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**FLORISTIC DIFFERENCES
IN PERMANENT OPENINGS AMONG
ECOLOGICAL LAND UNITS AND AFTER FIRE**

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FLORISTIC DIFFERENCES IN PERMANENT OPENINGS AMONG ECOLOGICAL LAND UNITS AND AFTER FIRE

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Introduction

Permanent openings are an integral part of the Forest Plan on the Chippewa National Forest. There are established across a range of ecological units using numerous methods. It is unclear, however, how floristic composition changes as a function of site or establishment method, or how quickly these changes occur. The objective of this study were:

- 1) To assess differences in the species composition of permanent openings among Landtype Associations (LTAs).
- 2) To assess the effects of mechanical treatments on species composition.
- 3) To assess the effects of fire on species composition, particularly on woody vegetation.

Study Design

Paired permanent opening were established in three LTAs:

LTA E - Guthrie Till Plain - Loamy Till Ground Moraine
LTA A - Itasca Moraine - Loam/Clay Loamy Till
LTA C - Nashwuak-Warba and Marcell Moraines - Sandy Till

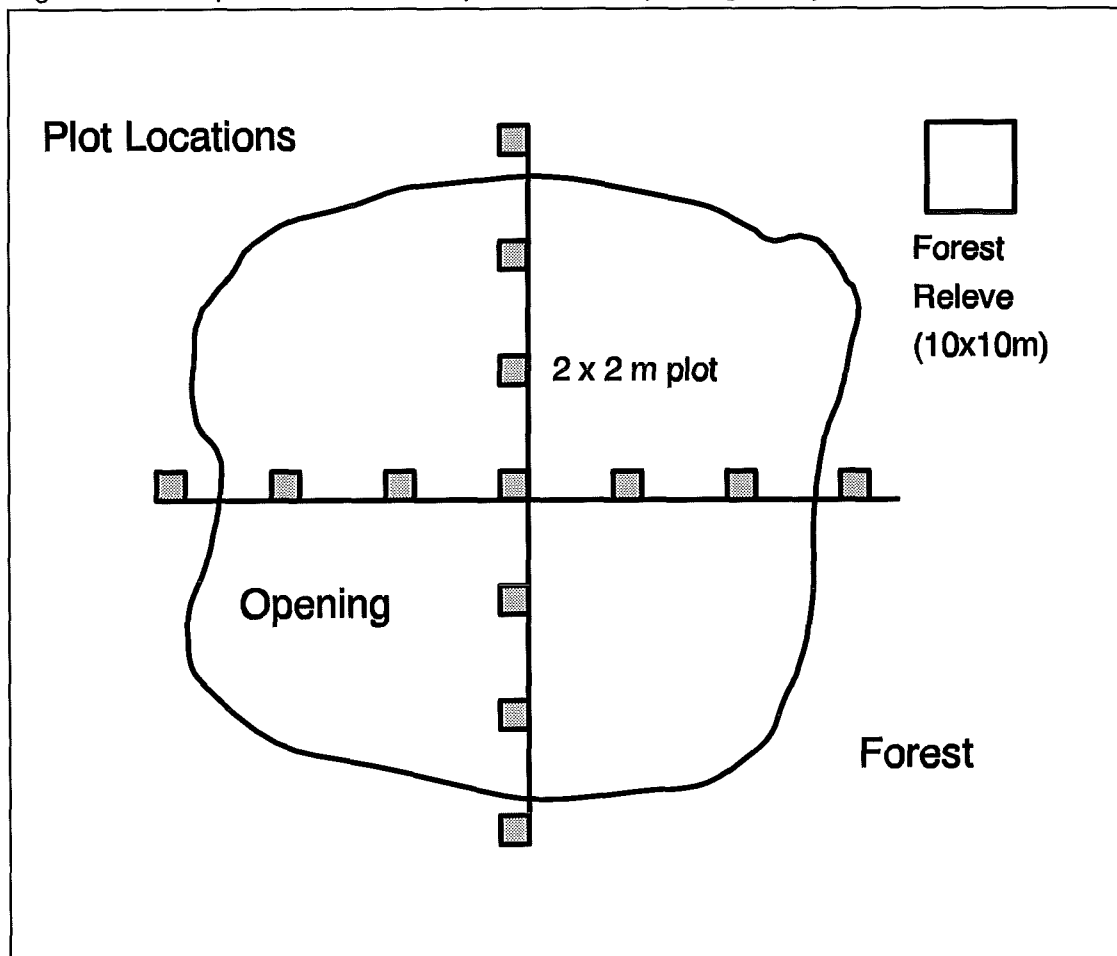
One 10 x 10 m relevee plot was established in the forest adjacent to the opening areas prior to harvest. This plot provides a basis for comparing recovery trajectories of vegetation in the openings to the pre treatment conditions. All openings were established by double-disking. One opening in each pair treated by brush-hogging, the other was left as a control. Table 1 shows the years in which openings were established and measurement were taken. It is important to note that plots to be compared were established in different years, as this brings in yearly differences in climate as an uncontrolled factor. Also, in 1991, PO 8 was brushed after the relevee plot was taken, so the data does not reflect the effect of opening maintenance. Openings in LTA C were seeded, which further confounds interpretations. Due to these aberrations, the current sampling design is more appropriate for examining vegetation changes within and among LTAs relative to pretreatment plots than for comparing differences due to establishment method.

Table 1. Years of establishment and sampling for three pairs of permanent openings.

	LTA E		LTA A		LTA C	
	PO 1	PO 8	PO 2	PO 9	PO 10	PO 11
	Cont	Brush	Cont	Brush	Cont	Brush
1989	X		X			
1990	X	X	X	X	X	X
1991	X	X	X	X	X	X

Nine 2 x 2 m plots were located within the opening, 4 were located just outside the opening, and 1 10 x 10 m plot (pre-treatment) was located in the adjacent woods:

Figure 1. Subplot locations for permanent opening study.



Permanent openings were also established to assess the effects of fire on floristic composition. All openings were located in LTA C. All four plots were burned in the spring of 1990, and vegetation monitored for two years following the burn (Table 2).

Table 2. Study design for assessing fire effects.

	PLOT 4	PLOT 5	PLOT 6	PLOT 7
1989	PRE-BURN BASELINE DATA			
1990	FIRST YEAR POST-BURN			
1991	SECOND YEAR POST-BURN			

While this study is uncontrolled (i.e. no paired unburned plots), it does allow an assessment of the differential response of plots on the same LTA.

Results

Plot Level Floristic Summaries

Plots were summarized by calculating the average rank abundance and frequency of occurrence for each species. Summaries were calculated based on the nine subplots within the permanent openings. The cover-abundance values used in vegetation sampling were converted to numeric ranks 1-7, which approximates a logarithmic transformation of the data. When species occurred in more than one height stratum within a subplot, their rank values for that subplot were summed; this provides a 'weighting' for those species occurring in multiple strata. Plot averages were calculated as "average when present" (AWP), i.e. averages were based only on non-zero subplot values. Frequencies were calculated as the fraction of the nine interior subplots in which a species was present. Importance values (IVs) were calculated as the product of AWP and Frequency. The IVs are technically equivalent to averaging in zero values at the subplot level, and provide a robust overall index of the importance of a species at the plot level.

The IVs for all species in all plots are presented in Appendix A. These values are summarized by plot and life form (e.g. woody deciduous, herbaceous, graminoid, etc), and total numbers of species are presented by life form. Values are sorted in descending from the 1991 data, so that the table shows the dominant species composition as of the last sampling period. These data have been provided on disk so that other types of summaries can be generated.

Table 3 presents the four most abundance species in each plot by life form as of the 1991 sampling date. Broadleaf evergreens (e.g. *Pyrolas*) were only a minor

Table 3. Dominant top four species in each life form class for ten permanent opening plots..

Plot	Rank	Forbs	Woody Deciduous	Graminoids	Climbers	Needleleaf Evergreen
		Species	Species	Species	Species	Species
1	1	<i>Trifolium pratense</i> L.	<i>Rubus strigosus</i> var. <i>canadensis</i> (Richards) House	<i>Carex pensylvanica</i> Lam.	<i>Parthenocissus quinquefolia</i> (L.) Planch	<i>Picea</i> sp.
	2	<i>Trifolium repens</i> L.	<i>Rubus pubescens</i> Raf.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.	<i>Polygonum convolvulus</i> L.	
	3	<i>Aster macrophyllus</i> L.	<i>Populus tremuloides</i> Michx.	<i>Agrostis scabra</i> Willd.	<i>Parthenocissus inserta</i> (Kerner) Fritsch	
	4	<i>Conyza canadensis</i> (L.) Cronq.	<i>Prunus pensylvanica</i> L. f.	<i>Poa palustris</i> L.	<i>Convolvulus sepium</i> L.	
2	1	<i>Trifolium repens</i> L.	<i>Populus tremuloides</i> Michx.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.	<i>Convolvulus sepium</i> L.	
	2	<i>Trifolium pratense</i> L.	<i>Rubus pubescens</i> Raf.	<i>Agrostis scabra</i> Willd.	<i>Polygonum convolvulus</i> L.	
	3	<i>Fragaria virginiana</i> Duchesne	<i>Quercus macrocarpa</i> Michx.	<i>Bromus inermis</i> Leyss.	<i>Parthenocissus quinquefolia</i> (L.) Planch	
	4	<i>Solidago gigantea</i> var. <i>gigantea</i> Ait.	<i>Rubus</i> sp.	<i>Carex pensylvanica</i> Lam.	<i>Celastrus scandens</i> L.	
4	1	<i>Pteridium aquilinum</i> (L.) Kuhn	<i>Corylus cornuta</i> Marsh.	<i>Carex pensylvanica</i> Lam.	<i>Parthenocissus quinquefolia</i> (L.) Planch	<i>Abies balsamea</i> (L.) Mill.
	2	<i>Aster macrophyllus</i> L.	<i>Fraxinus pennsylvanica</i> Marsh.	<i>Oryzopsis asperifolia</i> Michx.		<i>Pinus strobus</i> L.
	3	<i>Fragaria virginiana</i> Duchesne	<i>Diervilla lonicera</i> Mill.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.		<i>Picea glauca</i> (Moench) Voss
	4	<i>Solidago canadensis</i> var. <i>canadensis</i> L.	<i>Viburnum rafinesquianum</i> var. <i>affine</i> (Bush) House	<i>Scirpus cyperinus</i> (L.) Kunth		

Plot	Rank	Forbs	Woody Deciduous	Graminoids	Climbers	Needleleaf Evergreen
		Species	Species	Species	Species	Species
5	1	<i>Fragaria virginiana</i> Duchesne	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Cinna latifolia</i> (Trev.) Griseb.	<i>Convolvulus sepium</i> L.	
	2	<i>Geum aleppicum</i> Jacq.	<i>Salix bebbiana</i> Sarg.	<i>Poa palustris</i> L.		
	3	<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	<i>Corylus cornuta</i> Marsh.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.		
	4	<i>Trifolium hybridum</i> L.	<i>Prunus virginiana</i> L.	<i>Carex</i> sp.		
6	1	<i>Fragaria virginiana</i> Duchesne	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Poa pratensis</i> var. <i>pratensis</i> L.	<i>Convolvulus sepium</i> L.	<i>Abies balsamea</i> (L.) Mill.
	2	<i>Aster macrophyllus</i> L.	<i>Corylus cornuta</i> Marsh.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.		
	3	<i>Geum aleppicum</i> Jacq.	<i>Acer rubrum</i> L.	<i>Cinna latifolia</i> (Trev.) Griseb.		
	4	<i>Lactuca canadensis</i> var. <i>canadensis</i> L.	<i>Salix bebbiana</i> Sarg.	<i>Oryzopsis asperifolia</i> Michx.		
7	1	<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Cinna latifolia</i> (Trev.) Griseb.	<i>Convolvulus sepium</i> L.	
	2	<i>Fragaria virginiana</i> Duchesne	<i>Betula papyrifera</i> Marsh.	<i>Scirpus cyperinus</i> (L.) Kunth		
	3	<i>Athyrium angustum</i> (Willd.) Presl	<i>Fraxinus pennsylvanica</i> Marsh.	<i>Poa palustris</i> L.		
	4	<i>Geum aleppicum</i> Jacq.	<i>Corylus cornuta</i> Marsh.	<i>Carex</i> sp.		

Plot	Rank	Forbs	Woody Deciduous	Graminoids	Climbers	Needleleaf Evergreen
		Species	Species	Species	Species	Species
8	1	<i>Trifolium repens</i> L.	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Poa compressa</i> L.	<i>Vitis riparia</i> var. <i>riparia</i> Michx.	
	2	<i>Helianthus</i> X <i>laetiflorus</i> (H. <i>rigidus</i> X H. <i>tuberosu</i>)	<i>Betula papyrifera</i> Marsh.	<i>Carex pensylvanica</i> Lam.	<i>Parthenocissus quinquefolia</i> (L.) Planch	
	3	<i>Aster ciliolatus</i> Lindl.	<i>Populus tremuloides</i> Michx.	<i>Phleum pratense</i> L.	<i>Polygonum convolvulus</i> L.	
	4	<i>Fragaria virginiana</i> Duchesne	<i>Rubus pubescens</i> Raf.	<i>Agrostis scabra</i> Willd.	<i>Convolvulus sepium</i> L.	
9	1	<i>Fragaria virginiana</i> Duchesne	<i>Rubus pubescens</i> Raf.	<i>Agrostis scabra</i> Willd.	<i>Polygonum convolvulus</i> L.	
	2	<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.	<i>Populus tremuloides</i> Michx.	<i>Carex</i> sp.		
	3	<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Scirpus cyperinus</i> (L.) Kunth		
	4	<i>Aster macrophyllus</i> L.	<i>Betula papyrifera</i> Marsh.	<i>Poa palustris</i> L.		
10	1	<i>Trifolium repens</i> L.	<i>Populus tremuloides</i> Michx.	<i>Poa compressa</i> L.		<i>Abies balsamea</i> (L.) Mill.
	2	<i>Conyza canadensis</i> (L.) Cronq.	<i>Rubus pubescens</i> Raf.	<i>Carex pensylvanica</i> Lam.		
	3	<i>Aster macrophyllus</i> L.	<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	<i>Phleum pratense</i> L.		
	4	<i>Fragaria virginiana</i> Duchesne	<i>Betula papyrifera</i> Marsh.	<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.		

Plot	Rank	Forbs	Woody Deciduous	Graminoids	Climbers	Needleleaf Evergreen
		Species	Species	Species	Species	Species
11	1	Trifolium hybridum L.	Rubus pubescens Raf.	Poa palustris L.		Picea sp.
	2	Fragaria virginiana Duchesne	Rubus strigosus var. strigosus Michx.	Poa compressa L.		
	3	Aster ciliolatus Lindl.	Populus tremuloides Michx.	Bromus ciliatus L.		
	4	Polygonum cilinode Michx.	Diervilla lonicera Mill.	Agrostis stolonifera var. major (Gaud.) Farw.		

component of the plot composition and are not included in this table. Needleleaf evergreens and climbers were also uncommon. *Trifolium* spp. were the dominant herbaceous species in five of the 10 plots, including Plots 1 and 8 in LTA E, Plots 10 and 11 in LTA C, and Plot 2 in LTA A. The companion Plot 9 in LTA A was dominated by *Fragaria* and *Vicia*; *Trifolium* was not in the top four herbaceous species. *Rubus* spp. and *Populus* dominated the woody deciduous class on these four plots, and *Carex*, *Agrostis*, and *Poa* dominated the graminoid layer.

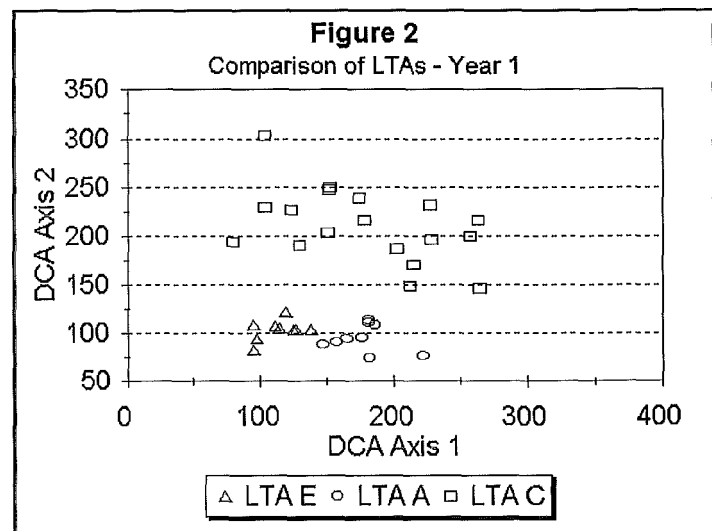
Plots 4 through 7, which were treated by fire, showed little evidence of *Trifolium*; these were dominated by *Pteridium*, *Fragaria*, *Aster macrophyllus*, and *Cirsium arvense*. *Corylus cornuta* and *Rubus strigosus* were the dominant woody species in the fire treated plots. *Carex*, *Cinna*, and *Agrostis* dominated the graminoid layer of these plots.

Differences among LTAs and Successional Pathways

To compare floristic differences among LTAs and among years, abundance data were subjected to detrended correspondence analysis (DCA; Hill 1979). This ordination method allows comparisons of LTAs in terms of initial composition, as well as an assessment of the rate and direction vegetation change over time. Gauch (1984) give a good overview of the theory and application of ordination analyses.

The initial composition of openings differed by LTA. An ordination of subplot data from year 1 (first year after opening created) shows that the LTAs are separated in terms of floristic composition (Figure 2).

In this diagram, subplots which are similar in floristic composition are close together in ordination space, and those which are dissimilar are far apart. In terms of initial composition, there is no overlap among plots from different LTAs, indicating that they are compositionally different. Moreover, the relatively tight clustering shown in LTAs E and A indicate that there is little variation in composition among subplots. This contrasts with LTA C, in which the subplots are relatively dissimilar from each other.

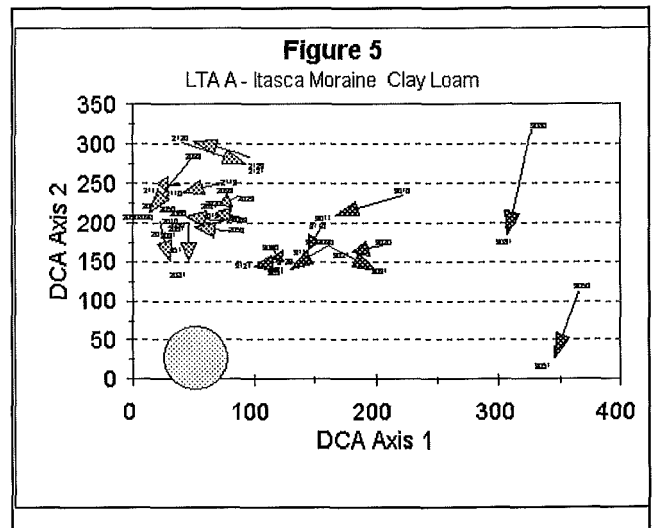
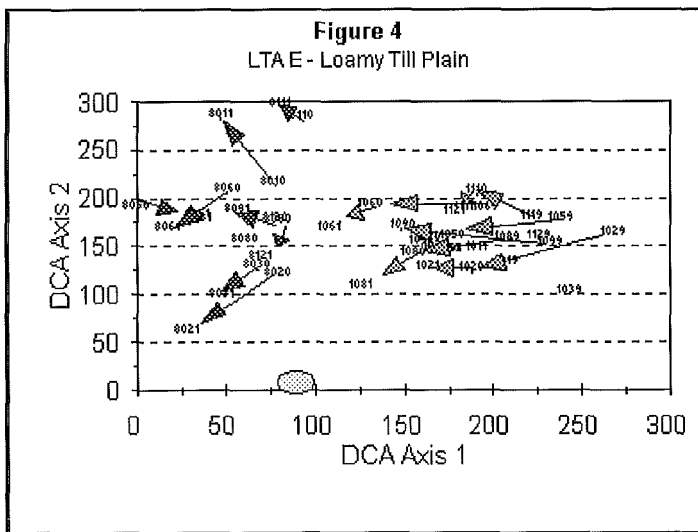
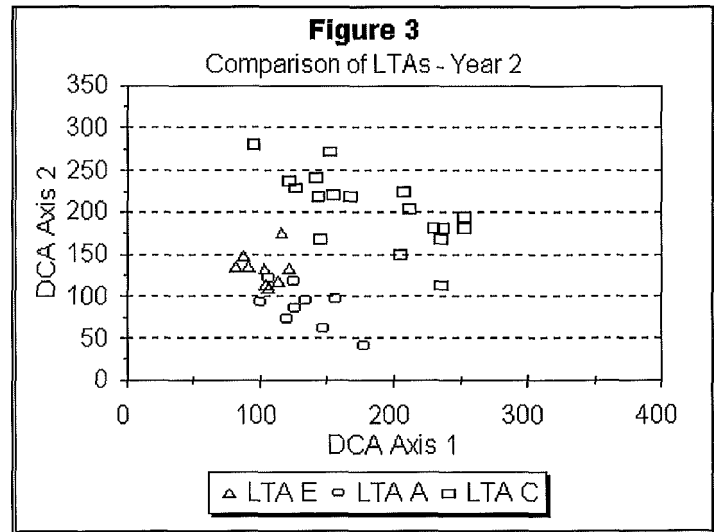


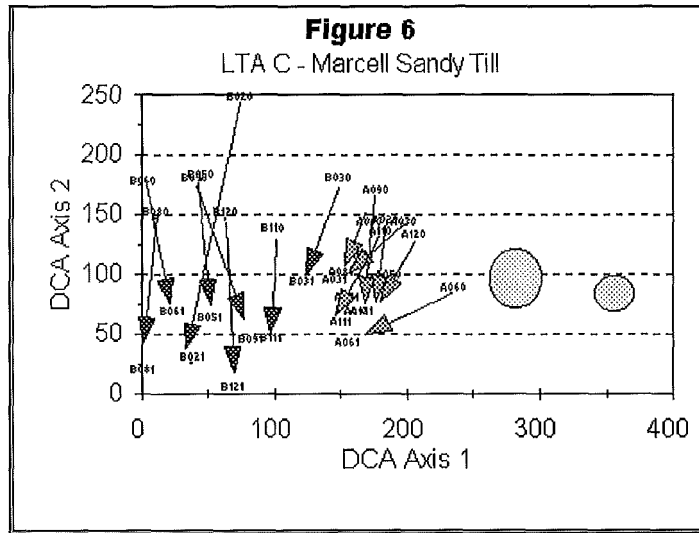
In the second year following treatment, differences among LTAs are still maintained, although there is now overlap between LTAs E and A (Figure 3). This indicates that the subplots from different LTAs are

becoming more similar in floristic composition. The data in Appendix A suggests that the convergence toward *Trifolium* and *Rubus* spp. in the second year is the cause of this increasing similarity.

Detrended correspondence analysis plots can also be used to show the successional trajectories of subplots over time. In these plots, the arrows represent the movement of plots in ordination space from one year to another, and the circled plot represents the pre-opening composition (from a releve plot located under nearby closed-canopy conditions). The paired plots of LTA E shows two different responses. Plot 1 shows a strong directional responses generally toward closed-canopy conditions (Figure 4).

Plot 8, on the other hand, shows a more scattered response, with subplots responding largely independently. LTA A, whose plots initially were relatively dissimilar, shows a trend towards closed forest conditions (Figure 5). Two outliers in Plot 8 have a strong effect on this ordination. LTA C, represented by Plots 10 and 11, show a strong unidirectional response away from closed forest conditions (Figure 6).





Floristic Response to Fire

Plots selected for assessing floristic response to fire showed some initial compositional differences, with a subset of plot 4 having a strong component of flora often associated with interior northern hardwood conditions, such as *Actaea*, *Linnea*, *Asarum*, and others (Figure 7). Plot 5 showed the strongest compositional shift in the year following burning (Figure 8). This shift was characterized by the loss of black ash and paper birch, and strong increases in *Trifolium* and *Vicia*. Only slight differences in composition occurred the second year after burning. Table 4 shows the trends in common woody and herbaceous species following fire.

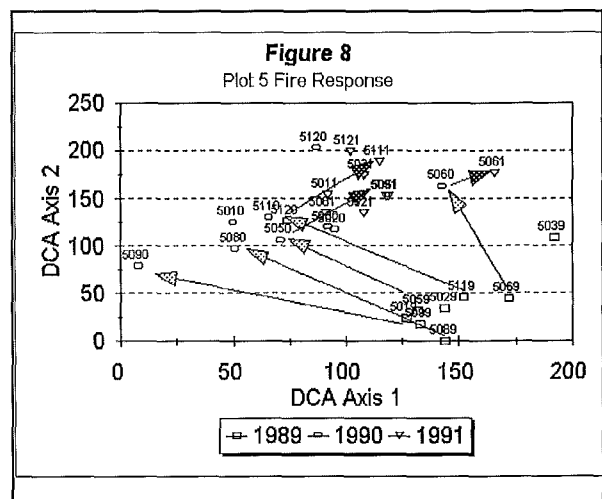
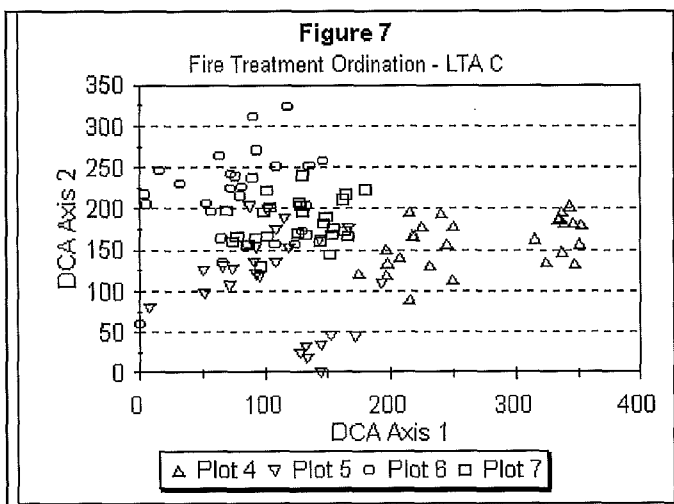
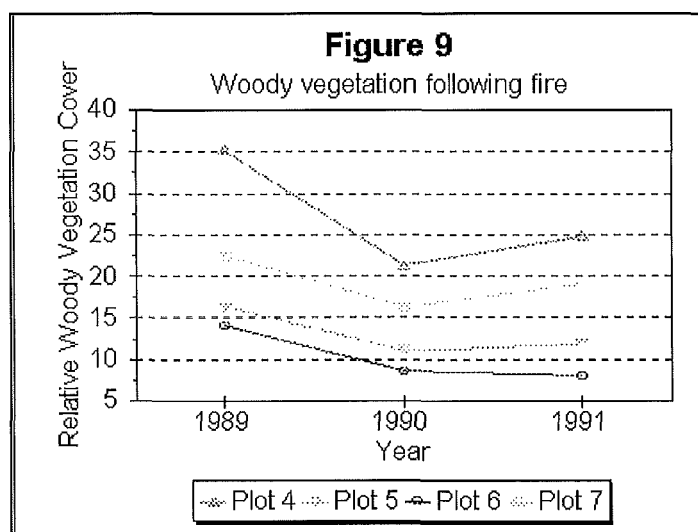


Table 4. Trends in species abundance following fire.

SPECIES	INCREASE	DECREASE
Fraxinus nigra		extirpated
Rubus allegheniensis		extirpated
Populus balsamifera		decreased
Quercus rubra	slight	
Rubus pubescens		strong decrease
Fraxinus pensylvanica	increased	
Cornus rugosa		extirpated
Corylus cornuta		decrease
Ribes cynosbati		slight
Rubus pubescens		strong decrease
Trifolium repens	strong increase	
Geum aleppicum	strong increase	
Bromus ciliatus	strong increase	

Of particular interest in assessing fire response is how well fire controls woody vegetation. In the year following burning, woody cover was 61 to 73% of the pre-burn levels (Figure 9). Woody cover increased slightly during the second year, but was still less than pre-burn conditions. Again, a controlled paired plot design would greatly enhance the interpretability of the treatments.



Conclusions and Recommendations

Overall, permanent openings tend to homogenize vegetation toward a particular class of growth strategies (annuals, biennials, "opportunistic species"). *Trifolium*, *Fragaria*, and *Aster* are the dominant herbaceous species in permanent openings, *Rubus* spp. and *Populus tremuloides* are major woody species, and *Carex*, *Agrostis*, and *Poa* are major graminoids. The seeding which occurred on some plots had obvious effects on present composition, and future sampling will be determined if these remain dominant or alter successional pathways.

This preliminary study suggests that the potentials and rates of recovery will likely vary by LTA, with some units progressing toward pre-treatment composition, whereas others have an uncertain future composition based on the two or three years data presented here. LTAs A and E showed evidence of moving toward pre-treatment floristic composition, whereas LTA C is currently shifting composition away from the typical forest flora.

Fire has the potential to decrease or eliminate certain woody and herbaceous species, and increase others. Woody vegetation on all four plots was reduced following burning, and had not recovered to baseline levels after two years.

It is recommended that sampling be continued on a biyearly basis to extend these results further in time. The current database represents considerable field and analytical effort, and provides a valuable baseline for continued sampling. In particular, the paired plots across three LTAs provide an established framework to test the effects of different opening maintenance methods on different ecological units. It is important that any new paired plots or treatments be established in the same year; a year's lag time introduces climatic differences as an uncontrolled covariable.

By controlling fire regimes on the four fire plots, the long-term effects of fire can be assessed. In this analysis, it is also important that controls be established and maintained, e.g. to study the effects of fire, do not burn all the plots, but rather leave half the population for comparison. This will allow more quantitative statements to be made on response to selected treatment variables. Lastly, the study should avoid overloading treatments on the plots; plots should be designated to study maintenance methods, fire response, or recovery, and should maintain adequate controls. The multiplicative effects of methods, fire, time, and random events will greatly reduce the power of the study for making realistic conclusions and management interpretations.

Acknowledgements

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Hill, M.O. 1979. DECORANA - a FORTRAN program for Detrended Correspondence Analysis. Section of Ecology and Systematics, Cornell University, Ithaca, New York.

Appendix A. Species Importance Values, summarized by Plot and Life Form.

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PLOT : 1

Life Form: Climbers

Species	1989	1990	1991
Parthenocissus quinquefolia (L.) Planch	0.44	0.11	0.11
Convolvulus sepium L.		0.56	
Parthenocissus inserta (Kerner) Fritsch		0.22	
Polygonum convolvulus L.	0.78		

Number of Species: 4

PLOT : 1

Life Form: Forbs

Species	1989	1990	1991
Trifolium pratense L.	3.78	6.00	4.78
Trifolium repens L.		5.00	4.33
Aster macrophyllus L.	3.22	2.00	2.89
Conyza canadensis (L.) Cronq.	2.67	2.89	2.78
Aster ciliolatus Lindl.		2.11	2.11
Fragaria virginiana Duchesne	0.89	1.00	1.67
Galium triflorum Michx.	0.67	1.11	1.33
Solidago gigantea var. gigantea Ait.	0.44	1.11	1.11
Vicia americana var. americana Muhl. ex Willd.	1.00	1.33	1.11
Helianthus X laetiflorus (H. rigidus X H. tuberosus)			0.89
Lathyrus venosus Muhl. ex Willd.	0.89	0.67	0.89
Agastache foeniculum (Pursh) Kuntze		0.22	0.78
Uvularia sessilifolia L.	0.33	0.78	0.78
Maianthemum canadense var. canadense Desf.	0.22	0.44	0.67
Thalictrum dioicum L.		0.44	0.67
Trifolium hybridum L.		0.67	0.67
Cirsium arvense var. arvense (L.) Scop.	0.89	0.44	0.56
Pteridium aquilinum (L.) Kuhn	1.44	0.67	0.56
Lathyrus ochroleucus Hook.		0.11	0.44
Medicago sativa L. ssp. sativa		0.22	0.44
Silene latifolia Poiret		0.22	0.44
Aquilegia canadensis var. coccinea (Small) Munz	0.78	0.33	0.33
Potentilla norvegica L.		0.33	0.33
Streptopus roseus var. longipes (Fern.) Fassett			0.33
Amphicarpaea bracteata (L.) Fern.	0.33	0.22	0.22

PLOT : 1

Life Form: Forbs

Species	1989	1990	1991
Anemone quinquefolia L.	0.11	0.56	0.22
Equisetum sp.		0.22	0.22
Agrimonia sp.		0.11	0.11
Anaphalis margaritacea (L.) Clarke	0.11		0.11
Anaphalis sp.		0.11	0.11
Apocynum androsaemifolium L.	0.11	0.22	0.11
Aralia nudicaulis L.	0.33	0.33	0.11
Aster lateriflorus (L.) Britt.			0.11
Cirsium vulgare (Savi) Tenore	0.33	0.22	0.11
Plantago major L.	0.11	0.22	0.11
Solidago juncea Ait.		0.11	0.11
Sonchus sp.			0.11
Taraxacum officinale Wiggers			0.11
Aster oolentangiensis Riddell		0.22	
Chenopodium album L.	0.67		
Crepis tectorum L.		0.22	
Epilobium angustifolium ssp. angustifolium L.	0.22	0.22	
Epilobium glandulosum var. adenocaulon (Ha.) Fer	0.44		
Equisetum arvense L.	0.22		
Galium trifidum L.	0.22		
Geranium bicknellii Britt.	0.56		
Helianthus annuus L.		0.22	
Helianthus sp.		0.56	
Helianthus tuberosus L.	0.44		
Melilotus alba	0.33	0.44	
Melilotus officinalis		0.22	
Nepeta cataria L.	0.56		
Polygonum lapathifolium var. salicifolium Sibth.	0.11		
Polygonum ramosissimum Michx.	0.11		
Solidago flexicaulis L.	0.33		
Solidago sp.	0.22		
Veronica peregrina var. peregrina L.	0.11		
Viola sp.	0.11		

Number of Species: 58

PLOT : 1

Life Form: Graminoids

PLOT : 1

Life Form: Graminoids

Species	1989	1990	1991
<i>Carex pensylvanica</i> Lam.		2.11	2.67
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.	0.33	1.11	2.33
<i>Agrostis scabra</i> Willd.	0.56	1.11	1.33
<i>Phleum pratense</i> L.	0.89	0.89	1.22
<i>Poa palustris</i> L.	0.44	0.11	1.22
<i>Poa pratensis</i> var. <i>angustifolia</i> (L.) Gaud.	0.56	0.22	0.89
<i>Juncus tenuis</i> Willd.	0.22	0.11	0.56
<i>Lolium perenne</i> var. <i>aristatum</i> Willd.	2.11	0.89	0.56
<i>Agrostis stolonifera</i> var. <i>palustris</i> (Huds.) Farw.		0.22	0.44
<i>Dactylis glomerata</i> L.		0.11	0.44
<i>Oryzopsis asperifolia</i> Michx.		0.11	0.33
<i>Juncus</i> sp.		0.44	0.22
<i>Bromus inermis</i> Leyss.		0.11	
<i>Carex</i> sp.	1.11	0.44	
<i>Echinochloa crusgalli</i> (L.) Beauv.	0.33		
<i>Eragrostis cilianensis</i> (All.) Lutati ex Hubbard	0.33		
<i>Glyceria grandis</i> S. Wats.	0.11		
<i>Panicum</i> sp.		0.11	
<i>Poa compressa</i> L.	0.11	0.11	
<i>Poa paludigena</i> Fern. & Wieg.	0.67		
<i>Poa pratensis</i> var. <i>pratensis</i> L.		0.56	
<i>Poa</i> sp.		0.33	
<i>Setaria glauca</i> (L.) Beauv.	0.22		

Number of Species: 23

PLOT : 1

Life Form: Needleleaf Evergreen

Species	1989	1990	1991
<i>Picea</i> sp.			0.11

Number of Species: 1

PLOT : 1

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus strigosus</i> var. <i>canadensis</i> (Richards) House	0.78	1.11	3.78

G. Host 2/94

PLOT : 1

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Populus tremuloides</i> Michx.	1.89	1.78	1.44
<i>Rubus pubescens</i> Raf.	1.00	1.78	1.44
<i>Prunus pensylvanica</i> L. f.		0.78	1.33
<i>Corylus cornuta</i> Marsh.	1.11	0.67	0.89
<i>Betula papyrifera</i> Marsh.	0.22	0.44	0.78
<i>Corylus americana</i> Walt.		0.22	0.56
<i>Prunus virginiana</i> L.	1.00	0.67	0.56
<i>Diervilla lonicera</i> Mill.		0.56	0.44
<i>Acer rubrum</i> L.	0.56	0.33	0.33
<i>Quercus rubra</i> var. <i>ambigua</i> (Gray) Fern.	0.22	0.22	0.22
<i>Cornus stolonifera</i> Michx.	0.22	0.22	0.11
<i>Populus grandidentata</i> Michx.	0.33	0.11	0.11
<i>Rhus radicans</i> var. <i>negundo</i> (Greene) Mulligan			0.11
<i>Salix humilis</i> var. <i>humilis</i> Marsh.		0.11	0.11
<i>Cornus rugosa</i> Lam.	0.22		
<i>Crataegus</i> sp.	0.22		
<i>Populus balsamifera</i> L.	0.22		
<i>Prunus pumila</i> var. <i>besseyi</i> (Bailey) Gl.	0.22		
<i>Rubus strigosus</i> Michx.		0.22	
<i>Viburnum rafinesquianum</i> var. <i>affine</i> (Bush) House		0.44	

Number of Species: 21

PLOT : 2

Life Form: Climbers

Species	1989	1990	1991
<i>Convolvulus sepium</i> L.		0.11	0.11
<i>Celastrus scandens</i> L.	0.11		
<i>Parthenocissus quinquefolia</i> (L.) Planch	0.11		
<i>Polygonum convolvulus</i> L.	1.44		

Number of Species: 4

PLOT : 2

Life Form: Forbs

PLOT : 2

Life Form: Forbs

Species	1989	1990	1991
<i>Trifolium pratense</i> L.	2.89	4.44	3.67
<i>Trifolium repens</i> L.		2.11	3.67
<i>Fragaria virginiana</i> Duchesne	1.67	2.67	3.33
<i>Solidago gigantea</i> var. <i>gigantea</i> Ait.	0.11	1.22	3.11
<i>Aster ciliolatus</i> Lindl.	0.22	2.00	2.78
<i>Aster macrophyllus</i> L.	2.56	1.56	2.22
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.	2.00	1.22	2.22
<i>Thalictrum dioicum</i> L.	0.44	0.44	2.11
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	2.11	1.56	1.67
<i>Pteridium aquilinum</i> (L.) Kuhn	0.78	1.44	1.56
<i>Lathyrus ochroleucus</i> Hook.			1.33
<i>Lathyrus venosus</i> Muhl. ex Willd.	1.89	1.33	1.22
<i>Sanicula marilandica</i> L.	0.22	0.44	1.11
<i>Amphicarpaea bracteata</i> (L.) Fern.		0.33	1.00
<i>Galium triflorum</i> Michx.	0.44		1.00
<i>Aster lateriflorus</i> (L.) Britt.	0.89		0.89
<i>Aralia nudicaulis</i> L.	1.44	0.67	0.67
<i>Galium trifidum</i> L.			0.67
<i>Uvularia sessilifolia</i> L.		0.22	0.67
<i>Solidago canadensis</i> var. <i>salebrosa</i> (Piper) Jones			0.56
<i>Solidago flexicaulis</i> L.	0.22		0.56
<i>Viola renifolia</i> Gray			0.56
<i>Viola</i> sp.	0.56	0.22	0.56
<i>Aster</i> sp.		0.44	0.44
<i>Cicuta maculata</i> var. <i>angustifolia</i> Hook.			0.44
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.			0.44
<i>Taraxacum officinale</i> Wiggers	0.44	0.11	0.44
<i>Aquilegia canadensis</i> var. <i>coccinea</i> (Small) Munz	0.11		0.33
<i>Conyza canadensis</i> (L.) Cronq.	4.67	1.22	0.33
<i>Geum aleppicum</i> Jacq.		0.44	0.33
<i>Lactuca</i> sp.			0.33
<i>Lysimachia ciliata</i> L.		0.11	0.33
<i>Helianthus</i> X <i>laetiflorus</i> (H. <i>rigidus</i> X H. <i>tuberosus</i>)		0.11	0.22
<i>Helianthus</i> sp.		0.22	0.22
<i>Sonchus</i> sp.			0.22
<i>Trifolium hybridum</i> L.	2.56		0.22
<i>Cypripedium calceolus</i> var. <i>parviflorum</i> (Sa.) Fern.			0.11
<i>Osmorhiza claytoni</i> (Michx.) Clarke	0.11	0.11	0.11
<i>Potentilla</i> sp.			0.11
<i>Solidago</i> sp.			0.11

PLOT : 2

Life Form: Forbs

Species	1989	1990	1991
<i>Agrimonia striata</i> Michx.	0.33		
<i>Anemone quinquefolia</i> L.		0.11	
<i>Apocynum androsaemifolium</i> L.	0.11		
<i>Aster umbellatus</i> var. <i>pubens</i> Gray		0.78	
<i>Castilleja coccinea</i> (L.) Spreng.		0.11	
<i>Chenopodium album</i> L.	0.56		
<i>Cirsium vulgare</i> (Savi) Tenore	0.78	0.11	
<i>Epilobium glandulosum</i> var. <i>adenocaulon</i> (Ha.) Fer	1.78		
<i>Epilobium</i> sp.		0.33	
<i>Eupatorium maculatum</i> L.		0.11	
<i>Euthamia graminifolia</i> var. <i>graminifolia</i> (L.) Nutt.		0.22	
<i>Galium boreale</i> L.		1.00	
<i>Galium labradoricum</i> (Wieg.) Wieg.		0.22	
<i>Geranium bicknellii</i> Britt.	1.11	0.11	
<i>Geranium maculatum</i> L.	0.22		
<i>Melilotus officinalis</i>		0.11	
<i>Melilotus</i> sp.		0.22	
<i>Plantago major</i> L.	0.33		
<i>Polygonatum pubescens</i> (Willd.) Pursh	0.33		
<i>Polygonum</i> sp.	0.11		
<i>Potentilla norvegica</i> L.	0.33		
<i>Prenanthes alba</i> L.	0.22		
<i>Sisymbrium altissimum</i> L.	0.11		
<i>Solidago canadensis</i> var. <i>canadensis</i> L.	1.78	0.89	
<i>Solidago gigantea</i> var. <i>serotina</i> (Kuntze) Cronq.		0.22	
<i>Sonchus arvensis</i> L.		0.11	
<i>Stellaria longifolia</i> var. <i>atrata</i> Moore	0.67		
<i>Veronica peregrina</i> var. <i>xalapensis</i> (HBK.) S.J. & W.	0.22		

Number of Species: 68

PLOT : 2

Life Form: Graminoids

Species	1989	1990	1991
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.	4.56		3.11
<i>Agrostis scabra</i> Willd.	3.56	2.00	2.11
<i>Bromus inermis</i> Leyss.	0.44	0.56	1.78
<i>Carex pensylvanica</i> Lam.		1.44	1.78

G. Host 2/94

PLOT : 2

Life Form: Graminoids

Species	1989	1990	1991
<i>Poa pratensis</i> var. <i>angustifolia</i> (L.) Gaud.		1.78	0.89
<i>Poa palustris</i> L.		0.67	0.78
<i>Phleum pratense</i> L.		0.56	0.67
<i>Panicum</i> sp.		0.11	0.56
<i>Poa compressa</i> L.	1.11		0.56
<i>Carex</i> sp.	2.00	0.22	0.44
<i>Poa paludigena</i> Fern. & Wieg.			0.33
<i>Juncus tenuis</i> Willd.	0.22		0.22
<i>Oryzopsis asperifolia</i> Michx.			0.22
<i>Poa</i> sp.			0.22
<i>Bromus ciliatus</i> L.	0.78		0.11
<i>Bromus</i> sp.		1.67	
<i>Carex stipata</i> Muhl. ex Willd.		0.44	
<i>Juncus</i> sp.		0.22	
<i>Lolium perenne</i> var. <i>aristatum</i> Willd.	0.11		

Number of Species: 19

PLOT : 2

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Populus tremuloides</i> Michx.	1.89	2.11	2.56
<i>Rubus pubescens</i> Raf.	2.56	1.56	2.44
<i>Quercus macrocarpa</i> Michx.	0.44	0.33	1.78
<i>Rubus</i> sp.		0.78	1.33
<i>Corylus cornuta</i> Marsh.	1.44	0.56	1.22
<i>Ribes cynosbati</i> L.	0.33	0.56	0.67
<i>Rubus strigosus</i> var. <i>canadensis</i> (Richards) House		0.22	0.67
<i>Prunus virginiana</i> L.	0.67	0.44	0.56
<i>Fraxinus pennsylvanica</i> Marsh.	0.44	0.11	0.44
<i>Acer rubrum</i> L.	0.11		0.33
<i>Diervilla lonicera</i> Mill.		0.22	0.33
<i>Fraxinus nigra</i> Marsh.			0.22
<i>Cornus rugosa</i> Lam.			0.11
<i>Ulmus americana</i> L.		0.11	0.11
<i>Betula papyrifera</i> Marsh.	0.11		
<i>Crataegus</i> sp.	0.22		
<i>Prunus</i> sp.		0.11	

G. Host 2/94

PLOT : 2

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Quercus rubra</i> var. <i>ambigua</i> (Gray) Fern.	0.22		
<i>Ulmus rubra</i> Muhl.	0.22		

Number of Species: 19

PLOT : 4

Life Form: Broadleaf Evergreen

Species	1989	1990	1991
<i>Pyrola asarifolia</i> Michx.		0.11	

Number of Species: 1

PLOT : 4

Life Form: Climbers

Species	1989	1990	1991
<i>Parthenocissus quinquefolia</i> (L.) Planch	0.11		

Number of Species: 1

PLOT : 4

Life Form: Forbs

Species	1989	1990	1991
<i>Pteridium aquilinum</i> (L.) Kuhn	3.44	3.89	5.11
<i>Aster macrophyllus</i> L.	5.22	3.22	4.11
<i>Fragaria virginiana</i> Duchesne	2.67	2.78	2.67
<i>Solidago canadensis</i> var. <i>canadensis</i> L.	1.11	1.78	1.44
<i>Apocynum androsaemifolium</i> L.	0.78	1.33	1.33
<i>Aralia nudicaulis</i> L.	2.11	1.33	1.33
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.	1.00	0.67	1.33
<i>Cornus canadensis</i> L.	0.89	1.22	1.22
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	1.44	0.89	1.11
<i>Lathyrus venosus</i> Muhl. ex Willd.	1.22	1.22	1.11
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.	1.44	0.67	1.11
<i>Amphicarpaea bracteata</i> (L.) Fern.	0.44	0.11	1.00
<i>Aster ciliolatus</i> Lindl.	1.22	0.78	1.00

G. Host 2/94

PLOT : 4

Life Form: Forbs

Species	1989	1990	1991
<i>Lathyrus ochroleucus</i> Hook.		0.22	1.00
<i>Geum aleppicum</i> Jacq.		0.44	0.89
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett		0.44	0.89
<i>Aster puniceus</i> ssp. <i>firmus</i> (Nees.) Jones	0.11	0.78	0.78
<i>Linnaea borealis</i> L.	0.44	0.33	0.78
<i>Sanicula marilandica</i> L.	0.56	0.44	0.78
<i>Asarum canadense</i> var. <i>acuminatum</i> Ashe.	0.67	0.78	0.67
<i>Clintonia borealis</i> (Ait.) Raf.	0.89	0.67	0.67
<i>Trifolium repens</i> L.		0.56	0.67
<i>Aster lateriflorus</i> (L.) Britt.		0.11	0.56
<i>Anemone quinquefolia</i> L.		0.33	0.44
<i>Athyrium angustum</i> (Willd.) Presl		0.44	0.44
<i>Equisetum sylvaticum</i> L.	0.33	0.33	0.44
<i>Hepatica americana</i> (DC.) Ker	0.67	0.11	0.44
<i>Taraxacum officinale</i> Wiggers	1.00	0.44	0.44
<i>Trifolium hybridum</i> L.	0.56		0.44
<i>Pyrola rotundifolia</i> L.			0.33
<i>Viola pubescens</i> var. <i>eriocarpa</i> (Schwein.) Russell			0.33
<i>Aquilegia canadensis</i> var. <i>coccinea</i> (Small) Munz	0.22	0.11	0.22
<i>Galium triflorum</i> Michx.	0.56	0.44	0.22
<i>Lactuca</i> sp.		0.11	0.22
<i>Mitella nuda</i> L.			0.22
<i>Osmorhiza claytoni</i> (Michx.) Clarke	0.22	0.44	0.22
<i>Stellaria alsine</i> Grimm			0.22
<i>Stellaria</i> sp.			0.22
<i>Trientalis borealis</i> Raf.			0.22
<i>Viola</i> sp.	0.22		0.22
<i>Actaea pachypoda</i> Ell.			0.11
<i>Actaea rubra</i> (Ait.) Willd.	0.78	0.56	0.11
<i>Thelypteris phegopteris</i> (L.) Slosson			0.11
<i>Agrimonia striata</i> Michx.	1.22		
<i>Aster umbellatus</i> var. <i>pubens</i> Gray		0.33	
<i>Cirsium vulgare</i> (Savi) Tenore	0.44		
<i>Equisetum arvense</i> L.	0.44		
<i>Lactuca canadensis</i> var. <i>canadensis</i> L.	0.11		
<i>Lycopus americanus</i> Muhl.		0.11	
<i>Polygonatum pubescens</i> (Willd.) Pursh	0.78		
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i> L.	0.11		
<i>Pyrola</i> sp.	0.56		
<i>Trifolium pratense</i> L.		0.11	

PLOT : 4

Life Form: Forbs

Species	1989	1990	1991
<i>Triodanis perfoliata</i> (L.) Nieuwl.	0.11		
<i>Uvularia sessilifolia</i> L.	0.22		

Number of Species: 55

PLOT : 4

Life Form: Graminoids

Species	1989	1990	1991
<i>Carex pensylvanica</i> Lam.		0.89	2.11
<i>Oryzopsis asperifolia</i> Michx.	0.11	0.89	1.67
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			1.56
<i>Phleum pratense</i> L.	0.67	0.89	0.78
<i>Scirpus cyperinus</i> (L.) Kunth	0.11	0.56	0.78
<i>Agrostis scabra</i> Willd.		2.56	0.67
<i>Carex</i> sp.	2.56	0.33	0.44
<i>Agropyron trachycaulum</i> var. <i>glaucum</i> (P. & M.) Mal		0.22	0.22
<i>Poa pratensis</i> var. <i>angustifolia</i> (L.) Gaud.	1.67	1.22	0.22
<i>Agropyron</i> sp.		0.11	
<i>Bromus ciliatus</i> L.	1.22	0.44	
<i>Phalaris arundinacea</i> L.	0.44	0.22	
<i>Poa palustris</i> L.	2.44	0.67	

Number of Species: 13

PLOT : 4

Life Form: Needleleaf Evergreen

Species	1989	1990	1991
<i>Abies balsamea</i> (L.) Mill.	3.11	1.67	2.11
<i>Picea glauca</i> (Moench) Voss	1.44	0.22	0.11
<i>Pinus strobus</i> L.	0.11		0.11

Number of Species: 3

PLOT : 4

Life Form: Woody Deciduous

PLOT : 4

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Corylus cornuta</i> Marsh.	5.00	2.78	3.33
<i>Fraxinus pennsylvanica</i> Marsh.	2.00	2.00	2.33
<i>Diervilla lonicera</i> Mill.	2.00	1.89	2.00
<i>Viburnum rafinesquianum</i> var. affine (Bush) House	2.22	1.22	1.56
<i>Rosa acicularis</i> Lindl.	1.78	1.11	1.44
<i>Rubus</i> sp.		1.56	1.44
<i>Rubus strigosus</i> var. canadensis (Richards) House	1.78	1.11	1.44
<i>Lonicera hirsuta</i> Eat.	1.00	1.00	1.33
<i>Acer rubrum</i> L.	1.56	1.11	1.11
<i>Amelanchier</i> sp.	1.44	0.67	1.00
<i>Ribes cynosbati</i> L.	0.33	0.44	0.89
<i>Salix bebbiana</i> Sarg.	0.89	0.78	0.89
<i>Betula papyrifera</i> Marsh.	3.44	0.56	0.78
<i>Populus tremuloides</i> Michx.	3.00	0.78	0.67
<i>Prunus virginiana</i> L.	1.00	0.11	0.67
<i>Rubus pubescens</i> Raf.	2.00	0.89	0.56
<i>Acer spicatum</i> Lam.	2.33	0.33	0.44
<i>Cornus stolonifera</i> Michx.			0.33
<i>Lonicera canadensis</i> Marsh.	0.22	0.56	0.33
<i>Lonicera dioica</i> var. dioica L.			0.33
<i>Rubus flagellaris</i> Willd.		0.33	0.33
<i>Cornus rugosa</i> Lam.	0.67	0.89	0.22
<i>Prunus pensylvanica</i> L. f.		0.22	0.22
<i>Rhamnus alnifolia</i> L'Her			0.22
<i>Ribes glandulosum</i> Grauer		0.11	0.22
<i>Salix humilis</i> var. humilis Marsh.	0.44	0.44	0.22
<i>Viburnum trilobum</i> Marsh.	0.44		0.22
<i>Crataegus</i> sp.	0.11	0.11	0.11
<i>Fraxinus nigra</i> Marsh.			0.11
<i>Populus grandidentata</i> Michx.	0.33	0.33	
<i>Ribes americanum</i> Mill.	0.44		
<i>Salix humilis</i> var. keweenawensis Farw.	0.44		
<i>Salix</i> sp.	0.33		

Number of Species: 33

PLOT : 5

Life Form: Climbers

PLOT : 5

Life Form: Climbers

Species	1989	1990	1991
<i>Convolvulus sepium</i> L.			0.22

Number of Species: 1

PLOT : 5

Life Form: Forbs

Species	1989	1990	1991
<i>Fragaria virginiana</i> Duchesne	3.78	4.89	4.78
<i>Geum aleppicum</i> Jacq.		3.78	3.89
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	2.89	2.33	3.56
<i>Athyrium angustum</i> (Willd.) Presl	0.33	1.11	2.33
<i>Trifolium hybridum</i> L.	1.11	1.78	2.33
<i>Solidago canadensis</i> var. <i>canadensis</i> L.	2.56	1.89	2.22
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.		0.33	2.00
<i>Aster macrophyllus</i> L.	0.44	0.44	1.56
<i>Viola pubescens</i> var. <i>pubescens</i> Ait.		0.89	1.44
<i>Lathyrus venosus</i> Muhl. ex Willd.	0.44	0.33	1.33
<i>Lactuca canadensis</i> var. <i>canadensis</i> L.		0.56	1.11
<i>Thalictrum dioicum</i> L.	1.11	0.78	1.00
<i>Sonchus</i> sp.			0.89
<i>Taraxacum officinale</i> Wiggers	0.22	0.22	0.89
<i>Uvularia grandiflora</i> Sm.	0.22	0.67	0.89
<i>Uvularia sessilifolia</i> L.	0.22		0.78
<i>Asarum</i> sp.			0.67
<i>Aster ciliolatus</i> Lindl.	1.11	1.44	0.67
<i>Pteridium aquilinum</i> (L.) Kuhn	0.78	0.33	0.67
<i>Viola</i> sp.	1.22	1.00	0.56
<i>Anemone quinquefolia</i> L.			0.44
<i>Aster lateriflorus</i> (L.) Britt.		0.11	0.33
<i>Aralia nudicaulis</i> L.		0.33	0.22
<i>Aster puniceus</i> ssp. <i>puniceus</i> L.			0.22
<i>Cirsium vulgare</i> (Savi) Tenore	0.44	0.44	0.22
<i>Galium triflorum</i> Michx.		0.22	0.22
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.		0.11	0.22
<i>Prenanthes alba</i> L.	0.89	0.22	0.22
<i>Sanicula marilandica</i> L.			0.22
<i>Sonchus arvensis</i> L.			0.22
<i>Viola conspersa</i> Reichenb.			0.22

G. Host 2/94

PLOT : 5

Life Form: Forbs

Species	1989	1990	1991
Lactuca sp.			0.11
Agrimonia striata Michx.	3.56		
Amphicarpaea bracteata (L.) Fern.	0.22		
Anemone cylindrica Gray	0.33		
Asarum canadense var. acuminatum Ashe.	0.33		
Aster umbellatus var. umbellatus Mill.		0.22	
Crepis sp.		0.33	
Geranium bicknellii Britt.	0.11		
Lactuca biennis (Moench) Fern.	0.11		
Polygonatum commutatum (Schultes f.) A. Dietr.		0.11	
Polygonatum pubescens (Willd.) Pursh	0.22		
Ranunculus macounii Britt.		0.22	
Solidago flexicaulis L.	0.11		
Viola pubescens var. eriocarpa (Schwein.) Russell	0.11		

Number of Species: 45

PLOT : 5

Life Form: Graminoids

Species	1989	1990	1991
Cinna latifolia (Trev.) Griseb.			2.78
Poa palustris L.	0.11	0.78	2.44
Agrostis stolonifera var. major (Gaud.) Farw.	0.44		2.22
Carex sp.	0.44	0.89	1.44
Phleum pratense L.	1.44	1.78	1.33
Poa pratensis var. pratensis L.	0.44	0.67	1.11
Scirpus cyperinus (L.) Kunth	0.67	0.44	0.33
Bromus ciliatus L.	1.00	1.44	0.22
Calamagrostis canadensis var. canadensis (M) Nutt.	0.56		0.22
Oryzopsis asperifolia Michx.			0.22
Poa compressa L.			0.22
Agrostis scabra Willd.		1.11	
Agrostis sp.		5.44	
Brachyelytrum erectum var. erectum (Schreb.) Bea	0.22	0.22	
Carex lacustris Willd.		0.22	
Muhlenbergia mexicana (L.) Trin.	2.00	1.44	
Poa pratensis var. angustifolia (L.) Gaud.	3.33		

G. Host 2/94

PLOT : 5

Life Form: Graminoids

Number of Species: 17

PLOT : 5

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	0.56	3.78	3.67
<i>Salix bebbiana</i> Sarg.	0.33	1.33	1.67
<i>Corylus cornuta</i> Marsh.	2.22	1.67	1.33
<i>Prunus virginiana</i> L.	0.78	0.44	1.11
<i>Fraxinus pennsylvanica</i> Marsh.		0.78	0.67
<i>Ostrya virginiana</i> (Mill.) K. Koch	0.22		0.56
<i>Rhus radicans</i> var. <i>negundo</i> (Greene) Mulligan	0.22		0.44
<i>Ribes cynosbati</i> L.	0.33	0.22	0.44
<i>Sambucus pubens</i> Michx.			0.44
<i>Amelanchier</i> sp.	0.22	0.11	0.33
<i>Acer rubrum</i> L.	0.22		0.22
<i>Acer spicatum</i> Lam.		0.44	0.22
<i>Diervilla lonicera</i> Mill.	0.11	0.33	0.22
<i>Populus balsamifera</i> L.		0.11	0.22
<i>Quercus rubra</i> var. <i>rubra</i> L.		0.22	0.22
<i>Rosa acicularis</i> Lindl.	0.44		0.11
<i>Betula papyrifera</i> Marsh.	1.00		
<i>Cornus rugosa</i> Lam.	0.22		
<i>Fraxinus nigra</i> Marsh.	2.78		
<i>Populus tremuloides</i> Michx.	1.11		
<i>Prunus pennsylvanica</i> L. f.		0.44	
<i>Rhus</i> sp.		0.67	
<i>Rubus pubescens</i> Raf.	0.44		
<i>Rubus strigosus</i> var. <i>canadensis</i> (Richards) House	3.00		
<i>Salix humilis</i> var. <i>humilis</i> Marsh.	1.44	0.44	
<i>Salix pentandra</i> L.	0.44		
<i>Salix</i> sp.	0.22	0.11	

Number of Species: 27

PLOT : 6

Life Form: Climbers

PLOT : 6

Life Form: Climbers

Species	1989	1990	1991
<i>Convolvulus sepium</i> L.	1.00	0.67	1.22

Number of Species: 1

PLOT : 6

Life Form: Forbs

Species	1989	1990	1991
<i>Fragaria virginiana</i> Duchesne	3.67	4.78	5.11
<i>Aster macrophyllus</i> L.	1.11	0.67	2.44
<i>Geum aleppicum</i> Jacq.		1.56	1.89
<i>Lactuca canadensis</i> var. <i>canadensis</i> L.			1.78
<i>Athyrium angustum</i> (Willd.) Presl	1.11	0.56	1.33
<i>Solidago canadensis</i> var. <i>canadensis</i> L.	1.78	1.33	1.33
<i>Erigeron strigosus</i> var. <i>strigosus</i> Muhl.	0.89	0.44	1.11
<i>Aquilegia</i> sp.	0.67		1.00
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.	0.33	0.22	1.00
<i>Lathyrus venosus</i> Muhl. ex Willd.	0.22		0.89
<i>Sonchus arvensis</i> L.		0.22	0.89
<i>Conyza canadensis</i> (L.) Cronq.			0.78
<i>Lactuca</i> sp.		1.78	0.78
<i>Aster ciliolatus</i> Lindl.	1.22	0.33	0.67
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	1.00	0.56	0.44
<i>Gallium triflorum</i> Michx.	0.67	0.44	0.44
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.	0.44	0.22	0.44
<i>Taraxacum officinale</i> Wiggers			0.44
<i>Trientalis borealis</i> Raf.			0.44
<i>Anaphalis margaritacea</i> (L.) Clarke	0.56	0.33	0.33
<i>Erigeron</i> sp.			0.33
<i>Anemone canadensis</i> L.			0.22
<i>Chenopodium album</i> L.			0.22
<i>Lathyrus ochroleucus</i> Hook.			0.22
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett	0.11		0.22
<i>Uvularia grandiflora</i> Sm.	0.11		0.22
<i>Viola pubescens</i> var. <i>eriocarpa</i> (Schwein.) Russell		0.22	0.22
<i>Viola pubescens</i> var. <i>pubescens</i> Ait.			0.22
<i>Viola</i> sp.	0.11	0.44	0.22
<i>Oenothera biennis</i> L.	0.11		0.11
<i>Potentilla norvegica</i> L.	0.11		0.11

G. Host 2/94

PLOT : 6

Life Form: Forbs

Species	1989	1990	1991
<i>Uvularia sessilifolia</i> L.		0.11	0.11
<i>Agrimonia striata</i> Michx.	3.00	0.11	
<i>Aralia nudicaulis</i> L.	0.44	0.22	
<i>Cirsium vulgare</i> (Savi) Tenore	0.22		
<i>Dryopteris cristata</i> (L.) Gray	0.11		
<i>Epilobium angustifolium</i> ssp. <i>angustifolium</i> L.		0.22	
<i>Epilobium</i> sp.	0.11		
<i>Fragaria</i> sp.	0.22		
<i>Lycopus uniflorus</i> Michx.	0.11		
<i>Mitella nuda</i> L.		0.22	
<i>Plantago major</i> L.	0.33		
<i>Polygonatum pubescens</i> (Willd.) Pursh	0.22		
<i>Prenanthes alba</i> L.	1.89		
<i>Pteridium aquilinum</i> (L.) Kuhn	0.33		
<i>Thalictrum dioicum</i> L.	0.56	0.56	
<i>Verbascum thapsus</i> L.	0.11		

Number of Species: 47

PLOT : 6

Life Form: Graminoids

Species	1989	1990	1991
<i>Poa pratensis</i> var. <i>pratensis</i> L.	3.33	4.67	3.56
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			2.67
<i>Cinna latifolia</i> (Trev.) Griseb.			2.67
<i>Oryzopsis asperifolia</i> Michx.			2.00
<i>Bromus ciliatus</i> L.	2.22	0.78	1.44
<i>Carex pensylvanica</i> Lam.		1.11	1.33
<i>Poa palustris</i> L.			1.22
<i>Poa compressa</i> L.			1.11
<i>Agrostis scabra</i> Willd.		0.22	0.89
<i>Scirpus cyperinus</i> (L.) Kunth	0.33		0.44
<i>Agropyron</i> sp.		0.44	0.33
<i>Andropogon</i> sp.			0.22
<i>Carex stipata</i> Muhl. ex Willd.		0.44	0.22
<i>Agrostis</i> sp.	4.11		
<i>Calamagrostis canadensis</i> var. <i>canadensis</i> (M) Nutt.	0.22		
<i>Carex</i> sp.	0.44	1.56	

G. Host 2/94

PLOT : 6

Life Form: Graminoids

Species	1989	1990	1991
<i>Muhlenbergia mexicana</i> (L.) Trin.	2.56	1.89	

Number of Species: 17

PLOT : 6

Life Form: Needleleaf Evergreen

Species	1989	1990	1991
<i>Abies balsamea</i> (L.) Mill.	0.11		

Number of Species: 1

PLOT : 6

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	5.11	4.89	5.11
<i>Acer rubrum</i> L.	1.44	1.00	0.67
<i>Corylus cornuta</i> Marsh.	2.78	0.89	0.67
<i>Prunus pensylvanica</i> L. f.			0.33
<i>Salix bebbiana</i> Sarg.	0.33		0.33
<i>Diervilla lonicera</i> Mill.	0.11		0.22
<i>Fraxinus pennsylvanica</i> Marsh.			0.22
<i>Ribes cynosbati</i> L.	0.67	0.44	0.22
<i>Viburnum rafinesquianum</i> var. <i>rafinesquianum</i> Sch	0.22		0.22
<i>Acer spicatum</i> Lam.	0.11		
<i>Alnus incana</i> (L.) Moench	0.11		
<i>Betula papyrifera</i> Marsh.	0.78	0.44	
<i>Cornus rugosa</i> Lam.	0.33		
<i>Corylus americana</i> Wait.		0.44	
<i>Lonicera villosa</i> var. <i>solonis</i> (Eat.) Fern.	0.22		
<i>Populus balsamifera</i> L.	0.11		
<i>Prunus</i> sp.		0.22	
<i>Prunus virginiana</i> L.	0.11		
<i>Rubus allegheniensis</i> Porter	0.56		
<i>Rubus pubescens</i> Raf.	0.78	0.22	
<i>Vaccinium angustifolium</i> Ait.	0.33		

PLOT : 6

Life Form: Woody Deciduous

Number of Species: 21

PLOT : 7

Life Form: Climbers

Species	1989	1990	1991
<i>Convolvulus sepium</i> L.	0.11		

Number of Species: 1

PLOT : 7

Life Form: Forbs

Species	1989	1990	1991
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.	4.22	3.89	4.78
<i>Fragaria virginiana</i> Duchesne	3.22	3.67	4.44
<i>Athyrium angustum</i> (Willd.) Presl	2.67	2.00	3.00
<i>Geum aleppicum</i> Jacq.		2.00	2.33
<i>Viola pubescens</i> var. <i>pubescens</i> Ait.	0.44	0.78	1.89
<i>Aster macrophyllus</i> L.	1.67	0.67	1.78
<i>Lathyrus venosus</i> Muhl. ex Willd.	0.33	0.89	1.56
<i>Galium triflorum</i> Michx.	1.44	1.22	1.11
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.	0.89	1.11	1.00
<i>Taraxacum officinale</i> Wiggers	0.22	0.44	0.89
<i>Uvularia grandiflora</i> Sm.		0.56	0.89
<i>Aster ciliolatus</i> Lindl.	1.11	1.22	0.78
<i>Pteridium aquilinum</i> (L.) Kuhn	0.11	0.78	0.67
<i>Aralia nudicaulis</i> L.	0.44	0.67	0.56
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett	0.11		0.56
<i>Anemone quinquefolia</i> L.		0.22	0.44
<i>Solidago canadensis</i> var. <i>canadensis</i> L.	0.22		0.44
<i>Uvularia sessilifolia</i> L.			0.44
<i>Viola renifolia</i> Gray			0.44
<i>Viola</i> sp.	1.11		0.44
<i>Botrychium virginianum</i> (L.) Sw.			0.22
<i>Lathyrus ochroleucus</i> Hook.		0.11	0.22
<i>Oenothera biennis</i> L.			0.22
<i>Polygonum cilinode</i> Michx.			0.22
<i>Sonchus arvensis</i> L.			0.22
<i>Trientalis borealis</i> Raf.	0.11		0.22

G. Host 2/94

PLOT : 7

Life Form: Forbs

Species	1989	1990	1991
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.	0.11	0.22	0.22
<i>Viola adunca</i> Smith			0.22
<i>Apocynum androsaemifolium</i> L.		0.22	0.11
<i>Botrychium</i> sp.			0.11
<i>Dryopteris</i> sp.			0.11
<i>Osmorhiza claytoni</i> (Michx.) Clarke	0.11	0.11	0.11
<i>Plantago major</i> L.			0.11
<i>Agrimonia striata</i> Michx.	2.22		
<i>Anaphalis margaritacea</i> (L.) Clarke	0.89		
<i>Cirsium vulgare</i> (Savi) Tenore	0.44	0.11	
<i>Dryopteris cristata</i> (L.) Gray	0.22	0.33	
<i>Equisetum sylvaticum</i> L.	0.11		
<i>Erigeron strigosus</i> var. <i>strigosus</i> Muhl.	0.56		
<i>Impatiens pallida</i> Nutt.	0.11		
<i>Polygonatum pubescens</i> (Willd.) Pursh	0.22		
<i>Prenanthes alba</i> L.	0.33		
<i>Solidago</i> sp.		0.11	
<i>Sonchus uliginosus</i> Bieb.		0.89	
<i>Trisetum</i> sp.	0.22		

Number of Species: 45

PLOT : 7

Life Form: Graminoids

Species	1989	1990	1991
<i>Cinna latifolia</i> (Trev.) Griseb.		0.22	3.22
<i>Scirpus cyperinus</i> (L.) Kunth	0.78	1.44	2.33
<i>Poa palustris</i> L.	5.44	1.33	2.11
<i>Carex</i> sp.	1.89	0.89	1.33
<i>Agrostis</i> sp.	1.00		1.22
<i>Agrostis scabra</i> Willd.		3.44	1.11
<i>Poa pratensis</i> var. <i>pratensis</i> L.	0.44	0.89	0.78
<i>Carex gracillima</i> Schwein.			0.67
<i>Poa compressa</i> L.			0.67
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			0.44
<i>Bromus ciliatus</i> L.	0.33	0.67	0.22
<i>Carex pennsylvanica</i> Lam.			0.22
<i>Oryzopsis asperifolia</i> Michx.		0.22	0.22

G. Host 2/94

PLOT : 7

Life Form: Graminoids

Species	1989	1990	1991
<i>Carex crinita</i> Lam.		0.44	
<i>Muhlenbergia mexicana</i> (L.) Trin.	1.89	2.89	

Number of Species: 15

PLOT : 7

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.	4.00	3.89	4.00
<i>Betula papyrifera</i> Marsh.	4.00	2.33	3.11
<i>Fraxinus pennsylvanica</i> Marsh.	1.11	1.89	2.67
<i>Corylus cornuta</i> Marsh.	2.11	2.00	1.67
<i>Salix bebbiana</i> Sarg.	0.67	0.56	1.44
<i>Cornus stolonifera</i> Michx.			1.11
<i>Rubus allegheniensis</i> Porter	1.11	0.44	0.78
<i>Populus tremuloides</i> Michx.	0.44	0.78	0.67
<i>Quercus rubra</i> var. <i>rubra</i> L.	1.44		0.67
<i>Prunus pennsylvanica</i> L. f.	0.33		0.56
<i>Rubus pubescens</i> Raf.	0.78	0.22	0.56
<i>Cornus rugosa</i> Lam.	2.00	1.89	0.44
<i>Prunus virginiana</i> L.	0.33	0.22	0.44
<i>Acer rubrum</i> L.	0.22	0.33	0.22
<i>Amelanchier</i> sp.	0.22		0.22
<i>Diervilla lonicera</i> Mill.	0.56	0.44	0.22
<i>Populus balsamifera</i> L.	0.22	0.33	0.22
<i>Ribes cynosbati</i> L.	0.33	0.11	0.11
<i>Lonicera canadensis</i> Marsh.		0.22	
<i>Populus grandidentata</i> Michx.		0.56	
<i>Ribes americanum</i> Mill.	0.11		
<i>Salix humilis</i> var. <i>humilis</i> Marsh.	1.89	0.11	
<i>Salix pedicellaris</i> var. <i>hypoglauca</i> Fern.	0.56		

Number of Species: 23

PLOT : 8

Life Form: Climbers

PLOT : 8

Life Form: Climbers

Species	1989	1990	1991
<i>Vitis riparia</i> var. <i>riparia</i> Michx.			0.44
<i>Parthenocissus quinquefolia</i> (L.) Planch			0.11
<i>Convolvulus sepium</i> L.		0.78	
<i>Polygonum convolvulus</i> L.		0.44	

Number of Species: 4

PLOT : 8

Life Form: Forbs

Species	1989	1990	1991
<i>Trifolium repens</i> L.		3.56	4.67
<i>Helianthus X laetiflorus</i> (<i>H. rigidus</i> X <i>H. tuberosus</i>)		1.00	3.22
<i>Aster ciliolatus</i> Lindl.		0.89	2.56
<i>Aster macrophyllus</i> L.		3.00	2.22
<i>Fragaria virginiana</i> Duchesne		1.22	2.22
<i>Conyza canadensis</i> (L.) Cronq.		2.56	1.89
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.		1.78	1.89
<i>Lathyrus venosus</i> Muhl. ex Willd.		0.33	1.56
<i>Galium triflorum</i> Michx.		0.44	1.33
<i>Thalictrum dioicum</i> L.		1.11	1.33
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.		0.67	1.00
<i>Potentilla norvegica</i> L.			1.00
<i>Lathyrus ochroleucus</i> Hook.		1.11	0.89
<i>Melilotus alba</i>			0.89
<i>Uvularia sessilifolia</i> L.		0.67	0.89
<i>Cirsium vulgare</i> (Savi) Tenore		0.11	0.78
<i>Sonchus</i> sp.		0.44	0.78
<i>Melilotus</i> sp.		0.33	0.67
<i>Aquilegia</i> sp.		0.11	0.44
<i>Galium boreale</i> L.		0.33	0.44
<i>Pteridium aquilinum</i> (L.) Kuhn		0.89	0.44
<i>Silene dichotoma</i> Ehrh.			0.44
<i>Solidago canadensis</i> var. <i>canadensis</i> L.			0.44
<i>Solidago gigantea</i> var. <i>gigantea</i> Ait.		0.11	0.44
<i>Sonchus arvensis</i> L.		0.44	0.44
<i>Agastache foeniculum</i> (Pursh) Kuntze			0.33
<i>Aralia nudicaulis</i> L.		0.11	0.33
<i>Lactuca</i> sp.		0.22	0.33

G. Host 2/94

PLOT : 8

Life Form: Forbs

Species	1989	1990	1991
Verbascum thapsus L.			0.33
Apocynum androsaemifolium L.			0.22
Aster sp.			0.22
Geum canadense Jacq.		0.22	0.22
Osmorhiza claytoni (Michx.) Clarke			0.22
Rorippa sp.			0.22
Sanicula marilandica L.			0.22
Sonchus oleraceus L.			0.22
Uvularia grandiflora Sm.			0.22
Achillea millefolium ssp. millefolium L.			0.11
Amphicarpaea bracteata (L.) Fern.			0.11
Cirsium sp.			0.11
Epilobium sp.			0.11
Geum aleppicum Jacq.		0.11	0.11
Oxalis sp.			0.11
Prenanthes alba L.		0.11	0.11
Rumex crispus L.			0.11
Streptopus roseus var. longipes (Fern.) Fassett			0.11
Taraxacum officinale Wiggers			0.11
Cerastium sp.		0.22	
Chenopodium album L.		1.00	
Epilobium glandulosum var. occidentale (Tr.) Fern.		0.22	
Equisetum sp.		0.22	
Helianthus sp.		0.67	
Matricaria sp.		0.11	
Polygonum aviculare L.		0.33	
Polygonum cilinode Michx.		0.11	
Rorippa islandica var. hispida (Desv.) But. & Ab.		0.44	
Sisymbrium sp.		0.11	
Solanum sp.		0.78	

Number of Species: 58

PLOT : 8

Life Form: Graminoids

Species	1989	1990	1991
Poa compressa L.		0.56	2.67
Carex pensylvanica Lam.		1.67	2.44

G. Host 2/94

PLOT : 8

Life Form: Graminoids

Species	1989	1990	1991
<i>Phleum pratense</i> L.		0.89	2.00
<i>Agrostis scabra</i> Willd.		0.22	1.11
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			0.56
<i>Bromus ciliatus</i> L.			0.44
<i>Juncus tenuis</i> Willd.		0.22	0.44
<i>Poa pratensis</i> var. <i>pratensis</i> L.		0.33	0.44
<i>Bromus kalmii</i> Gray		1.00	0.33
<i>Panicum</i> sp.		0.11	0.11
<i>Carex</i> sp.		1.11	
<i>Juncus</i> sp.		0.22	
<i>Lolium perenne</i> var. <i>perenne</i> L.		0.11	
<i>Panicum capillare</i> L.		0.11	

Number of Species: 14

PLOT : 8

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.		1.00	2.00
<i>Betula papyrifera</i> Marsh.		1.67	1.67
<i>Populus tremuloides</i> Michx.		1.78	1.56
<i>Rubus pubescens</i> Raf.		1.56	1.11
<i>Populus grandidentata</i> Michx.		0.89	1.00
<i>Rubus allegheniensis</i> Porter			0.89
<i>Diervilla ionicera</i> Mill.		0.44	0.67
<i>Acer rubrum</i> L.		0.44	0.56
<i>Corylus americana</i> Walt.		0.44	0.56
<i>Rhus radicans</i> var. <i>negundo</i> (Greene) Mulligan		0.22	0.56
<i>Corylus cornuta</i> Marsh.		0.67	0.44
<i>Rosa acicularis</i> Lindl.			0.33
<i>Prunus pensylvanica</i> L. f.		0.11	0.22
<i>Lonicera dioica</i> var. <i>dioica</i> L.		0.11	0.11
<i>Prunus serotina</i> Ehrh.			0.11
<i>Prunus virginiana</i> L.			0.11
<i>Salix pedicellaris</i> var. <i>hypoglauca</i> Fern.			0.11
<i>Rosa blanda</i> Ait.		0.11	
<i>Rubus</i> sp.		0.44	

PLOT : 8

Life Form: Woody Deciduous

Number of Species: 19

PLOT : 9

Life Form: Climbers

Species	1989	1990	1991
<i>Polygonum convolvulus</i> L.		0.22	

Number of Species: 1

PLOT : 9

Life Form: Forbs

Species	1989	1990	1991
<i>Fragaria virginiana</i> Duchesne		1.67	3.00
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.		1.33	2.33
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.		0.67	2.00
<i>Aster macrophyllus</i> L.		2.11	1.89
<i>Conyza canadensis</i> (L.) Cronq.		3.67	1.67
<i>Helianthus</i> X <i>laetiflorus</i> (H. <i>rigidus</i> X H. <i>tuberosus</i>)		0.11	1.67
<i>Lathyrus ochroleucus</i> Hook.		0.89	1.67
<i>Solidago canadensis</i> var. <i>canadensis</i> L.			1.67
<i>Aster ciliolatus</i> Lindl.		0.22	1.56
<i>Aster lateriflorus</i> (L.) Britt.			1.33
<i>Potentilla norvegica</i> L.		1.22	1.33
<i>Thalictrum dioicum</i> L.		0.89	1.33
<i>Aralia nudicaulis</i> L.		0.89	1.22
<i>Epilobium coloratum</i> Biehler		1.56	1.22
<i>Galium triflorum</i> Michx.		0.22	1.22
<i>Amphicarpaea bracteata</i> (L.) Fern.		0.22	1.00
<i>Epilobium</i> sp.		0.89	1.00
<i>Pteridium aquilinum</i> (L.) Kuhn		0.78	1.00
<i>Lathyrus venosus</i> Muhl. ex Willd.			0.89
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.		0.33	0.89
<i>Solidago gigantea</i> var. <i>gigantea</i> Ait.		0.11	0.78
<i>Taraxacum officinale</i> Wiggers		0.33	0.78
<i>Uvularia sessilifolia</i> L.		0.44	0.78
<i>Athyrium angustum</i> (Willd.) Presl		0.22	0.67
<i>Geranium bicknellii</i> Britt.		2.89	0.67
<i>Geum aleppicum</i> Jacq.		0.22	0.67

G. Host 2/94

PLOT : 9

Life Form: Forbs

Species	1989	1990	1991
<i>Viola adunca</i> Smith			0.67
<i>Onoclea sensibilis</i> L.		0.11	0.56
<i>Sanicula marilandica</i> L.		0.11	0.56
<i>Solidago</i> sp.			0.56
<i>Viola renifolia</i> Gray		0.44	0.56
<i>Anemone quinquefolia</i> L.		0.11	0.44
<i>Osmorhiza claytoni</i> (Michx.) Clarke		0.22	0.44
<i>Trifolium hybridum</i> L.			0.44
<i>Trifolium repens</i> L.			0.44
<i>Veronica</i> sp.		0.22	0.44
<i>Viola</i> sp.			0.44
<i>Aster puniceus</i> ssp. <i>puniceus</i> L.			0.33
<i>Aster umbellatus</i> var. <i>umbellatus</i> Mill.		0.22	0.33
<i>Galium asprellum</i> Michx.			0.33
<i>Galium boreale</i> L.			0.33
<i>Lactuca</i> sp.		0.22	0.33
<i>Lycopus americanus</i> Muhl.			0.33
<i>Polygonum cilinode</i> Michx.		1.00	0.33
<i>Ranunculus acris</i> L.		0.11	0.33
<i>Sonchus arvensis</i> L.		0.22	0.33
<i>Viola pubescens</i> var. <i>pubescens</i> Ait.			0.33
<i>Aster</i> sp.			0.22
<i>Cicuta maculata</i> var. <i>maculata</i> L.			0.22
<i>Cirsium</i> sp.			0.22
<i>Eupatorium perfoliatum</i> L.			0.22
<i>Lycopus uniflorus</i> Michx.			0.22
<i>Scutellaria</i> sp.			0.22
<i>Solidago missouriensis</i> var. <i>missouriensis</i> Nutt.		0.22	0.22
<i>Solidago rigida</i> var. <i>rigida</i> L.			0.22
<i>Stachys palustris</i> ssp. <i>palustris</i> L.		0.78	0.22
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett			0.22
<i>Uvularia grandiflora</i> Sm.		0.22	0.22
<i>Viola macloskeyi</i> Lloyd		0.33	0.22
<i>Antennaria</i> sp.			0.11
<i>Bidens</i> sp.			0.11
<i>Cirsium muticum</i> Michx.			0.11
<i>Cirsium vulgare</i> (Savi) Tenore		0.11	0.11
<i>Crepis</i> sp.			0.11
<i>Epilobium angustifolium</i> ssp. <i>angustifolium</i> L.			0.11
<i>Equisetum sylvaticum</i> L.			0.11

PLOT : 9

Life Form: Forbs

Species	1989	1990	1991
<i>Lysimachia ciliata</i> L.			0.11
<i>Osmunda claytoniana</i> L.		0.11	0.11
<i>Sonchus</i> sp.			0.11
<i>Alisma subcordatum</i> Raf.		0.22	
<i>Aster puniceus</i> ssp. <i>firmus</i> (Nees.) Jones		0.11	
<i>Caltha palustris</i> L.		0.33	
<i>Chenopodium album</i> L.		0.22	
<i>Epilobium strictum</i> Muhl.		0.22	
<i>Equisetum</i> sp.		0.22	
<i>Impatiens capensis</i> Meerb.		0.22	
<i>Polygonum aviculare</i> L.		0.11	
<i>Polygonum sagittatum</i> L.		0.11	
<i>Ranunculus abortivus</i> var. <i>abortivus</i> L.		0.22	
<i>Rorippa</i> sp.		0.11	
<i>Rumex orbiculatus</i> Gray		0.11	
<i>Sium suave</i> Walt.		0.22	
<i>Veronica americana</i> (Raf.) Schwein.		0.33	
<i>Veronica peregrina</i> var. <i>peregrina</i> L.		0.44	

Number of Species: 84

PLOT : 9

Life Form: Graminoids

Species	1989	1990	1991
<i>Agrostis scabra</i> Willd.		2.78	3.89
<i>Carex</i> sp.		2.56	3.33
<i>Scirpus cyperinus</i> (L.) Kunth			2.44
<i>Poa palustris</i> L.		1.78	2.11
<i>Carex pensylvanica</i> Lam.		1.11	1.22
<i>Calamagrostis canadensis</i> var. <i>canadensis</i> (M) Nutt			1.11
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			0.89
<i>Eleocharis</i> sp.		0.44	0.56
<i>Carex lacustris</i> Willd.		0.67	0.44
<i>Bromus ciliatus</i> L.			0.22
<i>Cinna latifolia</i> (Trev.) Griseb.		0.22	0.22
<i>Juncus tenuis</i> Willd.		0.11	0.22
<i>Oryzopsis asperifolia</i> Michx.			0.22
<i>Poa compressa</i> L.			0.22

G. Host 2/94

PLOT : 9

Life Form: Graminoids

Species	1989	1990	1991
<i>Typha latifolia</i> L.		0.22	0.22
<i>Bromus</i> sp.			0.11
<i>Alopecurus aequalis</i> Sobol.		0.56	
<i>Carex scoparia</i> Schkuhr ex Willd.		0.22	
<i>Glyceria grandis</i> S. Wats.		0.11	
<i>Juncus</i> sp.		0.22	
<i>Poa pratensis</i> var. <i>pratensis</i> L.		0.22	

Number of Species: 21

PLOT : 9

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus pubescens</i> Raf.		1.56	2.44
<i>Populus tremuloides</i> Michx.		2.00	2.33
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.		0.44	2.33
<i>Betula papyrifera</i> Marsh.		0.11	1.22
<i>Corylus cornuta</i> Marsh.		0.33	1.00
<i>Salix bebbiana</i> Sarg.			0.67
<i>Diervilla lonicera</i> Mill.			0.56
<i>Populus grandidentata</i> Michx.		0.33	0.44
<i>Rosa acicularis</i> Lindl.		0.22	0.44
<i>Salix</i> sp.			0.44
<i>Cornus stolonifera</i> Michx.			0.22
<i>Acer rubrum</i> L.		0.22	0.11
<i>Fraxinus nigra</i> Marsh.			0.11
<i>Prunus pensylvanica</i> L. f.			0.11
<i>Ribes cynosbati</i> L.			0.11
<i>Corylus americana</i> Walt.		0.33	
<i>Quercus rubra</i> var. <i>rubra</i> L.		0.11	
<i>Rhus radicans</i> var. <i>negundo</i> (Greene) Mulligan		0.11	

Number of Species: 18

PLOT : 10

Life Form: Forbs

PLOT : 10

Life Form: Forbs

Species	1989	1990	1991
<i>Trifolium repens</i> L.		0.89	2.56
<i>Conyza canadensis</i> (L.) Cronq.		0.78	2.44
<i>Aster macrophyllus</i> L.		1.78	2.33
<i>Fragaria virginiana</i> Duchesne		0.56	2.11
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.		0.56	1.56
<i>Polygonum cilinode</i> Michx.		0.67	1.56
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.		0.44	1.33
<i>Anemone quinquefolia</i> L.		0.11	0.89
<i>Aster ciliolatus</i> Lindl.			0.78
<i>Lathyrus venosus</i> Muhl. ex Willd.			0.78
<i>Clintonia borealis</i> (Ait.) Raf.		0.33	0.67
<i>Pteridium aquilinum</i> (L.) Kuhn		0.44	0.67
<i>Solidago hispida</i> var. <i>hispida</i> Muhl.		0.11	0.67
<i>Viola</i> sp.		0.22	0.67
<i>Geranium bicknellii</i> Britt.		0.56	0.56
<i>Cornus canadensis</i> L.		0.11	0.44
<i>Lathyrus ochroleucus</i> Hook.		0.56	0.44
<i>Antennaria</i> sp.			0.33
<i>Athyrium angustum</i> (Willd.) Presl		0.22	0.33
<i>Galium triflorum</i> Michx.		0.22	0.33
<i>Halenia deflexa</i> (Smith) Griseb.			0.33
<i>Potentilla norvegica</i> L.			0.33
<i>Solidago canadensis</i> var. <i>canadensis</i> L.			0.33
<i>Aralia nudicaulis</i> L.		0.56	0.22
<i>Epilobium angustifolium</i> ssp. <i>angustifolium</i> L.		0.11	0.22
<i>Epilobium coloratum</i> Biehler			0.22
<i>Polygonum erectum</i> L.			0.22
<i>Sanicula marilandica</i> L.			0.22
<i>Trifolium pratense</i> L.			0.22
<i>Apocynum androsaemifolium</i> L.			0.11
<i>Galium boreale</i> L.			0.11
<i>Plantago major</i> L.			0.11
<i>Polygonum aviculare</i> L.		0.11	0.11
<i>Taraxacum officinale</i> Wiggers		0.11	0.11
<i>Viola adunca</i> Smith			0.11
<i>Chrysanthemum</i> sp.		0.11	
<i>Gnaphalium</i> sp.		0.11	
<i>Oxalis dillenii</i> Jacq.		0.11	
<i>Petasites</i> sp.		0.11	
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett		0.22	

PLOT : 10

Life Form: Forbs

Species	1989	1990	1991
<i>Veronica peregrina</i> var. <i>peregrina</i> L.		0.22	

Number of Species: 41

PLOT : 10

Life Form: Graminoids

Species	1989	1990	1991
<i>Poa compressa</i> L.			4.33
<i>Carex pensylvanica</i> Lam.		2.33	3.56
<i>Phleum pratense</i> L.		0.11	1.44
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			1.33
<i>Panicum capillare</i> L.		0.44	1.11
<i>Bromus ciliatus</i> L.			0.89
<i>Agrostis scabra</i> Willd.		0.22	0.67
<i>Agropyron repens</i> var. <i>repens</i> (L.) Beauv.			0.33
<i>Echinochloa crusgalli</i> (L.) Beauv.			0.33
<i>Bromus</i> sp.		0.11	
<i>Carex</i> sp.		0.11	
<i>Deschampsia cespitosa</i> (L.) Beauv.		0.22	
<i>Deschampsia flexuosa</i> (L.) Trin.		0.67	
<i>Panicum</i> sp.		0.22	
<i>Poa palustris</i> L.		0.11	

Number of Species: 15

PLOT : 10

Life Form: Needleleaf Evergreen

Species	1989	1990	1991
<i>Abies balsamea</i> (L.) Mill.		0.11	

Number of Species: 1

PLOT : 10

Life Form: Woody Deciduous

PLOT : 10

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Populus tremuloides</i> Michx.		1.89	2.67
<i>Betula papyrifera</i> Marsh.		0.44	1.22
<i>Rubus pubescens</i> Raf.		0.89	1.22
<i>Rubus strigosus</i> var. <i>strigosus</i> Michx.		0.33	1.22
<i>Prunus pensylvanica</i> L. f.			1.00
<i>Diervilla lonicera</i> Mill.		0.11	0.78
<i>Ribes cynosbati</i> L.		0.11	0.56
<i>Vaccinium angustifolium</i> Ait.		0.11	0.56
<i>Corylus americana</i> Walt.		0.33	0.44
<i>Corylus cornuta</i> Marsh.			0.33
<i>Acer rubrum</i> L.		0.22	0.22
<i>Lonicera</i> sp.			0.22
<i>Prunus virginiana</i> L.			0.22
<i>Prunus</i> sp.		0.89	

Number of Species: 14

PLOT : 11

Life Form: Forbs

Species	1989	1990	1991
<i>Trifolium hybridum</i> L.		0.22	4.00
<i>Fragaria virginiana</i> Duchesne		1.22	3.56
<i>Aster ciliolatus</i> Lindl.			2.89
<i>Polygonum cilinode</i> Michx.		1.00	2.89
<i>Potentilla norvegica</i> L.			2.67
<i>Plantago major</i> L.		1.00	2.00
<i>Conyza canadensis</i> (L.) Cronq.		1.22	1.89
<i>Cirsium arvense</i> var. <i>arvense</i> (L.) Scop.		0.22	1.33
<i>Aster macrophyllus</i> L.		0.78	1.22
<i>Epilobium coloratum</i> Biehler			1.22
<i>Oxalis</i> sp.		0.22	1.22
<i>Epilobium</i> sp.		0.78	1.11
<i>Galium triflorum</i> Michx.		0.22	1.11
<i>Cirsium vulgare</i> (Savi) Tenore		0.11	1.00
<i>Pteridium aquilinum</i> (L.) Kuhn		0.11	1.00
<i>Sonchus arvensis</i> L.		0.44	0.89
<i>Taraxacum officinale</i> Wiggers		0.22	0.89
<i>Solidago gigantea</i> var. <i>gigantea</i> Ait.		0.11	0.78

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PLOT: 11

Life Form: Forbs

Species	1989	1990	1991
<i>Trifolium pratense</i> L.		0.44	0.78
<i>Trifolium repens</i> L.		0.33	0.78
<i>Equisetum sylvaticum</i> L.			0.67
<i>Viola</i> sp.			0.67
<i>Anemone quinquefolia</i> L.		0.11	0.56
<i>Geranium bicknellii</i> Britt.		0.44	0.56
<i>Maianthemum canadense</i> var. <i>canadense</i> Desf.			0.56
<i>Vicia americana</i> var. <i>americana</i> Muhl. ex Willd.		0.22	0.56
<i>Galium boreale</i> L.			0.44
<i>Lycopus americanus</i> Muhl.			0.44
<i>Prunella vulgaris</i> ssp. <i>vulgaris</i> L.			0.44
<i>Solidago canadensis</i> var. <i>canadensis</i> L.			0.44
<i>Viola pubescens</i> var. <i>pubescens</i> Ait.			0.44
<i>Equisetum pratense</i> Ehrh.		0.11	0.33
<i>Geum aleppicum</i> Jacq.			0.33
<i>Lathyrus venosus</i> Muhl. ex Willd.			0.33
<i>Streptopus roseus</i> var. <i>longipes</i> (Fern.) Fassett			0.33
<i>Apocynum androsaemifolium</i> L.		0.22	0.22
<i>Aster umbellatus</i> var. <i>umbellatus</i> Mill.			0.22
<i>Erigeron strigosus</i> var. <i>strigosus</i> Muhl.			0.22
<i>Hepatica americana</i> (DC.) Ker			0.22
<i>Lactuca</i> sp.			0.22
<i>Lysimachia ciliata</i> L.			0.22
<i>Osmunda</i> sp.			0.22
<i>Petasites frigidus</i> (L.) Fries.			0.22
<i>Taraxacum</i> sp.			0.22
<i>Thelypteris palustris</i> Schott		0.22	0.22
<i>Athyrium angustum</i> (Willd.) Presl			0.11
<i>Cirsium muticum</i> Michx.			0.11
<i>Lathyrus ochroleucus</i> Hook.		0.22	0.11
<i>Silene latifolia</i> Poiret			0.11
<i>Thalictrum dasycarpum</i> Fisch. & Lall.		0.22	0.11
<i>Aster</i> sp.		0.11	
<i>Chenopodium album</i> L.		0.11	
<i>Cirsium</i> sp.		0.11	
<i>Equisetum</i> sp.		0.44	
<i>Matricaria maritima</i> L.		0.22	
<i>Polygonum aviculare</i> L.		0.11	
<i>Potentilla</i> sp.		0.11	
<i>Sanicula marilandica</i> L.		0.11	

G. Host 2/94

PLOT : 11

Life Form: Forbs

Species	1989	1990	1991
<i>Veronica peregrina</i> var. <i>peregrina</i> L.		1.11	

Number of Species: 59

PLOT : 11

Life Form: Graminoids

Species	1989	1990	1991
<i>Poa palustris</i> L.		1.22	4.78
<i>Poa compressa</i> L.			2.67
<i>Bromus ciliatus</i> L.			2.44
<i>Agrostis stolonifera</i> var. <i>major</i> (Gaud.) Farw.			1.78
<i>Cinna latifolia</i> (Trev.) Griseb.			1.67
<i>Agrostis scabra</i> Willd.		0.22	1.44
<i>Carex pensylvanica</i> Lam.		1.11	1.33
<i>Carex</i> sp.		0.44	1.22
<i>Panicum capillare</i> L.			0.56
<i>Scirpus cyperinus</i> (L.) Kunth			0.44
<i>Calamagrostis canadensis</i> var. <i>canadensis</i> (M) Nutt			0.22
<i>Phleum pratense</i> L.		0.22	0.22
<i>Bromus</i> sp.		0.44	
<i>Milium effusum</i> L.		0.11	

Number of Species: 14

PLOT : 11

Life Form: Needleleaf Evergreen

Species	1989	1990	1991
<i>Picea</i> sp.			0.22

Number of Species: 1

PLOT : 11

Life Form: Woody Deciduous

Species	1989	1990	1991
<i>Rubus pubescens</i> Raf.		1.00	2.22

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PLOT : 11

Life Form: Woody Deciduous

Species	1989	1990	1991
Rubus strigosus var. strigosus Michx.			2.22
Populus tremuloides Michx.		0.67	1.44
Diervilla lonicera Mill.			1.22
Betula papyrifera Marsh.		0.33	0.78
Amelanchier sp.			0.33
Corylus cornuta Marsh.		0.44	0.33
Salix bebbiana Sarg.			0.33
Ribes americanum Mill.			0.22
Ribes cynosbati L.			0.22
Acer rubrum L.			0.11
Populus balsamifera L.		0.11	0.11
Prunus pennsylvanica L. f.			0.11
Sambucus pubens Michx.			0.11
Cornus stolonifera Michx.		0.22	
Corylus americana Walt.		0.11	

Number of Species: 16