

**PRAIRIE INVENTORY**  
**HERBERT HOOVER NATIONAL HISTORIC**  
**SITE**  
**1997**

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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 were sampled in 1982 and annually 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 During this time the practice of removing accumulated litter by haying has been replaced by prescribed burning and selective brush and weed cutting.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 seedlings of 1992 and 1994, persistence and flowering of various forb species, as well as cover and persistence information of the established prairie.

## Methods

Five walking transects were sampled on 1 and 4 August, 1997. 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 in a transect 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 on 4 and 5 August, 1997, 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 A4 for plot locations). Cover was determined as described above.

Two permanent forb transects were sampled between 28 July and 1 August, 1997, for presence and flowering/fruitleting. 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

Native prairie grasses and forbs accounted for over 93% of the vegetative cover of long term walking transects and permanent plots (Tables 1 and 2). Weedy grasses had about 3% cover and weedy forbs and annual and biennial forbs had 1.5% cover. Trees and shrubs had less than 1% cover (Tables 1 and 2).

Big bluestem (*Andropogon gerardii*) was the leading dominant at 40.40% cover for walking transects (WT) (Table 1) and 35.44% cover in permanent plots (Table 2). Indiangrass (*Sorghastrum nutans*) was the second leading dominant at 8.36% cover for walking transects and 12.21% cover for permanent plots (Tables 1 & 2). Switchgrass (*Panicum virgatum*) had lower cover at 3.33% and 3.36% cover in walking transects and permanent plots, respectively. Little bluestem (*Schizachyrium scoparium*), Canada wildrye (*Elymus canadensis*), side-oats grama (*Bouteloua curtipendula*), Virginia wildrye (*Elymus virginicus*) had cover values of less than 1% (Tables 1 & 2). Sedge species (*Carex spp.*) occurred in only one plot and had average cover of 0.07% in permanent plots (Table 2).

Weedy grasses had cover values at 2% or greater on all the walking transects except #3, but had less than 1% cover on permanent plots. Kentucky bluegrass (*Poa pratensis*) cover was 9.84% on WT2, especially at the north end of the transect (Table 1, Table A1, Figure 1). smooth bromegrass (*Bromus inermis*) was most prominent in WT1 at 5.48%, especially at the east end (Table 1, Table A1, Figure 1). Reed canary grass (*Phalaris arundinacea*) (4) was found in both WT1 and WT5 at around 2% cover (Table 1, Table A1, Figure 1).

Canada goldenrod (*Solidago canadensis*) had the greatest cover among prairie forbs averaging about 28% (Tables 1 and 2). Prairie ragwort (*Senecio plattensis*), hairy aster (*Aster pilosus*), and common horsetail (*Equisetum arvense*) had more than 1% cover in both walking transects and permanent plots. Bigtooth sunflower (*Helianthus grosseserratus*) and rigid sunflower (*H. rigidus*) were prominent in PP3 along with horsemint (*Monarda fistulosa*) (Table 2). Fifteen prairie forb species were encountered in the walking transects and 16 were present in permanent plots (Tables 1 and 2).

Only four species of weedy forbs (perennials) were observed, all with cover values at 1% or slightly higher (Tables 1 and 2). Dandelion (*Taraxacum officinale*) was the most prominent perennial weed. Canada thistle (*Cirsium arvense*) appeared in WT5 at the west end (Tables 1 and A1) and in PP8 (Table 2). Both plots had cover of about 1%.

Among weedy annuals and biennials meadow parsnip (*Pastinaca sativa*) was most prominent, averaging 1.28% over both walking transects and permanent plots. Total cover of this group of weeds averaged 1.58% cover (Tables 1 and 2).

Tree and shrub cover was very low in walking transects, 0.13% cover, and 1.78% in permanent plots (Tables 1 and 2). Riverbank grape (*Vitis riparia*) had the highest cover in PP10 at 6.61% and in PP7 at 4.81%.

#### Permanent Plots 11-14

Permanent plots 11 and 12, seeded in 1992, were dominated by Kentucky bluegrass at 51.23% cover (Table 3). Prairie grasses totaled 18.57% cover with Indiangrass, big bluestem, side-oats grama, and little bluestem all above 3% cover. PP11 had more prairie grass cover with Indiangrass at 11.12% and big bluestem at 9.05% (Table 3). Eleven species of prairie forbs were encountered with yellow coneflower leading at 11.55% cover. Canada goldenrod had 6.62% cover with the remaining species below 3% cover (Table 3). Weedy forbs and weedy annual/perennial cover was below 1% (Table 3).

Permanent plots 13 and 14, seeded in 1994, were dominated by weedy grasses. PP13 had reed canary grass (4) at 18.94% and orchard grass at 3.60% cover (Table 3). PP14 had quackgrass and Kentucky bluegrass as dominants at 37.56% and 24.32% respectively (Table 3) with no prairie grasses being sampled. Yellow coneflower, horsemint, hairy aster, and brown-eyed Susan (*Rudbeckia triloba*) were the leading prairie forbs accounting for about 36% of the average cover (Table 3). Golden alexanders (*Zizia aurea*) also was prominent at 2.78% average cover.

Dandelion was the only weedy perennial forb at 0.64% average cover and weedy annual/biennial forbs had 3.8% average cover lead by giant ragweed (*Ambrosia trifida*) with 3.21% average cover (Table 3).

### Forb Transects

Forb transect 1 (FT1) had 20 species relocated while 14 were relocated in forb transect 2 (Table A3). In FT1 the most abundant species were pale purple coneflower (*Echinacea pallida*) (20), tick trefoil (*Desmodium canadense*) (8), yellow coneflower (8), white prairie clover (*Dalea candida*) (7), rosinweed (*Silphium integrifolium*) (5), and compass plant (*S. laciniatum*) (4). In forb transect 2 (FT2) the most abundant species were tall cinquefoil (*Potentilla arguta*) (41), rattlesnake master (*Eryngium yuccifolium*) (27), yellow coneflower (24), pale purple coneflower (17), tick trefoil (12), rosinweed (10), white false indigo (*Baptisia lactea*) (8), compass plant (8), and oxeye (*Heliopsis helianthoides*) (7). In most species all the plants observed were flowering except for pale purple coneflower in which 13 of 20 plants (65%) flowered in FT1 and 14 of 17 (82%) in FT2. In FT2 rattlesnake master had 19 of 27 plants (63%) flowering (Table A3).

## **Discussion**

### Walking Transects and Permanent Plots

Cover of prairie grasses remains approximately the same as in the recent past. Over the last three years cover was 57%, 54%, and 54% in walking transects for 1995, 1996, and 1997, respectively. In the permanent plots cover was 51%, 48% and 52% for the same years (Tables 1 & 2 and (5,6)).

Prairie forb cover also was quite stable in walking transects, decreasing slightly from 1996 levels, but more than in 1995; 1995-35%, 1996-40%, and 1997-38%. In permanent plots the cover was also decreased from 1996; 1995-45%, 1996-46%, and 1997-43% (Tables 1 & 2 and (5,6)). Canada goldenrod continues as the leading forb in cover with 27% cover in 1997 in walking transects and 29% cover in permanent plots. This is a slight increase over last year by when cover was at 25% in walking transects and 28% in permanent plots (4). Prairie ragwort was the second leading prairie forb in 1997 with 4% cover in walking transacts and 3% cover in permanent plots (Tables 1 and 2).

Weedy grasses had low cover in permanent plots, less than 1% down slightly from 1.3% 1996. In walking transects the cover was 5.4%. this compares with 4% in

1996 (Table 1 and 2 and (5)). The addition of reed canary grass to the list increased the total by 1%.

Canada thistle occurred only in WT5 and PP8 which had not been sampled for several years (Tables 1 and 2). Meadow parsnip was the leading annual/biennial weed at 0.13% in permanent plots and 0.8% in walking transacts (Tables 1 and 2).

Riverbank grape occurred in PP7 and 10 with overall cover of 1.3% (Table 2). Other woody cover was insignificant.

#### 1992 and 1994 Seeded Areas

Permanent plots 11-14 are maturing after being seeded in 1992 (PP11 & 12) and 1994 (PP13 & 14). In plots 11 and 12 prairie grasses have not increased substantially in the last 3 years while weedy grasses continue to increase, especially Kentucky bluegrass. Prairie grasses had total cover of just over 18% while weedy grasses were at 54% (Table 4). Twenty-four species of prairie forbs have been sampled since 1992 in PP11 and PP12. Of that number, eleven species were sampled in 1997. Cover has increased for yellow coneflower, rigid goldenrod, Canada goldenrod, tall bush clover and tall cinquefoil. As expected, black-eyed Susan, a biennial, has decreased from a high in year 2 (1993) at 16.3% cover to 0.3% cover in year 6 (1997). A group of prairie forbs which were sampled at low levels, generally less than 2% cover, have not been sampled in the past two years. The species were butterfly milkweed, heath aster, common milkweed, Daisy fleabane, and wild lettuce. All of these species are somewhat weedy, especially Daisy fleabane and wild lettuce (Table 4). Other weedy species have essentially disappeared from the seeding. Alsike clover is an interesting example. It peaked in years 2 to 4 at 10% to 13% cover and then fell to 0% in year 5 and 0.3% in year 6 (Table 4).

PP13 and PP14 have had four years to develop after seeding. Situated in a lower and wetter site (Figure 1) with a different species mix than plots 11 and 12 the progression is somewhat different. Canada wildrye is decreasing in cover as would be expected from a high of 11% in year 3 (1994) to 4% in year 4 (1997) (Table 5). Other prairie grasses have not become established at substantial levels. Weedy grasses have followed the classic pattern with giant foxtail and other foxtail grasses important in the first two years with perennial grasses quackgrass, Kentucky bluegrass, and to a lesser extent orchard grass, increasing in cover beginning in the second year (1995) (Table 5). Reed canary grass first appeared in year 3 (1996) and increased in year 4 to 9.75% cover. On these two plots weedy grasses had 45% of the cover in 1997 (Table 5). Twenty-four species of prairie forbs have been sampled over the four year period.

Yellow coneflower and horsemint are the leading dominants increasing to 16% and 13%, respectively, in 1997 (Table 5). Fourteen additional species were sampled in 1997. Canada anemone and golden alexanders were new additions in 1997. Of the species sampled in past years, but not present in 1997, swamp milkweed might be expected to increase over time, but most other species are better adapted to disturbed conditions and are unlikely to add significant cover in future years (Table 5). Almost all weedy forbs have been eliminated in the succession except giant ragweed. Its cover decreased considerably from 1996 to 1997 and strong competition from perennial species is likely to keep it from becoming dominant (Table 5).

### Forb Transects

Flowering patterns of various species are becoming clear after six years of following individual forb plants. Several species flowered above 95% for the six years of the study (Table 6). They were golden alexanders, golden coreopsis (*Coreopsis tinctoria*), purple prairie clover (*Dalea purpurea*), lead plant (*Amorpha canescens*), white prairie clover, oxeye, and rosinweed. Close behind, above 90%, were spiderwort (*Tradescantia* sp.), horsemint, rattlesnake master, and yellow coneflower. Tall bush clover, tick trefoil, and tall cinquefoil flowered above 80% with pale purple coneflower, white false indigo, and compass plant bringing up the rear between 65% and 48%.

### Additional Forb Plantings

Over the past few years, but particularly while inventorying the prairie in 1996 and 1997, it was evident that forb plantings had been made in numerous locations on the prairie. These outplantings probably were made at the same time as the area where the forb transects 1 and 2 are located. This would have been in the late 1970's although details on the numbers and species set out are not available. In his notes and in conversations with Dr. Roger Landers (who contracted with Herbert Hoover NHS in 1975-77 to do research on establishment of prairie plants) his main involvement was planting sunflowers (*Helianthus* spp.) in the drainage way west of the gravesite and establishing forb transplants to the south of the gravesite (area of forb transects 1 and 2). Other forb outplantings referred to above might have been the work of Youth Conservation Corps (YCC) projects in the late 1970's. The species observed in the scattered plantings are all present in the forb transects area. Those same species occur on a list made by me to be collected in the fall of 1975 by Landers and myself for use at Herbert Hoover NHS in connection with Landers' research.

Table 7 lists species planned for collection, species established in forb transects one and two, and species observed in the eight sites noted in 1998. Approximate site locations are plotted on Figure 2.

Several species on the list for seed collection (Christiansen/Landers List) have not been observed on the prairie including prairie blazing star (*Liatris pycnostachya*), rough blazing star (*L. aspera*), shooting star (*Dodecatheon meadia*), and Virginia mountain mint (*Pycnanthemum virginianum*). Species in the plantings but not on the collection list include golden alexanders, golden coreopsis, lead plant, rosinweed, spiderwort, and white false indigo. These species apparently were added after the seed collection list was prepared. All species in the outplantings are present in the forb transects. However, there seems no way to know if additional species were set out or which species, of those set out, survived. What the list of outplanted species perhaps shows is a group of species which are good candidates for successful plantings.

### **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 had a large amount of giant ragweed as well as cool-season weedy grasses. Mowing to prevent seed set of giant ragweed has been successful in decreasing its cover. However, opening up the canopy with mowing favors the cool-season grasses (Kentucky bluegrass, quackgrass, and reed canary grass), 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. Cutting the larger branches into smaller pieces allows more of the slash to lie near the ground where it will decay more rapidly. Occasional burns will eventually eliminate the slash.

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 having few forbs and spread the seeds there. The best sites would be adjacent to a trail and into an area burned in the previous season.

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 after the first frost.

### References and Notes

- 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 For purposes of this report reed canary grass is considered a weedy grass rather than a native grass. The taxon present is clearly an European cultivar rather than native reed canary grass.
- 5 Christiansen, Paul. 1996, Prairie inventory: Herbert Hoover National Historic Site. Unpublished report. Herbert Hoover National Historic Site, West Branch, IA 52358-0607.
- 6 Christiansen, Paul. 1995, Prairie inventory: Herbert Hoover National Historic Site. Unpublished report. Herbert Hoover National Historic Site, West Branch, IA 52358-0607.

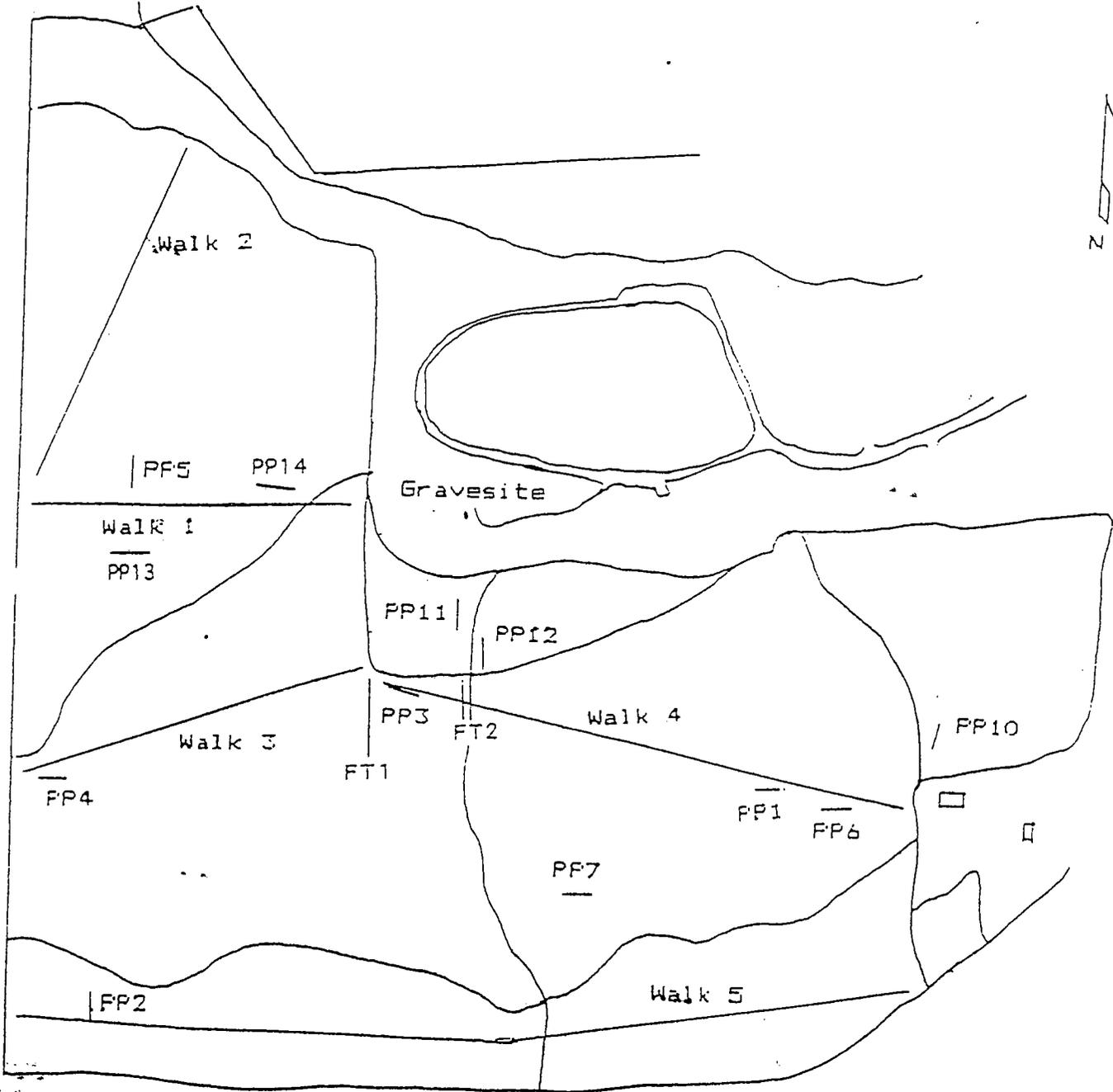


Figure 1. Herbert Hoover national Historic Site giving location of walking transects (walk n), permanent plots (PPn), and forb plots (FTn).

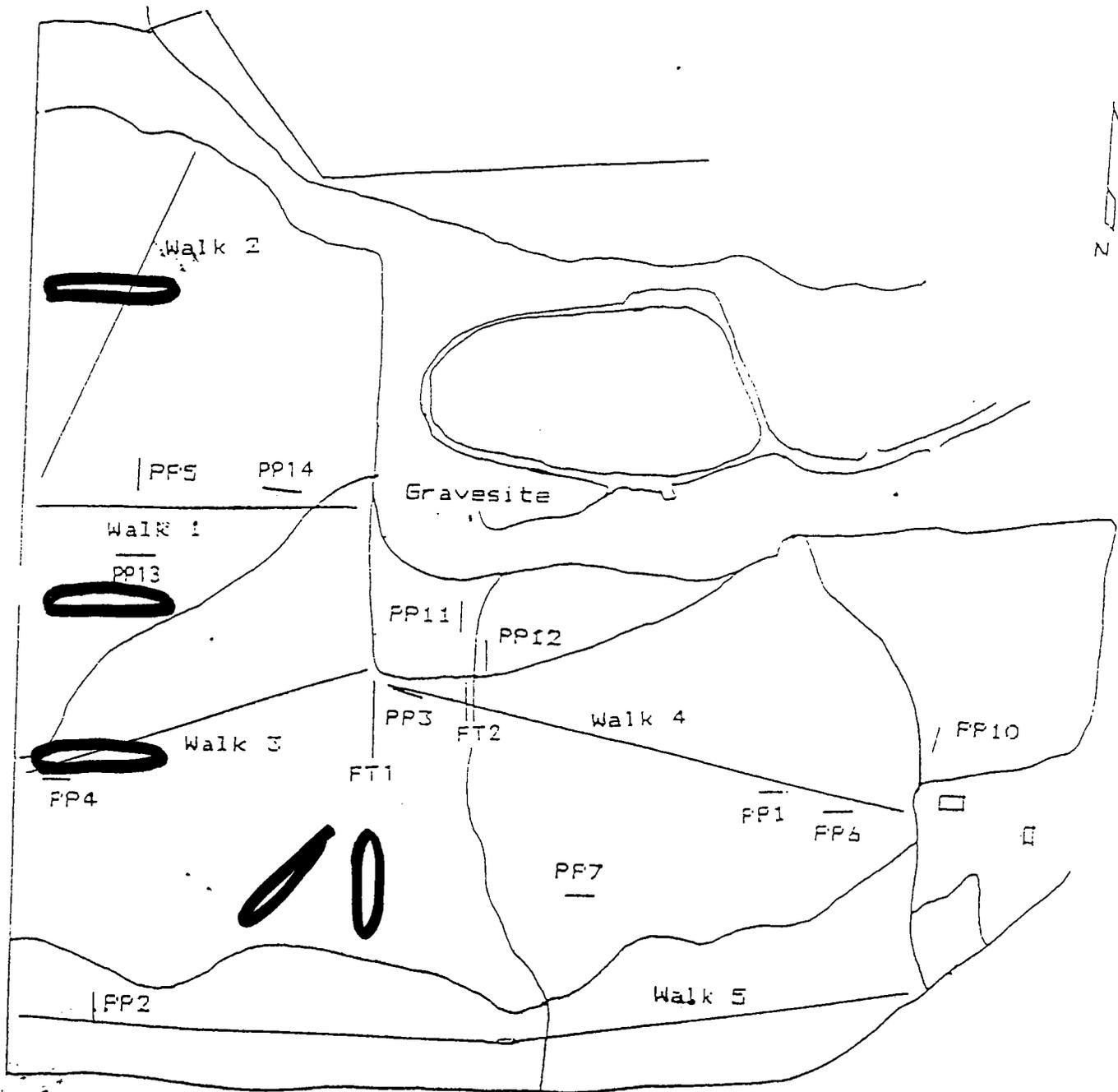


Figure 2. Herbert Hoover National Historic Site giving locations of outplanted forbs.

Herbert Hoover NHS Prairie Inventory, 1997

**Table 1. Composite of walking transects, August, 1997 (% relative cover)**

Species	Transect and number of plots					Total--107
	1--15	2--15	3--17	4--23	5--37	
<b>Prairie grasses</b>						
big bluestem	37.48	44.91	38.56	32.26	45.66	40.40
Indiangrass	8.15	5.56	14.96	9.62	5.76	8.36
switchgrass	6.52	1.39	1.57	5.94	2.00	3.33
Canada wildrye	2.67	1.39	0.79		0.79	0.97
little bluestem					2.79	0.96
Virginia wildrye	0.89					0.12
					<b>Subtotal</b>	<b>54.14</b>
<b>Weedy grasses</b>						
Kentucky bluegrass		9.84	0.26	0.57	2.79	2.51
smooth brome grass	5.48	3.59		3.21		1.96
reed canary grass	1.78				2.06	0.96
					<b>Subtotal</b>	<b>5.43</b>
<b>Prairie forbs</b>						
Canada goldenrod	10.81	17.01	30.31	35.85	31.05	27.16
prairie ragwort		2.43	9.19	7.45	1.88	4.05
horsemint	5.04	3.13				1.15
yellow coneflower	7.41					1.04
field thistle	1.78		0.79	0.66	1.09	0.89
hairy aster	3.56	1.50		0.09	0.42	0.87
wild lettuce				2.55	0.73	0.80
smooth goldenrod		2.43	0.79			0.47
tick trefoil	1.78		0.79			0.38
clammy groundcherry		1.39	0.79			0.32
common horsetail		0.23			0.36	0.16
Virginia groundcherry	0.89					0.12
pale purple coneflower				0.57		0.12
milk vetch		0.69				0.10
heath aster				0.09	0.06	0.04
					<b>Subtotal</b>	<b>37.67</b>
<b>Weedy forbs</b>						
dandelion	1.93	2.20	0.79	0.57	0.73	1.08
Canada thistle					1.09	0.38
plantain	0.89					0.12
					<b>Subtotal</b>	<b>1.58</b>
<b>Weedy annuals/biennials</b>						
meadow parsnip	1.93	0.81	0.13	0.57	0.73	0.78
field bindweed	0.89					0.12
white sweetclover		0.69	0.13			0.12
common ragweed	0.15					0.02
					<b>Subtotal</b>	<b>1.04</b>
<b>Trees and shrubs</b>						
black cherry		0.69				0.10
black raspberry			0.13			0.02
dogwood		0.12				0.02
					<b>Subtotal</b>	<b>0.13</b>
					<b>Grand total</b>	<b>100.00</b>

Herbert Hoover NHS Prairie Inventory, 1997

Table 2. Composite of permanent plots, August, 1997 (% relative cover)

Species	PP1	PP2	PP3	PP4	PP5	PP6	PP7	PP8	PP10	Mean % Cover
<b>Prairie grasses</b>										
big bluestem	12.44	35.36	37.30	28.89	40.30	43.50	34.78	41.89	44.51	35.44
Indiangrass	9.77	6.86	4.00	19.20	10.65	24.00	16.00	11.57	7.83	12.21
switchgrass	5.03	5.94	0.10	1.76	1.81	1.89	0.72	2.64	10.37	3.36
little bluestem						1.26			4.67	0.66
side-oats grama									0.61	0.07
sedge	0.59									0.07
									<b>Subtotal</b>	<b>51.80</b>
<b>Weedy grasses</b>										
Kentucky bluegrass	1.48		1.54	2.06	0.10				0.61	0.64
quackgrass								0.75		0.08
smooth brome			0.61							0.07
									<b>Subtotal</b>	<b>0.79</b>
<b>Prairie forbs</b>										
Canada goldenrod	52.71	36.28	1.23	33.59	30.95	26.21	40.55	24.15	19.61	29.48
prairie ragwort	10.17		7.99	2.06	2.11	1.89	0.72		2.74	3.08
rigid sunflower			17.62							1.96
hairy aster	1.78	0.79	1.95	0.10	6.63	1.26		1.51	1.22	1.69
bigtooth sunflower			13.11							1.46
wild lettuce	1.79		0.61	4.51	0.60				0.61	0.90
common horsetail				5.58			2.29			0.87
golden alexanders								6.92		0.77
field thistle			3.38				0.12	2.64		0.68
horsemint			6.05							0.67
smooth goldenrod	3.06									0.34
Virginia groundcherry					2.11					0.23
tick trefoil								1.89		0.21
clammy groundcherry								1.51		0.17
heath aster			0.72							0.08
common milkweed			0.10							0.01
									<b>Subtotal</b>	<b>42.60</b>
<b>Weedy forbs</b>										
dandelion	0.59	1.58		0.10	1.21			2.64		0.68
field bindweed	0.59				0.80					0.15
Canada thistle								0.88		0.10
									<b>Subtotal</b>	<b>0.93</b>
<b>Annual/biennial forbs</b>										
meadow parsnip		13.19			2.71			0.13		1.78
white sweetclover				2.15						0.24
giant ragweed								0.88		0.10
									<b>Subtotal</b>	<b>2.12</b>
<b>Trees and shrubs</b>										
riverbank grape							4.81		6.61	1.27
raspberry			3.07							0.34
honeysuckle			0.61							0.07
Siberian elm									0.61	0.07
									<b>Subtotal</b>	<b>1.75</b>
									<b>Grand Total</b>	<b>100.00</b>

Herbert Hoover NHS Prairie Inventory, 1997

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

Species	PP11	PP12	Mean	Species	PP13	PP14	Mean
<b>Prairie grasses</b>				<b>Prairie grasses</b>			
Indiangrass	11.12	2.45	6.79	Canada wildrye	8.36		4.18
big bluestem	9.05		4.53	big bluestem	1.90		0.95
side-oats grama	6.03	0.61	3.32	sedge species		0.09	0.05
litle bluestem	0.09	5.92	3.01	<b>Subtotal</b>			<b>5.18</b>
switchgrass		1.22	0.61				
<b>Subtotal</b>			<b>18.25</b>				
<b>Weedy grasses</b>				<b>Weedy grasses</b>			
Kentucky bluegrass	55.51	46.94	51.23	Kentucky bluegrass		24.32	12.16
alta fescue	1.32	3.37	2.35	quackgrass		37.56	18.78
<b>Subtotal</b>			<b>53.57</b>	reed canary grass	18.94	0.56	9.75
				orchardgrass	3.60	0.56	2.08
				<b>Subtotal</b>			<b>42.77</b>
<b>Prairie forbs</b>				<b>Prairie forbs</b>			
yellow coneflower	4.62	18.47	11.55	yellow coneflower	26.67	5.59	16.13
Canada goldenrod	6.50	6.73	6.62	horsemint	11.85	14.26	13.06
tall bushclover	2.92	2.76	2.84	hairy aster	3.49	3.63	3.56
tall cinquefoil		4.08	2.04	brown-eyed Susan	5.82	0.56	3.19
rigid goldenrod	0.57	2.76	1.67	golden alexanders	4.44	1.12	2.78
showy goldenrod		1.63	0.82	sneezeweed	0.63	2.33	1.48
clammy ground-cherry		1.22	0.61	obedient plant	2.22	0.56	1.39
black-eyed Susan		0.61	0.31	cup plant		2.33	1.17
field thistle		0.61	0.31	rigid goldenrod	2.22		1.11
purple prairie clover	0.57		0.29	black-eyed Susan	1.90		0.95
oxeye	0.57		0.29	field thistle	1.27	0.56	0.92
<b>Subtotal</b>			<b>27.31</b>	Canada goldenrod	0.63	0.56	0.60
				tick trefoil	0.63		0.32
				common horsetail	0.63		0.32
				rough avens		0.56	0.28
				Canada anemone		0.56	0.28
				<b>Subtotal</b>			<b>47.51</b>
<b>Weedy forbs</b>				<b>Weedy forbs</b>			
alsike clover		0.61	0.31	dandelion	1.27		0.64
<b>Subtotal</b>			<b>0.31</b>	<b>Subtotal</b>			<b>0.64</b>
<b>Weedy annuals/biennials</b>				<b>Weedy annuals/biennials</b>			
meadow parsnip	1.13		0.57	giant ragweed	2.22	4.19	3.21
<b>Subtotal</b>			<b>0.57</b>	meadow parsnip	0.63		0.32
<b>Grand Total</b>			<b>100.01</b>	prickly lettuce	0.63		0.32
				Queen Anne's lace		0.09	0.05
				<b>Subtotal</b>			<b>3.88</b>
				<b>Grand Total</b>			<b>99.97</b>

**Table 4. Composite of Permanent Plots #11 & #12, 1992-1997\***

Species	Percent Relative Cover					
	1992	1993	1994	1995	1996	1997
<b>Prairie grasses</b>						
big bluestem	75%	0.66	2.32	3.89	4.92	4.53
Indiangrass	5%	0.53	3.92	5.53	5.44	6.79
side-oats grama	30%	3.84	4.28	2.78	4.49	3.32
little bluestem			0.97	0.26	2.37	3.01
switchgrass						0.61
<b>Weedy grasses</b>						
Kentucky bluegrass	35%	21.74	30.98	35.72	44.39	51.23
alta fescue	10%	6.71	5.30	3.51	2.78	2.35
foxtail species	5%	0.61				
crabgrass	15%					
timothy		2.01	1.29	1.18	0.22	
<b>Prairie forbs</b>						
yellow coneflower	15%	11.6	10.88	11.33	13.31	11.55
black-eyed Susan	15%	16.34	8.08	7.74	0.22	0.31
Canada goldenrod		2.92	9.39	9.79	8.89	6.62
tall bushclover	15%	0.66	1.01	1.71	1.73	2.84
Tall cinquefoil		0.23	0.44	0.26	1.15	2.04
rigid goldenrod		0.68	1.23	1.54	2.66	1.67
clammy groundcherry		1.18	0.22	0.28	0.48	0.61
field thistle	5%	2.89	0.04		0.22	0.31
oxeye		0.53			0.26	0.29
purple prairie clover	15%			0.28	2.27	0.29
showy goldenrod						0.82
white prairie clover				0.24	0.44	
tick trefoil	5%					
mint species?	20%					
unknown composite	5%	0.23				
cinquefoil (Potentilla recta)		0.57				
butterfly milkweed		0.53	0.44	0.90		
heath aster		2.78	3.06	0.57		
common milkweed		0.26	0.47	0.24		
Daisy fleabane		0.25	0.50	0.36		
wild lettuce		2.03	0.25			
Virginia groundcherry			0.25			
smooth goldenrod				0.26		
pale purple coneflower					0.22	

\*/1992 Percent frequency

Table 4 (cont)\*

Species	1992	1993	1994	1995	1996	1997
<b>Weedy perennial forbs</b>						
alsike clover	5%	10.53	13.03	8.29		0.31
Canada thistle	10%	2.99	0.34	0.64		
dandelion	15%	1.51	0.47	1.39	1.76	
field bindweed		0.04		0.56	0.22	
yellow wood-sorrel		0.49		0.04		
alfalfa			0.29			
black medic				0.09		
<b>Weedy annuals/biennials</b>						
giant ragweed	5%					
jimsonweed	10%					
fireweed	50%			0.30		
pigweed	10%					
common ragweed		0.26				
horseweed		4.23				
black nightshade		0.05				
soybean			0.55			
red clover				0.30	0.22	
yellow sweetclover					0.22	
meadow parsnip						0.57
<b>Trees and Shrubs</b>						
white mulberry				0.04		

---

\*1992 Percent frequency

**Table 5. Composite of Permanent Plots #13 & #14, 1994-1997**

Seeded in May, 1994 Species	Percent Relative Cover			
	1994	1995	1996	1997
<b>Prairie grasses</b>				
Canada wildrye		7.53	11.10	4.18
big bluestem			1.24	0.95
side-oats grama	0.40			
native grasses	0.43			
switchgrass		0.05		
sedge	0.55			0.05
<b>Weedy grasses</b>				
giant foxtail	79.26			
yellow foxtail	0.40			
foxtail species		3.18	0.99	
Japanese bromegrass		6.97	4.17	
quackgrass		6.36	11.43	18.78
Kentucky bluegrass		2.71	13.08	12.16
orchardgrass		2.92	0.62	2.08
reed canary grass			8.37	9.75
<b>Prairie forbs</b>				
yellow coneflower	1.96	1.76	8.23	16.13
horsemint	0.09	1.33	7.81	13.06
black-eyed Susan	1.85	31.47	1.06	0.95
common horsetail	0.09	0.05	0.05	0.32
cup plant		0.28	1.33	1.17
rigid goldenrod		0.31	0.28	1.11
tick trefoil	0.16		0.25	0.32
brown-eyed Susan			1.86	3.19
hairy aster			2.03	3.56
obedient plant			0.28	1.39
sneezeweed			1.64	1.48
field thistle			1.73	0.92
Canada goldenrod			0.71	0.6
Canada anemone				0.28
golden alexanders				2.78
rough avens				0.28
common milkweed	0.09			
ragwort	0.09			
Virginia groundcherry	5.01			
white avens	0.09		0.50	
Pitcher's sage		0.31		
rough cinquefoil		2.41		
swamp milkweed		0.05		
Canada milkvetch		0.59	0.28	
clammy groundcherry		0.31	0.56	
Daisy fleabane		0.28	0.28	

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**Table 5 (cont.)**

Species	Percent Relative Cover			
	1994	1995	1996	1997
<b>Weedy perennial forbs</b>				
dandelion	0.49			0.64
alfalfa	0.09			
Smartweed species		5.28		
Smooth dock		1.26		
Mint species		0.70		
Curly dock		0.28		
Horse nettle		0.05		
Dandelion		0.70	0.28	
yellow wood-sorrel			0.05	
field bindweed			0.28	
<b>Weedy annuals/biennials</b>				
giant ragweed		20.88	17.71	3.21
Queen Anne's lace			0.53	0.05
wild parsnip			0.28	0.32
pennyroyal			0.05	
prickly lettuce				0.32
smartweed	3.49			
buttonweed	2.05			
seedlings	1.20			
flower-of-an-hour	0.69			
speedwell?	0.64			
smooth dock	0.40			
mustard	0.40			
horseweed		1.08		
shepard's purse		0.05		
horseweed		1.08	0.05	
<b>Trees and shrubs</b>				
white mulberry seedlings	0.07			

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Table 6. Flowering Percentage of Forbs in Forb Transects from 1992 to 1997

Species	Forb Transect 1		Forb Transect 2		Mean
golden alexanders	8 of 8	100%			100%
golden coreopsis			12 of 12	100%	100%
purple prairie clover	6 of 6	100%			100%
lead plant			11 of 11	100%	100%
white prairie clover	32 of 32	100%	5 of 5	100%	100%
oxeye	10 of 11	91%	30 of 30	100%	98%
rosinweed	26 of 29	90%	53 of 53	100%	96%
spiderwort	7 of 8	87%	10 of 10	100%	94%
horsemint	13 of 14	93%			93%
rattlesnake master	8 of 11	73%	137 of 150	91%	90%
yellow coneflower	35 of 37	95%	102 of 115	89%	90%
tall bush clover	20 of 23	87%			87%
tick trefoil	99 of 107	93%	38 of 53	72%	86%
tall cinquefoil	14 of 18	78%	166 of 203	82%	81%
pale purple coneflower	66 of 111	59%	52 of 70	74%	65%
white false indigo	15 of 15	100%	23 of 51	45%	59%
compass plant	14 of 25	56%	13 of 31	42%	48%

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Table 7. Forb Species Observed in Selected Sites

Species	Christiansen/ Landers List	Forb Transect		Outlying Plantings
		One	Two	
blue aster	x	x		
Canada wildrye		*	*	4/8
compass plant	x	x	x	1/8
golden alexanders		x	x	
golden coreopsis			x	
horsemint	x	x		
lead plant			x	2/8
oxeye	x	x	x	4/8
pale purple coneflower	x	x	x	3/8
prairie blazing star	x			
purple prairie clover	x	x		
rattlesnake master	x	x	x	1/8
rigid goldenrod	x	x		
rosinweed			x	
rough blazingstar	x			
shooting star	x			
tick trefoil	x	x	x	4/8
spiderwort		x	x	3/8
tall bush clover	x	x		4/8
tall cinquefoil	x	x	x	4/8
Virginia mountain mint	x			
white false indigo		x	x	5/8
white prairie clover	x	x	x	
yellow coneflower	x	x	x	4/8

\* / Canada wildrye has been observed in the forb transects but individual plants have not been marked or followed.

## Appendix

Table A1	Walking transect data	A2
Table A2	Permanent plots, percent cover and percent frequency	A5
Table A3	Forb transects occurrences for 1992-1997	A12
Table A4	Perm plot locations	A20
Table A5	Plant names	A21

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<b>Table A1. Walking transect quadrat data</b>																			
<b>Walking transect 1</b>		1 August, 1997																	
	Sample Number																Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	#	Cover	Rel Cover	Frequency
smooth brome grass	4	2	2													3	6.17	5.48	20.00
wild parsnip	2	1	2									3				3	2.17	1.93	20.00
Canada goldenrod	2	2	4					2						3	3	6	12.17	10.81	40.00
big bluestem		5	2	6	1			5	2	5	3	3	6	3	3	12	42.17	37.48	80.00
hairy aster			2		2							2	2			4	4.00	3.56	26.67
yellow coneflower				4	4											2	8.33	7.41	13.33
switchgrass				2	1						3	3		1	2	6	7.33	6.52	40.00
Canada wildrye					2	2							2			3	3.00	2.67	20.00
field thistle						2						2				2	2.00	1.78	13.33
wild bergamot							5									1	5.67	5.04	6.67
reed canary grass							2				2					2	2.00	1.78	13.33
plantain							2									1	1.00	0.89	6.67
Virginia wildrye								2								1	1.00	0.89	6.67
Indiangrass								2	5	3						3	9.17	8.15	20.00
dandelion									2		2				1	3	2.17	1.93	20.00
common ragweed									1							1	0.17	0.15	6.67
Virginia groundcherry										2						1	1.00	0.89	6.67
field bindweed											2					1	1.00	0.89	6.67
tick trefoil												2	2	3		3	2.00	1.78	13.33
																	112.50	100.00	
<b>Walking transect 2</b>		1 August, 1997																	
	Sample Number																Percent	Percent	Percent
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	#	Cover	Rel Cover	Frequency
big bluestem	5	4	3	4	6	6	4	5	6	5	6	4	3			13	64.67	44.91	86.67
Canada goldenrod	3		3			2		2		1	3	3	5	4	3	10	24.50	17.01	66.67
hairy aster	2			1			2									3	2.17	1.50	20.00
dandelion	2	1								2					2	4	3.17	2.20	26.67
Indiangrass		2	3	3			2	2								5	8.00	5.56	33.33
common horsetail		1	1													2	0.33	0.23	13.33
wild parsnip				1										2		2	1.17	0.81	13.33
smooth goldenrod					2								3			2	3.50	2.43	13.33
black cherry							2									1	1.00	0.69	6.67
Canada wildrye							2						2			2	2.00	1.39	13.33
Kentucky bluegrass							2	2					5	6		4	14.17	9.84	26.67
dogwood								1								1	0.17	0.12	6.67
white sweetclover									2							1	1.00	0.69	6.67
switchgrass									2	2						2	2.00	1.39	13.33
prairie ragwort									3	2						2	3.50	2.43	13.33
clammy groundcherry										2						2	2.00	1.39	13.33
wild bergamot											2	3		2		3	4.50	3.13	20.00
smooth brome grass													2	4	2	2	5.17	3.59	13.33
milk vetch															2	1	1.00	0.69	6.67
																	144.00	100.00	

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<b>Table A1 (cont.)</b>																														
<b>Walking transect 3</b>		1 August, 1997																												
		Sample Number																	Percent		Percent		Percent							
Species		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	#	Cover	Rel Cover	Frequency								
prairie ragwort	3																		8	10.29	9.19	47.06								
white sweetclover	1																		1	0.15	0.13	5.88								
switchgrass	2																		2	1.76	1.57	11.76								
Kentucky bluegrass	1																		2	0.29	0.26	11.76								
big bluestem	3	5	3	2		3	5	3		3	4	4	2	3	5	5	2	15	43.24	38.58	88.24									
Canada goldenrod	1	4	2	3	4	3	3	2		3	4	4	3	2	2	2	4	16	33.97	30.31	94.12									
black raspberry		1																	1	0.15	0.13	5.88								
tick trefoil			2																1	0.88	0.79	5.88								
Indiangrass			2	3	2	3		3		4			2	4			1	9	16.76	14.96	52.94									
clammy grandcherry			2																1	0.88	0.79	5.88								
wild parsnip			2	3	2	2	3		1										1	0.15	0.13	5.88								
smooth goldenrod						2													1	0.88	0.79	5.88								
dandelion									3	1									1	0.88	0.79	5.88								
field thistle									2										1	0.88	0.79	5.88								
Canada wildrye																	2		1	0.88	0.79	5.88								
																				112.06	100.00									
<b>Walking transect 4</b>		4 August, 1997																												
		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	21	22	23	#	Cover	Rel Cover	Frequency		
smooth brome	5																									1	3.70	3.21	4.35	
Canada goldenrod	3	2	2					3	6	3	4	2	5	2	1	5	4	5	3	5	3	3	4	3	20	41.30	35.85	86.96		
big bluestem		5	3	4	6	4				2	5		2	2		4		5			6	2	6	14	37.17	32.26	60.87			
Indiangrass		2	3			2	3				2	2		3	2				2			2	3	11	11.09	9.62	47.83			
heath aster		1																							1	0.11	0.09	4.35		
prairie ragwort			3			3			3		1		2	3				2	2						8	8.59	7.45	34.78		
dandelion			2																						1	0.65	0.57	4.35		
pale purple coneflower				2																					1	0.65	0.57	4.35		
switchgrass							3	2					3		3				2	2				6	6.85	5.94	26.09			
field thistle								1		2															2	0.76	0.66	8.70		
wild parship										2															1	0.65	0.57	4.35		
hairy aster									1																1	0.11	0.09	4.35		
wild lettuce										2	2		3												3	2.93	2.55	13.04		
Kentucky bluegrass											2														1	0.65	0.57	4.35		
																										115.22	100.00			

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Table A1 (cont.)																									
Walking transect 5		4 August, 1997																							
		Sample Number																							
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
switchgrass	3							2										2							
big bluestem	4	6	5	3	4	5	3	3	4	4	5	1	3	2	6	4	5	4	2	3					
field thistle		2																							
Indiangrass		2			1	2	5		2	2		2	1		2		3			1					
Canada goldenrod			2	3	2	2		2		1	2	3	3	5	6	3		3	3	4					
little bluestem								3						1											
Kentucky bluegrass												4				2			3						
wild parsnip													2												
heath aster													1												
dandelion																			2						
wild lettuce																				2	2				
prairie ragwort																					2				
common horsetail																									
hairy aster																									
Canada wildrye																									
reed canary grass																									
Canada thistle																									
																						Percent	Percent	Percent	
																						#	Cover	Rel Cover	Frequency
switchgrass																					4	2.23	2.00	10.81	
big bluestem			4		3	2	5	5	6	3	5	5	2				4		5	32	50.88	45.66	86.49		
field thistle										2											3	1.22	1.09	8.11	
Indiangrass					2					1	6										13	6.42	5.76	35.14	
Canada goldenrod			4	5	3	5	2	3	2		2		5	2	4	5	5	4			28	34.59	31.05	75.68	
little bluestem																					4	3.11	2.79	10.81	
Kentucky bluegrass																					3	3.11	2.79	8.11	
wild parsnip															2						2	0.81	0.73	5.41	
heath aster																					1	0.07	0.06	2.70	
dandelion															2						2	0.81	0.73	5.41	
wild lettuce																					2	0.81	0.73	5.41	
prairie ragwort			4																		2	2.09	1.88	5.41	
common horsetail			2																		1	0.41	0.36	2.70	
hairy aster				2	1																2	0.47	0.42	5.41	
Canada wildrye				1														2	2	3		0.88	0.79	8.11	
reed canary grass														5							1	2.30	2.06	2.70	
Canada thistle																				2	3	1.22	1.09	8.11	
																						111.42	100.00		

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Table A2. Permanent Plot Data																									
Permanent Plot 1		4 August, 1997																							
Species	Sample Number																				#	Percent	Percent	Percent	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Cover	Rel Cover	Frequency	
smooth goldenrod	4	2																				2	3.88	3.06	10.00
Canada goldenrod	4	5	5	6	4	4	6	5	5	5	4	4	4	4	4	3	4	2	2	2	20	66.75	52.71	100.00	
sedge species			2																			1	0.75	0.59	5.00
Kentucky bluegrass					3																	1	1.88	1.48	5.00
Indiangrass					2	3			2					4	1	4			2	3	8	12.38	9.77	40.00	
dandelion						2																1	0.75	0.59	5.00
wild lettuce							2		2		2											3	2.25	1.78	15.00
hairy aster								2		2	2											3	2.25	1.78	15.00
prairie ragwort								2		2	2	3		2	2	2	2	2	3	4	11	12.88	10.17	55.00	
switchgrass												3	3						3	2	4	6.38	5.03	20.00	
big bluestem														2	2	3		5	2	5	4	7	15.75	12.44	35.00
field bindweed																			2			1	0.75	0.59	5.00
																							126.63	100.00	
Permanent Plot 2		5 August, 1997																							
Species	Sample Number																				#	Percent	Percent	Percent	
	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	4	4	3	4	3	3	3	5	4	4		2	2		1	2	3	2	3	1	18	34.38	36.28	90.00	
Indiangrass		2									3				1	3				3	5	6.50	6.86	25.00	
dandelion	2				2																2	1.50	1.58	10.00	
wild parsnip	2	1	2	2	2	3	3	2	2	3	2			2				2			13	12.50	13.19	65.00	
switchgrass	2			2		2		2						2				3			6	5.63	5.94	30.00	
big bluestem										4	2	3	6	6	3	5	3	2	3	5	4	12	33.50	35.36	60.00
hairy aster														2								1	0.75	0.79	5.00
																							94.75	100.00	

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<b>Table A2 (cont.)</b>																											
<b>Permanent Plot 3</b>		4 August, 1997																									
		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		
rigid sunflower		4	3	2	2	4	5	3	2	4				3									10	21.50	17.62	50.00	
smooth brome		2																				1	0.75	0.61	5.00		
Kentucky bluegrass		3																				1	1.88	1.54	5.00		
black raspberry			2	2		2	2										2					5	3.75	3.07	25.00		
big bluestem			3	3	3	3	3	3	4	3	3	4	4	5	5	3	4	4	3	2		19	45.50	37.30	95.00		
Canada goldenrod			2								2										3	2	1.50	1.23	10.00		
switchgrass			1																			1	0.13	0.10	5.00		
wild bergamot				5	4																	2	7.38	6.05	10.00		
prairie ragwort					3	3				2	3	3							2	2		7	9.75	7.99	35.00		
wild lettuce						2																1	0.75	0.61	5.00		
field thistle							2	2						2			3					4	4.13	3.38	20.00		
Indiangrass								2	2					2			2			3		5	4.88	4.00	25.00		
heath aster								2	1													2	0.88	0.72	10.00		
hairy aster										2							2	1		2		4	2.38	1.95	20.00		
saw-tooth sunflower											3	3	2	4	3	2		2	4		3	9	16.00	13.11	45.00		
common milkweed															1							1	0.13	0.10	5.00		
Tartarian honeysuckle																					2	1	0.75	0.61	5.00		
																							122.00	100.00			
<b>Permanent Plot 4</b>		5 August, 1997																									
		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		4	3	4	3	2	2	3	3	2	3	4	3	3	3	4	3	4	4	3	4	20	42.88	33.59	100.00		
white sweetclover		3			1	2																3	2.75	2.15	15.00		
big bluestem		4	5	4	2	2	3	3	1	4	3	3	3	3	2	3	3	4	2	3	1	20	36.88	28.89	100.00		
common horsetail		3	2	1	2		2	1	2	1	2	1	1		2			1				13	7.13	5.58	65.00		
Indiangrass					3	3	3	2	1	2	3	3	3	3	2	3	3	2	2	3	3	17	24.50	19.20	85.00		
hairy aster						1																1	0.13	0.10	5.00		
switchgrass												2			2				2			3	2.25	1.76	15.00		
wild lettuce														3			1					4	5.75	4.51	20.00		
Kentucky bluegrass																			2			2	2.63	2.06	10.00		
dandelion																			1			1	0.13	0.10	5.00		
prairie ragwort																				2	3	2	2.63	2.06	10.00		
																							127.63	100.00			

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Table A2 (cont.)																										
Permanent Plot 5																										
5 August, 1997																										
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	4	3	6	4	4	5	4	4	4	3			2		2	4	2	2		3	16	38.50	30.95	80.00		
switchgrass	2	2					2														3	2.25	1.81	15.00		
wild parsnip	2						1		1	2		2				2					1	7	3.38	2.71	35.00	
big bluestem	2	3	3	4			2	4		4	6	6	6	4		3	5	5	5	4	16	50.13	40.30	80.00		
field bindweed	1											1		2								3	1.00	0.80	15.00	
hairy aster		3			2				2	2				2	3	2	2						8	8.25	6.63	40.00
Indiangrass			2			2				1					4		1	2		2	7	13.25	10.65	35.00		
Virginia groundcherry				2	3																	2	2.63	2.11	10.00	
Kentucky bluegrass					1																	1	0.13	0.10	5.00	
wild lettuce														2						1		1	0.75	0.60	5.00	
dandelion																2				2		2	1.50	1.21	10.00	
prairie ragwort																			3	2		2	2.63	2.11	10.00	
																							124.38	100.00		
Permanent Plot 6																										
4 August, 1997																										
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	4	4	3	2	4	2	2	2	4	3	3	3	3	2		3	3	3	2		17	31.25	26.21	85.00		
big bluestem	5	4	2	5	4	5	3	5	5	5	5	3	3	2	5	3		3	2	5	18	51.88	43.50	90.00		
Indiangrass		2	3	2	2	2	3	2	2	2	1	3	4	5	2	3	5	2	3	2	19	28.63	24.00	95.00		
switchgrass				2							2											3	2.25	1.89	15.00	
little bluestem															2							7	1.50	1.26	35.00	
hairy aster																2			2			2	1.50	1.26	10.00	
prairie ragwort																			2	2	2	3	2.25	1.89	15.00	
																							119.25	100.00		
Permanent Plot 7																										
4 August, 1997																										
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	3	1	3	3	3	4	4	4	3	3	3	3	4	3	2	4	2	3	5	20	42.13	40.55	100.00		
Indiangrass	3	3	1		3	2		2	2	3		3	2					2	2	3	2	14	16.63	16.00	70.00	
prairie ragwort	2																					1	0.75	0.72	5.00	
common horsetail	2	2	2												1							4	2.38	2.29	20.00	
big bluestem		1	4	4	2	4	4	3	2	3	3	2	4	4	3	6	3	3	2	4	17	36.13	34.78	85.00		
switchgrass			2																			1	0.75	0.72	5.00	
riverbank grape													5	2								2	5.00	4.81	10.00	
field thistle																				1		1	0.13	0.12	5.00	
																							103.88	100.00		

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Table 2 (cont.)																								
Permanent Plot 8		5 August, 1997																						
Species	Sample Number																				Percent	Percent	Percent	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Cover	Rel Cover	Frequency
big bluestem	2		3	3		3	4	3	5	4	6	3		3	5	5	3	2	4	3	16	41.63	41.89	80.00
Indiangrass	2	3	2			2						4	2				1	3	2	2	10	11.50	11.57	50.00
clammy groundcherry	2			2																	2	1.50	1.51	10.00
quackgrass	2																				1	0.75	0.75	5.00
Canada goldenrod		4	3	2				5	2	4			6	3	3	2	2			3	11	24.00	24.15	55.00
Canada thistle		2										1									2	0.88	0.88	10.00
giant ragweed			2			1															2	0.88	0.88	10.00
hairy aster				2															2		2	1.50	1.51	10.00
field thistle					3													2			2	2.63	2.64	10.00
switchgrass						3															2	2.63	2.64	10.00
wild parsnip						1															1	0.13	0.13	5.00
golden alexanders							3	3									4				3	6.88	6.92	15.00
dandelion									3										2		2	2.63	2.64	10.00
tick trefoil																		3			1	1.88	1.89	5.00
																						99.38	100.00	
Permanent Plot 10		4 August, 1997																						
Species	Sample Number																				Percent	Percent	Percent	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	#	Cover	Rel Cover	Frequency
big bluestem	5	3	3	5	4	2	4	3	4	5	6	3	3	2	6	4	2	2	4	5	20	54.75	44.51	100.00
wild lettuce	2																				1	0.75	0.61	5.00
Indiangrass	2				2	2	1	3	4	2	2								2		9	9.63	7.83	45.00
Canada goldenrod	2	2			1			2	1	2		2	4	4	2	4	4	3	3	4	15	24.13	19.61	75.00
Kentucky bluegrass	2																				1	0.75	0.61	5.00
riverbank grape		4		5	2																3	8.13	6.61	15.00
prairie ragwort				1	2	2	1	2	1							2					7	3.38	2.74	35.00
little bluestem						5	2	2													3	5.75	4.67	15.00
side-oats grama							2														1	0.75	0.61	5.00
switchgrass											4	3	4	2	2			4			6	12.75	10.37	30.00
hairy aster											2										2	1.50	1.22	10.00
Siberian elm																		2			1	0.75	0.61	5.00
																						123.00	100.00	

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Table A2 (cont.)																									
Permanent Plot 11		5 August, 1997																							
Species	Sample Number																				#	Percent Cover	Percent Rel Cover	Percent Frequency	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
Kentucky bluegrass	6	5	6	5		5	5	5	4	6	4	5	4	5	5	4	4	4	4	4	19	73.63	55.51	95.00	
Canada goldenrod	2		3					2			3	2						3	2		7	8.63	6.50	35.00	
alta fescue	2	2	1	1																	4	1.75	1.32	20.00	
wild parsnip	2			2																	2	1.50	1.13	10.00	
tall bush clover		3		1			3														3	3.88	2.92	15.00	
big bluestem					3		2		3		3	2		2		2	2	3	2		10	12.00	9.05	50.00	
Indiangrass					3	2			3			2	5	3	3	2			2		9	14.75	11.12	45.00	
yellow coneflower					2	2									4		2	2			5	6.13	4.62	25.00	
side-oats grama								2	2							2		2		5	6	8.00	6.03	30.00	
little bluestem							1														1	0.13	0.09	5.00	
purple prairie clover								2													1	0.75	0.57	5.00	
rigid goldenrod								2													1	0.75	0.57	5.00	
oxeye																	2				1	0.75	0.57	5.00	
																							132.63	100.00	
Herbert Hoove National Historic Site																									
Permanent Plot 12		5 August, 1997																							
Species	Sample Number																				#	Percent Cover	Percent Rel Cover	Percent Frequency	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
Kentucky bluegrass	5	4	3	5	4	4	3	4	4	4	4	5	5	3	3	3	3	4	4	5	19	57.50	46.94	95.00	
little bluestem	2		3		3	3	2				1										6	7.25	5.92	30.00	
yellow coneflower		3		2			4			1	2	2	2		2	5	2	4	2	3	13	22.63	18.47	65.00	
showy goldenrod			3		1																2	2.00	1.63	10.00	
Indiangrass			2			2	2									2					4	3.00	2.45	20.00	
switchgrass			2						2												2	1.50	1.22	10.00	
clammy groundcherry					2															2	2	1.50	1.22	10.00	
Canada goldenrod						2		3		2	2	2	2		2		3				8	8.25	6.73	40.00	
side-oats grama						2															1	0.75	0.61	5.00	
alta fescue							2								2		2		3		4	4.13	3.37	20.00	
tall cinquefoil								2						5							2	5.00	4.08	10.00	
rigid goldenrod									2	3								2			3	3.38	2.76	15.00	
black-eyed Susan										2											1	0.75	0.61	5.00	
round-headed bush clover										2					2						3	3.38	2.76	15.00	
alsike clover													2								1	0.75	0.61	5.00	
field thistle																				2	1	0.75	0.61	5.00	
																							122.50	100.00	

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Table 2 (cont.)																								
Permanent Plot 13		5 August, 1997																						
Species	Sample Number																				Percent Cover	Percent Rel Cover	Percent Frequency	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				#
wild bergamot	3	3	3			2			2	2	5			2				3		2	8	14.00	11.85	40.00
rigid goldenrod	3															2					2	2.63	2.22	10.00
obedient plant	2												2								2	2.63	2.22	10.00
Canada wildrye	2	2	3	2	2		3	2		2		2		2				1			11	9.88	8.36	55.00
tall coneflower	2			5									3								3	6.88	5.82	15.00
common horsetail	2																				1	0.75	0.63	5.00
reed canary grass		3				6		5	2			4				6		3	2		8	22.38	18.94	40.00
yellow coneflower		2	3		3		4	4	5	5	2	1	2	5	6				2	2	14	31.50	26.67	70.00
golden alexanders					3						2		3						2		4	5.25	4.44	20.00
dandelion				2																2	2	1.50	1.27	10.00
wild parsnip							2														1	0.75	0.63	5.00
big bluestem									2						2						3	2.25	1.90	15.00
black-eyed Susan										2				2				2			3	2.25	1.90	15.00
tick trefoil											2										1	0.75	0.63	5.00
hairy aster													2				3	2	2		4	4.13	3.49	20.00
orchard grass																	5				1	4.25	3.60	5.00
field thistle																	2			2	2	1.50	1.27	10.00
giant ragweed																		2		3	2	2.63	2.22	10.00
sneezeweed																		2			1	0.75	0.63	5.00
Canada goldenrod																				2	1	0.75	0.63	5.00
prickly lettuce																				2	1	0.75	0.63	5.00
																						118.13	100.00	

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Table A2 (cont.)																									
Permanent Plot 14																									
5 August, 1997																									
Species	Sample Number																				#	Percent Cover	Percent Rel Cover	Percent Frequency	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
wild bergamot	4	2	2	5	2	2	4							2	2	2		2	3	2	13	19.13	14.26	65.00	
quackgrass	3	5	6			4	3	2	4	3	3	4	5	3	4	4	4	4	3	4	18	50.38	37.56	90.00	
yellow coneflower	3					2				2	2					3		2			7	7.50	5.59	35.00	
Canada anemone	2																				1	0.75	0.56	5.00	
tall coneflower		2																			1	0.75	0.56	5.00	
hairy aster			2	2		2						3			2						5	4.88	3.63	25.00	
giant ragweed				2		2	2	2	2			3									2	6	5.63	4.19	30.00
Queen Anne's lace				1																	1	1	0.13	0.09	5.00
golden alexanders				2	2																2	2	1.50	1.12	10.00
sneezeweed					4																1	1	3.13	2.33	5.00
sedge species					1																1	1	0.13	0.09	5.00
cup plant										4											1	1	3.13	2.33	5.00
Canada goldenrod						2															1	1	0.75	0.56	5.00
"flat grass"							2														1	1	0.75	0.56	5.00
rough avens								2													1	1	0.75	0.56	5.00
reed canary grass									2												1	1	0.75	0.56	5.00
Kentucky bluegrass								3	4	4	4	4	2	4		1	4	4	4	3	12	32.63	24.32	60.00	
field thistle											2										1	1	0.75	0.56	5.00
obedient plant																			2		1	1	0.75	0.56	5.00
																							134.13	100.00	

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Table A3. Forb Transect Occurrences for 1992, 1993, 1994, 1995, 1996, and 1997.									
Forb Transect #1									
* = flowering/fruitletting, NF = not flowering, NoLo = not located, NYF = not yet flowering									
31 July, 1 August, 1997									
Number	Species	1992	1993	1994	1995	1996	1997	Transect	Lateral
								(m)	E/W (m)
94 (no tag)	Showy sunflower			*	*	NYF	NYF	0.00	2.7-11.5E
92-1-39	Pale purple coneflower	*	NF	NoLo	NoLo	NoLo	NoLo	3.70	3.70E
95-1-1	Horsenint			*	*	NYF	*	5.00	7.90E
94 (no tag)	Showy sunflower			*	*	NYF	NYF	5.00	2.25-15.0+E
96-1-1	Yellow coneflower					*	*	5.00	7.50E
97-1-1	Rigid goldenrod						*	5.00	7.50E
95-1-2	Horsenint				*	NYF	*	3.75	7.90E
92-1-28	Pale purple coneflower	*	*	*	*	*	*	6.60	0.90W
94 (no tag)	Rosinweed			*	?	NL	NL	7.20	8.40W
92-1-1	Pale purple coneflower	*	NoLo	NF	NF	NF	NF	7.60	2.10E
95-1-3	Horsenint				*	NoLo	*	8.75	9.15E
95-1-4	Tick trefoil			*	*	NYF	*	8.85	0.40E
93 (no tag)	Bigtooth sunflower		NF	NoLo	NoLo	NoLo	NoLo	8.90?	0.75W
93 (no tag)	Bigtooth sunflower(96 EW dia 1.4		NF	*	NF	NYF	NYF	9.75	1.70E
97-1-3	Dogbane (Ap. sib.)						NF	10.90	0.40W
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	*	NoLo	NoLo	NoLo	NoLo	NoLo	12.80	4.30W
92-1-71	Smooth aster	*	NoLo	*	NF	NYF	NoLo	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	*	NoLo	*	*	*	*	13.55	10.25E
94 (no tag)	Compass plant			*	NoLo	NoLo	NoLo	16.00	9.40W
96-1-3	Pale purple coneflower					*	*	16.15	0.40E
95-1-29	Horsenint		*	*	*	NYF	*	18.30	5.50W
92-1-26	Spiderwort	*	NF	NoLo	*	*	*	19.55	0.40W
92-1-25	Pale purple coneflower	*	NF	*	*	NF	*	21.25	1.90W
97-1-2	Tall cinquefoil						*	22.30	1.50E
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		*	NoLo	NoLo	NoLo	NoLo	24.00	9.65E
95-1-10	Rosinweed			*	*	*	*	24.00	9.55E
92-1-22	Pale purple coneflower	NF	*	NF	NF	*	*	24.35	2.55W
92-1-23	Compass plant	NF	NF	NF	*	NF	NF	24.40	3.05W
92-1-20	Rosinweed	*	*	*	*	NYF	*	24.65	3.25W
92-1-4	Pale purple coneflower	*	NF	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

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Table A3 (cont.).									
Forb Transect #1 (cont.)								31 July, 1 August, 1997	
*=flowering/fruitleting, NF=not flowering, NYF=not yet flowering, NoLo=not located									
Number	Species	1992	1993	1994	1995	1996	1997	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	*	•	*	•	•	NF	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	*	*	*	NF	26.80	1.40E
92-1-8	White prairie clover	•	*	*	*	*	Dead	26.90	0.90E
92-1-9	Pale purple coneflower	•	NF	•	NF	*	NF	27.10	0.35E
92-1-15	Yellow coneflower	*	•	*	*	*	*	27.45	5.30W
92-1-16	Rattlesnake master	*	NoLo	•	*	*	*	27.75	0.95W
95-1-15	Bigtooth sunflower		*	*	•	NYF	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	NF	29.10	2.50E
92-1-18	White prairie clover				*	*	*	29.45	4.70E
92-1-13	Pale purple coneflower	NF	•	NF	NF	•	*	29.50	3.95E
92-1-12	White prairie clover	•	•	*	*	*	*	29.70	4.90E
92-1-14	Tall cinquefoil	NF	NF	*	*	NYF	NoLo	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	*	•	*	*	*	*	29.75	5.15E
92-1-30	Pale purple coneflower	*	NF	•	NF	*	*	30.30	3.70E
92-1-31	Pale purple coneflower	•	•	NF	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	NoLo	NF	NoLo	33.30	5.55E
95-1-22	Tick trefoil			*	•	NYF	NL	33.35	3.65E
96-1-21A	Tick trefoil			*	NoLo	NF	dead	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	dead	34.00	3.20E
92-1-37	Tick trefoil	•	•	dead	NoLo	NoLo	NoLo	34.30	7.05E
92-1-38	Tick trefoil	*	*	dead	NoLo	NoLo	NoLo	34.30	7.05E

## Herbert Hoover NHS Prairie Inventory, 1997

Table A3 (cont.).									
Forb Transect #1 (cont.)								31 July, 1 August, 1997	
*=flowering/fruitletting, NF=not flowering, NYF=not yet flowering, NoLo=not located									
Number	Species	1992	1993	1994	1995	1996	1997	Transect (m)	Lateral E/W (m)
94 (no tag)	Tick trefoil			•	NoLo	NoLo	NoLo	34.50	3.80E
92-1-66	Tick trefoil	*	•	NoLo	NoLo	NoLo	NoLo	35.10	7.85W
92-1-40	Tick trefoil	*	NoLo	NoLo	NoLo	NoLo	NoLo	35.95	3.40E
92-1-65	Tick trefoil	•	NoLo	NoLo	NoLo	NoLo	NoLo	36.90	0.50W
92-1-41	Tick trefoil	•	•	•	*	NoLo	dead	37.55	2.00E
92-1-42	Tick trefoil	•	•	NoLo	NoLo	NoLo	NoLo	37.95	2.90E
92-1-64	Tick trefoil	*	NoLo	*	NoLo	NoLo	NoLo	38.50	7.85W
92-1-43	Tick trefoil	•	NoLo	NoLo	NoLo	NoLo	NoLo	39.30	0.60E
92-1-44	Tick trefoil	*	NoLo	NoLo	NoLo	NoLo	NoLo	39.45	3.05E
92-1-45	Tick trefoil	*	•	NoLo	NoLo	NoLo	NoLo	40.05	2.75E
92-1-46	Tick trefoil	*	*	*	NoLo	NoLo	NoLo	40.20	4.45E
92-1-49	Tick trefoil	•	NoLo	NoLo	NoLo	NoLo	NoLo	40.30	2.60E
92-1-48	Tick trefoil	NF	•	NoLo	NoLo	NoLo	NoLo	40.40	2.80E
92-1-47	Tick trefoil	NF	*	*	•	NoLo	NoLo	40.85	2.85E
92-1-50	Tick trefoil (tag lost '94)	•	*	*	NoLo	NoLo	NoLo	41.05	2.65E
92-1-51	Tick trefoil	*	NoLo	NoLo	NoLo	NoLo	NoLo	41.15	2.05E
92-1-52	Tick trefoil	*	*	*	*	NYF	*	41.70	0.75E
92-1-53	Tick trefoil	*	NoLo	NoLo	NoLo	NoLo	NoLo	42.35	3.35E
92-1-54	Tick trefoil	*	*	*	NoLo	NoLo	NoLo	44.40	4.50E
5-1-25	Compass plant				*	*	*	45.50	9.20W
94 (no tag)	Tick trefoil			*	NoLo	NoLo	NoLo	45.80	6.60E
92-1-55	Tick trefoil	•	NoLo	NoLo	NoLo	NoLo	NoLo	45.85	6.35E
92-1-56	White false indigo	*	*	*	*	•	*	46.00	3.60E
92-1-63	Pale purple coneflower	•	NF	•	NoLo	NF	NF	46.05	7.60W
94 (no tag)	Tick trefoil			*	NoLo	NoLo	NoLo	46.10	6.50E
95-1-20	White false indigo				*	*	•	47.60	7.70E
92-1-62	Compass plant	•	NF	*	*	NF	*	48.20	9.35W
92-1-57	Tall bushclover	*	*	*	*	*	*	49.55	4.00E
95-1-21	Pale purple coneflower				*	NF	NF	50.35	4.10E
92-1-61	Tick trefoil	*	*	*	•	NYF	NoLo	50.70	8.10W
95-1-24	Pale purple coneflower				NF	*	*	50.55	7.20E
96-1-4	Pale purple coneflower					•	dead	50.55	7.20W
95-1-23	White prairie clover				*	•	•	50.70	7.10E
92-1-58	Tick trefoil	*	*	NF	NoLo	NoLo	NoLo	54.00	4.05E
95-1-22	Yellow coneflower			*	•	•	*	54.55	3.80E
92-1-59	Purple prairie clover	*	*	*	*	*	*	54.55	0.80E
92-1-60	Tick trefoil	•	*	*	*	NYF	dead	57.05	4.90E
95 (no tag)	Evening primrose 13 plants				*		NF	45.2-47.3	1.5-3.6W
"134"	Stake							44.25	7.05E

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Table A3 (cont.)									
Forb Transect #2								28 & 31 July, 1997	
*=flowering/fruitletting, NF=not flowering, NoLo=not located, NYF=not yet flowering									
Number	Species	1992	1993	1994	1995	1996	1997	Transect (m)	Lateral EW (m)
95-2-97	Tick trefoil				NF	NoLo	NoLo	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					*	NF	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	NoLo	*	2.90	1.80W
96-2-8	Tick trefoil					NF	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					NoLo	NoLo	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	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	2.20E
93-2-4	Oxeye		*	*	*	*	*	4.70	7.10E
95-2-99	Tick trefoil				NF	NYF	NL	4.80	7.55E
93-2-2	Tall cinquefoil		*	*	NF	NF	NF	4.85	1.90E
92-2-6	Rattlesnake master	*	NF	*	*	*	*	5.00	6.10E
95-2-103	Tick trefoil				NF	NYF	NF	5.00	3.20E
93-2-3	Rattlesnake master		*	NoLo	NoLo	NoLo	NoLo	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	NoLo	*	5.35	4.90E
95-2-119	Oxeye				*	*	*	5.40	0.95W
95-2-104	Tall cinquefoil				NF	*	NF	5.40	2.75E
92-2-8	Tick trefoil	*	*	*	*	NYF	*	5.55	2.80E
92-2-7	Pale purple coneflower	*	*	NoLo	NoLo	NoLo	NoLo	5.60	3.28E
95-2-120	Tall cinquefoil				NF	*	*	5.60	2.60W
94-2-1	Tick trefoil			*	NF	NoLo	NoLo	5.60	4.10E
92-2-95	White false indigo	*	NF	*	*	*	*	5.70	0.80W

## Herbert Hoover NHS Prairie Inventory, 1997

Table A3 (cont.)									
Forb Transect #2 (cont.)								28 & 31 July, 1997	
*=flowering/fruitletting, NF=not flowering, NoLo=not located, NYF=not yet flowering									
Number	Species	1992	1993	1994	1995	1996	1997	Transect (m)	Lateral E/W (m)
92-2-9	White false indigo	*	NoLo	NF	•	*	*	5.70	0.60E
96-2-11	Pale purple coneflower					•	NF	5.70	3.85W
95-2-102	Tick trefoil				NF	NYF	*	5.80	3.75E
94-2-2	Tall cinquefoil			* NF	NF	NF	NL	6.05	3.55E
94-2-3	White false indigo			NF	NF	NF	*	6.10	3.80E
95-2-121	Rattlesnake master		*	NoLo	•	*	•	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	•	NoLo	•	*	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	NoLo	NF	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	NoLo	NoLo	NoLo	NoLo	NoLo	7.55	3.20W
95-2-107	Tall cinquefoil	*	*	*	*	*	*	7.60	2.40E
92-2-87	Pale purple coneflower	NF	•	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	*	*	NoLo	•	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	NF	8.40	1.85W
92-2-22	Tall cinquefoil	*	*	•	*	*	*	8.60	2.40E
95-2-108	Tall cinquefoil				*	NoLo	NoLo	8.80	6.00E
92-2-85	Yellow coneflower	NoLo	NoLo	*	*	•	•	8.80	4.10W
95-2-131	Tall cinquefoil				•	NF	*	8.90	0.60W
92-2-84	Yellow coneflower	NF	•	*	*	*	*	9.00	4.10E

Herbert Hoover NHS Prairie Inventory, 1997

Table A3 (cont.)									
Forb Transect #2 (cont.)								28 & 31 July, 1997	
* = flowering/fruitleting, NF = not flowering, NoLo = not located, NYF = not yet flowering									
Number	Species	1992	1993	1994	1995	1996	1997	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	NoLo	*	Gone	NoLo	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	NoLo	NF	•	*	9.20	2.45W
95-2-109	Tall cinquefoil					*	*	9.20	2.80E
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	NF	9.40	3.00W
95-2-129	Yellow coneflower			*	*	*	*	9.40	5.50W
92-2-77	Yellow coneflower	NF	*	NoLo	•	•	NF	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		•	NoLo	NoLo	•	*	9.60	5.46W
92-2-78	Yellow coneflower	NF	•	NoLo	•	NF	•	9.70	2.70W
92-2-26	Rosinweed	•	NL	•	•	•	*	9.70	0.25E
95-2-134	Tall cinquefoil		*	NoLo	•	NF	•	9.90	0.70W
95-2-135	Tall cinquefoil		*	NoLo	*	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		*	NoLo	•	•	•	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				*	*	NF	12.40	2.30E
92-2-31	Pale purple coneflower	*	*	NF	NoLo	NoLo	NoLo	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	*	NoLo	*	*	*	NF	13.60	2.90E
94-2-11	Golden coreopsis			*	*	NYF	*	14.30	3.95W
92-2-34	Rattlesnake master	*	•	*	•	•	NF	14.40	2.90E
92-2-69	Rattlesnake master	*	•	*	*	*	*	14.50	2.40W

## Herbert Hoover NHS Prairie Inventory, 1997

Table A3 (cont.)									
Forb Transect #2 (cont.)								28 & 31 July, 1997	
*=flowering/fruiling, NF=not flowering, NoLo=not located, NYF=not yet flowering									
Number	Species	1992	1993	1994	1995	1996	1997	Transect (m)	Lateral E/W (m)
95-2-114	Tall cinquefoil				*	*	*	14.60	4.30E
92-2-35	Rattlesnake master	*	NoLo	NoLo	NoLo	*	NoLo	14.80	2.70E
92-2-37	Tall cinquefoil	*	NL	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	*	*	*	*	*	NF	14.90	2.80E
92-2-39	Tall cinquefoil	*	*	*	*	*	*	15.00	0.35E
94-2-10	Compass plant		*	NoLo	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 lost	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	*	NoLo	*	*	NoLo	dead	18.10	1.60W
93 (no tag)	Tick trefoil		*	NoLo	NoLo	NoLo	NoLo	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	NoLo	NoLo	NoLo	NF	dead	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	*	*	*	NoLo	*	NF	19.50	3.90W
92-2-47	Rattlesnake master	*	*	*	*	*	*	19.70	0.40E
92-2-66	Compass plant	NF	NF	NF	*	NF	NF	17.90	0.60W
92-2-51	Rattlesnake master	*	NF	*	*	*	*	20.30	5.45E
92-2-49	Rattlesnake master	*	NF	*	*	*	NF	20.60	3.45E
92-2-48	Tall cinquefoil	*	NF	*	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		*	NoLo	*	*	*	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

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Table A3 (cont.)									
Forb Transect #2 (cont.)								28 & 31 July, 1997	
*=flowering/fruitlet, NF=not flowering, NoLo=not located, NYF=not yet flowering									
Number	Species	1992	1993	1994	1995	1996	1997	Transect (m)	Lateral EW (m)
97-2-1	Compass plant						NF	26.00	2.80E?W?
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	*	*	*	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 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
<b>Grasses</b>	
Barnyard grass	<i>Echinochloa sp.</i>
xKentucky bluegrass	<i>Poa pratensis</i>
Big bluestem	<i>Andropogon scoparius</i>
Little bluestem	<i>Schizachyrium scoparium</i>
xJapanese bromegrass	<i>Bromus japonicus</i>
xSmooth bromegrass	<i>Bromus inermis</i>
xCrabgrass	<i>Digitaria sp.</i>
xAlta fescue	<i>Festuca arundinacea</i>
xFoxtail species	<i>Setaria leutescens, S. faberi, and S. viridis</i>
xGiant foxtail	<i>Setaria faberi</i>
xGreen foxtail	<i>Setaria viridis</i>
xYellow foxtail	<i>Setaria leutescens</i>
Side-oats grama	<i>Bouteloua curtipendula</i>
Indiangrass	<i>Sorghastrum nutans</i>
Muhleygrass	<i>Muhlenbergia sp.</i>
Nimblewill	<i>Muhlenbergia schreberi</i>
xOrchardgrass	<i>Dactylis glomerata</i>
xQuackgrass	<i>Agropyron repens</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Rosette panicgrass	<i>Panicum (Dicanthelium) sp.</i>
Squirrel tail grass	<i>Hordeum jubatum</i>
Switchgrass	<i>Panicum virgatum</i>
xTimothy	<i>Phleum pratense</i>
Canada wildrye	<i>Elymus canadensis</i>
Yellow nutsedge	<i>Cyperus esculentus</i>
Rush	<i>Cyperus sp.</i>
<b>Composites</b>	
Aster	<i>Aster sp.</i>
Blue aster	<i>Aster laevis</i>
Hairy aster	<i>Aster pilosus</i>
Heath (many-flowered) aster	<i>Aster ericoides</i>
Blazing star	<i>Liatris aspera</i>
Brown-headed coneflower	<i>Rudbeckia triloba</i>
xBurdock	<i>Arctium minus</i>
Compass plant	<i>Silphium laciniatum</i>
pale purple coneflower	<i>Echinacea pallida</i>
Yellow (gray-headed) coneflower	<i>Ratibida pinnata</i>
Cup plant	<i>Silphium perfoliatum</i>
xDandelion	<i>Taraxacum officinalis</i>
Prairie dock	<i>Silphium terebinthinaceum</i>
Daisy fleabane	<i>Erigeron annuus</i>
Fireweed	<i>Erichitites hieracifolia</i>
Goldenrod	<i>Solidago sp.</i>
Canada goldenrod	<i>Solidago canadensis</i>
Late goldenrod	<i>Solidago gigantea</i>
Rigid goldenrod	<i>Solidago rigida</i>
Showy goldenrod	<i>Solidago speciosa</i>
Horseweed (mare's tail)	<i>Conyza canadensis</i>
xPrickly lettuce	<i>Lactuca scariola</i>
Wild lettuce	<i>Lactuca canadensis</i>
Oxeye	<i>Heliopsis helianthoides</i>
Giant ragweed	<i>Ambrosia trifida</i>
Little (common) ragweed	<i>Ambrosia artemisiifolia</i>
Rosinweed	<i>Silphium integrifolium</i>

Table A5. Plant names (cont).

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

**Table A5. Plant names (cont).**

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