmooth bromegrass	*Bromus inermis*
xCrabgrass	*Digitaria sp.*
xAlta fescue	*Festuca arundinacea*
xFoxtail species	*Setaria leutescens, S. faberi,* and *S. viridis*
xGiant foxtail	*Setaria faberi*
xGreen foxtail	*Setaria viridis*
xYellow foxtail	*Setaria leutescens*
Side-oats grama	*Bouteloua curtipendula*
Indiangrass	*Sorghastrum nutans*
Muhleygrass	*Muhlenbergia sp.*
Nimblewell	*Muhlenbergia schreberi*
xOrchardgrass	*Dactylis glomerata*
xQuackgrass	*Agropyron repens*
Reed canary grass	*Phalaris arundiancea*
Rosette panicgrass	*Panicum (Dicanthelium) sp.*
Squirrel tail grass	*Hordeum jubatum*
Switchgrass	*Panicum virgatum*
xTimothy	*Phleum pratense*
Canada wildrye	*Elymus canadensis*
Yellow nutsedge	*Cyperus esculentus*
Rush	*Cyperus sp.*
Composites	
Aster	*Aster sp.*
Blue aster	*Aster laevis*
Hairy aster	*Aster pilosus*
Heath (many-flowered) aster	*Aster ericoides*
Blazing star	*Liatris aspera*
Brown-headed coneflower	*Rudbeckia triloba*
xBurdock	*Arctium minus*
Compass plant	*Silphium laciniatum*
pale purple coneflower	*Echinacea pallida*
Yellow (gray-headed) coneflower	*Ratibida pinnata*
Cup plant	*Silphium perfoliatum*
xDandelion	*Taraxacum officinalis*
Prairiedock	*Silphium terebinthinaceum*
Daisy fleabane	*Erigeron annuus*
Fireweed	*Erichtites hieracifolia*
Goldenrod	*Solidago sp.*
Canada goldenrod	*Solidago canadensis*
Late goldenrod	*Solidago gigantea*
Rigid goldenrod	*Solidago rigida*
Horseweed (mare's tail)	*Conyza canadensis*
xPrickly lettuce	*Lactuca scariola*
Wild lettuce	*Lactuca canadensis*
Oxeye	*Heliopsis helianthoides*
Giant ragweed	*Ambrosia trifida*
Little (common) ragweed	*Ambrosia artemisiifolia*
Rosinweed	*Silphium integrifolium*

Table A5. Plant names (cont).

Common Name	Scientific Name
Composites (cont.)	
Bigtooth sunflower	*Helianthus grosseserratus*
Showy (rigid) sunflower	*Helianthus laetiflorus* (*rigidus*)
Sneezeweed	*Helenium autumnale*
xCanada thistle	*Cirsium arvense*
Field thistle	*Cirsium discolor*
Other Families	
White avens	*Geum canadense*
Field bindweed	*Convolvulus sepium*
Nightshade bittersweet	*Solanum dulcamara*
Blackberry	*Rubus* subgenus *eubatis*
Tall (round-headed) bushclover	*Lespedeza capitata*
xButtonweed	*Abutilon theophrastii*
XWild carrot	*Daucus carota*
Cinquefoil	*Potentilla recta*
Rough cinquefoil	*Potentilla norvegica*
Tall cinquefoil	*Potentilla arguta*
xClover species	*Trifolium spp.*
xAlsike clover	*Trifolium hybridum*
Red clover	*Trifolium pratense*
Purple prairie clover	*Dalea* (*Petalostemon*) *purpurea*
White prairie clover	*Dalea* (*Petalostemon*) *candida*
Virginia creeper	*Parthenocissus quinquefolia*
xCurly dock	*Rumex crispus*
Smooth dock	*Rumex altissimus*
Dogbane	*Apocynum sibiricum*
Dogwood	*Cornus sp.*
Gray dogwood	*Cornus racemosa*
xSiberian elm	*Ulmus pumila*
White false indigo	*Baptisia leucantha*
Poison ivy	*Toxicodendron radicans*
xFlower-of-an-hour	*Hibiscus trionum*
Riverbank grape	*Vitis riparia*
Clammy (hoary) ground-cherry	*Physalis heterophylla*
Virginia ground-cherry	*Physalis virginiana*
xHoneysuckle	*Lonicera sp.*
xHorse-nettle	*Solanum carolinense*
Horsemint	*Monarda fistulosa*
Field horsetail	*Equisetum arvense*
Jimson weed	*Datura sp.*
xKochia	*Kochia scoparia*
Lamb's quarters	*Chenopodium album*
Leadplant	*Amorpha canescens*
Common mallow	*Malva neglecta*
Milkvetch	*Astragalus canadensis*
Common milkweed	*Asclepias syriaca*
xWhite mulberry	*Morus alba*
xMustard	*Brassica sp.*
xBlack nightshade	*Solanum nigrum*
Obedient plant	*Physostegia parviflora*
xMeadow parsnip	*Pastinaca sativa*
Pellitory	*Parietaria pensylvanica*

Table A5. Plant names (cont).

Common Name	Scientific Name
Other Families (cont.)	
xField pennycress	*Thaspium arvense*
xPigweed	*Amaranthus retroflexus*
Plantain	*Plantago rugellii*
Biennial evening primrose	*Oenothera biennis*
xPurslane	*Portulaca oleracea*
Raspberry	*Rubus sp.*
Rattlesnake master	*Eryngium yuccifolium*
xSheperd's purse	*Capsella bursa-pastoris*
Smartweed	*Polygonum sp.*
Spiderwort	*Tradescantia sp.*
Smooth sumac	*Rhus glabra*
xSweetclover	*Melilotus sp.*
Tick trefoil	*Desmodium sp.*
White vervain	*Verbena urticifolia*
Common violet	*Viola practincola* (*V. papiolinacea*)
xYellow rocket	*Brassica campestris*
Yellow wood-sorrel	*Oxalis stricta*