** D R A F T **

STUDIES OF ILLINOIS OAK SAVANNA REMANTS IN 1987 AND 1988

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INTRODUCTION

In 1986 studies of historic oak savanna systems of Northern Illinois were initiated under a program supported by Illinois Department of Conservation, Illinois Nature Conservancy, Max McGraw Wildlife Foundation, Morton Arboretum, and Applied Ecological Services, Inc. In 1986 four areas were investigated (Reed Turner Woodland, Wadsworth Savanna, Somme Prairie and Savanna, and Middlefork Savanna) and baseline data was summarized (Apfelbaum et al. 1987). Studies of vascular vegetation and breeding birds were undertaken in each area, leaf litter insects were studied in Reed Turner and Middlefork Savannas, lichen and bryophytes were investigated in all but Wadsworth Savanna. Small mammals were studied in Wadsworth, Somme, Reed Turner, and Middlefork Savanna.

In 1987 the research programs were continued in five additional study areas in Illinois and three in Indiana. Resurvey of leaf litter insects and vegetation at Reed Turner Woodland and leaf litter insects at Middlefork Savanna were completed. Soil studies were completed in all sites. The new sites added to the program in 1987 included Edgebrook Flatwoods Savanna, Bluff Spring Fen Savanna, Sauganash Swamp White Oak Savanna, additional areas at Somme Savanna and Gander Mountain Savanna. Major studies were initiated (under separate agreement) at Tefft Sand Savanna, Jasper-Pulaski State Wildlife area, Indiana. Studies were also initiated in Indiana at the Gaylord Savanna at Hoosier Prairie and Indiana Dunes State Park Savanna.

In 1988 four additional Illinois study areas were added to this research program. Vascular vegetation was studied at Somme Savanna (additional areas), Lyman Woods, Cap Sauers Holding, and Glenview Woods Savanna. In addition studies were continued at the Tefft Savanna, and began at the Willow Slough and Stoutberg Savannas near Jasper-Pulaski, Indiana. Avian studies were conducted at Somme and Lyman Woods, Cap Sauers Holding, and Glenview Woods in 1988. Small mammal studies were conducted at Glenview Woods. Identifications of spiders, ants, leaf litter insects from previous field seasons was continued in 1988.

In summary 17 study areas have been included in this program.

Goals of this research program are to:

1) Present statistically representative data for savanna systems before and after introduction of management strategies.

2) Represent a full compliment of the historic savanna types from across the geographic range where savanna occurred in the midwest United States during recent presettlement times.

3) Focus research on vegetation and avian responses to restoration management efforts. Where funding and labor permits, studies of small mammals, insects and non-vascular vegetation will be undertaken.

4) Establish several key research areas where replicated, controlled tests of various management treatments can be studies.

Of the study sites included in this program (Table 1) eleven are on relatively deep silt loam soils. Sites on thin silt loam and gravel till soils, and others on sand and sand loam soils have also been studied. Two large study blocks with controlled replicated treatments were installed, one in Illinois and one in Indiana.

In 1989 additional study areas in Illinois, Wisconsin, and Minnesota

will be included in this program. The resurvey of Illinois sites will also begin.

In 1990, 4 growing seasons after commencement of this program, massive resurvey studies will be implemented where management has been implemented. We have learned that although management cooperations has been excellent, some of the agencies or land-owners have had scheduling problems or for some other reason have not implemented management in the study areas. This has set back resurvey efforts.

The purposes of this report is to present basic summary data from the 1987 and 1988 savanna studies in Illinois. Indiana and Wisconsin studies have been summarized and reports submitted under separate cover to agencies and land-owners.

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STUDY AREAS

Cap Sauers Holding Oak Savanna

Oak savanna study sites at Cap Sauers were established in a 60-80 acre block (28 ha) of forest dominated by 60-100 year old bur and black oak. Soils are deep loess derived loams on gently rolling well-drained uplands. Historic erosion gullying and overland sheet erosion, and heavy grazing were evident. Ground cover vegetation was relatively homogenous and depauperate throughout. Six 150-300 meter study transects were permanently established through the study area which has been established as an area for long-term study of savanna restoration strategies. Treatments to be tested are understory brush removal, spring and fall prescribed burning, and introduction of savanna plant species seeds. Single and multiple treatments will be tested in controlled replicated plots. Vascular vegetation and soils and stand origin and history were studied in July 1988. Ownership of the nearly 1500 acre Cap Sauers Holding is by the Cook County Forest Preserve District.

Cap Sauers Holding Buckthorn

This study program has suggested that mortality and poor reproduction of oak may result in major changes in plant composition and wildlife of historic

savannas. Three study areas of 5-40 acres (2-16 ha) dominated by buckthorn were identified in Cap Sauers Holding. Buckthorn had invaded 15-35 years ago into the old farm fields and prairies at these sites. Study areas were chosen to represent similar stands of buckthorn that can likely result if oak canopy mortality and poor reproduction occurs. Dense, impenetrable tangles of European and glossy buckthorn with arrow wood (Viburnum dentatum) and a virtually absent ground cover characterized the study sites. Scattered green ash and red elm saplings grew in the study sites. Vegetation and breeding bird studies were conducted in the buckthorn stands. No data will be presented in this report for this study area.

Lyman Woods

Lyman Woods is a 17 acre (6.8 ha) savanna remnant owned by the Downers Grove Park District and cooperatively managed by the DuPage County Forest Preserve District. This site has a high quality spring, mid-summer and fall ground cover. ALong a gentle north slope vegetation grades from bur and black oak domination at the slope crest to mesophytic woods of red oak, white oak with scattered white ash and bur oak. At the slope base disturbed forests of green ash and box elder grow in what was previously mesic and wet prairie that fringed large wetlands to the immediate north. Detailed site descriptions, management plans for this and contiguous properties, and a review of previous ecological studies in Lyman Woods have been documented (Apfelbaum and Haney, 1988).

At Lyman Woods ten 300 meter East-West oriented study transects were established for studies. Transects were permanently marked from a North-South baseline on the West side. Transects were regularly and systematically place every 100 meters along this baseline. Vegetation studies were conducted along these transects. Avian breeding surveys were conducted throughout Lyman

Woods.

Glenview Woods Savanna

A small part (~15 acres, ~ 6 ha) of Glenview Woods which is owned by the Cook County Forest Preserve District was included in this study. This represents a very different savanna vegetation from any other study area in the research program. Glenview Woods borders the north branch of the Chicago River. A transition from open white oak savanna to red oak with a shrub understory of Carpinus caroliniana associated with open understory occurs along a very shallow west to east slope gradient. Basswood, red oak and black maple also grow near the stream. Bur oak dominate to the immediate west of the white oak. We believe this stand occurs along a historic abrupt ecotone from prairie with interspersed bur oak savanna and grove to the immediate west.

Study transects were randomly established from the red oak zones to the north branch Chicago River stream bank. Avian studies were conducted along and near the vegetation study transects.

Gander Mountain Buckthorn Stand

Birds and vegetation were studied near Gander Mountain, Wisconsin on land owned and managed by the Lake County Preserve District. The study area was a large 80+ acre, 32 ha) dense stand of glossy buckthorn (Rhamnus frangula) associated with a dewatered wetland on high pH peats. Chosen because of the dense buckthorn stand this site provided an additional test of the effects of oak canopy mortality and potential changes with buckthorn domination. No data will be presented in this report for this study site.

Bluff Spring Fen Savanna

A 3-5 acre (1.6 ha) parcel on north exposed slopes on thin morainal soils having a diverse ground cover flora and bur oak canopy characterized the study area. Study transects were regularly and systematically established from a North-South baseline and ran down the slopes into Bluff Spring Fen Nature Preserve. The nature preserve is owned by Elgin Park District. Management is provided by volunteer stewards under direction of The Nature Conservancy and the Illinois Nature Preserves Commission.

Mueller Savanna

A 15 acre (6 ha) block of bur oak savanna with a light grazing history and 60-80 year old timber was chosen for study near Brodhead, Wisconsin. Heavy shading supported few species in a depauperate ground cover vegetation. Cooperative private owners (Mueller family) have allowed us to establish controlled replicated study plots. The entire woods is included in burn, burn and thin, or no management control plots. This area was set up for demonstration of savanna restoration strategies to be used for education and research purposes. No data will be presented in this report for this study area.

Edgebrook Flatwoods

Owned by the Cook County Forest Preserve District 10-20 acres (6 ha) of this site were studied. Gentle slopes were dominated by mesic oak (red oak) forests and graded to level areas with northern pin oak (Quercus palustris) with occasional pockets of open graminoid vegetation. This area is being actively managed by volunteered stewards using prescribed burning. This site represents the wet end of the hydrologic gradient where fires were believed to be less frequent than in oak savannas on drier upland sites.

Sauganash Savanna

Sauganash Savanna is a 5-15 (3 ha) acre site included in this study because it is an open site with wet to mesic prairie vegetation dominating the ground cover and interspersed swamp white oak trees. This site also represents the wet end of the savanna hydrologic gradient in northeastern Illinois. Ownership is by Cook County Forest Preserve District and management is by volunteer stewards.

METHODS

The small size of Glenview Woods, Lyman Woods, Bluff Spring Fen, Edgebrook Flatwoods, and Sauganash Savanna will allow for relatively intense sampling but not for a wide variety of treatments. In these areas baseline analysis will provide an initial datum used for determining ecological trend. In larger areas separate control and treatment areas, and respective study transects were established. Some were further divided to provide replication for treatment and control study areas. Segmentation into burn units generally strived to follow trail systems.

All study transects were surveyed with compass and tape. Study transect endpoints and 50 meter points were marked with steel conduit stakes.

Ground Cover

All vascular and woody plants less than a meter high were quantified in meter square quadrats centered over transect lines at 10 meter intervals. In each quadrat percent cover of all plant species and ground cover elements (woody debris, leaf litter, rock, etc.) was estimated within cover classes. This data was used to calculate absolute and relative cover, relative frequency, and importance values for each species by transects. Transects

were combined for control (non-burn) and treatment (burn) areas. All nomenclature for vascular vegetation follows Swink and Wilhelm (1979). Searches for special status species were conducted, and locations were identified.

All sampling was conducted in late May 1986; later blooming species were identified in vegetation condition. Plots were re-sampled in August 1986 to determine adequacy of vegetative identification and sampling; results were found to be virtually identical and are not reported here. In 1987 and 1988 studies were conducted in 6-9 June and 14-16 July, respectively.

Woody Vegetation

The intercept of woody plant canopies directly over each 50 meter transect was recorded by species in two layers, trees (2 inches DBH and over) and vines, shrubs, and small trees (less than 2 inches DBH and greater than 1 meter high). All associated tree diameters (DBH) were recorded by species on 1 meter either side of each 50 meter line. Stems of all vine, shrub, and small tree species at least 1 meter tall were tallied within 1 meter of the left side of each 50 meter line. All dead stems were identified and recorded separately. Woody stems were divided into 4 inch size classes for each species. Alive and dead stems were expressed as species density and combined for all transects within treatment units.

RESULTS AND DISCUSSIONS

Cap Sauers Holding

Woody Vegetation

Woody vegetation was surveyed along four transects in the south side of Cap Sauers Holding, off Ford Road, on 14 July 1988. Transect 1 was set 200 m. east of the private drive on Ford Road, with the beginning marked by a metal

conduit 10 m. north of the north edge of the road. Transects were run due north. Transects 1, 2, and 3 were 350 m. along, in 50 m. units. Transect 4 was 300 m. long. Transects were spaced an even 200 m. apart, each 200 m. west of the previous starting point along Ford Road. Data are analyzed both by transect and by overall means and variance for purposed of evaluating the variation within this section of the forest.

A master list of woody species found in this section of Cap Sauers Holding is provided in Table 1. White oak and Northern Red oak were the most important tree species although Bur Oak in the canopy and Black Cherry in the understory were common (Table 2). As one would hope, there was excellent agreement between species dominance as indicated by cover and basal area (Table 3). Total basal area for the forest was 97 square feet per acre, a bit above average for mature savanna forests that have not been burned or grazed recently. Dead basal area was about 30 per cent of alive basal area, well within the range of normal mortality.

Tree density by size class (Table 4) suggests that most species are reproducing well. This is unusual in unmanaged savannas. Red oak appears to be reproducing better than white or bur, but a greater concern has to be the larger number of black cherry trees in the smallest size class. This indicates that fire is needed to maintain the oak populations. In looking at the shrub and small tree stem densities (Table 6) shows the increase in buckthorn in the forests. Cover (Table 5) also indicates the heavy buckthorn invasion. This is the greatest indication of problems in what is otherwise a remarkable good oak savanna forest.

Ground Vegetation Cover

Dominant ground cover species based on frequency along all study transects (Tables 7 - 10) included sweet cicely (Osmorhiza claytoni),

Snakeroot (Sanicula gregaria), virginia creeper (Parthenocissus quinquefolia), honewort (Cryptotaenia canadensis), enchanters nightshade (Circaea quadrisulcata) and wood knotweed (Tovara virginianum). Many of these same species also accounted for the highest relative cover values measured. Several shrubs, including arrow wood (Viburnum dentata), gray dogwood (Cornus racemosa) and buckthorn (Rhamnus cathartica and R. frangula), high bush cranberry (Viburnum opulus), less than a meter height also had high relative cover values. Between 40-50 species of plants were sampled in quadrats along each transect. The majority of species were native plants with only a few naturalized species achieving importance.

The relative cover of leaf litter in each transect were very similar averaging nearly 25 percent (Table 11). Leaf litter during the July 1988 sampling was absent from less than 10 percent of all study quadrats.

Table 1. Master list of woody species encountered in Cap Sauer's Holding (south), 14 July 1988, along four transects used to inventory the forest. Nomenclature follows that of Gleason and Conquist (1963).

Acer negundo	**Box elder**
Carya cordiformis	**Bitternut hickory**
C. ovata	**Shagbark hickory**
Celastrus scandens	**Bittersweet**
Cornus racemosa	**Grey dogwood**
Corylus americana	**Hazel-nut**
Crataegus sp.	**Hawthorn**
Fraxinus americana	**White ash**
Fraxinus pennsylvanica	**Green ash**
Juglans nigra	**Black walnut**
Lonicera sempervirens	**Honeysuckle**
Lonicera tartarica	**Trumpet honeysuckle**
Malus sp.	**Apple**
Ostrya virginiana	**Eastern hophornbeam**
Parthenocisus quinquefolia	**Virginia creeper**
Prunus americana	**Wild cherry**
Prunus virginiana	**Choke cherry**
Quercus alba	**White oak**
Q. ellipsoidalis	**Hills oak**
Q. macrocarpa	**Bur oak**
Q. muhlenbergia	**Chinkapin oak**
Q. rubra	**Northern red oak**
Q. velutina	**Black oak**
Rhamnus catharticus	**Buckthorn**
R. frangula	**Buckthorn**
Rhus radicans	**Poison ivy**
Tilia americana	**American basswood**
Ulmus americana	**American elm**
U. rubra	**Red elm**
Viburnum dentatum	**Arrow-wood**
Vibernum prunifolium	**Black haw**
Vitis sp.	**Grape**

Table 2. Tree (stems over 2 inches d.b.h.) cover in Cap Sauer's Holding (South) along four transect lines, as estimated by 50 m. intercepts on 14 July 1988.

	TRANSECTS				
SPECIES	Transect 1	Transect 2	Transect 3	Transect 4	AVERAGE
Acer negundo	0.5 (1.2)				0.1 (0.6)
Carya cordiformis			1.9 (2.7)		0.4 (1.5)
C. ovata	1.2 (2.8)	2.5 (4.1)		4.7 (4.0)	1.6 (3.7)
Corylus americana				4.3 (2.5)	0.6 (1.9)
Crataegus sp.	2.6 (4.0)	1.6 (3.9)	2.9 (3.6)		1.7 (3.5)
Fraxinus americana		3.7 (9.1)	5.8 (11.5)		2.3 (7.6)
F. pennsylvanica		1.4 (3.4)			0.4 (2.0)
Juglans nigra	2.8 (6.2)			4.4 (3.4)	1.2 (3.9)
Malus sp.		1.6 (3.8)			0.8 (2.7)
Prunus serotina	8.0 (6.0)	4.4 (5.6)	6.6 (6.8)	8.7 (11.8)	7.2 (8.4)
Quercus alba	51.1 (33.7)	29.1 (24.3)	30.3 (33.3)	32.4 (22.4)	35.7 (30.0)
Q. ellipsoidalis	5.3 (11.9)				1.3 (6.4)
Q. macrocarpa	12.3 (10.7)	3.7 (5.8)	15.7 (27.9)	15.1 (22.1)	11.2 (18.6)
Q. muhlenbergia	0.1 (0.3)				0.1 (0.2)
Q. rubra	42.5 (26.0)	38.4 (18.0)	34.4 (19.6)	52.6 (24.2)	42.1 (23.1)
Q. velutina		13.8 (17.6)		3.2 (1.3)	2.5 (8.6)
Rhamnus catharticus			1,9 (3.8)	6.9 (8.9)	1.5 (5.6)
R. frangula	1.6 (2.5)	0.7 (1.7)	1.9 (3.8)		1.0 (2.4)
Tilia americana			7.4 (10.0)		1.5 (5.5)
Ulmus americana	4.6 (5.4)		0.6 (1.2)		1.1 (2.8)
U. rubra	2.1 (4.6)	1.6 (3.9)	2.9 (3.6)		1.7 (3.5)

Table 3. Basal area of alive and dead trees and shrubs in Cap Sauer's Holding, as estimated by 10 factor prism points along four transects lines, 14 July 1988.

SPECIES	ALIVE TREES ft^2/acre	ALIVE TREES m^2/hectare	DEAD TREES ft^2/acre	DEAD TREES m^2/hectare
Carya cordiformis	0.2 (0.4)	0.1 (0.1)		
C. ovata	0.2 (0.5)	0.1 (0.1)		
Cornus racemosa	3.0 (6.2)	0.1 (1.4)	0.4 (0.9)	0.1 (0.2)
Corylus americana	1.2 (2.7)	0.3 (0.5)	0.2 (0.4)	0.1 (0.1)
Crataegus sp.	0.4 (0.5)	0.1 (0.1)		
Fraxinus americana	5.7 (5.5)	1.3 (1.3)		
Juglas nigra	0.4 (0.9)	0.1 (0.2)		
Malus sp.	1.2 (2.7)	0.3 (0.6)		
Prunus serotina	2.2 (2.0)	0.5 (0.5)		
P. virginiana	2.0 (3.5)	0.1 (0.8)	0.6 (0.9)	0.1 (0.2)
Quercus alba	33.8 (24.6)	7.8 (5.7)	1.0 (1.2)	0.2 (0.3)
Q.macrocarpa	2.5 (2.4)	0.6 (0.6)	0.2 (0.4)	0.1 (0.1)
Q. rubra	28.0 (15.8)	6.5 (3.7)	3.2 (2.0)	0.7 (1.0)
Q. velutina	3.8 (5.8)	0.9 (1.3)	1.0 (2.2)	0.2 (0.5)
Rhamnus frangula	1.0 (17.3)	0. 2 (4.0)		
Tilia americana	0.6 (1.3)	0.1 (0.3)		
Ulmus americana	0.2 (0.5)	0.1 (0.1)		
U. rubra	0.4 (0.5)	0.1 (0.1)		
TOTAL	97.1 (33.5)	22.4 (7.7)	28.1 (147.0)	6.5 (33.9)

Table 4. Tree density and stem size distribution in Cap Sauer's Holding (south) as measured in four transects, 14 July 1988. One standard deviation is given parentheses

ALIVE TREES

SPECIES	Tree Size Classes (inches at d.b.h.) 2-6	6-10	10-14	14-18	18-22	22-26	26-30	30-34	Total
Acer negundo	5								5(10)
Carya cordiforms	5								5 (10)
Carpinus carolin.	5	5							15 (30)
Corylus americana	20								50(135)
Crataegus sp.	15	10							25 (55)
Fraxinus americana	5	10	5	5					25 (65)
F. penn.	25								25(110)
Juglans nigra	5	5							10 (35)
Malus sp.	25	35							80(180)
Prunus serotina	90	10	5						85(125)
P. virginiana	5								5 (10)
Quercus alba	45	20	15	35	35	15	15	105	175(215)
Q. macrocarpa	10	10	10	5	15	15			45 (90)
Q. rubra	130	80	30	20	50	15	5	5	265(415)
Q. velutina	35	15	35						65(120)
R. catharticus	5				5				15 (50)
R. frangula	40								40 (85)
Tilia americana	15								15 (30)
Ulmus rubra	5								20 (50)
Viburnum acerif.	5								5 (10)
V. dentatum	20								20(75)
TOTAL	540(520)	170(295)	55(70)	65(95)	90(105)	35(55)	20(35)	10(25)	160(295)

DEAD TREES

Fraxinus penn.	5								5 (10)
Malus sp.	5								5 (10)
Prunus serotina	5	10							5 (10)
Quercus alba	75								55(140)
Q. rubra	15	10			5				55 (70)
Q. velutina	10								15 (35)
Rhamnus frangula	5								5 (15)
TOTAL	75(85)	5(15)			5(10)				15 (40)

Table 5. Shrub and small tree (stems < 2 inches d.b.h.) cover in Cap Sauer"s Holding (south) as estimated along four transect lines using 50 m. intercepts on 14 July 1988. One standard deviation is given in parenthesis.

	TRANSECTS				
SPECIES	Transect 1	Transect 2	Transect 3	Transect 4	Average
Acer negundo	0.1(0.2)	0.7(1.7)	1.0(2.3)		0.8(2.4)
Carya cordiformis	0.4(0.9)	0.2(0.5)	1.0(2.2)	1.0(2.5)	0.4(0.9)
C. ovata	0.6(1.5)	1.4(2.4)		0.6(1.5)	0.7(1.6)
Celastrus scandens				0.3(0.8)	0.1(0.4)
Cornus racemosa	2.3(3.2)	1.6(3.3)	3.2(3.9)	1.8(2.1)	1.8(2.6)
Corylus americana			2.2(4.8)		0.6(2.2)
Crataegus sp.	2.7(4.3)	8.6(12.9)	10.9(4.0)	19.2(13.0)	8.6(10.5)
Fraxinus americana	2.1(5.1)	0.9(1.6)		0.3(0.8)	0.1(0.4)
F. pennsylvanica		1.6(2.0)	1.2(1.7)		0.4(1.1)
Lonicera semperivir.	2.2(5.3)	0.1(0.3)			0.6(2.7)
Prunus serotina	7.5(7.4)	2.6(2.6)	9.2(5.2)	7.6(5.3)	6.9(5.9)
P. virginiana	2.9(3.7)	0.5(0.9)	0.2(0.4)	0.4(0.9)	1.1(2.2)
Quercus muhlenbergii	0.3(0.7)				0.1(0.4)
Q. rubra	1.1(1.4)	0.3(0.8)	2.5(5.5)	2.8(5.3)	1.7(3.6)
Rhamnus catharticus	0.6(1.5)	0.1(0.2)	2.8(3.7)	2.4(3.2)	1.6(3.4)
R. frangula	15.8(12.0)	39.5(13.5)	5.3(5.0)	9.7(7.3)	22.1(16.1)
Rhus radicans	1.2(2.6)	0.9(1.5)		0.6(1.5)	1.3(3.1)
Tilia americana			6.2(8.7)		1.3(4.4)
Ulmus americana			2.2(4.8)		0.6(2.2)
U. rubra		2.4(3.6)	0.9(2.1)		0.8(2.3)
Viburnum acer.	2.3(4.6)		1.4(3.1)		0.8(2.7)
V. dentatum	10.0(8.5)	3.0(4.0)	1.8(2.5)		3.8(6.0)
V. prunifolium	0.1(0.2)				0.1(0.1)
Vitis sp.	2.7(4.5)	2.1(2.7)	1.4(3.1)	2.5(5.2)	2.3(3.7)

Table 6. Stem numbers (per hectare) of shrub and small trees (stems < 2 inches d.b.h.) along four transects through Cap Sauer's Holding (south). Data were collected on 14 July 1988. One standard deviation is given in parentheses.

ALIVE STEMS

SPECIES	Transect 1	Transect 2	Transect 3	Transect 4
Acer negundo			20(40)	
Carpinus carolinana	33(82)			30(50)
Carya cordiformis	67(103)	29(76)	80(70)	30(50)
C. ovata	67(163)	114(302)		
Celastrus scandens				20(40)
Cornus racemosa	633(991)	714(765)	600(620)	430(540)
Corylus americana			340(420)	
Crataegus sp.	333(723	143(299)	380(150)	380(510)
Fraxinus americana	33(82)		320(380)	
F. pennsylvanica	229(293)			300(500)
Lonicera tartarica	133(327)			
Morus rubra			20(40)	
Ostrya carolinana	33(82)			
Prunus americana		57(151)		
P. serotina	333(327)	57(98)	280(310)	560(450)
Prunus virginiana		29(76)		120(150)
Quercus rubra	67(103)			30 (50)
Q. velutina	67(163)			
Rhamnus catharticus	133(327)	85(227)	300(380)	220(210)
R. frangula	3067(2957)	1800(1665)	940(510)	1100(850)
Rhus radicans	200(253)		20(40)	
Rosa multiflora	29(76)			
Ulmus rubra	314(832)		60(120)	
Viburnum acerifolium	33 (82)		180(360)	
V. dentatum	2433(2699)	514(886)	220(260)	300(500)
V. prunifolium	33(82)			
Vitis sp.	133(207)	114(302)		

DEAD STEMS

Cornus racemosa		57(151)	260(330)	70(100)
Corylus americana			80(100)	
Crataegus sp.			60(80)	
Fraxinus americana			20(40)	
Prunus serotina	100(167)		160(200)	30(50)
Quercus rubra	33(82)			
Rhamnus catharticus	33(82)			
R. frangula	333(413)	457(341)	300(260)	300(300)
Viburnum dentatum			20(40)	

Table 7. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from study transect 1 Cap Sauers Holding (Cook County, IL). Based on sampling using meter square quadrats established every 10 meters along surveyed transects studied 14 July 1988.

	AF	RF	AC	RC	IV
ACER NEGUNDO	1	0.5	11	4.8	5.4
AGRIMONIA PUBESCENS	1	0.5	1	0.4	0.9
ALLIARIA OFFICINALIS	4	2.1	1	0.4	2.5
ALLIUM CANADENSE	1	0.5	1	0.4	0.9
APIOS AMERICANA	6	3.2	4.3	1.9	5.1
ARENARIA LATERIFLORA	1	0.5	1	0.4	0.9
ASTER SHORTII	3	1.6	4.3	1.9	3.5
BERBERIS THUNBERGII	2	1.1	6	2.6	3.7
CAREX LAXIFLORA	1	0.5	1	0.4	0.9
CAREX PENSYLVANICA	1	0.5	1	0.4	0.9
CARYA OVATA	2	1.1	6	2.6	3.7
CELASTRUS ORBICULATUS	1	0.5	1	0.4	0.9
CIRCAEA QUADRISULCATA	10	5.3	5	2.2	7.5
CORNUS RACEMOSA	6	3.2	12.5	5.5	8.7
CRYPTOTAENIA CANADENSIS	10	5.3	4	1.8	7.0
EUPATORIUM RUGOSUM	2	1.1	6	2.6	3.7
GALIUM CONCINNUM	6	3.2	7.6	3.4	6.5
GEUM CANADENSIS	1	0.5	1	0.4	0.9
CRATAEGUS CRUS-GALLI	1	0.5	1	0.4	0.9
HELIANTHUS DIVARICATA	1	0.5	1	0.4	0.9
LAPORTEA CANADENSIS	1	0.5	1	0.4	0.9
LEERSIA VIRGINICA	1	0.5	1	0.4	0.9
OSMORHIZA CLAYTONI	14	7.4	4.6	2.0	9.4
PARTHENOCISSUS QUINQUEFOLIA	12	6.3	11.5	5.1	11.4
PHRYMA LEPTOSTACHYS	4	2.1	1	0.4	2.5
PODOPHYLLUM PELTATUM	2	1.1	6	2.6	3.7
POTENTILLA SIMPLEX	3	1.6	1	0.4	2.0
PRUNUS SEROTINA	2	1.1	6	2.6	3.7
PRUNUS VIRGINIANA	3	1.6	11	4.8	6.4
QUERCUS RUBRA	2	1.1	1	0.4	1.5
QUERCUS VELUTINA	3	1.6	1	0.4	2.0
RHAMNUS CATHARTICA	3	1.6	1	0.4	2.0
RHAMNUS FRANGULA	6	3.2	2.7	1.2	4.3
ROSA MULTIFLORA	1	0.5	11	4.8	5.4
RUBUS OCCIDENTALIS	5	2.6	11	4.8	7.5
RUBUS SP.	1	0.5	11	4.8	5.4
SANICULA GREGARIA	23	12.1	24.8	10.9	23.0
SMILACINA RACEMOSA	3	1.6	1	0.4	2.0
SMILAX HERBACEA	4	2.1	1	0.4	2.5
SOLIDAGO SP.	4	2.1	6	2.6	4.7
SPHENOPHOLIS INTERMEDIA	1	0.5	1	0.4	0.9
TEUCRIUM CANADENSIS	1	0.5	1	0.4	0.9
TOVARA VIRGINIANUM	17	8.9	10.8	4.8	13.7
VIBURNUM OPULUS	2	1.1	11	4.8	5.9
VIBURNUM DENTATA	7	3.7	13.5	5.9	9.7
VIOLA CANADENSE	2	1.1	1	0.4	1.5
VIOLA PAPILIONACEA	2	1.2	1	0.4	1.5
	190	100	226.	100	200

Table 8. Summary of absolute (A) and relative (R) frequency (F) and Cover (C) values and importance values (IV) from study transect 2 (Cap Sauers Holding (Cook County, IL). Based on sampling using meter square quadrats established every 10 meters along surveyed transects studied 14 July 1988.

	AF	RF	AC	RC	IV
AGRIMONIA PUBESCENS	3	1.4	7.7	2.7	4.1
ALLIARIA OFFICINALIS	1	0.5	1	0.4	0.8
ALLIUM CANADENSE	1	0.5	1	0.4	0.8
APIOS SP.	1	0.5	11	3.9	4.4
APIOS AMERICANA	3	1.4	1	0.4	1.8
CELASTRUS ORBICULATUS	1	0.5	11	3.9	4.4
CIRCAEA QUADRISULCATA	17	7.9	3.4	1.2	9.1
CORNUS RACEMOSA	9	4.2	19.5	6.9	11.1
CRATAEGUS CRUS-GALLI	6	2.8	2.7	0.9	3.7
CRYPTOTAENIA CANADENSIS	7	3.3	5.3	1.9	5.1
DACTYLIS GLOMERATA	2	0.9	1	0.4	1.3
DIOSCOREA SP.	2	0.9	1	0.4	1.3
EUPATORIUM RUGOSUM	6	2.8	6	2.1	4.9
FRAGARIA VIRGINIANA	6	2.8	10.8	3.8	6.6
GALIUM CONCINNUM	6	2.8	6	2.1	4.9
GEUM CANADENSIS	4	1.9	8.3	2.9	4.8
HACKELIA VIRGINIANA	1	0.5	11	3.9	4.4
LEERSIA VIRGINICUS	1	0.5	11	3.9	4.4
MENISPERMUM CANADENSE	2	0.9	1	0.4	1.3
OSMORHIZA CLAYTONI	12	5.6	1.8	0.6	6.3
OXALIS EUROPAEA	1	0.5	1	0.4	0.8
PARTHENOCISSUS QUINQUEFOLIA	7	3.3	6.6	2.3	5.6
PHALARIS ARUNDINACEA	1	0.5	60	21.1	21.6
PHRYMA LEPTOSTACHYA	3	1.4	1	0.4	1.8
PILEA PUMILA	2	0.9	1	0.4	1.3
PODOPHYLLUM PELTATUM	2	0.9	15.5	5.5	6.4
POTENTILLA SIMPLEX	7	3.3	2.4	0.9	4.1
PRUNUS AMERICANA	1	0.5	1	0.4	0.8
PRUNUS SEROTINA	2	0.9	1	0.4	1.3
RHAMNUS CATHARTICA	8	3.7	9.6	3.4	7.1
RHAMNUS FRANGULA	12	5.6	4.3	1.5	7.1
RHUS RADICANS	11	5.1	9.9	3.5	8.6
ROSA MULTIFLORA	3	1.4	4.3	1.5	2.9
RUBUS OCCIDENTALIS	3	1.4	4.3	1.5	2.9
SANICULA GREGARIA	20	9.3	13.3	4.7	14.0
SMILACINA RACEMOSA	12	5.6	1.8	0.6	6.3
SMILACINA STELLATA	2	0.9	1	0.4	1.3
SMILAX HERBACEA	3	1.4	1	0.4	1.8
TOVARA VIRGINIANA	12	5.6	5.1	1.8	7.4
VIBURNUM OPULUS	1	0.5	11	3.9	4.4
VIBURNUM DENTATA	6	2.8	4.3	1.5	4.3
VIOLA CANADENSIS	3	1.4	1	0.4	1.8
VIOLA PAPILIONACEA	1	0.5	1	0.4	0.8
	214	100	283.	100	200

Table 9. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from study transect 3 Cap Sauers Holding (Cook County, IL). Based on sampling using meter square quadrats established every 10 meters along surveyed transects studied 14 July 1988.

	AF	RF	AC	RC	IV
AGRIMONIA GRYPOSEPALA	1	0.9	1	0.3	1.3
ALLIARIA OFFICINALIS	2	1.9	1	0.3	2.2
APIOS AMERICANA	2	1.9	6	2.0	3.9
ASTER SAGITTIFOLIUS	1	0.9	1	0.3	1.3
CARYA CORDIFORMIS	1	0.9	11	3.7	4.7
CAREX PENSYLVANICA	1	0.9	1	0.3	1.3
CELASTRUS ORBICULATUS	10	9.3	6.9	2.3	11.6
CORNUS RACEMOSA	7	6.5	8	2.7	9.2
CORYLUS AMERICANA	1	0.9	1	0.3	1.3
CRATAEGUS CRUS-GALLI	3	2.8	4.3	1.5	4.3
DACTYLIS GLOMERATA	1	0.9	1	0.3	1.3
DIOSCOREA SPP.	2	1.9	1.5	0.5	2.4
EUPATORIUM RUGOSUM	2	1.9	6	2.0	3.9
FRAGARIA VIRGINIANA	2	1.9	6	2.0	3.9
GALIUM CONCINNUM	1	0.9	30	10.1	11.0
HACKELIA VIRGINIANUM	2	1.9	1	0.3	2.2
HELIANTHUS DIVARICATUS	1	0.9	60	20.2	21.2
MENISPERMUM CANADENSE	1	0.9	1	0.3	1.3
OSMORHIZA CLAYTONI	8	7.5	1	0.3	7.8
PARTHENOCISSUS QUINQUEFOLIA	9	8.4	6.6	2.2	10.6
PHRYMA LEPTOSTACHYA	2	1.9	1	0.3	2.2
PODOPHYLLUM PELTATUM	1	0.9	1	0.3	1.3
PRUNUS SEROTINA	3	2.8	1	0.3	3.1
QUERCUS RUBRA	2	1.9	1	0.3	2.2
QUERCUS VELUTINA	1	0.9	1	0.3	1.3
RHAMNUS FRANGULA	2	1.9	6	2.0	3.9
RIBES MISSOURIENSE	1	0.9	11	3.7	4.7
RUBUS OCCIDENTALIS	1	0.9	11	3.7	4.7
SAMBUCUS CANADENSIS	1	0.9	1	0.3	1.3
SANICULA GREGARIA	16	14.9	22.5	7.6	22.5
SMILACINA RACEMOSA	3	2.8	7.7	2.6	5.4
SMILAX HERBACEA	2	1.9	1	0.3	2.2
SOLIDAGO SP.	2	1.9	6	2.0	3.9
TILIA AMERICANA	1	0.9	1	0.3	1.3
TOVARA VIRGINIANUM	3	2.8	4.3	1.5	4.3
ULMUS AMERICANA	1	0.9	1	0.3	1.3
VIBURNUM OPULUS	1	0.9	60	20.2	21.2
VIOLA CANADENSIS	2	1.9	1	0.3	2.2
VIOLA SP.	1	0.9	1	0.3	1.3
VIOLA TRILOBA	3	2.8	1	0.3	3.1
	107	100	295.	100	200

Table 10. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (V) from study transect 4 Cap Sauers Holding (Cook County, IL). Based on sampling using meter square quadrats established every 10 meters along surveyed transects studied 14 July 1988.

	AF	RF	AC	RC	IV
ACALYPHA RHOMBOIDEA	1	0.5	1	0.3	0.9
ACER NEGUNDO	1	0.5	1	0.3	0.9
ALLIARIA OFFICINALIS	6	3.1	4.3	1.6	4.6
APIOS AMERICANA	2	1.0	6	2.2	3.2
ARALIA NUDICAULIS	2	1.0	30	10.8	11.8
ASTER SAGITTIFOLIUS	1	0.5	11	4.0	4.9
CAREX CEPHALOPHORA	2	1.0	1	0.4	1.4
CAREX PENSYLVANICA	2	1.0	1	0.4	1.4
CARYA CORDIFORMIS	4	2.1	6	2.2	4.2
CARYA OVATA	1	0.5	11	3.9	4.9
CIRCAEA QUADRISULCATA	16	8.2	5.3	1.9	10.1
CORNUS RACEMOSA	6	3.1	18.8	6.8	9.9
CRATAEGUS CRUS-GALLI	8	4.1	5.9	2.1	6.2
CRYPTOTAENIA CANADENSIS	5	2.6	1	0.4	2.9
DACTYLIS GLOMERATA	1	0.5	1	0.4	0.9
EUPATORIUM RUGOSUM	3	1.5	1	0.4	1.9
FRAGARIA VIRGINIANA	1	0.5	11	3.9	4.5
GALIUM CIRCAEZANS	3	1.5	4.3	1.6	3.1
GALIUM CONCINNUM	3	1.5	1	0.4	1.9
GEUM SP.	1	0.5	1	0.4	0.9
HELIANTHUS DIVARICATUS	2	1.0	6	2.2	3.2
OSMORHIZA CLAYTONI	9	4.6	4.3	1.6	6.2
OXALIS STRICTA	5	2.6	3	1.1	3.6
PARTHENOCISSUS QUINQUEFOLIA	13	6.7	10.7	3.9	10.5
PHLOX DIVARICATA	1	0.5	1	0.4	0.9
PHYMA LEPTOSTACHYA	9	4.6	2.1	0.8	5.4
PILEA PUMILA	1	0.5	1	0.4	0.9
PLANTAGO RUGELII	1	0.5	1	0.4	0.9
POLYGONATUM PERSICARIA	1	0.5	1	0.4	0.9
POTENTILLA SIMPLEX	1	0.5	1	0.4	0.9
PRUNUS SEROTINA	3	1.5	4.3	1.6	3.1
QUERCUS ALBA	1	0.5	1	0.4	0.9
QUERCUS RUBRA	1	0.5	1	0.4	0.9
RHAMNUS CATHARTICA	7	3.6	2.4	0.9	4.5
RHAMNUS FRANGULA	9	4.6	21.5	7.8	12.4
RHUS RADICANS	6	3.1	17.1	6.2	9.3
ROSA MULTIFLORA	1	0.5	1	0.4	0.9
RUBUS OCCIDENTALIS	5	2.6	16.6	6.0	8.6
RUBUS SP.	1	0.5	11	4.0	4.5
SANICULA GREGARIA	13	6.7	14.6	5.3	11.9
SMILACINA RACEMOSA	8	4.1	3.5	1.3	5.4
SMILAX HERBACEA	3	1.5	1	0.4	1.9
SOLIDAGO SP.	4	2.1	3.5	1.3	3.3
TARAXACUM OFFICINALE	1	0.5	1	0.4	0.9
TOVARA VIRGINIANA	10	5.1	8.9	3.2	8.3
VERNONIA SP.	1	0.5	1	0.4	0.9
VIBURNUM DENTATA	3	1.5	4.3	1.6	3.1
VIOLA CANADENSIS	1	0.5	1	0.4	0.9
VIOLA PAPILIONACEA	2	1.0	6	2.2	3.2
VIOLA TRILOBA	2	1.0	1	0.4	1.4
VITIS RIPARIA	1	0.5	1	0.4	0.9
	195	100	276.	100	200

Table 11. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) for leaf litter from study transects 1-4 Cap Sauers Holding (Cook County, IL). Based on sampling using meter square quadrats established every 10 meters along surveyed transects 14 July 1988.

	AF	RF	AC	RC	IV
TRANSECT 1	30	26.5	78	25.4	51.9
TRANSECT 2	30	26.5	75.7	24.6	51.2
TRANSECT 3	22	19.4	73.6	23.9	43.4
TRANSECT 4	31	27.4	79.7	25.9	53.3
	113	100	307.	100	200

Glenview Woods

Woody Vegetation

Woody plants were sampled in Glenview Woods on 16 July 1988 in the area of "Harms Woods" from the foot trail along the south side of the north branch of the North Branch of the Chicago River to the bridle trail. Three transects were established approximately through the center of this section. A metal conduit was driven into the ground at the beginning of each transect, at the top of the bank, between the foot trail and the stream. Transects were 150, 150, and 100 m. long, due west from each conduit. Transect 1 as the most eastern line, and started from near the base of a large WHite Oak tree approximately 200 m. east of where the foot trail and bridle trail branch. Transects 2 and 3 were 50 and 100 m. west, respectively, of transect 1. Al list of woody plants encountered in this forest is given in Table 1.

Glenview Woods ("Harms Woods") is a rich mixture of deciduous species showing evidence of both maple-basswood and oak savanna forest types. Although sugar maple and American basswood are the dominant tree species as measured by cover, northern red oak followed by green ash are the overwhelming dominants as measured by basal area (Table 2). The reason for this apparent discrepancy results from the size distribution of tree species (Table 4). Prism sampling is very sensitive to size; larger stems are much more likely to be sampled than smaller stems. Whereas most of the sugar maple and basswood are small stems in Glenview, northern red oak trees are relatively larger, and green ash is intermediate between these species groups. These data indicate the invasion of the more mesic species, especially sugar maple, basswood, and ash, since fire has been excluded from the area. For example, of the estimated 800 2 to 6 inch d.b.h. stems per hectare (Table 4), over 450 are sugar maple, green ash, and basswood.

THe other complicating factor in this section of Glenview besides the

protection from fire is drainage. This site is very level and poorly drained. In slight depressions, swamp white oak and green ash dominate. Where drainage is better, white and northern red, along with sugar maple and basswood are more common. This is quite similar to the forest, soil, and drainage conditions in the control section at Somme, although the buckthorn there has greatly reduced other species such as sugar maple and basswood.

The bulk of the shrub layer in Glenview is hophornbeam, green ash, witch hazel, and basswood. Small oaks are uncommon (Table 3). Of the native shrubs and small trees, hophornbeam, hornbeam, gray dogwood, and arrow-wood were especially well represented with bladder-nut in concentrations in some wetter areas. Buckthorn is present and probably will increase unless fire is restored.

Ground cover plants

The most frequent plant species encountered in study quadrats at Glenview Woods (Tables 5 - 7) included poison ivy (Rhus radicans), buckthorns (Rhamnus spp.), virginia creeper (Parthenocissus quinquefolia), and woodland geranium (Geranium maculatum). Based on cover these same species were dominant. Based on importance values, dominance was shared closely among the 20-40 species sampled in each of the three study transects. Over ninety percent of the species sampled were native species. The study area exhibited a very rich ground cover although many plants were suppressed under the quickly increasing shade of shrubs and saplings.

Table 1. Master list of woody species encountered during inventory of Glenview Woods, 16 July 1988. Nomenclature follows Gleason and Cronquist (1963).

Acer nigrum	**Black maple**
A. rubrum	**Red maple**
A. saccharum	**Sugar maple**
A. saccharinum	**Silver maple**
Carpinus caroliniana	**Hornbeam**
Crataegus sp.	**Hawthorn**
Carya cordiformis	**Bitternut hickory**
C. ovata	**Shagbark hickory**
Corylus americana	**Hazel-nut**
Cornus racemosa	**Gray dogwood**
Fraxinus americana	**White ash**
Fraxinus pennsylvanica	**Green ash**
Hamamelis virginiana	**Witch hazel**
Ilex decidua	**Holly**
Ostrya virginiana	**Ironwood**
Populus deltoides	**Cottonwood**
Prunus serotina	**Black cherry**
Quercus alba	**White oak**
Q. bicolor	**Swamp white oak**
Q. macrocarpa	**Bur oak**
Q. rubra	**Northern red oak**
Rhamnus catharicus	**Buckthorn**
R. frangula	**Buckthorn**
Rhus radicans	**Poison ivy**
Ribes sp.	**Gooseberry**
Rosa multiflora	**Multiflora rose**
Staphylea trifolia	**Bladder-nut**
Tilia americana	**American basswood**
Ulmus americana	**American elm**
U. rubra	**Red elm**
Viburnum dentatum	**Arrow-wood**
V. lentago	**Nannyberry**
Vitis sp.	**Grape**

Table 2. Tree (stems > 2 inches d.b.h.) cover and basal area (B.A.) in Glenview Woods, as sampled in eight 50 m. intercept and 16 prism point (10 factor) samples, 16 July 1988. One standard deviation is given in parentheses after means.

		Basal area (10 factor prism estimate) Square ft.^{2}/acre		Sq. m.^{2}/hectare	
Species	Percent cover	Alive	Dead	Alive	Dead
Acer nigrum	1.3 (2.6)	1.9 (5.4)		0.4 (1.2)	
A. rubrum	4.0 (7.8)	1.9 (5.4)		0.4 (1.2)	
A. saccarum	18.1 (21.5)	5.0 (7.3)	0.6 (2.5)	1.2 (1.7)	0.1 (0.6)
A. saccharinum	2.8 (5.3)				
Carpinus carolinana	3.3 (4.5)				
Carya cordiformis	1.4 (3.6)				
C. ovata	0.6 (1.3)	1.3 (3.4)		0.3 (0.8)	
Cornus racemosa		0.6 (2.5)		0.1 (0.6)	
Crataegus sp.	0.4 (1.1)				
Fraxinus americana	5.4 (7.4)	6.3 (9.6)	1.2 (3.4)	1.5 (2.2)	0.3 (0.8)
F. pennsylvanica	3.4 (4.5)	11.3 (12.0)		2.6 (2.8)	
Hamamelis virginia		3.6 (6.2)	0.6 (2.5)	0.8 (1.4)	0.1 (0.6)
Ostrya virginiana	2.5 (3.5)	2.5 (6.8)		0.6 (1.6)	
Quercus alba	10.5 (16.8)	3.8 (6.2)	0.6 (0.3)	0.8 (1.4)	0.1 (0.6)
Q. bicolor	6.5 (7.5)	3.8 (10.2)		0.9 (2.4)	
Q. macrocarpa	2.5 (6.6)				
Q. rubra	13.9 (18.8)	14.4 (15.9)	1.2 (3.4)	3.3 (3.7)	0.3 (0.8)
Populus deltoides	1.5 (3.9)	1.3 (3.4)	0.6 (0.3)	0.3 (0.8)	0.1 (0.6)
Prunus serotina		0.6 (2.5)		0.1 (0.6)	
Rhamnus catharticus		1.3 (5.0)		0.3 (1.2)	
Tilia americana	15.1 (11.2)	1.9 (4.0)		0.4 (0.9)	
Staphylea trifolia		1.3 (5.0)	0.6 (0.3)	0.3 (1.2)	0.1 (0.6)
Ulmus americana	7.5 (7.8)	0.6 (2.5)		0.1 (0.6)	
U. rubra	1.5 (3.8)	0.6 (2.5)		0.1 (0.2)	

Table 3. Shrub cover and stem density for shrubs (stems < 2 inches d.b.h.) from Glenview Woods, as sampled in eight 50 m. intercept and 50 x 1 m. quadrats, 16 July 1988. Standard deviations are given in parentheses after means.

SPECIES	Percent cover	Stems per hectare Alive	Dead
Acer negundo		200 (380)	
A. nigrum	1.1 (2.3)		
A. rubrum	0.9 (2.1)	20 (80)	
A. saccharum	6.5 (6.3)	380 (280)	20 (80)
Carpinus carolinana	22.2 (17.3)	2720 (3060)	280 (700)
Carya cordiformis	0.1 (0.2)	60 (140)	
C. ovata	0.6 (1.3)	20 (80)	
Cornus racemosa	2.5 (3.1)	660 (740)	
Corylus americana	1.3 (2.8)	400 (700)	60 (140)
Crataegus sp.	2.4 (3.6)	520 (540)	80 (140)
Fraxinus americana	2.9 (4.2)	720 (560)	120 (280)
F. pennsylvanica	14.4 (15.7)	800 (1440)	80 (220)
Hamamelis virginiana	14.8 (16.4)	400 (700)	60 (140)
Ilex decidua	0.9 (2.0)		
Ostrya virginiana	3.7 (5.6)	1420 (2340)	
Prunus serotina	0.1 (0.2)	80 (140)	
Quercus bicolor	0.2 (0.6)		
Q. rubra	0.9 (1.4)	360 (840)	29 (80)
Ribes sp.		80 (220)	
Rosa multiflora	0.9 (2.4)		
Rhamnus catharticus	1.3 (2.7)	540 (760)	20 (80)
R. frangula	4.6 (6.0)	60 (140)	
Rhus radicans	6.0 (4.7)	320 (360)	20 (80)
Staphylea trifolia	3.8 (10.6)	760 (2120)	160 (420)
Tilia americana	13.9 (3.0)	600 (280)	20 (80)
Ulmus americana	0.9 (2.1)		
U. rubra	0.9 (1.4)	160 (300)	20 (80)
Viburnum acerifolium		20 (80)	
V. dentatum	2.5 (4.9)	500 (1260)	20 (80)
V. lentago	0.1 (0.1)	60 (100)	
Vitis sp.	4.2 (4.4)	180 (320)	

Table 4. Summary of alive and dead trees by species in the "Harms Woods" section of Glenview Woods, as measured in 2 x 50 m. transects on 16 July 1988. Data are mean number of trees per hectare with one standard deviation given in parentheses.

		Size classes (inches at d.b.h.)				
SPECIES	alive dead	2.- 6	6-10	10-14	14-18	Total
Acer saccharum	a	200 (169)	10 (40)	30 (70)		238 (169)
	d	13 (35)				13 (35)
A. saccharinum	a	13 (35)			12 (35)	25 (46)
Carpinus caroliniana	a	50 (107)				50 (107)
Crataegus sp.	a	38 (74)				38 (74)
Carya cordiformis	a	13 (35)				13 (35)
C. ovata	a	13 (35)				13 (35)
Fraxinus americana	a	50 (107)		13 (35)		63 (141)
	d		13 (35)			13 (35)
F. pennsylvanica	a	138 (169)	25 (71)	13 (35)		175 (191)
	d			13 (35)		13 (35)
Hamamelis virginiana	d	13 (35)				13 (35)
Ostrya virginiana	a	25 (35)				25 (35)
	d	13 (35)				13 (35)
Populus deltoides	a	25 (70)	13 (35)		38 (106)	
	d		13 (35)		13 (35)	25 (46)
Quercus alba	a		13 (35)	13 (35)		25 (46)
Q. bicolor	a	13 (35)	38 (74)	13 (35)		63 (74)
Q. rubra	a	25 (71)		13 (35)	13 (35)	50 (76)
Tilia americana	a	125 (167)	38 (52)			163 (151)
Ulmus american	a	13 (35)				13 (35)
U. rubra	a	63 (177)	38 (74)			100 (177)
TOTAL	a	800 (250)	200 (120)	88 (99)	25 (46)	1113 (146)
	d	64 (140)	49 (116)	25 (71)	25 (71)	163 (292)

Table 5. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from 150 meter long study transect 1 Glenview Woods Savanna, Glenview IL. Based on sampling 16 July 1988.

	AF	RF	AC	RC	IV
ACER RUBRUM	1	1.1	1	0.2	1.2
ALLIUM CANADENSE	1	1.1	11	1.8	2.9
ALLIUM TRICOCCUM	1	1.1	1	0.2	1.2
ARISAEMA DRACONTIUM	2	2.2	11	1.8	3.9
ARISAEMA TRIPHYLLUM	1	1.1	11	1.8	2.9
ASTER PUNICEUS	1	1.1	1	0.2	1.2
ASTER SAGITTIFOLIUS	1	1.1	1	0.2	1.2
ASTER SHORTII	4	4.3	3.5	0.6	4.9
ASTER SP.	3	3.3	4.3	0.7	3.9
CAREX HIRSUTELLA	1	1.1	11	1.8	2.9
CAREX PENSYLVANICA	1	1.1	30	4.9	5.9
CINNA LATIFOLIA	1	1.1	30	4.9	5.9
CORNUS RACEMOSA	2	2.2	30	4.9	7.1
FRAGARIA VIRGINIANA	2	2.2	1	0.2	2.3
FRAXINUS AMERICANA	2	2.2	11	1.8	3.9
GERANIUM MACULATUM	5	5.4	20.6	3.4	8.7
GEUM CANADENSIS	4	4.3	10.7	1.8	6.1
GLECHOMA HEDERACEA	3	3.3	11	1.8	5.1
HEPATICA ACUTILOBA	1	1.1	11	1.8	2.9
HYSTRIX PATULA	1	1.1	11	1.8	2.9
IMPATIENS CAPENSIS	2	2.2	6	0.9	3.2
LEERSIA VIRGINICA	2	2.2	30.5	4.9	7.1
LONICERA PROLIFERA	2	2.2	20.5	3.3	5.5
MENISPERMUM CANADENSIS	1	1.1	30	4.9	5.9
OXALIS STRICTA	1	1.1	1	0.2	1.2
OSTRYA VIRGINIANA	2	2.2	1	0.2	2.3
PARTHENOCISSUS QUINQUEFOLIA	12	13.0	7.7	6.1	19.1
PILEA PUMILA	1	1.1	1	0.2	1.2
POLYGONUM SP.	1	1.1	1	0.2	1.2
POTENTILLA SIMPLEX	1	1.1	60	9.8	10.8
PRUNELLA VULGARIS	1	1.1	11	1.8	2.9
RHAMNUS CATHARTICA	5	5.4	3	0.5	5.9
RHAMNUS FRANGULA	2	2.2	11	1.8	3.9
RHAMNUS SP.	1	1.1	1	0.2	1.2
RHUS RADICANS	7	7.6	29	4.7	12.3
RIBES AMERICANA	1	1.1	11	1.8	2.9
RUBUS OCCIDENTALIS	2	2.2	30	4.9	7.1
SCUTELLARIA SP.	1	1.1	11	1.8	2.9
SMILACINA RACEMOSA	1	1.1	1	0.2	1.2
SOLIDAGO SP.	2	2.2	1	0.2	2.3
SPHENOPHOLIS INTERMEDIA	1	1.1	11	1.8	2.9
STAPHYLEA TRIFOLIA	1	1.1	30	4.9	5.9
THALICTRUM DASYCARPUM	1	1.1	30	4.9	5.9
UVULARIA PERFOLIATA	1	1.1	1	0.2	1.2
VIOLA PAPILIONACEA	1	1.1	11	1.8	2.9
ZIZIA AUREA	1	1.1	11	1.8	2.8
	92	100	613.	100	200

Table 6. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from 150 meter long study transect 2 Glenview Woods Savanna, Glenview IL. Based on sampling 16 July 1988.

	AF	RF	AC	RC	IV
ACER RUBRUM	1	1.3	11	1.3	2.6
ACER SACCHARUM	1	1.3	11	1.3	2.6
ALLIUM CANADENSE	1	1.3	11	1.3	2.6
AMPHICARPA BRACTEATA	1	1.3	30	3.7	4.9
ARABIS GLABRA	1	1.3	11	1.3	2.6
ARISAEMA DRACONTIUM	3	3.8	4.33	0.5	4.3
ARISAEMA TRIPHYLLUM	2	2.5	6	0.7	3.2
ASTER SIMPLEX	4	5	8.5	1.0	6.0
BROMUS PURGANS	1	1.3	11	1.3	2.6
CAREX PENSYLVANICA	1	1.3	90	10.9	12.2
CAREX SP.	2	2.5	45	5.5	8.0
CARPINUS CAROLINIANA	1	1.3	60	7.3	8.6
CIRCAEA QUADRISULCATA	4	5	13.2	1.6	6.6
ELYMUS VILLOSA	1	1.3	30	3.7	4.9
FRAGARIA VIRGINIANA	1	1.3	1	0.1	1.4
GERANIUM MACULATUM	5	6.3	18.8	2.3	8.5
GEUM CANADENSIS	6	7.5	20.6	2.5	10.0
HELIANTHUS DIVARICATUS	1	1.3	30	3.7	4.9
IMPATIENS CAPENSIS	1	1.3	60	7.3	8.6
LEERSIA VIRGINICA	1	1.3	11	1.3	2.6
MENISPERMUM CANADENSIS	4	5	11	1.3	6.3
ONOCLEA SENSIBILIS	1	1.3	11	1.3	2.6
OSTRYA VIRGINIANA	2	2.5	30	3.7	6.2
OXALIS STRICTA	1	1.3	1	0.1	1.4
PARTHENOCISSUS QUINQUEFOLIA	7	8.8	37.4	4.6	13.3
POTENTILLA SIMPLEX	3	3.8	14	1.7	5.5
RANUNCULUS SP.	2	2.5	6	0.7	3.2
RHAMNUS CATHARTICA	1	1.3	1	0.1	1.4
RHUS RADICANS	9	11.2	22.8	2.8	14.0
RUBUS OCCIDENTALIS	1	1.3	60	7.3	8.6
SMILAX ECIRRHATA	2	2.5	6	0.7	3.2
SOLIDAGO CAESIA	2	2.5	11	1.3	3.8
STAPHYLEA TRIFOLIA	2	2.5	90	10.9	13.4
THALICTRUM DASYCARPUM	1	1.3	11	1.3	2.6
TRILLIUM RECURVATUM	1	1.3	11	1.3	2.6
UVULARIA PERFOLIATA	1	1.3	1	0.1	1.4
VIOLA SP.	1	1.3	11	1.3	2.6
	80	100	818.	100	200

Table 7. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from 100 meter long transect 3 Glenview Woods Savanna, Glenview, IL. Based on sampling 16 July 1988.

	AF	RF	AC	RC	IV
ASTER SHORTII	1	1.8	11	1.6	3.4
ASTER SP.	1	1.8	1	0.1	1.9
CAREX HIRSUTELLA	1	1.8	60	8.6	10.3
CAREX PENSYLVANICA	2	3.6	50.5	7.2	10.8
CAREX SP.	1	1.8	11	1.6	3.4
CINNA LATIFOLIA	1	1.8	11	1.6	3.4
CORNUS RACEMOSA	1	1.8	30	4.3	6.1
ELYMUS VILLOSA	1	1.8	1	0.1	1.9
EPILOBIUM SP.	1	1.8	11	1.6	3.4
FRAGARIA VIRGINIANA	1	1.8	30	4.3	6.1
GERANIUM MACULATUM	5	9.1	24.8	3.5	12.6
GEUM CANADENSIS	2	3.6	11	1.6	5.2
GLYCERIA STRIATA	1	1.8	11	1.6	3.4
HAMAMELIS VIRGINIANA	2	3.6	15.5	2.2	5.8
HELIANTHUS DIVARICATUS	1	1.8	90	12.8	14.6
LILIUM MICHIGANENSE	2	3.6	11	1.6	5.2
MENISPERMUM CANADENSIS	2	3.6	6	0.9	4.5
PARTHENOCISSUS QUINQUEFOLIA	1	1.8	11	1.6	3.4
PRUNELLA VULGARIS	1	1.8	11	1.6	3.4
RANUNCULUS SP.	2	3.6	35.5	5.1	8.7
RHAMNUS CATHARTICA	4	7.3	3.5	0.5	7.8
RHUS RADICANS	9	16.3	47.8	6.8	23.1
RUBUS OCCIDENTALIS	2	3.6	90	12.8	16.4
SMILACINA RACEMOSA	1	1.8	11	1.6	3.4
SOLIDAGO ALTISSIMA	1	1.8	60	8.6	10.3
VIBURNUM DENTATUM	3	5.5	17.3	2.5	7.9
VIOLA SP.	2	3.6	6	0.9	4.5
VITIS RIPARIA	1	1.8	11	1.6	3.4
ZIZIA AUREA	2	3.6	11	1.6	5.2
	55	100	701.	100	200

Lyman-Bender Woods

Woody Vegetation

Vegetation surveys were conducted in Lyman Woods (LW), the north half of the Bender Woods (BW), and in the least disturbed section of the Good Samaritan Hospital woodland (GSHW) to the west of Lyman WOods on 15 July 1988. Woody vegetation, trees, and shrubs more than one meter tall, were sampled with 50 m. line intercepts along transects to estimate cover, 1 x 50 m^2 quadrats to estimate shrub and small tree (d.b.h. < 2 inches) stem densities, 2 x 50 m^2 quadrats to estimate tree (d/b/h/ > 2 inches) densities by size class, and 10 factor prism points at 25 m. points along transects to estimate basal area. All data were catalogued by alive and dead, and by species. Vines such as poison-ivy and grape were sampled in the shrub layer.

East-west transects were established, one along the Lyman-Bender property line on the south edge of LW, then at 100 m. intervals north, from the west property line of LW. Transects were placed at 100, 200, 300, and 400 m. north from the Lyman-Bender line. Transects were extended east in 50 m. sample units until the east property line was crossed; in LW, all transects were 200 m. long.

At the 300 and 400 m. points, 100 m. transects, in 50 m. sample unites, were extended west into GSHW to collect comparable data from this portion of the forest which has a different history than LW. Additional transects were established through BW at 50, 100, and 125 m. south of the Lyman-Bender line. The first two ran 150 m. east and the latter 100 m. east from the west edge of the forest.

We summarize here these data and provide tabulated results (see Tables) together with an interpretation of data. ALthough not a part of this immediate study, at some future time we will integrate these data, along with soil and hydrology data, into a regional study of savanna ecology. That

analysis will require more than two years to complete, but we can provide general ecological interpretation now based on intensive study of more than four dozen savanna parcels in the immediate region, through northeastern Illinois and northwestern Indiana.

A list of woody species encountered in Lyman and contiguous forests in given in Table 1. In Table 2 we compare the tree cover of species in Lyman and contiguous forests. Northern red oak, white oak, white ash, and red elm are the most important species in LW whereas white oak, white ash, and black cherry are the dominants in Bender. In the GSHW black cherry is the most important, but all of these trees are understory trees that apparently invaded following exclusion of grazing animals and/or fire about 25 years ago. Aside from black cherry, white oak, followed by white ash, red oak and red elm make up the most tree cover. Note in Table 2 the inverse relationship between white oak and black cherry tree cover. This and other evidence to be discussed below indicated that black cherry tends to replace white oak, and probably other savanna trees in the absence of disturbance. Black cherry is an aggressive and successful invader of forests in the region, although buckthorn successfully displaces it in areas where there is a good buckthorn seed source. Apparently, black cherry became will established in the GSHW before buckthorn could invade. Less black cherry invaded LW because the longer term protection allowed other species, especially red elm, to expand in the understory. Buckthorn and many other exotic species have occupied the understory in BW.

A comparison of basal area data in the three woodlands provides similar information. The GSHW is generally lower site with richer soils than all of Bender and the average of LW, being more comparable to the lower, north end of LYman. THe total basal area in the Hospital woodland, therefore, is 30 per cent higher than in BW and LW with proportionately more dead basal area.

White and red oak comprise over half the basal area in LW whereas white and bur oak are more important in Bender. All the basal area in the GSHW is comprised of white and red oak and black cherry.

Table 4 shows the large numbers of black cherry and white ash occur in the smallest size class compared to white and bur oak. This is further reflected in Table 6 showing the number of stems less than two inches c.b.h. Other than the high number of native shrub stems, it is clear that reproduction of black cherry and white ash, and to some extent, bitternut hickory, are occurring, especially in the hospital woodland. Red oak is reproducing n LW but not in Bender or GSHW. These data are expected and confirm the hypothesis that in the absence of continued disturbance, these forests are shifting toward more mesic species, especially black cherry, white ash, elm, and red oak. Most of the white and bur oaks are over 100 years old, and many are over 250 years old. Increasing numbers of sugar maple and basswood are showing up in the younger age classes in LW. Controlled fire would halt this invasion of mesic species and begin to convert the forests back toward a savanna woodland, allowing for preservation of savanna species.

Table 5 compares shrub and small tree cover in the forests. Again, the very high cover of black cherry in the hospital woodland is indicated. Buckthorn has not yet invaded the hospital woodland, but is well established and increasing in BW and to a lesser extent in LW. It is not clear why arrow-wood is so much more common in BW but it may be a result of its introduction as an ornamental in addition to its lesser occurrence as a native shrub in the forest. All tables show the dramatic reduction of woodland species in GSHW compared to LW and BW.

Ground cover vegetation

Ground cover richness, frequency, and cover varied among the eight study

transects in these parcels (Tables 7 - 14). Transects that transversed areas that were more disturbed by anthropogenics had fewer species and domination by poison ivy (Rhus radicans), virginia creeper (Parthenocissus quinquefolia), buckthorns (Rhamnus spp.), garlic mustard (Alliaria officinalis), and multiflora rose (Rosa multiflora). The first few of these species also dominated in areas that were subjected to low human disturbance levels; a suite of 18-35 other species shared the importance in these areas. Other species including blackberry (Rubus occidentalis), enchanters nightshade (Circaea quadrisulcata), trailing honeysuckle (Lonicera prolifera), cherry seedlings (Prunus serotina and P. virginiana), and solomons seal (Smilacina racemosa) had relatively high importance overall in Lyman-Bender Woods.

Table 1. Master list of woody species encountered in Lyman Woods and the adjacent properties, herein called Bender and Hospital woods, during an intensive study of these forests on 15 July 1988. Nomenclature follows that of Gleason and Conquist (1963).

Acer negundo	**Box elder**
A. rubrum	**Red maple**
A. saccharum	**Sugar maple**
Carya cordiformis	**Bitternut hickory**
C. glabra	**Pignut hickory**
C. ovata	**Shagbark hickory**
Celtis occidentalis	**Hackberry**
Cornus racemosa	**Grey dogwood**
Corylus americana	**Hazel-nut**
Crataegus sp.	**Hawthorn**
Fraxinus americana	**White ash**
Fraxinus pennsylvanica	**Green ash**
Juglans nigra	**Black walnut**
Lonicera tartarica	**Trumpet honeysuckle**
L. prolifera	**Honeysuckle**
Morus rubra	**Mulberry**
Ostrya virginiana	**Eastern hophornbeam**
Parthenocisus quinquefolia	**Virginia creeper**
Pinus strobus	**Eastern white pine**
Populus deltoides	**Eastern cottonwood**
Prunus serotina	**Black cherry**
P. virginiana	**Choke cherry**
Quercus alba	**White oak**
Q. ellipsoidalis	**Hills oak**
Q. macrocarpa	**Bur oak**
Q. rubra	**Northern red oak**
Rhamnus catharticus	**Buckthorn**
R. frangula	**Buckthorn**
Rhus radicans	**Poison ivy**
Ribes sp.	**Gooseberry**
Rosa multiflora	**Multiflora rose**
Sambucus canadensis	**Elderberry**
Staphyla trifolia	**Bladdernut**
Tilia americana	**American basswood**
Ulmus americana	**American elm**
U. rubra	**Red elm**
Viburnum acerifolium	**Maple-leaf viburnum**
V. dentatum	**Arrow-wood**
V. lentago	**Nanny-berry**
Vitis sp.	**Grape**

Table 2. Tree cover in Lyman Woods, and the contiguous portions of Bender Woods and the Good Samaritan Hospital woodland based on 50 m. line intercept estimates on 15 July 1988. One standard deviation is given in parentheses.

	PERCENT COVER OF TREES		
Species	Lyman Woods	Bender Woods	Hospital Woods
Acer negundo			3.6 (7.1)
A. saccharum	0.8 (2.3)		
Betula papyrifera		0.4 (1.0)	
Carya cordiformis	2.7 (5.7)	0.8 (2.2)	
C. ovata	6.1 (9.0)	4.9 (7.7)	3.3 (6.5)
Celtis occidentalis	0.3 (1.5)		
Crataegus sp.	3.7 (5.3)	1.9 (2.6)	
Fraxinus americana	14.2 (12.5)	22.7 (18.5)	20.8 (29.9)
F. pennsylvanica	0.4 (1.8)		
Juglans nigra	1.8 (3.9)	1.4 (3.6)	3.1 (6.1)
Morus rubra		0.3 (0.8)	
Ostrya virginana	2.3 (6.9)	0.9 (2.3)	
Pinus strobus		4.0 (7.1)	
P. serotina	8.9 (9.8)	17.8 (15.3)	63.0 (16.2)
Prunus virginana		1.3 (3.4)	
Populus deltoides		0.4 (0.9)	
Quercus alba	17.7 (15.1)	37.8 (31.3)	46.9 (25.0)
Q. ellipsoidalis		5.5 (10.6)	
Q. macrocarpa	9.0 (15.5)	3.5 (6.2)	4.7 (9.4)
Q. palustris		0.3 (0.9)	
Q. rubra	27.5 (22.9)	5.7 (5.7)	12.4 (19.4)
Rhamnus catharticus	1.0 (2.6)	10.2 (9.0)	0.1 (0.2)
Tilia americana	1.8 (3.6)		
Ulmus americana	7.3 (15.0)	2.1 (5.7)	1.6 (3.1)
U. rubra	16.6 (20.9)	1.0 (2.6)	9.1 (18.2)

Table 3. Basal area of woody vegetation in Lyman Woods, Bender Woods, and the Good Samaritan Hospital woodland as estimated by 10 factor prism samples taken on15 July 1988. One standard deviation is given in parentheses.

	LYMAN WOODS		BENDER WOODS		HOSPITAL WOODS	
	Alive	Dead	Alive	Dead	Alive	Dead
SPECIES	ft^2/A.	ft^2/A	ft^2/A	ft^2/A	ft^2/A	ft^2/A
Acer saccharum	0.8(4.0)					
Carya cordiformis	0.5(2.0)		0.1(0.1)			
C. glabra	0.3(2.0)					
C. ovata	5.0(14.3)		0.4(0.1)			
Fraxinus americana	11.1(10.3)	7.0(32.0)	1.3(0.3)			
Juglas nigra	1.0(3.1)					
Morus rubra	0.2(1.6)					
Pinus strobus			0.1(0.1)			
Populus deltoides			0.1(0.1)			
Prunus serotina	3.0(1.6)	2.7(7.7)	8.3(9.5)	0.2(0.2)	27.5(5.0)	7.5(9.6)
Quercus alba	21.3(20.2)	4.4(7.2)	35.2(62.0)	0.2(0.3)	72.5(25.0)	10.0(8.2)
Q. ellipsoidalis			0.6(0.9)			
Q. macrocarpa	7.6(11.0)	0.5(2.2)	16.0(14.8)			
Q. rubra	20.5(35.6)	1.5(4.3)	7.2(10.1)		10.0(14.0)	
Q. velutina			0.1 (0.5)			
Rhamnus catharticus			0.3(0.8)			
Sambucus canadensis			0.1(0.2)			
Ulmus americana	1.3(4.1)		0.1(0.1)			
U. rubra	4.7(6.9)	0.2(1.6)	0.6(0.8)			
TOTAL	73.1(26.1)	10.2(13.2)	78.8(25.0)	5.6(9.6)	110.0(16.3)	17.5(17.1)

Table 4. Tree density and size class (d.b.h. in inches) distribution in Lyman Woods and contiguous forests based on sampling in 2 x 50 m. quadrats, 15 July 1988. One standard deviation is given in parentheses. All data are number per hectare. Alive stems are given over dead stems (/).

SPECIES	SIZE CLASSES IN INCHES AT D.B.H. 2-6	6-10	10-14	14-18	18-22	22-26	26-30	30-34	TOTAL
LYMAN WOODS									
Acer saccharum	4/0								4/0(8/0)
Carya cordiformis	25/0				4/0				28/0(15/0)
Crataegus sp.	18/7								18/7(29/12)
Fraxinus amer.	78/0	14/7	21/0	0/7	4/0				200/20(94/24)
Prunus serotina	86/7	14/0	7/0						500/33(497/47)
P. virginiana	39/7								39/7(86/23)
Quercus alba	0/4	7/0	11/4	36/0	4/4	4/4			308/33(67/23)
Q. macrocarpa		4/0			4/0	4/0			50/0(85/0)
Q. rubra	85/7	21/0	29/4	21/4	14/0	4/0		4/0	371/28(367/36)
Tilia americana	35/0		10/0						66/0(62/0)
Ulmus americana	82/4								82/4(168/12)
U. rubra	39/11	25/35	4/0	4/0					263/50(201/61)
TOTAL	446/54	104/38	92/13	95/8	33/4	13/4		4/0	754/50(715/129)
BENDER WOODS									
Betual papyrif.		6/0							6/0(17/0)
Carya cordiformis	6/6								6/6(17/17)
C. ovata	6/0		6/0	6/0					19/0(50/0)
Crataegus sp.	19/0								19/0(24/0)
Fraxinus amer.	200/13								200/13(187/22)
Juglans nigra		6/0							6/0(17/0)
Morus rubra	6/0								6/0(17/0)
Pinus strobus			6/0						6/0(17/0)
Populus deltoides	0/6	19/0							19/6(50/17)
Prunus serotina	138/13	13/0							150/13(106/22)
Quercus alba		6/0	38/6						44/6(39/17)
Q. ellipsoidalis				13/0	13/0				25/0(66/0)
Rhamnus cathar.	150/0								150/0(205/0)
Ulmus americana	25/0								25/0(35/0)
U. rubra	25/0	13/0							50/0(18/0)
TOTAL	600/38	63/0	50/6	19/0	13/0				745/44(496/54)
HOSPITAL WOODS									
Acer negundo	15/0	15/0							30/0(50/0)
Carya ovata		13/0							15/0(25/0)
Fraxinus amer.	200/0	15/0							215/0(360/0)
Prunus serotina	750/0	15/0				15/0			780/0(290/0)
Quercus alba				40/15	15/0				55/15(75/25)
Ulmus americana	15/0								15/0(25/0)
U. rubra	15/0								15/0(25/0)
TOTAL	945/0	58/0		40/15	15/0	15/0			1073/15(850/25)

Table 5. Cover of shrubs and small trees (d.b.h. < 2 inches) in Lyman Woods and contiguous parcels as estimated from 50 m. line intercepts taken 15 July 1988. One standard deviation is given in parentheses. Data are percent cover.

SPECIES	Lyman Woods	Bender Woods	Hospital Woods
Acer negundo	5.8 (7.8)	0.2 (0.5)	0.9 (1.8)
A. rubrum	0.1 (0.5)		
A. saccharum	1.1 (3.1)		
Carya cordiformis	2.6 (4.1)	5.6 (9.9)	4.5 (5.2)
C. glabra	0.1 (0.4)		
C. ovata	3.5 (4.6)	3.0 (3.4)	
Celtis occidentalis	0.9 (2.6)		
Cornus racemosa	3.3 (4.5)	5.0 (5.3)	3.7 (6.3)
Corylus americana	1.4 (3.0)		
Crataegus sp.	1.2 (1.9)	3.6 (5.7)	0.7 (1.4)
Fraxinus americana	2.8 (6.9)		5.5 (2.9)
F. pennsylvanica	0.3 (0.8)	0.4 (1.1)	
Juglans nigra	0.1 (0.5)		
Lonicera prolifera		0.1 (0.1)	
L. tartarica	0.7 (1.8)	0.1 (0.3)	
Ostrya virginiana	1.1 (4.9)	0.1 (0.3)	
Prunus serotina	8.6 (8.9)	8.9 (6.9)	28.3(31.9)
P. virginiana	1.9 (2.3)	0.9 (1.1)	
Quercus rubra	0.2 (0.5)	0.8 (2.1)	
Rhamnus catharticus	3.0 (3.3)	14.0 (8.6)	
R. frangula	0.9 (2.3)	0.9 (1.7)	
Rhus radicans	1.9 (3.5)	0.5 (1.4)	0.1 (0.2)
Ribes sp.	0.3 (0.6)	0.3 (0.7)	
Rosa multiflora		1.1 (2.3)	
Sambucus canadensis		1.1 (2.0)	
Tilia americana	0.5 (1.9)	2.5 (2.2)	
Ulmus americana	1.6 (3.0)	0.8 (1.4)	
U. rubra		0.9 (2.0)	0.8 (1.6)
Viburnum acerifolium	2.5 (4.2)	1.4 (3.1)	2.7 (3.4)
V. dentatum	4.4 (4.9)	19.7 (18.8)	
V. lentago	0.6 (1.7)		
Vitis sp.	3.1 (6.8)		6.8 (7.6)

Table 6. Comparison of Lyman Woods with contiguous forests in shrub and small tree stem numbers (d.b.h. < 2 inches). Data are number of stems per hectare. One standard deviation is given in parentheses.

	Lyman Woods		Bender Woods		Hospital Woods	
SPECIES	Alive	Dead	Alive	Dead	Alive	Dead
Acer negundo	20(40)				50(100)	
A. rubrum	80(220)					
A. saccharum	20(60)					
Carya cordiformis	380(320)		150(233)	25(70)	200(283)	
C. glabra	20(100)					
C. ovata	140(220)		75(103)			
Cornus racemosa	1600(1740)	160(220)	1550(1175)	275(354)	1350(1843)	350(300)
Corylus americana	440(940)		100(185)	300(701)		
Crataegus	100(320)	40(100)	275(778)	150(351)	100(200)	
Fraxinus americana	260(520)	20(100)	100(214)	25(71)	300(258)	200(281)
Lonicera tartarica	20(40)		525(1406)			
Ostrya virginana	80(220)					
Prunus serotina	380(500)	80(160)	400(595)	125(212)	500(757)	700(633)
P. virginana	500(660)		475(725)	50(141)		
Quercus ellipsoidalis			66(163)			
Q. rubra	40(80)	40(100)	25(71)			
Rhamnus catharticus	140(300)	40(80)	1375(878)	375(271)	50(100)	
R. frangula	40(140)					
Ribes sp.	120(500)					
Rosa multiflora	60(240)		300(595)			
Sambucus canadensis	40(140)		375(1061)			
Staphyla trifolia	240(1060)					
Tilia americana	40(100)					
Ulmus americana	60(140)		75(149)			
U. rubra	140(280)	40(100)	75(104)		100(116)	
Viburnum acerifolium	320(580)	80(280)	375(363)		700(1137)	50(100)
V. dentatum	1120(1240)		7525(9099)	550(639)		
V. lentago	20(40)					
Vitis sp.	240(600)				250(379)	

Table 7. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "0" west transect in the Bender property adjacent to Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
AGRIMONIA GRYPOSEPALA	2	1	6	1.1	3.0
ALLIARIA OFFICINALIS	1	1	1	0.2	1.1
ALLIUM CANADENSE	6	5.8	7.5	1.4	7.1
ALLIUM TRICOCCUM	5	4.8	1	0.2	5.0
AMPHICARPA BRACTEATA	1	1	11	2.0	2.9
APIOS AMERICANA	1	1	1	0.2	1.1
ARISAEMA DRACONTIUM	1	1	1	0.2	1.1
BERBERIS THUNBERGII	1	1	11	2.0	2.9
CARYA OVATA	1	1	30	5.5	6.5
CAULOPHYLLUM THALICTROIDES	2	1.9	6	1.1	3.0
CIRCAEA QUADRISULCATA	5	4.8	12.6	2.3	7.1
CORNUS RACEMOSA	5	4.8	18.8	3.4	8.3
DENTARIA LACINIATA	2	1.9	1	0.2	2.1
DESMODIUM SP.	1	1	11	2.0	2.9
DIOSCOREA VILLOSA	2	1.9	6	1.1	3.0
EUPATORIUM RUGOSUM	2	1.9	11	2.0	3.9
FRAXINUS AMERICANA	2	1.9	11	2.0	3.9
GERANIUM MACULATUM	9	8.7	18.3	3.4	12.0
GEUM CANADENSIS	1	1	1	0.2	1.1
HYSTRIX PATULA	1	1	1	0.2	1.1
MENISPERMUM CANADENSIS	1	1	11	2.0	2.9
OXALIS STRICTA	1	1	1	0.2	1.1
PARTHENOCISSUS QUINQUEFOLIA	18	17.3	32.5	6.0	23.2
POLYGONATUM BIFLORUM	2	1.9	6	1.1	3.0
PRUNUS SEROTINA	1	1	1	0.2	1.1
QUERCUS MACROCARPA	1	1	1	0.2	1.1
RHAMNUS CATHARTICA	1	1	1	0.2	1.1
RHUS RADICANS	1	1	90	16.5	17.4
RIBES MISSOURIENSE	4	3.8	8.5	1.6	5.4
ROSA SETIGERA	1	1	30	5.5	6.5
RUBUS OCCIDENTALIS	5	4.8	32.4	6.0	10.7
SAMBUCUS CANADENSIS	1	1	30	5.5	6.5
SMILACINA RACEMOSA	6	5.8	17.5	3.2	9.0
SMILACINA STELLATA	2	1.9	11	2.0	3.9
SMILAX HERBACEA	2	1.9	6	1.1	3.0
TOVARA VIRGINIANA	1	1	11	2.0	2.9
UVULARIA GRANDIFLORA	1	1	1	0.2	1.1
VIBURNUM DENTATUM	2	1.9	75	13.7	15.6
VIOLA CANADENSIS	1	1	11	2.0	2.9
VITIS RIPARIA	1	1	1	0.2	1.1
	104	100	545.	100	200

Table 8. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "100" west transect in the Bender property adjacent to Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ACER NEGUNDO	1	1.2	11	3.9	5.1
ALLIUM CANADENSE	4	4.9	6	2.1	7.0
ALLIUM TRICOCCUM	2	2.5	1	0.4	2.8
ANEMONELLA THALICTROIDES	2	2.5	6	2.1	4.6
CARYA CORDIFORMIS	1	1.2	11	3.9	5.1
CARYA OVATA	1	1.2	11	3.9	5.1
CELASTRUS ORBICULATUS	2	2.5	1	0.4	2.8
CLAYTONIA VIRGINICA	7	8.6	16.4	5.8	14.4
DIOSCOREA VILLOSA	1	1.2	1	0.4	1.6
EUPATORIUM PURPUREUM	1	1.2	11	3.9	5.1
FRAXINUS AMERICANA	4	4.9	3.5	1.2	6.2
GERANIUM MACULATUM	5	6.2	7	2.5	8.6
LONICERA PROLIFERA	4	4.9	15.5	5.4	10.3
PARTHENOCISSUS QUINQUEFOLIA	12	14.8	15	5.3	20.0
PRUNUS SEROTINA	1	1.2	11	3.9	5.1
PRUNUS VIRGINIANA	1	1.2	11	3.9	5.1
RHAMNUS CATHARTICA	9	11.1	7.6	2.6	13.7
RHUS RADICANS	3	3.7	1	0.4	4.1
RIBES MISSOURIENSE	1	1.2	11	3.9	5.1
ROSA MULTIFLORA	4	4.9	23	8.0	13.0
RUBUS OCCIDENTALIS	1	1.2	11	3.9	5.1
SAMBUCUS CANADENSIS	1	1.2	30	10.5	11.7
SMILACINA RACEMOSA	2	2.5	20.5	7.2	9.7
SMILAX HERBACEA	1	1.2	1	0.4	1.6
SMILAX SP.	1	1.2	11	3.9	5.1
SOLIDAGO SP.	1	1.2	11	3.9	5.1
TRILLIUM RECURVATUM	1	1.2	1	0.4	1.6
ULMUS RUBRA	1	1.2	11	3.9	5.1
VIBURNUM DENTATUM	6	7.4	7.6	2.7	10.0
	81	100	285.	100	200

Table 9. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "100" east transect in Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
AMPHICARPA BRACTEATA	1	1.4	1	0.2	1.7
APIOS AMERICANA	3	4.3	7.66	1.8	6.1
CAULOPHYLLUM THALICTROIDES	1	1.4	11	2.6	4.0
CINNA LATIFOLIA	1	1.4	11	2.6	4.0
CIRCAEA QUADRISULCATA	6	8.6	6	1.4	9.9
CORNUS RACEMOSA	2	2.9	11	2.6	5.4
FRAGARIA VIRGINIANA	1	1.4	1	0.2	1.7
FRAXINUS AMERICANA	2	2.9	35.5	8.3	11.1
GALIUM APARINE	1	1.4	1	0.2	1.7
GERANIUM MACULATUM	4	5.7	6	1.4	7.11
GEUM CANADENSIS	2	2.9	11	2.6	5.4
GLYCERIA STRIATA	1	1.4	30	7.0	8.5
IMPATIENS CAPENSIS	2	2.9	20.5	4.8	7.7
LEERSIA VIRGINICA	1	1.4	11	2.6	4.0
ONOCLEA SENSIBILIS	1	1.4	30	7.0	8.5
PARTHENOCISSUS QUINQUEFOLIA	15	21.4	34.4	8.1	29.4
PILEA PUMILA	1	1.4	1	0.2	1.7
PRUNUS VIRGINIANA	1	1.4	1	0.2	1.7
RANUNCULUS SP.	1	1.4	11	2.6	4.0
RHAMNUS CATHARTICA	2	2.9	1	0.2	3.1
RHUS RADICANS	7	10	20.5	4.8	14.8
RIBES MISSOURIENSE	1	1.4	30	7.0	8.5
RUBUS OCCIDENTALIS	2	2.9	20.5	4.8	7.7
SMILACINA RACEMOSA	5	7.1	11	2.6	9.7
SOLIDAGO GIGANTEA	1	1.4	60	14.0	15.4
STAPHYLEA TRIFOLIA	2	2.9	30	7.0	9.9
TOVARA VIRGINIANA	1	1.4	1	0.2	1.7
VIBURNUM DENTATUM	1	1.4	11	2.6	4.0
VITIS RIPARIA	1	1.4	1	0.2	1.7
	70	100	427.	100	200

Table 10. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "125" west transect in the Bender property adjacent to Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ACER NEGUNDO	1	2.2	30	14.4	16.7
ALLIUM CANADENSE	1	2.2	1	0.5	2.7
ALLIUM TRICOCCUM	1	2.2	1	0.5	2.7
ANEMONELLA THALICTROIDES	2	4.4	1	0.5	4.9
CAREX CEPHALOPHORA	1	2.2	1	0.5	2.7
CAREX PENSYLVANICA	1	2.2	1	0.5	2.7
CORNUS RACEMOSA	2	4.4	15.5	7.5	11.9
CRATAEGUS SP.	1	2.2	1	0.5	2.7
FRAGARIA VIRGINIANA	3	6.7	1	0.5	7.1
FRAXINUS AMERICANA	1	2.2	30	14.4	16.7
GERANIUM MACULATUM	2	4.4	6	2.9	7.3
GLYCERIA STRIATA	1	2.2	11	5.3	7.5
LONICERA PROLIFERA	1	2.2	1	0.5	2.7
PARTHENOCISSUS QUINQUEFOLIA	6	13.3	14.1	6.8	20.1
PRUNUS VIRGINIANA	1	2.2	11	5.3	7.5
RHAMNUS CATHARTICA	4	8.9	6	2.9	11.7
ROSA MULTIFLORA	4	8.9	6	2.9	11.7
RUBUS OCCIDENTALIS	2	4.4	35.5	17.1	21.5
SMILACINA RACEMOSA	3	6.7	4.3	2.1	8.8
SMILACINA STELLATA	1	2.2	11	5.3	7.5
SMILAX HERBACEA	2	4.4	1	0.5	4.9
SOLIDAGO ULMIFOLIA	1	2.2	1	0.5	2.7
TOVARA VIRGINIANA	1	2.2	1	0.5	2.7
VIBURNUM DENTATUM	2	4.4	15.5	7.5	11.9
	45	100	207	100	200

Table 11. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "200" west transect in the Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in square meter quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ACER NEGUNDO	1	1.1	11	1.7	2.9
AGRIMONIA GRYPOSEPALA	1	1.1	11	1.7	2.9
ALLIUM CANADENSE	1	1.1	1	0.2	1.3
ALLIUM TRICOCCUM	2	2.2	1	0.2	2.4
ANEMONELLA THALICTROIDES	1	1.1	1	0.2	1.3
ARISAEMA TRIPHYLLUM	1	1.1	11	1.7	2.9
ASTER SP.	1	1.1	30	4.8	5.9
CAMPANULA AMERICANUM	1	1.1	11	1.7	2.9
CAREX SPARGANIOIDES	1	1.1	1	0.2	1.3
CARYA OVATA	1	1.1	11	1.7	2.9
CELASTRUS SP.	1	1.1	1	0.2	1.3
CIRCAEA QUADRISULCATA	1	1.1	1	0.2	1.3
CORNUS RACEMOSA	1	1.1	11	1.7	2.9
DESMODIUM ILLINOENSE	3	3.4	14	2.2	5.6
DIOSCOREA VILLOSA	1	1.1	1	0.2	1.3
FRAXINUS AMERICANA	1	1.1	30	4.8	5.9
GERANIUM MACULATUM	6	6.7	12.5	2.0	8.7
GEUM CANADENSIS	3	3.4	7.7	1.2	4.6
GLYCERIA STRIATA	1	1.1	1	0.2	1.3
HELIANTHUS DIVARICATUS	1	1.1	30	4.8	5.9
HEMEROCALLIS FULVA	2	2.2	60	9.5	11.7
HYSTRIX PATULA	4	4.5	8.5	1.3	5.8
IMPATIENS CAPENSIS	1	1.1	1	0.2	1.3
LONICERA PROLIFERA	2	2.2	15.5	2.5	4.7
LONICERA TATARICA	2	2.2	45	7.1	9.4
PARTHENOCISSUS INSERTA	1	1.1	30	4.8	5.9
PARTHENOCISSUS QUINQUEFOLIA	12	13.4	44.5	7.1	20.5
PHALARIS ARUNDINACEA	1	1.1	11	1.7	2.9
PRUNUS SEROTINA	1	1.1	30	4.8	5.9
RANUNCULUS SP.	1	1.1	11	1.7	2.9
RHAMNUS CATHARTICA	2	2.2	11	1.7	4.0
RHUS RADICANS	7	7.8	61.5	9.8	17.6
RIBES MISSOURIENSE	3	3.4	33.6	5.3	8.7
RUBUS OCCIDENTALIS	2	2.2	1	0.2	2.4
SMILACINA RACEMOSA	9	10.1	9.7	1.5	11.6
SMILAX HERBACEA	1	1.1	2	0.3	1.4
SOLIDAGO SP.	1	1.1	1	0.2	1.3
TOVARA VIRGINIANA	2	2.2	12	1.9	4.4
TRIOSTEUM PERFOLIATUM	1	1.1	11	1.7	2.9
UVULARIA GRANDIFLORA	1	1.1	11	1.7	2.9
VIBURNUM DENTATUM	1	1.1	1	0.2	1.3
VITIS RIPARIA	2	2.2	20.5	3.3	5.5
	89	100	630.	100	200

Table 12. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "300" west transect in the Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ALLIARIA OFFICINALIS	1	1.4	90	14.9	16.3
ANEMONELLA THALICTROIDES	1	1.4	1	0.2	1.5
BRACHYELYTRUM ERECTUM	3	4.1	4.3	0.7	4.8
CELASTRUS SCANDENS	1	1.4	11	1.8	3.2
CIRCAEA QUADRISULCATA	2	2.7	1	0.2	2.9
CORNUS RACEMOSA	4	5.5	32.7	5.4	10.9
CORYLUS AMERICANA	1	1.4	60	9.9	11.3
DESMODIUM GLUTINOSUM	1	1.4	1	0.2	1.5
FRAXINUS AMERICANA	1	1.4	11	1.8	3.2
GERANIUM MACULATUM	2	2.7	30	5.0	7.7
GEUM CANADENSIS	2	2.7	1	0.2	2.9
IMPATIENS CAPENSIS	1	1.4	1	0.2	1.5
LEERSIA ORYZOIDES	1	1.4	1	0.2	1.5
LONICERA PROLIFERA	1	1.4	30	5.0	6.4
MENISPERMUM CANADENSIS	2	2.7	6	0.9	3.7
PARTHENOCISSUS QUINQUEFOLIA	16	21.9	45.2	7.5	29.4
PILEA PUMILA	1	1.4	1	0.2	1.5
POLYGONATUM BIFLORUM	1	1.4	30	5.0	6.4
PRUNUS VIRGINIANA	2	2.7	45	7.5	10.2
RHUS RADICANS	5	6.8	36.2	6.0	12.8
RIBES MISSOURIENSE	2	2.7	11	1.8	4.6
ROSA MULTIFLORA	1	1.4	11	1.8	3.2
RUBUS OCCIDENTALIS	1	1.4	30	5.0	6.4
SMILACINA RACEMOSA	9	12.3	13.1	2.2	14.5
TOVARA VIRGINIANA	1	1.4	1	0.2	1.5
TRILLIUM RECURVATUM	2	2.7	6	0.9	3.7
UVULARIA GRANDIFLORA	3	4.1	33.6	5.6	9.7
VIBURNUM OPULUS	3	4.1	27.3	4.5	8.6
VIBURNUM DENTATUM	2	2.7	30.5	5.1	7.8
	73	100	602.	100	200

Table 13. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "400" west transect in the Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ALLIARIA OFFICINALIS	12	14.4	43.5	8.7	23.1
ARISAEMA TRIPHYLLUM	2	2.4	12	2.4	4.8
CAREX HIRTIFOLIA	1	1.2	11	2.2	3.4
CIRCAEA QUADRISULCATA	4	4.8	8.5	1.7	6.5
CORNUS RACEMOSA	2	2.4	11	2.2	4.6
DIOSCOREA VILLOSA	2	2.4	20.5	4.1	6.5
FRAGARIA VIRGINIANA	3	3.6	17.3	3.5	7.1
GERANIUM MACULATUM	3	3.6	17.3	3.5	7.1
GEUM CANADENSIS	2	2.4	1	0.2	2.6
LONICERA PROLIFERA	1	1.2	11	2.2	3.4
LONICERA TATARICA	1	1.2	30	6.0	7.2
PARTHENOCISSUS QUINQUEFOLIA	16	19.2	34.7	6.9	26.2
POLYGONATUM BIFLORUM	1	1.2	2	0.4	1.6
PRUNUS VIRGINIANA	2	2.4	45	9.0	11.4
QUERCUS BICOLOR	1	1.2	11	2.2	3.4
RHUS RADICANS	4	4.8	28	5.6	10.4
RIBES MISSOURIENSE	1	1.2	30	6.0	7.2
SMILACINA RACEMOSA	5	6.0	28.4	5.7	11.7
SMILACINA STELLATA	6	7.2	28.6	5.7	12.9
THALICTRUM DASYCARPUM	3	3.6	17.3	3.5	7.1
TOVARA VIRGINIANA	1	1.2	11	2.2	3.4
TRILLIUM FLEXIPES	1	1.2	1	0.2	1.4
VIBURNUM OPULUS	4	4.8	45	9.0	13.8
VIBURNUM DENTATUM	3	3.6	4.3	0.9	4.5
VIOLA PENSYLVANICA	2	2.4	30.5	6.1	8.5
	83	100	500.	100	200

Table 14. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 200 meter long "50" west transect in the Lyman Woods Preserve, Downers Grove, IL. Based on sampling used in meter square quadrats established every 10 meters along surveyed transects studied 15 July 1988.

	AF	RF	AC	RC	IV
ALLIUM CANADENSE	1	1.3	1	0.3	1.6
ALLIUM TRICOCCUM	1	1.3	1	0.3	1.6
ARISAEMA TRIPHYLLUM	2	2.6	22	7.3	9.9
ASTER SIMPLEX	1	1.3	11	3.6	4.9
ASTER SP.	1	1.3	11	3.6	4.9
CAREX SP.	1	1.3	1	0.3	1.6
CAREX TRICHOCARPA	1	1.3	1	0.3	1.6
CARYA CORDIFORMIS	1	1.3	11	3.6	4.9
CHENOPODIUM ALBA	1	1.3	1	0.3	1.6
CIRCAEA QUADRISULCATA	2	2.6	6	1.9	4.6
CORNUS RACEMOSA	5	6.5	6.8	2.2	8.7
CRATAEGUS SP.	3	3.9	7.7	2.5	6.4
DAUCUS CAROTA	1	1.3	1	0.3	1.6
EUPATORIUM RUGOSUM	1	1.3	1	0.3	1.6
FRAGARIA VIRGINIANA	1	1.3	1	0.3	1.6
FRAXINUS AMERICANA	1	1.3	1	0.3	1.6
GERANIUM MACULATUM	3	3.9	4.3	1.4	5.3
GRASS UNKNOWN	1	1.3	1	0.3	1.6
IMPATIENS CAPENSIS	2	2.6	20.5	6.8	9.4
PARTHENOCISSUS QUINQUEFOLIA	11	14.2	27.6	9.1	23.4
PENSTEMON CALYCOSUS	1	1.3	1	0.3	1.6
POA COMPRESSA	1	1.3	1	0.3	1.6
PODOPHYLLUM PELTATUM	2	2.6	11	3.6	6.2
PRUNUS SEROTINA	1	1.3	1	0.3	1.6
PRUNUS VIRGINIANA	2	2.6	6.5	2.1	4.7
RHAMNUS CATHARTICA	2	2.6	45.5	15.0	17.6
RHUS RADICANS	1	1.3	11	3.6	4.9
RIBES MISSOURIENSE	2	2.6	1	0.3	2.9
ROSA MULTIFLORA	1	1.3	11	3.6	4.9
RUBUS OCCIDENTALIS	2	2.6	11	3.6	6.2
SANICULA GREGARIA	1	1.3	1	0.3	1.6
SMILACINA RACEMOSA	5	6.5	9	2.9	9.5
SMILAX HERBACEA	2	2.6	6	1.9	4.6
SPHENOPHOLIS INTERMEDIA	1	1.3	1	0.3	1.6
TOVARA VIRGINIANA	2	2.6	6	1.9	4.6
TRILLIUM RECURVATUM	1	1.3	11	3.6	4.9
VERBENA HASTATA	1	1.3	1	0.3	1.6
VIBURNUM OPULUS	1	1.3	11	3.6	4.9
VIBURNUM DENTATUM	6	7.8	17.5	5.8	13.5
VIOLA CANADENSIS	1	1.3	1	0.3	1.6
	77	100	302.	100	200

Somme Woods Savanna

Woody Vegetation

Transect 4 in the Somme control section was extended from the 300 m. end point to 800 m. on 16 July 1988. The extension, due west, followed the flagged bird transect within a few meters and, therefore, provides a good vegetation summary to match with avian data.

The forest along the extension resembled the forest in the first 300 m. from the beginning, although it may have fewer species (see Table 1 for woody species found in the extension). Buckthorn, primarily R. cathartica, tended to dominate the understory (Table 3), with a scattered overstory of bur oak (Table 2). Smaller trees, especially northern red oak, shagbark hickory, and, on wetter sites, swamp white oak, are generally distributed along the transect. A cattail marsh occurred between 300 and 350 m. on Transect 4.

THe impact of buckthorn on the forest is seen in most data. For example, we found some swamp white oak trees still alive (Table 4), but all swamp white oak in the shrub layer were dead (Table 3) indicating that this species is no longer reproducing. THe number of native trees showing evidence of good reproduction was nil. Clearly, this forest is well on the way to becoming a buckthorn thicket with few native plants. Even poison-ivy here was far less abundant than in all other closed forests we have examined in the Chicago region.

Ground cover vegetation

In 1987 and 1988 additional study transects were added at this study area. Two control transects (Transect numbers 3 and 4) were added in 1987; in 1988, control transect 4 was lengthened by 500 meters to represent a major change in soil type and hydrologic gradient which was reflected closely by vegetation changes.

Transects sections studied in 1987 were dominated by ash (Fraxinus spp.), bur oak (Quercus macrocarpa), and basswood (Tilia americana) based on canopy intercept (Table 5). Tree-size (greater than 4 inch DBH) buckthorn occurred in nearly equal abundance in each transect. The shrub strata was by far dominated by buckthorn (Rhamnus cathartica) which accounted for nearly 20% of the intercept along both transects. Basswood was the second most important shrub-sized woody plant along these transects. The same conclusions can be drawn referencing stem density for shrubs (Table 7). Based on tree diameters (Table 8) ash and basswood accounted for the majority of trees in the 2-4, 4-6, and 6-8 inch size class at DBH. The extension of transect 4 documented a nearly continuous buckthorn shrub layer and increasing cover by oaks, hickory, and maple (Acer saccharum) as the transect proceeded eastward.

Dominant ground cover species along control transect 3 included buckthorn (Rhamnus cathartica), touch-me-not (Impatiens capensis), poison ivy (Rhus radicans), prickly ash (Xanthoxylum americanum), gray dogwood, wild strawberry (Fragaria virginiana), and Carex laxiflora.

Ground cover vegetation in Control transect 4 in 1987 and the extension studied in 1988 (Tables 9 and 10) were dominated by buckthorn, poison ivy, gray dogwood, and spring avens (Geum canadense). The 1988 extension traversed a small wetland pocket bordered with box elder seedlings and with an emergent vegetation dominated by wild calamus (Acorus calamus). Herbaceous vegetation in both years was limited to light gaps associated with poorly drained soils, windfalls, or were in areas that have yet to close in with a dense shrub, sapling or tree canopy. Large areas along each study transect had little or no ground cover vegetation. Suppressed and etiolated plants were commonplace in the densely shaded sections of the transects.

Table 1. Master list of woody species encountered during extension of Transect 4, in the "control" section of Somme Woods, 16 July 1988. Nomenclature follows that of Gleason and Conquist (1963).

A. saccharum	**Sugar maple**
Berberis sp.	**Barberry**
Crataegus sp.	**Hawthorn**
Carya cordiformis	**Bitternut hickory**
C. ovata	**Shagbark hickory**
Cornus obliqua	**Dogwood**
Fraxinus americana	**White ash**
Fraxinus pennsylvanica	**Green ash**
Lonicera tartarica	**Honeysuckle**
Ostrya virginiana	**Ironwood**
Populus deltoides	**Cottonwood**
Prunus virginiana	**Choke cherry**
Quercus alba	**White oak**
Q. bicolor	**Swamp white oak**
Q. macrocarpa	**Bur oak**
Q. palustris	**Pin oak**
Q. rubra	**Northern red oak**
Rhamnus catharticus	**Buckthorn**
R. frangula	**Buckthorn**
Rhus radicans	**Poison ivy**
Rosa multiflora	**Multiflora rose**
Tilia americana	**American basswood**
Ulmus americana	**American elm**
U. rubra	**Red elm**
Vitis sp.	**Grape**

Table 2. Tree cover and basal area of alive and dead trees at Somme Woods, extension of Transect 4, based on survey with 50 m. line intercepts and 10 factor prism points on 16 July 1988. One standard deviation is given in parentheses.

		Basal area (b.a.) based on prism point estimates			
		Alive trees		Dead trees	
SPECIES	Percent cover	ft^2/acre	m^2/hectare	ft^2/acre	m^2/hectare
Acer saccharum	0.1 (0.4)	0.2 (0.4)			
A. nigrum	2.0 (4.5)	0.1 (0.3)			
Carya ovata	4.2 (5.7)	0.7 (1.8)		0.1 (0.3)	
Crataegus sp.	0.4 (1.4)	0.2 (0.4)			
Fraxinus americana	2.5 (4.2)	1.1 (1.3)		0.1 (0.3)	
F. pennsylvanica	3.9 (4.6)	0.2 (0.6)			
Ostrya virginiana	3.8 (6.6)	0.1 (0.3)			
Populus deltoides	1.0 (3.0)	0.2 (0.4)			
Quercus alba	7.6 (8.7)	1.2 (1.3)		0.2 (0.4)	
Q. bicolor	9.4 (15.6)	1.0 (1.3)		0.1 (0.3)	
Q. macrocarpa	19.2 (12.9)	1.9 (1.6)		0.1 (0.3)	
Q. palustris	1.3 (4.1)	0.1 (0.3)			
Q. rubra	15.6 (17.3)	1.5 (1.8)		0.2 (0.6)	
Rhamnus catharticus	38.6 (27.2)	4.9 (3.2)		0.4 (0.7)	
R. frangula	1.6 (3.7)	0.5 (1.5)			
Tilia americana	10.8 (10.1)	1.1 (1.1)			
Ulmus americana	0.7 (2.2)	0.1 (0.3)			
TOTAL		155.0 (56.0)	35.6 (12.9)	13.0 (13.)	3.0 (3.0)

Table 3. Shrub and small tree (stems < 2 inches d.b.h.) cover and stem densities along Transect 4 extension (300-800 m.) in Somme Woods. Data were gathered on 16 July 1988 in 50 m. line transect (for cover) and 50 x 1 m. quadrats for stem numbers. One standard deviation is given in parenthesis.

		Stem numbers (per hectare)	
SPECIES	Percent cover	Alive stems	Dead stems
Acer nigrum	1.0 (2.7)	40 (120)	20 (60)
A. saccharum	0.2 (0.5)	80 (260)	
Carya cordiformis	1.0 (2.1)	20 (60)	
C. ovata	0.6 (1.1)		
Cornus obliqua	0.1 (0.4)	20 (60)	
Cornus racemosa		20 (60)	40 (120)
Crataegus sp.	1.9 (2.8)	220 (260)	40 (80)
Fraxinus americana	1.9 (3.8)	140 (380)	20 (60)
F. pennsylvanica	0.4 (1.3)	40 (80)	
Lonicera tartarica	0.6 (1.6)	220 (460)	20 (60)
Ostrya virginiana	8.6 (19.7)	200 (560)	
Quercus bicolor			60 (120)
Q. macrocarpa	0.7 (2.0)	20 (60)	
Q. rubra	1.5 (2.5)	60 (140)	
Rhamnus catharticus	34.9 (15.8)	6160(3820)	2180 (1720)
R. frangula	7.3 (9.1)	280 (600)	120 (280)
Rhus radicans	0.8 (1.6)	20 (60)	
Rosa multiflora	0.1 (0.4)		
Tilia americana	3.1 (2.4)	240 (200)	
Ulmus rubra	0.6 (2.0)		
Vitis sp.	0.5 (1.4)		

Table 4. Summary of alive and dead trees by stem classes (d.b.h. in inches) in Somme Woods, Transect 4 extension. Data were collected 16 July 1988.

ALIVE STEMS
(stem classes are d.b.h. in inches)

SPECIES	2-6	6-10	10-14	14-18	18-22	22-26	Total
Acer saccharum	30(60)	10(3)					40(80)
Carya cordiformis	10(30)						10(30)
C. ovata	10(30)		10(30)				20 (40)
Crataegus sp.	20(40)						20(40)
Fraxinus americana	100(150)	20(40)					100(150)
F. pennsylvanica	70(100)	20(40)					70(100)
Ostrya virginiana	80(200)						80(200)
Populus deltoides			10(30)				10(30)
Quercus alba				10(30)			10(30)
Q. bicolor	90(110)			10(30)			120(150)
Q. macrocarpa	20(40)					10(30)	40(80)
Q. rubra	120(120)				10(30)		120(120)
Rhamnus catharticus	570(530)						570(530)
R. frangula	50(100)						50(100)
Tilia americana	90(120)						90(120)
TOTALS	1490(560)	70(100)	20(40)	20(40)	10(30)	10(30)	1800(760)

DEAD STEMS
(stem classes are d.b.h. in inches)

Carya ovata	10(30)						10(30)
Crataegus sp.	10(30)						10(30)
Fraxinus americana	10(30)						10(30)
Quercus bicolor	30(90)			10(30)			40(90)
Q. rubra	10(30)						10(30)
Rhamnus catharticus	60(100)						60(100)
Tilia americana	10(30)						10(30)
TOTALS	150(170)			10(30)			160(160)

Table 5. Intercept of shrubs (<2" diameter at DBH) along control transects 3 and 4 at Somme Savanna, Northbrook, IL. Based on sampling with 1x50 meter transect segments (e.g. 3-1, 3-2) on 6 June 1987.

	TRANS						TRANS					
	3-1	3-2	3-3	3-4	AVG	STD	4-1	4-2	4-3	4-4	AVG	STD
Acer negundo			0.5		0.5	0.0		1.2	0.1		0.7	0.6
Carya ovata			3.0		3.0	0.0						
Cornus obliqua	3.1		0.2		1.7	1.5						
Cornus racemosa	2.0	2.6	1.6		2.1	0.4	6.0	0.2			3.1	2.9
Crataegus sp.	3.1		0.4	1.0	1.5	1.2	2.8	1.3	0.4		1.5	1.0
Fraxinus americana			0.4		0.4	0.0		0.5	3.7		2.1	1.6
Fraxinus pensylvanica			1.7		1.7	ERR	0.1		0.4		0.3	0.2
Lonicera tatarica	4.1		2.0	1.9	2.7	1.0	1.2	1.2	1.7		1.4	0.2
Prunus serotina								3.2			3.2	0.0
Prunus virginiana				1.1	1.1	ERR				1.7	1.7	ERR
Quercus bicolor			0.1		0.1	0.0						
Quercus macrocarpa									0.7		0.7	ERR
Rhamnus cathartica	26.7	10.1	11.3	15.6	15.9	6.5	21.5	19.8	18.0	25.5	21.2	2.8
Rhamnus frangula								0.5			0.5	0.0
Rhus radicans				3.5	3.5	.0.0	3.4		0.1	4.0	2.5	1.7
Tilia americana	3.1	2.7	6.5	9.2	5.4	2.7	5.8	10.9	4.4	8.9	7.5	2.6
Ulmus americana			0.9	4.8	2.9	1.9			4.1		4.1	0.0
Ulmus rubra	1.1				1.1	ERR	1.5	2.9	1.0	5.3	2.7	1.7
Viburnum prunifolium				5.1	5.1	0.0	1.1	0.2			0.7	0.5
Vitis riparia	3.1	0.2		3.8	2.4	1.6	10.7	2.0			6.4	4.3
Xanthoxylum americanum	8.4				8.4	ERR						
	54.7	15.6	28.6	46.0	36.2	15.2	54.1	43.9	34.6	45.4	44.5	6.9

Table 6. Intercept of trees (> 2" diameter at DBH) along control transects 3 and 4 at Somme Savanna, Northbrook, IL. Based on 1x50 meter transect segments (e.g. 3-1, 3-2) on 8 June 1987.

	TRANS						TRANS					
	3-1	3-2	3-3	3-4	AVG	STD	4-1	4-2	4-3	4-4	AVG	STD
Crataegus spp.	1.1	3.9			2.5	1.4		0.7		2.8	1.8	1.0
Fraxinus americana			3.2	9.3	6.3	3.1			9.0	21.7	15.4	6.4
Fraxinus pensylvanica	27.1	10.0	5.0	8.7	12.7	8.5	42.4	29.9			36.2	6.3
Juglans nigra				4.1	4.1	0.0				5.1	5.1	0.0
Quercus macrocarpa			18.0	32.1	25.1	7.1	1.7	17.8	38.4	19.0	19.2	13.0
Rhamnus cathartica	3.5	0.9	5.9	2.1	3.1	1.9	1.8		11.1		6.5	4.6
Tilia americana	14.4	1.6	9.5	8.3	8.5	4.6	16.6	14.3	7.3	22.0	15.1	5.3
Ulmus americana			2.0		2.0	0.0			11.1	2.8	7.0	4.1
Ulmus rubra								7.5	1.6	2.8	4.0	2.5
Viburnum prunifolium				3.0	3.0	0.0						
	46.1	16.4	43.6	67.6	43.4	18.2	62.5	70.2	78.5	76.2	71.9	6.2

Table 7. Average shrub stem density at Somme Savanna, Northbrook, IL. Based on sampling on 8 June 1987.

	T3				T4			
	A		D		A		D	
SPECIES	AVG	STD	AVG	STD	AVG	STD	AVG	STD
Acer negundo	0.25	0.43	0.00	0.00	0.00	0.00	0.00	0.00
Cornus obliqua	4.25	7.36	0.00	0.00	0.00	0.00	0.00	0.00
Cornus racemosa	7.25	4.71	3.50	3.77	9.25	13.29	4.00	5.34
Crataegus spp.	1.75	1.48	0.25	0.43	0.00	0.00	0.00	0.00
Fraxinus americana	0.00	0.00	0.00	0.00	2.50	2.87	1.75	0.00
Fraxinus pensylvanica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lonicera spp.	2.75	4.21	0.00	0.00	0.00	0.00	0.00	0.00
Lonicera tatarica	0.00	0.00	0.00	0.00	2.50	3.28	2.75	3.90
Prunus serotina	0.00	0.00	0.00	0.00	0.50	0.87	0.00	0.00
Prunus virginiana	0.00	0.00	0.00	0.00	1.25	1.30	0.75	1.30
Rhamnus cathartica	24.00	18.10	2.25	3.90	30.00	13.40	12.25	1.64
Rhamnus frangula	0.00	0.00	0.00	0.00	0.75	1.30	0.00	0.00
Tilia americana	2.25	3.34	0.75	0.83	6.50	2.29	0.75	0.00
Ulmus americana	0.00	0.00	0.00	0.00	0.25	0.43	0.25	0.00
Ulmus rubra	0.25	0.43	0.00	0.00	0.50	0.87	0.00	0.00
Viburnum prunifolium	1.50	2.06	6.75	6.98	0.00	0.00	0.00	0.00
Vitis spp.	1.50	2.06	0.00	0.00	1.25	1.30	0.00	0.00
Xanthoxylum americanum	7.75	13.42	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	53.50	43.49	13.50	9.31	55.25	26.64	22.50	8.35

Table 8. Tree diameters by stem-size class at Somme Savanna, Northbrook, IL for transect 3 and transect 4. Based on measurements along 1x50 meter transects on 8 June 1987.

SPECIES	trans	2-4	4-6	6-8	8-10	10-1	12-1
	3						
Crataegus spp.		1	0	0	0	0	
Fraxinus americana		0	0	0	0	0	
Fraxinus pensylvanica		4	2	1	2	1	
Quercus macrocarpa		1	0	0	0	0	
Rhamnus cathartica		3	0	0	0	0	
Tilia americana		11	2	0	0	0	
Ulmus americana		1	0	0	0	0	
	total	21	4	1	2	1	
	4						
Crataegus spp.		2	0	0	0	0	
Fraxinus americana		1	0	1	0	0	
Fraxinus pensylvanica		1	8	5	1	1	
Quercus macrocarpa		2	1	0	0		
Rhamnus cathartica		2	0	0			
Tilia americana		10	4	1	1	1	
	total	18	13	7	2	2	

Table 9. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from control transects 3 and 4 (200 meters long each) at Somme Savanna, Northbrook, IL. Based on sampling using in meter square quadrats established every 10 meters along surveyed transects, studied 8 June 1987.

	trans 3			trans 4			total		
	RF	RC	IV	RF	RC	IV	RF	RC	IV
Acer negundo				0.71	1.42	2.14	0.30	0.78	1.08
Achillea millefolium	1.03	1.45	2.49				0.60	1.17	1.77
Agrimonia gryposepala				0.71	1.42	2.14	0.30	0.78	1.08
Allium cernuum				1.42	1.42	2.85	0.60	0.78	1.38
Arisaema dracontium	0.51	0.96	1.48	3.57	1.71	5.28	1.80	0.91	2.71
Arisaema triphyllum	2.07	0.96	3.04	2.85	1.42	4.28	2.40	1.56	3.96
Aster ericoides	2.07	1.45	3.52	0.71	1.42	2.14	1.50	1.09	2.60
Aster puniceus				0.71	1.42	2.14	0.30	0.78	1.08
Aster sagittifolius	3.62	0.96	4.59	0.71	1.42	2.14	2.40	0.78	3.18
Bromus kalmii	0.51	0.96	1.48				0.30	0.78	1.08
Carex granularis	2.07	2.42	4.49				1.20	1.96	3.16
Carex hirtella				1.42	7.13	8.56	0.60	3.92	4.52
Carex laxiflora	3.62	1.38	5.01	3.57	1.42	4.99	3.60	0.98	4.58
Carex normalis	0.51	3.87	4.39				0.30	3.13	3.43
Carex rosea	2.59	1.93	4.53	2.14	1.90	4.04	2.40	1.37	3.77
Carex scoparia	0.51	2.90	3.42				0.30	2.35	2.65
Carex sp.	1.03	0.96	2.00	0.71	1.42	2.14	0.90	0.78	1.68
Carex stricta	0.51	2.90	3.42				0.30	2.35	2.65
Carex sp.	0.51	0.96	1.48				0.30	0.78	1.08
Chrysanthemum leucanthemum	2.59	0.96	3.56				1.50	0.78	2.28
Circaea quadrisulcata	1.55	1.93	3.49	2.85	2.14	4.99	2.10	1.34	3.44
Convolvulus sepium	0.51	0.96	1.48				0.30	0.78	1.08
Cornus obliqua	0.51	2.90	3.42				0.30	2.35	2.65
Cornus racemosa	2.59	2.52	5.11	4.28	4.28	8.56	3.30	2.21	5.51
Crataegus sp.	1.03	0.96	2.00				0.60	0.78	1.38
Cryptotaenia canadensis	0.51	0.96	1.48				0.30	0.78	1.08
Cyperus sp.				1.42	1.42	2.85	0.60	0.78	1.38
Dactylis glomerata	0.51	0.96	1.48	0.71	2.85	3.56	0.60	1.17	1.77
Daucus carota	2.59	1.16	3.75				1.50	0.94	2.44
Rudbeckia hirta	0.51	0.96	1.48				0.30	0.78	1.08
Fragaria virginiana	3.10	1.93	5.04	0.71	1.42	2.14	2.10	1.45	3.55
Fraxinus americana	2.59	1.93	4.53	0.71	1.42	2.14	1.80	1.43	3.24
Fraxinus pennsylvanica				2.85	2.14	4.99	1.20	1.17	2.37
Galium aparine	1.55	0.96	2.52	0.71	1.42	2.14	1.20	0.78	1.98
Geranium maculatum	0.51	0.96	1.48				0.30	0.78	1.08
Geum canadense	5.18	1.06	6.24	7.14	1.57	8.71	6.00	0.86	6.86
Geum laciniatum				5.71	1.42	7.14	2.40	0.78	3.18
Glyceria striata	0.51	2.90	3.42	0.71	2.85	3.56	0.60	1.96	2.56
Helianthus grosseserratus	1.03	1.45	2.49				0.60	1.17	1.77
Impatiens capensis	6.21	3.31	9.53	2.85	1.42	4.28	4.80	2.20	7.01
Juncus dud	1.03	1.45	2.49				0.60	1.17	1.77
Lonicera tatarica	2.07	1.69	3.77	1.42	3.56	4.99	1.80	1.56	3.37
Melilotus sp.	0.51	0.96	1.48	0.71	1.42	2.14	0.60	0.78	1.38
Cerastium sp.	2.59	0.96	3.56				1.50	0.78	2.28
Parthenocissus inserta	1.55	1.29	2.84	2.85	1.42	4.28	2.10	0.89	2.99
Pastinaca sativa	0.51	0.96	1.48	0.71	1.42	2.14	0.60	0.78	1.38
Phleum pratense	1.55	1.29	2.84				0.90	1.04	1.94
Poa compressa	1.03	1.45	2.49	0.71	2.85	3.56	0.90	1.30	2.20
Poa pratensis	0.51	1.93	2.45	0.71	4.28	4.99	0.60	1.96	2.56
Podophyllum peltatum				0.71	1.42	2.14	0.30	0.78	1.08
Prunella vulgaris				1.42	1.42	2.85	0.60	0.78	1.38
Prunus virginiana				2.14	2.37	4.52	0.90	1.30	2.20
Quercus alba				0.71	1.42	2.14	0.30	0.78	1.08

Table 9. (Cont'd)

Quercus rubra				0.71	1.42	2.14	0.30	0.78	1.08
Ranunculus abortivus				2.14	1.90	4.04	0.90	1.04	1.94
Rhamnus cathartica	8.29	2.00	10.2	10	5.60	15.6	9.00	2.30	11.3
Rhus radicans	6.73	1.71	8.45	4.28	2.37	6.66	5.70	1.36	7.06
Ribes missouriense	1.03	1.93	2.97				0.60	1.56	2.17
Rosa sp.	0.51	1.93	2.45				0.30	1.56	1.87
Sanicula gregaria	0.51	0.96	1.48				0.30	0.78	1.08
Smilacina stellata	0.51	0.96	1.48				0.30	0.78	1.08
Smilax ecirrhata	0.51	0.96	1.48				0.30	0.78	1.08
Solidago altissima	2.59	1.16	3.75	0.71	1.42	2.14	1.80	0.91	2.71
Solidago graminifolia	0.51	1.93	2.45				0.30	1.56	1.87
Solidago rigida	2.59	2.32	4.91	0.71	1.42	2.14	1.80	1.70	3.50
Sphenopholis intermedia				0.71	1.42	2.14	0.30	0.78	1.08
Taraxacum officinale	1.03	0.96	2.00	2.14	1.42	3.57	1.50	0.78	2.28
Tilia americana	0.51	1.93	2.45	5.71	1.96	7.67	2.70	1.13	3.83
Tovara virginiana	1.55	0.96	2.52	3.57	2.28	5.85	2.40	1.07	3.48
Trifolium sp.	0.51	2.90	3.42				0.30	2.35	2.65
Trifolium hybrid	0.51	1.93	2.45				0.30	1.56	1.87
Trillium recurvatum				1.42	1.42	2.85	0.60	0.78	1.38
Ulmus rubra				0.71	1.42	2.14	0.30	0.78	1.08
Viburnum opulus				0.71	1.42	2.14	0.30	0.78	1.08
Vicia americana	1.03	1.45	2.49	0.71	1.42	2.14	0.90	1.04	1.94
Viola sororia	1.03	0.96	2.00	2.14	1.90	4.04	1.50	0.94	2.44
Vitis riparia	2.07	0.96	3.04	1.42	1.42	2.85	1.80	0.78	2.58
Xanthoxylum americanum	1.03	5.81	6.85				0.60	4.70	5.31
Zizia aurea	0.51	0.96	1.48				0.30	0.78	1.08
	100	100	200	100	100	200	100	100	200

Table 10. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from along the 500 meter extension of control transect 4 at Somme Woods and Savanna, (Northbrook, IL). Based on sampling using in meter square quadrats established every 10 meters along surveyed transects, studied 16 July 1988.

	AF	RF	AC	RC	IV
ACALYPHA SP.	1	0.6	1	0.4	1.0
ACER NEGUNDO	4	2.4	15.7	5.6	8.0
ACORUS CALAMUS	4	2.4	70.2	24.8	27.3
ANEMONELLA THALICTROIDES	1	0.6	11	3.9	4.5
ARISAEMA DRACONTIUM	1	0.6	1	0.4	1.0
ARISAEMA TRIPHYLLUM	1	0.6	1	0.4	1.0
ASTER SIMPLEX	2	1.2	1	0.4	1.6
BIDENS FRONDOSA	1	0.6	1	0.4	1.0
CAREX ROSEA	3	1.8	1	0.4	2.2
CAREX GRACILLIMA	4	2.4	1	0.4	2.8
CAREX PENSYLVANICA	6	3.6	1	0.4	4.0
CAREX TENERA	2	1.2	6	2.1	3.3
CIRSIUM VULGARE	1	0.6	1	0.4	1.0
CORNUS RACEMOSA	3	1.8	4.3	1.5	3.4
CRATAEGUS SP.	2	1.2	1	0.4	1.6
ERIGERON PHILADELPHICUS	1	0.6	1	0.4	1.0
FRAGARIA VIRGINIANA	2	1.2	1	0.4	1.6
FRAXINUS AMERICANA	7	4.2	5.3	1.9	6.1
GERANIUM MACULATUM	2	1.2	1	0.4	1.6
GEUM CANADENSIS	3	1.8	1	0.4	2.2
GLYCERIA STRIATA	4	2.4	18.2	6.5	8.9
LEERSIA ORYZOIDES	2	1.2	6	2.1	3.3
LONICERA PROLIFERA	1	0.6	1	0.4	1.0
LONICERA TATARICA	2	1.2	15.5	5.5	6.7
LYSIMACHIA CILIATA	2	1.2	1	0.4	1.6
OXALIS STRICTA	1	0.6	1	0.4	1.0
OSTRYA VIRGINIANA	3	1.8	4.3	1.5	3.4
PARTHENOCISSUS QUINQUEFOLIA	1	0.6	1	0.4	1.0
PHALARIS ARUNDINACEA	1	0.6	30	10.6	11.2
POTENTILLA SIMPLEX	11	6.7	3.7	1.3	8.0
PRUNUS SEROTINA	1	0.6	11	3.9	4.5
RHAMNUS CATHARTICA	43	26.0	25.3	8.9	35.0
RHUS RADICANS	24	14.5	5.5	1.9	16.5
RIBES MISSOURIENSE	2	1.2	6	2.1	3.3
ROSA MULTIFLORA	1	0.6	11	3.9	4.5
RUBUS OCCIDENTALIS	2	1.2	6	2.1	3.3
SCIRPUS AMERICANUS	1	0.6	1	0.4	1.0
SMILACINA RACEMOSA	2	1.2	1	0.4	1.6
THALICTRUM DASYCARPUM	1	0.6	1	0.4	1.0
TILIA AMERICANA	1	0.6	1	0.4	1.0
TOVARA VIRGINIANA	3	1.8	1	0.4	2.2
TYPHA SPP.	1	0.6	1	0.4	1.0
VIOLA PAPILIONACEA	1	0.6	1	0.4	1.0
VIOLA PENSYLVANICA	1	0.6	1	0.4	1.0
VITIS RIPARIA	2	1.2	1	0.4	1.6
	165	100	282.	100	200

Sauganash Savanna

Woody Vegetation

Trees at Sauganash covered only slightly over 75% of the transect length based on intercept (Table 1). This is a marked contrast with most of the other savanna study areas in Illinois where tree (and shrub) canopies are virtually continuous. Dominant tree species included swamp white oak (Quercus bicolor), basswood, and ash (Fraxinus spp.). The shrub layer (Table 2) was dominated by gray dogwood, swamp white oak, ash, and willow (Salix spp.) based on intercept measurements. Shrub-sized plants of buckthorn (Rhamnus frangula) and red elm (Ulmus rubra) were limited to mesic soils.

Based on stem density of shrub-sized plants, gray dogwood, grape (Vitis riparia), and blueash (Fraxinus quadrangulata) were dominant (Table 3). The relatively sparse and restricted woody canopy is reflected by the relatively few tree-sized plants at Sauganash (Table 4). The largest tree along the study transect was an 8-10 inch diameter swamp white oak and this species accounted for the largest number of tree stems tallied.

Ground cover vegetation

One transect which was divided into four-50 meter sections was studied in this area. All transect sections were dominated by plants commonly associated with mesic to wet-mesic prairie and wetlands (Table 5). Over fifty plant species were sampled along the transects. Dominant plant species overall included gray dogwood, dogbane (Apocynum sibiricum), ash (Fraxinus sp.), Carex tenera, bluejoint grass (Calamagrostis canadensis), buckthorns (Rhamnus frangula and R. cathartica), manna grass (Glyceria striata), purple loosestrife (Lythrum salicaria), saw-tooth sunflower (Helianthus grosseserratus), viburnum (Viburnum dentata and V. prunifolium), and others. The ground cover strata at Sauganash was rich and heterogenous; patches of

wet prairie and emergent wetland vegetation were interspersed with slightly elevated areas with mesic soils and associated species.

Table 1. Intercept of woody plants (> 2" diameter at DBH and > 1 m height) along four 50 meter long study transects at Sauganash Savanna, Cook County, IL. Based on measurement of intercept along 1x50 meter transects on 8 June 1987.

INTERCEPT SAUGANASH TREES

	trans 1	trans 2	trans 3	trans 4
Quercus bicolor	24.7	24.7	46	31.1
Tilia americana	6.1			
Fraxinus americana	5	3.5		
Crataegus sp.	3.2		5.9	
Fraxinus quadrangulata	4.9			3.4
Fraxinus pensylvanica				3.4
	43.9	28.2	51.9	37.9

Table 2. Intercept of woody plants (< 2" diamter at DBH) along four 50 meter long study transects at Sauganash Savanna, Cook County, IL. Based on measurements of intercept along 1x50 meter transects on 8 June 1987.

	trans 1	trans 2	trans 3	trans 4
Viburnum dentatum	2.9			
Rhamnus cathartica	4.1			
Rhamnus frangula	4.7			
Ulmus rubra	9.8			
Cornus racemosa	14.1		19.4	3.7
Viburnum prunifolium	0.5	0.7		
Crataegus sp.	6.4	4.9	8.7	3.5
Cornus sp.	0.9			
Fraxinus quadrangulata	3.8	0.6		2.1
Quercus bicolor	2	10.2	11.8	1.3
Vitis riparia		3.6	5.1	0.9
Fraxinus americana		1.9	5.7	5.8
Salix sp.			7.9	4.9
Cornus obliqua		1.1		
Malus sp.				3.1
Fraxinus pensylvanica				9.9
	49.2	23	58.6	35.2

Table 3. Average shrub stem density at Sauganash Savanna, Cook County, IL. Based on measurements 10 June 1987.

	Alive		Dead	
SPECIES	AVG	STD	AVG	STD
Ulmus americana	1.63	3.94	0.00	0.00
Rhamnus sp.	1.00	2.29	0.13	0.33
Quercus bicolor	2.38	4.53	0.13	0.33
Fraxinus sp.	2.25	4.02	1.00	2.29
VItus sp.	9.25	22.26	1.50	3.97
Cornus racemosa	4.75	6.50	2.13	4.91
Crataegus sp.	3.13	7.54	0.50	1.32
Ulmus rubra	0.13	0.33	0.13	0.33
Cornus obliqua	0.63	1.65	0.00	0.00
Fraxinus quadrangulata	8.50	17.83	2.00	4.92
Salix sp.	1.13	1.96	0.63	1.65
TOTAL	34.75	41.62	8.13	9.56

Table 4. Tree diameters by stem-size class at Sauganash Savanna, Cook County, IL. Based on measurement along 1x50 meter transects on 8 June 1987.

SPECIES	2-4	4-6	6-8	8-10	10-12	12-14	14-16
Crateagus sp.	0	2	0	0	0	0	0
Fraxinus sp.	2	0	0	0	0	0	0
Quercus bicolor	6	5	0	1	0	0	0
Rhamnus frangula	3	0	0	0	0	0	0
Ulmus rubrum	0	1	0	0	0	0	0
Fraxinus quadrangulata	2	0	0	0	0	0	0
	13	8	0	1	0	0	0

Table 5. Summary of absolute (A) and relative (R) frequency (F) and cover values and importance values (IV) from study transects 1-4 at Sauganash Savanna, Cook County, IL. Based on sampling using meter square quadrats established every 10 meters along surveyed transects 8 June 1987.

	trans 1			trans 2			trans 3			trans 4			total		
	RF	RC	IV	RF	RC	IV	RF	RC	IV	RF	RC	IV	RF	RC	IV
Acer saccaharum				1.33	1.03	2.37	2.43	1.70	4.14				1.06	0.91	1.97
Agastache sp.				1.33	1.03	2.37	2.43	6.81	9.24				1.06	2.28	3.34
Apocynum sibiricum	3.03	2.35	5.38	2.66	3.63	6.30	12.1	2.38	14.5	8.10	5.35	13.4	5.85	1.74	7.59
Arenaria lateriflora				1.33	2.07	3.41							0.53	1.82	2.35
Aster ericoides				1.33	1.03	2.37							0.53	0.91	1.44
Aster puniceus	3.03	2.35	5.38										0.53	0.91	1.44
Bidens sp.										2.70	4.28	6.98	0.53	1.82	2.35
Calamagrostis canadensis	3.03	7.07	10.1	2.66	2.07	4.74							1.59	2.13	3.72
Cardamine sp.				1.33	1.03	2.37							0.53	0.91	1.44
Carex normalis							2.43	3.40	5.84				2.12	1.14	3.26
Carex stipata										2.70	2.14	4.84	0.53	0.91	1.44
Carex tenura	3.03	9.43	12.4	2.66	2.59	5.26	2.43	1.70	4.14	2.70	4.28	6.98	2.65	2.19	4.85
Carex sp.				1.33	1.03	2.37							0.53	0.91	1.44
Circaea quadrisulcata				1.33	1.03	2.37							0.53	0.91	1.44
Cornus obliqua				1.33	2.07	3.41							0.53	1.82	2.35
Cornus racemosa	6.06	8.25	14.3	4	1.03	5.03	2.43	1.70	4.14	2.70	2.14	4.84	3.72	1.56	5.29
Crataegus sp.				1.33	1.03	2.37	2.43	1.70	4.14				1.06	0.91	1.97
Cyperus atrovirens				2.66	1.03	3.70	2.43	1.70	4.14				1.59	0.91	2.50
Unknown grass										2.70	12.8	15.5	0.53	5.46	6.01
Fragaria virginiana	3.03	4.71	7.74	1.33	1.03	2.37	2.43	1.70	4.14				1.59	1.21	2.81
Fraxinus americana				2.66	1.03	3.70	7.31	3.97	11.2	5.40	6.42	11.8	3.72	1.95	5.68
Galium obtusum				1.33	3.11	4.45				2.70	4.28	6.98	1.06	2.28	3.34
Geranium maculatum	3.03	2.35	5.38	1.33	1.03	2.37							1.06	0.91	1.97
Geum canadense				1.33	1.03	2.37							0.53	0.91	1.44
Glyceria striata				1.33	1.03	2.37	2.43	1.70	4.14	5.40	3.21	8.61	2.12	1.14	3.26
Helianthus grosseserratus	3.03	4.71	7.74	1.33	1.03	2.37	2.43	5.10	7.54				1.59	1.82	3.42
Iris virginicus										2.70	2.14	4.84	0.53	0.91	1.44
Juncus dudleyi	3.03	2.35	5.38	1.33	2.07	3.41							1.06	1.37	2.43
Liatris spicata	3.03	4.71	7.74	1.33	2.07	3.41							1.06	1.82	2.89
Lilium michiganense				1.33	1.03	2.37				2.70	2.14	4.84	1.06	0.91	1.97
Lithrum salicaria				4	4.15	8.15	2.43	1.70	4.14	8.10	2.85	10.9	3.72	2.21	5.94
Litter	15.1	15.0	30.2	4	9.70	13.7	7.31	17.0	24.3	16.2	21.4	37.6	9.04	8.06	17.1
Lycopus sp.				1.33	1.03	2.37							0.53	0.91	1.44
Lysimachia ciliata				1.33	1.03	2.37	4.87	1.70	6.58				1.59	0.91	2.50
Malus sp.							2.43	1.70	4.14	2.70	6.42	9.13	1.06	1.82	2.89
Onoclea sensibilis	3.03	2.35	5.38										0.53	0.91	1.44
Oxypolis rigidor				1.33	1.03	2.37	2.43	1.70	4.14				1.06	0.91	1.97
Oxalis sp.				2.66	1.03	3.70	2.43	1.70	4.14				1.59	0.91	2.50
Panicum implicatum	3.03	4.71	7.74	4	1.03	5.03							2.12	1.14	3.26
Poa compressa				1.33	1.03	2.37				2.70	2.14	4.84	1.06	0.91	1.97
Poa pratensis	3.03	2.35	5.38	4	1.73	5.73				5.40	2.14	7.54	3.19	1.21	4.40
Potentilla simplex	3.03	2.35	5.38	1.33	1.03	2.37							1.06	0.91	1.97
Prunella vulgaris				1.33	2.07	3.41	2.43	1.70	4.14				1.06	1.37	2.43
Quercus bicolor				1.33	2.07	3.41	2.43	1.70	4.14				1.06	1.37	2.43
Rhamnus cathartica				2.66	1.55	4.22	2.43	1.70	4.14				1.59	1.21	2.81
Rhamnus frangula	9.09	2.35	11.4										1.59	0.91	2.50
Rosa multiflora				1.33	2.07	3.41							0.53	1.82	2.35
Rosa palustris							2.43	1.70	4.14				0.33	0.91	1.44
Salix glaucophylloides	3.03	2.35	5.38										0.53	0.91	1.44
Salix humilis	3.03	2.35	5.38										0.53	0.91	1.44
Scirpus lineatus										2.70	2.14	4.84	0.53	0.91	1.44
Senecia pauperculus	3.03	2.35	5.38	2.66	2.59	5.26	2.43	1.70	4.14	2.70	4.28	6.98	2.65	1.64	4.30
Sisyrinchium angustifolium				1.33	2.07	3.41							0.53	1.82	2.35

Table 5. (Cont'd)

Smilacina stellata	6.06	3.53	9.59	1.33	3.11	4.45	4.87	2.55	7.43			2.65 1.64 4.30
Solanum dulcamara				1.33	1.03	2.37						0.53 0.91 1.44
Solidago altissima	3.03	2.35	5.38	2.66	2.07	4.74	2.43	3.40	5.84	5.40	2.14	7.54 3.19 1.37 4.56
Solidago graminifolium				1.33	3.11	4.45				2.70	2.14	4.84 1.06 1.82 2.89
Ulmus rubra	3.03	2.35	5.38									0.53 0.91 1.44
Ulmus rubra				2.66	1.03	3.70						1.06 0.91 1.97
Viburnum dentatum	3.03	2.35	5.38	2.66	10.3	13.0	4.87	15.3	20.2			2.65 7.12 9.78
Viburnum prunifolium	3.03	2.35	5.38	2.66	1.55	4.22	4.87	7.66	12.5	8.10	2.85	10.9 4.25 1.94 6.19
Viola papilionacea	3.03	2.35	5.38	1.33	1.03	2.37	2.43	1.70	4.14			1.59 0.91 2.50
Vitis riparia				4	1.73	5.73	2.43	1.70	4.14	2.70	2.14	4.84 2.65 1.27 3.93
Zizea aurea				1.33	1.03	2.37						0.53 0.91 1.44
	100	100	200	100	100	200	100	100	200	100	100	200 100 100 200

Bluff Spring Fen Savanna

Woody Vegetation

Woody vegetation at Bluff Spring Fen was measured in four 50 meter study transects. Dominant tree species based on intercept included bur and white oaks (Table 1). These same species were not represented in the shrub layer as measured by stem tally (Table 2) and intercept (Table 3). The largest trees along all study transects (Table 4) were the white and bur oaks which grew as a dominant overstory above young growths of black cherry, and dense gray dogwood, scattered box elder (Acer negundo), and honeysuckle (Lonicera spp.).

Ground cover vegetation

Ground cover vegetation was studied along three 50 meter long transects in this study area (Table 5). Dominant species based on frequency included Pennsylvania sedge (Carex pensylvanica), gray dogwood (Cornus racemosa), Galium concinnum, ash, and woodland geranium (Geranium maculatum). Based on importance value, these same species were dominant. Grape (Vitis riparia), raspberry and blackberry (Rubus spp.), virginia creeper (Parthenocissus inserta), and Desmodium glutinosum were additional dominants. By far, Pensylvanica sedge and gray dogwood were the most important plants based on relative frequency and cover. Over 50 plant species, most native, were sampled in 18 meter square quadrats at this site.

Table 1. Intercept of trees (> 2" diameter DBH) at Bluff Spring Fen Savanna, (Elgin, IL) along four 50 meter long transects. Sampling occurred along 1x50 meter belts established 9 June 1987.

	trans 1	trans 2	trans 3	trans 4
Acer rubrum				3.3
Fraxinus pensylvanica				
Prunus serotina	10.9		2.6	
Quercus alba	18.4	5.8	38.3	24.1
Quercus macrocarpa	33.8	10.5	4.2	18.5
Quercus velutina		35.8		
	63.1	52.1	45.1	45.9

Table 2. Intercept of shrubs (< 2" diameter at DBH) at Bluff Spring Fen Savanna, (Elgin, IL) along four 50 meter long transects. Sampling occurred along 1x50 meter belts established 9 June 1987.

	trans 1	trans 2	trans 3	trans 4
Acer sp.				1.2
Acer negundo		6.2	3.2	16.9
Acer saccharum	2.5			
Carya cordiformis	1.5	0.7		
Cornus racemosa	26.8	40.4	3.9	3.6
Crataegus sp.	1			
Fraxinus americana	1		3.9	
Fraxinus pensylvanica		0.3	0.6	11.2
Carya ovata		2.1		
Lonicera tatarica	0.5			2.1
Lonicera prolifera			0.9	
Ostrya virginiana	0.6			
Prunus serotina	1	1.2	21.2	1.6
Prunus virginiana	1.2			
Quercus rubra	11.9	0.5	1	
Rhamnus cathartica				0.6
Rosa palustris	0.2			
Smilax sp.		2.6		1.5
Viburnum dentatum	1.2			
Viburnum prunifolium				1.1
Vitus riparia	11.1	6.4	5.9	5.4
	60.5	60.4	40.6	45.2

Table 3. Average shrub stem density at Bluff Spring Fen Savanna, Elgin, IL along trasects 1 - 4. Based on measurements 8 June 1987. A = Alive D = Dead

	trans 1		trans 2		trans 3		trans 4	
SPECIES	A	D	A	D	A	D	A	D
Acer negundo	0	0	5	0	5	1	11	0
Acer saccharum	1	0	0	0	0	0	1	0
Carya cordiformis	3	0	0	0	0	0	0	0
Carya ovata	0	0	1	0	0	0	0	0
Cornus racemosa	112	33	180	30	20	2	19	10
Carylus americana	6	2	0	0	0	0	0	0
Fraxinus americana	0	0	0	0	1	0	3	2
Fraxinus pennsylvanica	0	0	0	0	4	0	5	0
Lonicera prlifera	2	0	0	0	0	0	0	0
Lonicera sp.	0	0	2	0	0	0	0	0
Lonicera tatartica	3	0	0	0	0	0	0	0
Prunus serointa	1	1	1	0	13	3	0	0
Prunus virginiana	5	3	0	0	2	0	0	0
Rosa palustris	6	0	0	0	0	0	0	0
Ribes sp.	0	0	0	0	1	0	0	0
Quercus rubrum	1	0	0	0	1	0	0	0
Smilax sp.	0	0	0	0	0	0	1	0
Viburnum prunifolium	1	0	0	0	0	0	0	0
Vitis sp.	1	0	3	0	0	0	0	0
TOTAL	142	39	192	30	47	6	40	12

Table 4. Tree diameters by stem-size class at Bluff Spring Fen Savanna, Elgin, IL along transects 1 - 4. Based on measurement along 1x50 meter transect on 8 June 1987.

SPECIES	trans	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20
Quercus alba	1	0	0	0	0	0	0	1		
Prunus serotina	1	2	0	0	0	0	0	0		
Quercus rubra	2	0	0	0	0	0	0	0	0	1
Quercus alba	3	0	0	0	0	0	3	0	2	
Acer negundo	4	1	0	0	0	0	0	0		
Quercus alba	4	0	1	1	1	1	1	0		

Table 5. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importance values (IV) from study transects 1-3 at Bluff Spring Fen Savanna, Elgin, IL. Based on sampling using meter square quadrats established every 10 meters along surveyed transect studied 9 June 1987.

	trans 1			trans 2			trans 3			total		
	RF	RC	IV	RF	RC	IV	RF	RC	IV	RF	RC	IV
Acer negundo	1.53	1.70	3.24							0.60	0.73	1.33
Allium canadensis	1.53	1.70	3.24	2.12	2.40	4.53				1.21	1.09	2.30
Allium tricocum	1.53	1.70	3.24							0.60	0.73	1.33
Anemone cylindracea	1.53	1.70	3.24				1.88	1.05	2.94	1.21	0.73	1.94
Anemone quinquefolium				4.25	1.20	5.45				1.21	0.73	1.94
Anemonella thalictroides							3.77	2.63	6.40	1.21	1.82	3.03
Arenaria lateriflora							1.88	1.05	2.94	0.60	0.73	1.33
Arisaena dracontium				2.12	1.20	3.33				0.60	0.73	1.33
Aster sagitifolius	1.53	1.70	3.24							0.60	0.73	1.33
Carex cephalophaea							1.88	1.05	2.94	0.60	0.73	1.33
Carex pensylvanica	6.15	2.55	8.71	6.38	4.01	10.3	3.77	8.43	12.2	5.45	2.59	8.05
Carex rosea	1.53	1.70	3.24				1.88	2.10	3.99	1.21	1.09	2.30
Carex scoparia	1.53	1.70	3.24							0.60	0.73	1.33
Cirsium discolor	1.53	1.70	3.24							0.60	0.73	1.33
Cirsium sp.							1.88	2.10	3.99	0.60	1.46	2.06
Clematis virginiana							1.88	2.10	3.99	0.60	1.46	2.06
Comandra richardsoni				2.12	2.40	4.53				0.60	1.46	2.06
Cornus racemosa	4.61	8.52	13.1	12.7	11.2	23.9	5.66	4.56	10.2	7.27	5.11	12.3
Corylus americana	1.53	1.70	3.24							0.60	0.73	1.33
Cyperus sp.							1.88	1.05	2.94	0.60	0.73	1.33
Desmodium glutinosum	3.07	4.26	7.33	6.38	3.20	9.59				3.03	1.90	4.93
Dioscorea pennsylvanica	4.61	1.70	6.31	2.12	3.61	5.73	3.77	3.16	6.93	3.63	1.46	5.09
Dodecatheon meadii				2.12	6.01	8.14	1.88	2.10	3.99	1.21	2.55	3.77
Equisetum arvense	1.53	1.70	3.24							0.60	0.73	1.33
Fraxinus americana				8.51	3.61	12.1				2.42	2.19	4.61
Fraxinus pensylvanica	4.61	1.70	6.31				3.77	2.10	5.88	3.03	1.02	4.05
Galium aparine	3.07	1.70	4.78	2.12	1.20	3.33	1.88	1.05	2.94	2.42	0.73	3.15
Galium concinnum	3.07	2.55	5.63	8.51	2.70	11.2	5.66	1.40	7.06	5.45	1.29	6.75
Geranium maculatum	4.61	2.84	7.45	2.12	4.81	6.94	5.66	3.51	9.17	4.24	1.98	6.22
Geum sp.							5.66	1.40	7.06	1.81	0.97	2.79
Glechoma hederaceae				2.12	12.0	14.1				0.60	7.30	7.91
Hydrophyllum virginiana							1.88	1.05	2.94	0.60	0.73	1.33
Hystrix patula	4.61	1.70	6.31				1.88	1.05	2.94	2.42	0.73	3.15
Impatiens capensis	1.53	3.40	4.94				3.77	4.21	7.99	1.81	2.43	4.25
Lonicera prolifera	1.53	1.70	3.24							0.60	0.73	1.33
Panicum latifolium	4.61	1.70	6.31							1.81	0.73	2.54
Parthenocissus inserta	1.53	1.70	3.24	4.25	8.42	12.6				1.81	3.65	5.47
Poa pratensis	1.53	1.70	3.24							0.60	0.73	1.33
Podophyllym peltatum	1.53	3.40	4.94							0.60	1.46	2.06
Polygonum cilinode	1.53	1.70	3.24							0.60	0.73	1.33
Potentilla simplex							1.88	2.10	3.99	0.60	1.46	2.06
Prunus serotina	1.53	1.70	3.24				3.77	4.21	7.99	1.81	2.19	4.01
Prunus virginiana	1.53	1.70	3.24							0.60	0.73	1.33
Ranunculus sp.				2.12	1.20	3.33	1.88	2.10	3.99	1.21	1.09	2.30
Rhus radicans				2.12	2.40	4.53	3.77	4.74	8.51	1.81	2.68	4.49
Rosa carolina	1.53	1.70	3.24	2.12	2.40	4.53				1.21	1.09	2.30
Rubus occidentalis							3.77	6.32	10.1	1.21	4.38	5.59
Rubus strigosus							1.88	8.43	10.3	0.60	5.84	6.45
Smilacina racemosa	4.61	1.70	6.31	4.25	1.20	5.45	3.77	3.69	7.46	4.24	2.19	6.43
Smilacina stellata	1.53	1.70	3.24	2.12	2.40	4.53				1.21	1.09	2.30
Smilax ecirrhata	1.53	1.70	3.24							0.60	0.73	1.33
Smilax herbacea	1.53	1.70	3.24							0.60	0.73	1.33

Table 5. (Cont'd)

Taraxacum officinale	1.53	1.70	3.24						0.60	0.73	1.33
Trillium recurvatum	1.53	1.70	3.24				1.88	2.10	3.99	1.21	1.09	2.30
Triosteum perfoliatum	1.53	1.70	3.24							0.60	0.73	1.33
Veronicastrum virginicum				2.12	1.20	3.33				0.60	0.73	1.33
Viburnum acerifolium	1.53	1.70	3.24							0.60	0.73	1.33
Vitis riparia	1.53	3.40	4.94	4.25	9.02	13.2	3.77	8.43	12.2	3.03	4.82	7.85
Vuburnum dentatum	1.53	1.70	3.24							0.60	0.73	1.33
Litter	9.23	16.1	25.4	12.7	12.0	24.8	11.3	10.5	21.8	10.9	7.18	18.0
	100	100	200	100	100	200	100	100	200	100	100	200

Edgebrook Flatwoods Savanna

Woody Vegetation

Intercept values for trees revealed red, white and bur oak to be dominant (Table 1). Red elm (Ulmus rubra) also had a relatively higher intercept. Dominant shrubs along the transects, based on intercept, included red elm, basswood, white ash, and hawthorns (Crataegus spp.) (Table 2). Over twenty species of trees and shrubs were sampled along the study transects (Tables 1 - 4).

Some of the dominant trees, white ash, basswood, and red oak were represented equally through all stem size classes from the 2 to 22-24 inch diameter (Table 3). Other species such as white and bur oak were represented primarily in the larger size classes.

Ground cover vegetation

The most important ground cover plant species based on importance value were poison ivy, virginia creeper, and woodland geranium (Table 5). The study area was diverse with over 60 species encountered in the sample quadrats. The study transects closely shared dominant ground cover plants and had similar richness.

Table 1. Intercept of trees (> 2" DBH) at Edgebrook Flatwoods along transects 1 and 2 sampled on 8 June 1987.

TRANSECT 1

	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	AVG	STD
Acer saccharum		13				5.3			9.2	3.8
Carpinus caroliniana								3.5	3.5	0.0
Carya ovata				6.7	1.6				4.2	2.5
Cornus oblique					3.7				3.7	0.0
Cornus racemosa					5.6				5.6	0.0
Crataegus sp.		3.7			2.9	2.3			3.0	0.5
Fraxinus americana			4.5	5.6	3.3				4.5	0.9
Fraxinus pennsylvanica					9.6	4.5			7.1	2.6
Fraxinus quadrangulata				2.7					2.7	0.0
Ostrya virginiana					0.7			5.6	3.2	2.4
Prunus serotina					2.7			3.5	3.1	0.4
Quercus alba	26.7	3.5	20.8			1.3	14.1		13.3	9.8
Quercus bicolor		3.6							3.6	0.0
Quercus ellipsoidalis	5.1								5.1	0.0
Quercus macrocarpa				18.5				36.6	27.6	9.1
Quercus rubra	26.2	25.1	48.1			37	47.3	16.1	33.3	11.8
Rhamnus frangula					3.1				3.1	0.0
Tilia americana		8.1		12.1	11.1	17.5	14.5	10.3	12.3	3.0
Ulmus americana				16.1				6.2	11.2	5.0
Ulmus rubra		5.9	2.2	14.2		14.3	24.7	12.8	12.4	7.1
Viburnum prunifolium					6.2				6.2	0.0
Vitis riparia					0.2				0.2	0.0
	58	62.9	75.6	75.9	50.7	82.2	100.6	94.6	75.1	16.3

TRANSECT 2

	2-1	2-2	2-3	AVG	STD
Acer saccharum		8.7		8.7	0.0
Crataegus sp.	8.1	2.1	4.8	5.0	2.5
Fraxinus americana	5.1	2.7		3.9	1.2
Fraxinus quadrangulata		7.6	9.3	8.5	0.8
Populus deltoides	13.7			13.7	0.0
Prunus serotina		1.3		1.3	0.0
Quercus alba	18.4	10.3	2.7	10.5	6.4
Quercus rubra	8.1	2.6	9	6.6	2.8
Tilia americana	8.7	14.1	2.9	8.6	4.6
Ulmus rubra	13.2	5.2	2.5	7.0	4.5
	75.3	54.6	31.2	53.7	18.0

Table 2. Intercept of shrubs (<2"DBH) at Edgebrook Flatwoods along transect 1 and transect 2 sampled on 8 June 1987.

TRANSECT 1

	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	AVG	STD
Acer rubrum	1.6								1.6	0.0
Acer saccharum		16.4	9.1			5.7	8.1	2.4	8.3	4.2
Carpinus caroliniana								3.7	3.7	0.0
Carya ovata				1.2					1.2	0.0
Cornus racemosa				2.1		0.7			1.4	0.6
Cornus unk.			0.6	0.8					0.7	0.1
Crataegus sp.	3.1		0.9	0.8		4.1	0.6		1.9	1.3
Fraxinus americana	15.2	29	13.7			4.3	1.6		12.8	8.8
Fraxinus pennsylvanica				12					12.0	0.0
Lonicera sp.						0.9			0.9	0.0
Ostrya virginiana						0.7		10.3	5.5	3.9
Prunus serotina		2.4				6.2		1.2	3.3	1.8
Prunus virginiana						0.4	3.3	2.5	2.1	1.1
Quercus alba					18.6				18.6	0.0
Quercus borealis			1.7						1.7	0.0
Quercus rubra					16.5	5.9		6.3	9.6	4.2
Rhamnus cathartica	7.1	1.1							4.1	2.4
Rhus radicans	0.6			1.6					1.1	0.4
Tilia americana	0.8	5.6	6.2		15.1	3.8	5.7	5.1	6.0	3.8
Ulmus americana			0.6	3.3	4	2.6	2.6		2.6	1.0
Ulmus rubra	10.7	0.4	3.6	1.5	21.4	1.2	1.7		5.8	6.7
Viburnum acerifolium				1.1					1.1	0.0
Viburnum dentatum			1.1				0.1	2	1.1	0.7
Viburnum prunifolium		0.8		2.7					1.8	0.8
Vitis riparia				0.6			5.3	0.4	2.1	2.0
Zanthoxylum americana								5.9	5.9	0.0
	39.1	55.7	37.5	27.7	75.6	36.5	29	39.8	42.6	13.9

TRANSECT 2

	2-1	2-2	2-3	AVG	STD
Acer saccharum		5.2	2.8	4.0	1.2
Cornus racemosa		1.5		1.5	0.0
Crataegus sp.	9	7.9	6.5	7.8	1.0
Fraxinus americana	0.6	4.6		2.6	2.0
Fraxinus quadrangulata		8.2	0.7	4.5	3.8
Ostrya virginiana			1.1	1.1	0.0
Prunus serotina			4.6	4.6	0.0
Prunus virginiana			1.7	1.7	0.0
Rhamnus cathartica	0.1	0.4		0.3	0.2
Tilia americana	2.3	6.2	5.6	4.7	1.7
Ulmus rubra	12.2	5.7	15.1	11.0	3.9
Viburnum prunifolium		0.8		0.8	0.0
Vitis riparia	1.1			1.1	0.0
	25.3	40.5	38.1	34.6	6.7

Table 3. Size class frequency distribution for species in each transect at Edgebrook Flatwoods in June 1987.

edgebrook tree diameters

SPECIES	trans	2-4	4-6	6-8	8-1	10-	12-	14-	16-	18-	20-	22-24	
transect 1													
Carpinus caroliniana		1	0	0	0	0	0	0	0	0	0	0	
Crataegus spp.		3	1	0	1	0	0	0	0	0	0	0	
Fraxinus americana		1	2	1	2	2	1	2	2	2	2	2	
Fraxinus quadrangulata		1	0	0	0	0	0	0	0	0	0	0	
Prunus serotina		0	1	0	0	0	0	0	0	0	0	0	0
Quercus alba		0	0	0	0	0	0	0	0	0	0	0	
Quercus bicolor		0	0	0	0	0	0	0	0	0	1	0	
Quercus macrocarpa		0	0	0	0	0	0	0	0	0	0	0	1
Quercus rubra		2	1	0	1	0	0	1	1	0	0	2	1
Rhamnus cathartica		0	0	0	0	0	0	0	0	0	0	0	0
Tilia americana		8	2	3	3	3	3	3	3	3	3	3	
Ulmus rubra		5	1	1	0	0	0	0	0	0	0	0	
transect 2													
Carpinus caroliniana		0	0	0	0	0	0	0	0	0	0	0	
Crataegus spp.		6	0	0	0	0	0	0	0	0	0	0	
Fraxinus americana		0	1	0	0	0	0	0	0	0	0	0	
Fraxinus quadrangulata		1	1	0	0	0	0	0	0	0	0	0	
Prunus serotina		0	0	0	0	0	0	0	0	0	0	0	0
Quercus alba		0	1	0	0	0	0	0	0	0	0	1	
Quercus bicolor		0	0	0	0	0	0	0	0	0	0	0	
Quercus macrocarpa		0	0	0	0	0	0	0	0	0	0	0	0
Quercus rubra		1	0	0	0	0	0	0	1	0	0	0	0
Rhamnus cathartica		0	0	0	0	0	0	0	0	0	0	0	0
Tilia americana		1	2	2	0	0	0	0	0	0	0	0	
Ulmus rubra		3	3	0	0	0	0	0	0	0	0	0	

Table 4. Average shrub stem density at Edgebrook Flatwoods for transects 1 and 2. Based on measurements of 8 June 1987. A = Alive D = Dead

	T1				T2			
	A		D		A		D	
SPECIES	AVG	STD	AVG	STD	AVG	STD	AVG	STD
Acer rubrum	0.1	0.3	0	0	0.3	0.5	0	0
Acer saccharum	6.6	7.2	0.3	0.4	1.3	1.2	0	0
Carpinus caroliniana	0.5	1.3	0.1	0.3	0	0	0	0
Carya ovata	0.1	0.3	0	0	0	0	0	0
Cornus obliqua	1.1	3.0	0	0	0	0	0	0
Cornus racemosa	3.4	4.4	2.3	4.0	1.7	2.4	0	0
Crataegus spp.	2.8	3.0	1.8	3.4	1.3	1.2	5	4.5
Fraxinus americana	4.6	3.6	2.5	4.4	3	1.6	6.3	4.6
Fraxinus pennsylvanica	1.8	3.2	0.1	0.3	0	0	0	0
Fraxinus quadrangulata	0.4	1.0	0	0	2.3	1.2	0.7	0.5
Lonicera tatarica	0	0	0	0	0	0	0	0
Ostrya virginiana	0.4	0.5	0	0	0.3	0.5	0	0
Prunus serotina	1.4	1.7	0.6	1.0	0.7	0.5	0.3	0.5
Prunus virginiana	3.8	7.7	0.1	0.3	1.3	1.9	0.3	0.5
Quercus rubra	0.6	1.3	0	0	0	0	0.3	0.5
Rhamnus cathartica	0.5	1.3	1.4	3.6	0.3	0.5	0	0
Rhamnus frangula	0.1	0.3	0	0	0	0	0	0
Rosacea spp.	0	0	0	0	0.7	0.5	0	0
Tilia americana	1.9	1.5	1	1.1	0.7	0.5	0	0
Ulmus americana	0.1	0.3	0	0	0	0	0	0
Ulmus rubra	2.3	1.6	0.9	1.4	4.3	1.7	0.7	1.0
Viburnum acerifolium	0	0	0	0	1	1.4	2.7	3.8
Viburnum dentata	1	1.8	0	0	0	0	0	0
Viburnum prunifolium	2.6	2.1	0	0	1	0.8	2.3	1.7
Zanthoxylum americanum	0.6	1.7	0.1	0.3	0	0	0	0
TOTAL	36.6	9.7	11.1	15.8	20.3	0.5	18.6	13.0

Table 5. Summary of absolute (A) and relative (R) frequency (F) and cover (C) values and importances values (IV) from Edgebrook Flatwoods. Study transect 1 was 350 meters and transect 2 was 150 meters long; both were established 8 June 1987.

	trans 1					trans 2					total				
	AF	RF	AC	RC	IV	AF	RF	AC	RC	IV	AF	RF	AC	RC	IV
Acer rubrum	4	2.1	3.8	3.9	6.0						4	1.3	3.8	2.8	4.2
Acer saccharum	1	0.5	4	4.1	4.7	2	1.8	1	1.4	3.2	3	1.0	2	1.5	2.5
Agrimonia gryposepala	6	3.1	1	1.0	4.2	3	2.7	1	1.4	4.1	9	3.0	1	0.8	3.7
Allium canadense	6	3.1	1.2	1.2	4.4	1	0.9	1	1.4	2.3	7	2.3	1.1	0.9	3.2
Allium tricoccum	1	0.5	5	5.2	5.7	1	0.9	1	1.4	2.3	2	0.7	3	2.3	2.9
Arisaema dracontium	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Commelina communis						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Carex davisii						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Carex hirtella	2	1.0	1	1.0	2.1						2	0.7	1	0.8	1.4
Carex laxiflora	2	1.0	1	1.0	2.1						2	0.7	1	0.8	1.4
Carex pennsylvanica	1	0.5	3	3.1	3.6	3	2.7	1.7	2.3	5.0	4	1.3	2	1.5	2.8
Carex rosea	3	1.6	1.3	1.4	3.0	1	0.9	2	2.8	3.7	4	1.3	1.5	1.1	2.5
Carex sp.						2	1.8	1	1.4	3.2	2	0.7	1	0.8	1.4
Cicuta maculata						1	0.9	4	5.6	6.5	1	0.3	4	3.0	3.3
Circaea quadrisulcata						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Cornus obliqua	3	1.6	2.7	2.8	4.3						3	1.0	2.7	2.0	3.0
Cornus racemosa	5	2.6	2	2.1	4.7						5	1.7	2	1.5	3.2
Crataegus sp.	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Unk dicot						2	1.8	1	1.4	3.2	2	0.7	1	0.8	1.4
Euonymus obovatus	7	3.7	1.3	1.3	5.0	4	3.6	1.3	1.8	5.4	11	3.6	1.3	1.0	4.6
Epilobium sp.	1	0.5	2	2.1	2.6						1	0.3	2	1.5	1.8
Fragaria virginiana	3	1.6	1	1.0	2.6						3	1.0	1	0.8	1.7
Fraxinus sp.	8	4.2	2.1	2.2	6.4	5	4.5	1	1.4	5.9	13	4.3	1.7	1.3	5.6
Geranium maculatum	11	5.8	2.9	3.0	8.8	4	3.6	2.3	3.2	6.8	15	5.0	2.7	2.1	7.0
Geum canadense	8	4.2	1	1.0	5.2	2	1.8	1	1.4	3.2	10	3.3	1	0.8	4.1
Glyceria striata	4	2.1	1.3	1.3	3.4	2	1.8	1	1.4	3.2	6	2.0	1.2	0.9	2.9
grass	4	2.1	3.5	3.6	5.7						4	1.3	3.5	2.6	4.0
Hepatica acutiloba	1	0.5	1	1.0	1.6	1	0.9	1	1.4	2.3	2	0.7	1	0.8	1.4
Hydrophyllum virginiana						2	1.8	1.5	2.1	3.9	2	0.7	1.5	1.1	1.8
Impatiens capensis	7	3.7	3.1	3.3	6.9						7	2.3	3.1	2.4	4.7
Impatiens capensis						5	4.5	2.4	3.4	7.9	5	1.7	2.4	1.8	3.5
Juncus tenuis	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Leersia virginica						1	0.9	2	2.8	3.7	1	0.3	2	1.5	1.8
Litter						16	14.4	6.3	8.8	23.1	16	5.3	6.3	4.7	10.0
Lonicera prolifera	1	0.5	2	2.1	2.6	1	0.9	1	1.4	2.3	2	0.7	1.5	1.1	1.8
Osmorhiza claytoni						1	0.9	2	2.8	3.7	1	0.3	2	1.5	1.8
Oxalis stricta	5	2.6	1	1.0	3.7	4	3.6	1	1.4	5.0	9	3.0	1	0.8	3.7
Parthenocissus inserta	12	6.3	2.5	2.6	8.9	1	0.9	1	1.4	2.3	13	4.3	2.4	1.8	6.1
Phlox divaricata						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Phryma leptostachya						3	2.7	1	1.4	4.1	3	1.0	1	0.8	1.7
Plantago major						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Podophyllum peltatum	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Polygonum sp.	5	2.6	1.4	1.5	4.1						5	1.7	1.4	1.1	2.7
Potentilla recta	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Potentilla simplex						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Prenanthes alba						1	0.9	3	4.2	5.1	1	0.3	3	2.3	2.6
Prunus serotina	6	3.1	3.2	3.3	6.4						6	2.0	3.2	2.4	4.4
Prunus serotina						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Prunus virginiana						3	2.7	2	2.8	5.5	3	1.0	2	1.5	2.5
Pilea pumila						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Quercus alba	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Quercus rubra	2	1.0	5	5.2	6.3						2	0.7	5	3.8	4.4

Table 5. (Cont'd)

Ranunculus septentrionalis						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Rhamnus cathartica	1	0.5	1	1.0	1.6	1	0.9	1	1.4	2.3	2	0.7	1	0.8	1.4
Rhus radicans	19	9.9	2.4	2.5	12.4	6	5.4	1.7	2.3	7.7	25	8.3	2.2	1.7	9.9
Ribes americanum	2	1.0	2	2.1	3.1						2	0.7	2	1.5	2.2
Rorippa islandica	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
Rosa setigera						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Rubus sp.	4	2.1	1.5	1.6	3.7						4	1.3	1.5	1.1	2.5
Smilacina racemosa	9	4.7	1.8	1.8	6.6	3	2.7	2	2.8	5.5	12	4.0	1.8	1.4	5.4
Smilacina stellata	7	3.7	1.6	1.6	5.3						7	2.3	1.6	1.2	3.5
Smilax sp.	1	0.5	2	2.1	2.6						1	0.3	2	1.5	1.8
Solidago altissima	2	1.0	2.5	2.6	3.6	1	0.9	1	1.4	2.3	3	1.0	2	1.5	2.5
Solidago caesia	1	0.5	2	2.1	2.6						1	0.3	2	1.5	1.8
Solidago sp.						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Solidago ulmifolia						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Taraxacum officinale						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Tilia americana	2	1.0	2	2.1	3.1	1	0.9	1	1.4	2.3	3	1.0	1.7	1.3	2.3
Tovara virginiana						5	4.5	1.4	2.0	6.5	5	1.7	1.4	1.1	2.7
Ulmus sp.	2	1.0	1.5	1.6	2.6						2	0.7	1.5	1.1	1.8
Ulmus rubra						2	1.8	1	1.4	3.2	2	0.7	1	0.8	1.4
Viburnum opulus						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Viburnum prunifolium	1	0.5	2	2.1	2.6						1	0.3	2	1.5	1.8
Viola papilionacea	4	2.1	1	1.0	3.1	2	1.8	1	1.4	3.2	6	2.0	1	0.8	2.7
Viola pennsylvanica	1	0.5	2	2.1	2.6						1	0.3	2	1.5	1.8
Viola sororia	2	1.0	1	1.0	2.1	1	0.9	1	1.4	2.3	3	1.0	1	0.8	1.7
Vitis riparia	6	3.1	2	2.4	5.2	2	1.8	1	1.4	3.2	8	2.6	1.8	1.3	4.0
Zanthoxylum americana						1	0.9	1	1.4	2.3	1	0.3	1	0.8	1.1
Zizia aurea	1	0.5	1	1.0	1.6						1	0.3	1	0.8	1.1
	191	100	96.4	100	200	111	100	71.3	100	200	302	100	132.	100	200

Reed-Turner Woods Savanna

Reed Turner Nature Preserve was divided into study areas to reflect the variable nature of different parts of the preserve. Each area was divided into burn treatment and control (no burn) zones and studied. In this report the burn and control areas were summarized separately and are compared for herbaceous and woody vegetation before (1986) and after a first prescribed burn (Fall 1986). Resampling was conducted in Spring 1987. The burn test areas were also burned in Fall 1987; after three growing season and following repeated annual burning, Reed Turner will be resurveyed.

Woody vegetation response to 1986 fall burn

1) Small (0-2") diameter stem density increased dramatically through one growing year after initiating prescribed fire because of sprouting of many trees and shrubs (Tables 1 and 2). Exemplary sprouting in burned compared to unburned areas included black cherry which had an 80 fold increase, choke cherry (100x) and buckthorn (30X) based on average sprouts per tree stem in each 1x50 meter study quadrat.

2) Crataegus. choke cherry, and all three species of Viburnum were killed by fire, except for sprout recovery. All other species suffered some mortality, but at least some stems survived the fire.

3) Black cherry, choke cherry, gray dogwood, Rhamnus cathartica, and gooseberry were most vigorous sprouters, based on number of sprouts produced.

4) Larger stems showed little responses to fire, either in mortality or sprouting. Even two inch stems of oak were not apparently effected

where 2-6" stems of basswood, buckthorn, and cherry were largely killed, with only a few survivors.

Ground cover vegetation

In this report we only compare the study areas where prescribed burning was conducted using the 1986 preburn and 1987 post burn data.

The prescribed fire in the yard study site at Reed Turner was associated with the addition of 18 new species and absence of 14 species recorded before fire in Spring 1986 (Tables 3 - 5).

Nearly 50% of all species showed no numerical changes (less than 25% value change) in importance value from preburn 1986 to after fire in 1987. Species that had large increases in importance values (greater than 50% change) after fire included some grasses and sedges and false solomon's seal. Ground cover species with large decreases (a 25% value change or more) in importance value included Poa pratensis, dandelion, and white ash.

A net gain of five ground cover species was measured after introduction of fire.

Table 1. Density of woody vegetation at Reed Turner Preserve of the burn sites in 1987. n=9

SPECIES	0-2 s	0-2 a	0-2 d	2-6 s	2-6 a	2-6 d	6-10 s	6-10 a	6-10 d	10-14 s	10-14 a	10-14 d	14-18 s	14-18 a
Acer saccharum		0.1 ± 0.3												
Carya ovata		0.2 ± 0.4			0.3 ± 0.7	0.1 ± 0.3								
Celastrans orbiculatus	1.3 ± 4.0		0.4 ± 1.3					0.1 ± 0.3						
Cornus racemosa	13.9 ± 28.0	1.7 ± 5.0												
Crataegus p.	1.4 ± 3.4		0.4 ± 0.7											
Eugonomus sp.		0.2 ± 0.7	1.0 ± 2.3											
Fraxinus americana	2.4 ± 4.1	0.1 ± 0.3	2.0 ± 2.2	0.2 ± 0.7	0.6 ± 0.7	0.1 ± 0.3								
Lonicera tatartica	0.6 ± 1.7	0.2 ± 0.7	0.4 ± 1.3											
Prunus serotina	18.0 ± 18.2	0.7 ± 1.0	1.2 ± 1.2	7.2 ± 16.3	0.2 ± 0.4			0.4 ± 0.9			0.1 ± 0.3			
Prunus virginiana	19.0 ± 21.0		4.5 ± 5.7											
Quercus alba						0.1 ± 0.3			0.4 ± 1.0		0.2 ± 0.4	0.1 ± 0.3		0.1 ± 0
Quercus borealis		0.1 ± 0.3			0.3 ± 1.0									
Quercus ellipsoidalis			0.1 ± 0.3		0.1 ± 0.3			0.2 ± 0.4			0.1 ± 0.3	0.1 ± 0.3		
Quercus macrocarpa					0.3 ± 1.0									
Rhmanus cathartica	9.0 ± 14.7	1.3 ± 2.4	1.9 ± 3.2		0.2 ± 0.4									
Rhamnus frangula	1.6 ± 4.7	0.1 ± 0.3	0.8 ± 1.2	3.6 ± 10.7	0.1 ± 0.3									
Ribes sp.	9.0 ± 18.5	1.8 ± 5.0	0.2 ± 0.4	0.1 ± 0.3										
Ostrya virginiana	4.1 ± 12.3	0.3 ± 0.7	0.6 ± 1.7		1.0 ± 1.7		0.2 ± 0.4	0.3 ± 0.7						
Tilia americana	2.4 ± 4.6	0.3 ± 0.7	1.9 ± 3.6	0.7 ± 2.0	1.0 ± 1.7			0.3 ± 1.0						
Ulmus rubra	2.1 ± 4.8	0.6 ± 1.1	0.4 ± 0.5											
Viburnum acerifolium	6.6 ± 14.1		1.4 ± 3.0											
Viburnum dentatum	1.2 ± 3.7		0.4 ± 1.3											
Viburnum prunifolium	0.9 ± 2.0		0.2 ± 0.4											

Table 2. Density of woody vegetation at Reed Turner Preserve of the no burn sites in 1987. n=10

SPECIES	s	0-2 a	0-2 d	2-6 a	2-6 d	6-10 a	6-10 d	10-14 a	10-14 d	14-18 a	14-18 d	18-22 a	18-22 d
Acer saccharum		1.0±1.4		0.2±0.6									
Amelanchior sp.		0.4±1.0											
Carya cordiformis	0.4±1.0	0.3±0.7											
Carya ovata		0.9±1.3											
Cornus racemosa		4.8±11.2	0.2±0.6										
Crataegus crus-galli		0.2±0.6											
Crataegus mollis	0.6±1.9	1.0±2.2											
Crataegus speciosa		2.2±4.4	0.4±1.0	0.4±1.0									
Euonomous sp.	0.4±1.0	0.2±0.4											
Fraxinus americana		1.3±1.9	0.2±1.0										
Juglans nigra				0.1±2.3									
Lonicera tatarica		0.4±1.3											
Malus sp.		0.3±0.9		0.1±0.3									
Ostrya virginana	1.6±4.7	2.5±2.2		0.6±1.1									
Philadelphiera	0.2±0.6	1.1±2.3											
Prunus serotina	2.2±4.2	3.0±3.7	1.0±1.2										
Prunus virginiana	0.1±0.3	2.3±3.5											
Quercus alba						0.1±0.3				0.4±0.7		0.1±0.3	
Quercus borealis		0.2±0.4	0.3±0.7	1.0±1.3	0.2±0.6								
Quercus ellipsoidalis				0.2±0.4									
Quercus macrocarpa										0.1±0.3			
Quercus marilandica		0.2±0.4											
Rhamnus cathartica	0.3±0.9	1.8±2.0	0.4±2.7	0.3±0.5									
Rhamnus frangula		0.4±1.3	0.1±0.3										
Ribes sp.		0.2±0.4											
Rhus radicans		0.1±0.3											
Ulmus americana		0.3±0.9											
Ulmus rubra	0.1±0.3	2.7±3.6		0.3±0.9									
Tilia americana	0.2±0.4	2.5±2.8	0.9±1.9	2.0±2.6	0.1±0.3	0.1±0.3		0.1±0.3					
Viburnum acerifolium		1.6±3.2											
Viburnum dentatum		0.2±0.4											
Viburnum prunifolium	0.2±0.4	0.3±0.7											

Table 3. Comparison of richness statistics for the yard study area at Reed Turner Nature Preserve using pre-burn data and post-burn data from the yard study site to be burned.

	Yard Study Area	
	Pre-burn (Spring 1986)	Post-burn (Spring 1987)
Total # plant species	43	48
Total # of new species	0	18
Total # of absent species	14	0
Species present before and after with stable values	-	20
# of species with increased IV	-	5
# of species with decreased IV	-	3

Table 4. Post-burn ground cover and plant absolute and frequency and relative cover and frequency and summation, and importance value from study transects in the yard burn study site at Reed Turner Nature Preserve. Based on analysis in 1987. (I = increase after fire; D = decrease after fire; N = new species appeared after fire; A = disappeared after fire; S = stable before and after fire)

RESPONSES	SPECIES	AF	AC	RF	RC	IV
N	Anemone virginicum	3	2.70	1	1.56	4.27
N	Anemonella thalictroides	1	0.90	1	1.56	2.46
S	Antennaria plantaginifolius	1	0.90	1	1.56	2.46
S	Aster sagittifolius	5	4.50	1.6	2.50	7.01
N	Aster laetiflorus	3	2.70	1.33	2.08	4.79
N	Carex laxiflora	1	0.90	1	1.56	2.46
S	Carex cephalophora	3	2.70	1	1.56	4.27
I	Carex pensylvanica	5	4.50	4.2	6.58	11.0
N	Carya ovata	1	0.90	1	1.56	2.46
N	Cerastium vulgatum	2	1.80	1	1.56	3.36
S	Cornus racemosa	1	0.90	1	1.56	2.46
N	Daucus carota	3	2.70	1	1.56	4.27
S	Dianthus armeria	1	0.90	1	1.56	2.46
S	Erigeron philadelphicus	1	0.90	1	1.56	2.46
S	Eupatorium purpureum	1	0.90	1	1.56	2.46
I	Festuca rubra	3	2.70	2.66	4.17	6.88
S	Fragaria virginiana	2	1.80	1	1.56	3.36
D	Fraxinus americana	3	2.70	1.66	2.61	5.31
N	Geranium maculatum	1	0.90	1	1.56	2.46
S	Glechoma hederacea	1	0.90	1	1.56	2.46
S	Hieracium pratense	5	4.50	1.8	2.82	7.32
N	Hydrophyllum virginianum	1	0.90	1	1.56	2.46
N	Juncus tenuis	1	0.90	2	3.13	4.03
N	Lespedeza violacea	1	0.90	3	4.70	5.60
	Moss	1	0.90	2	3.13	4.03
S	Oxalis stricta	3	2.70	1	1.56	4.27
N	Oxalis europaea	2	1.80	1	1.56	3.36
N	Panicum implicatum	1	0.90	1	1.56	2.46
I	Poa compressa	1	0.90	2	3.13	4.03
D	Poa pratensis	5	4.50	1	1.56	6.07
S	Potentilla simplex	6	5.40	2	3.13	8.54
	Prunella vulgaris	1	0.90	1	1.56	2.46
S	Prunus serotina	2	1.80	1.5	2.35	4.15
S	Quercus alba	2	1.80	1	1.56	3.36
I	Ranunculus abortivus	4	3.60	1	1.56	5.17
S	Rhamnus cathartica	2	1.80	1	1.56	3.36
N	Rhus radicans	1	0.90	1	1.56	2.46
S	Rubus occidentalis	1	0.90	1	1.56	2.46
N	Sanicula gregaria	2	1.80	1	1.56	3.36
I	Smilacina racemosa	6	5.40	1.5	2.35	7.75
S	Smilax ecirrhata	1	0.90	1	1.56	2.46
S	Solidago ulmifolia	4	3.60	1.25	1.95	5.56
D	Taraxacum officinale	6	5.40	1	1.56	6.97
	Trillium recurvatum	1	0.90	1	1.56	2.46
S	Viburnum acerifolium	1	0.90	1	1.56	2.46
S	Viola sororia	7	6.30	2.28	3.58	9.88
N	Vitis riparia	1	0.90	2	3.13	4.03
		111	100	63.8	100	200

Table 5: Ground Cover and Plant Absolute Cover (COV) and Frequency (FRE) and Relative Cover (%C) and Frequency (%F) and summation, an Important Value (IV), from Study Transects in the YARD BURN STUDY SITE Reed-Turner Nature Preserve. Based on Analysis 20 May 1986 using 1m2 quadrats before prescribed burning.

NAME	A	A	A	A	B	B	B	B	COV	FRE	%C	%F	IV
ACER NEGUNDO						1			0.13	1	1	1	2
ACHILLEA MILLEFOLIUM		2	1						0.38	2	2	2	4
ANEMONE QUINQUEFOLIA	1								0.13	1	1	1	2
ANTENNARIA NEGLECTA		1							0.13	1	1	1	2
ANTENNARIA PLANTAGINIFOLIA					1				0.13	1	1	1	2
ASTER SAGITTIFOLIUS	1	1		2	1				0.63	4	3	4	7
CAREX CEPHALOPHORA		4	2						0.75	2	4	2	6
CAREX PENSYLVANICA				1	1	4			0.75	3	4	3	7
CORNUS RACEMOSA	1	1							0.25	2	1	2	3
DANTHONIA SPICATA	1				4				0.63	2	3	2	5
DENTARIA LACINIATA						1			0.13	1	1	1	2
DIANTHUS ARMERIA					1				0.13	1	1	1	2
ERIGERON STRIGOSUS					1				0.13	1	1	1	2
ERYTHRONIUM ALBIDUM	1		1	4	1	2	2		1.38	6	6	6	13
EUPATORIUM SP.	1								0.13	1	1	1	2
FESTUCA RUBRA					1				0.13	1	1	1	2
FRAGARIA VIRGINIANA							1	2	0.38	2	2	2	4
FRAXINUS AMERICANA		1	4	2		4			1.38	4	6	4	11
GLECOMA HEDERACEAE								2	0.25	1	1	1	2
HIERACIUM SP.	1		1		1		1		0.50	4	2	4	7
JUGLANS NIGRA		1							0.13	1	1	1	2
LITTER, LEAF	4	8	10	10	4	4			5.00	6	24	6	30
LITTER, WOODY		1							0.13	1	1	1	2
LONICERA TATARICA			1						0.13	1	1	1	2
ORNITHOGALUM UMBELLATUM	1								0.13	1	1	1	2
OSTRYA VIRGINIANA					1				0.13	1	1	1	2
OXALIS STRICTA			1		1				0.25	2	1	2	3
POA COMPRESSA		1							0.13	1	1	1	2
POA PORTENSIS			4	2	1	1	4		1.50	5	7	5	12
POTENTILLA SIMPLEX		2	1	1	1		2		0.88	5	4	5	9
PRUNUS SEROTINA			2						0.25	1	1	1	2
PRUNUS VIRGINIANA				2					0.25	1	1	1	2
QUERCUS ALBA		1					2		0.38	2	2	2	4
RANUNCULUS ARBORTIVUS	1				1				0.25	2	1	2	3
RHAMNUS CATHARTICA			1	1					0.25	2	1	2	3
ROSA MULTIFLORA						1			0.13	1	1	1	2
RUBUS OCCIDENTALIS						1			0.13	1	1	1	2
SMILACINA RACEMOSA		1							0.13	1	1	1	2
SMILAX ECHINATA					1				0.13	1	1	1	2
SOLIDAGO ULMIFOLIUM						2	1		0.38	2	2	2	4
TARAXACUM OFFICINALE	1	1	1	1	1		1		0.75	6	4	6	10
UNK, GRAMIN	2	1							0.38	2	2	2	4
VIBURNUM DENTATUM		1							0.13	1	1	1	2
VIBURNUM OPULUS	1								0.13	1	1	1	2
VIOLA SORORIA	4				1	1	1		0.88	4	4	4	8
TOTAL	45	21	28	30	26	24	22	15	4 21.25	93	100	100	200

QUADRATS = 8

The overall response of woodlands at Reed Turner to Fall 1986 burning involved a 10% increase in richness and the addition of sixteen species compared to the preburn data (Tables 6-8). Slightly more than 40% of the species remained stable with no change (no greater than 25%) before and after burning. Six species decreased substantially (>50%) in importance value and twelve were completely absent after fire. For the most part, increasers were species generally associated with more open conditions. Woody ground cover species showed a variable response to the first burn at Reed-Turner Preserve.

Table 6. Summary of ground cover trends after prescribed burning in the East, West, and Center Woods study transects (data combined as averages) at Reed Turner Nature Preserve, Long Grove, IL.

	Pre-burn (Spring 1986)	Post-burn (Spring 1987)
Total # plant species	53	59
Total # of new species		16
Total # of absent species		12
Species present before and after with stable importance values	-	24
# of species with increased IV	-	10
# of species with decreased IV	-	6

Table 7. Post-burn ground cover (1987) combined from East, West, and Center Woods study transects at Reed Turner Nature Preserve, Long Grove, IL. (I = increase after fire; D = decrease after fire; N = new species appeared after fire; A = disappeared after fire; S = stable before and after fire)

RESPONSE	SPECIES	AF	AC	RF	RC	IV
N	Acer negundo	1	0.4	1.0	1.1	1.5
S	Acer saccharum	1	0.4	1.0	1.1	1.5
S	Agrimonia gryposepala	1	0.4	1.0	1.1	1.5
I	Allium canadensis	3	1.2	3.7	4.1	5.3
S	Allium tricoccum	1	0.4	1.0	1.1	1.5
I	Anemonella thalictroides	6	2.3	1.7	1.9	4.2
I	Arisaema triphylla	16	6.3	1.4	1.6	7.8
I	Camassia scilloides	1	0.4	3.0	3.4	3.8
I	Carex pensylvanica	3	1.2	1.0	1.1	2.3
S	Carex sp.	2	0.8	1.0	1.1	1.9
S	Carya ovata	1	0.4	1.0	1.1	1.5
S	Celastrus orbiculatus	2	0.8	1.5	1.7	2.5
N	Chenopodium	1	0.4	1.0	1.1	1.5
S	Circaea quadrisulcata	23	9.0	1.8	2.0	11.0
N	Cirsium arvense	9	3.5	1.1	1.3	4.8
S	Cornus racemosa	8	3.1	1.3	1.4	4.5
S	Crataegus crusgalli	2	0.8	2.0	2.3	3.0
S	Crataegus mollis	1	0.4	1.0	1.1	1.5
S	Dentaria laciniata	3	1.2	1.3	1.5	2.7
N	Erigeron strigosus	1	0.4	1.0	1.1	1.5
S	Fragaria virginiana	1	0.4	1.0	1.1	1.5
D	Fraxinus americana	5	2.0	1.0	1.1	3.1
I	Geranium maculatum	3	1.2	1.7	1.9	3.1
N	Geum canadensis	2	0.8	1.0	1.1	1.9
	Geum sp.	3	1.2	1.0	1.1	2.3
N	Hackelia	1	0.4	1.0	1.1	1.5
N	Helianthus divaricatus	1	0.4	1.0	1.1	1.5
N	Lonicera prolifera	1	0.4	1.0	1.1	1.5
N	Lonicera tatarica	1	0.4	1.0	1.1	1.5
S	Ostrya virginiana	14	5.5	1.0	1.1	6.6
N	Oxalis sp.	5	2.0	1.0	1.1	3.1
N	Oxalis stricta	14	5.5	1.1	1.2	6.7
S	Parthenocissus inserta	4	1.6	1.0	1.1	2.7
S	Parthenocissus quinquefolia	1	0.4	1.0	1.1	1.5
N	Polygonum	1	0.4	1.0	1.1	1.5
S	Potentilla simplex	1	0.4	1.0	1.1	1.5
S	Prunus serotina	5	2.0	2.0	2.3	4.2
D	Prunus virginiana	3	1.2	4.0	4.5	5.7
D	Quercus borealis	3	1.2	3.0	3.3	4.5
S	Rhamnus frangula	2	0.8	2.0	2.3	3.0
D	Rhamnus cathartica	14	5.5	1.3	1.5	6.9
I	Rhus radicans	8	3.1	1.3	1.4	4.5
D	Ribes americana	1	0.4	1.0	1.1	1.5
S	Ribes missouriense	9	3.5	2.4	2.8	6.3
S	Rosa multiflora	2	0.8	1.0	1.1	1.9
D	Rubus occidentalis	1	0.4	2.0	2.3	2.6
S	Smilacina racemosa	21	8.2	2.2	2.5	10.7
I	Taraxacum officinale	8	3.1	1.0	1.1	4.3
S	Tilia americana	2	0.8	1.5	1.7	2.5
N	Trifolium repens	1	0.4	1.0	1.1	1.5
I	Trillium recurvatum	1	0.4	2.0	2.3	2.6
S	Ulmus americana	2	0.8	1.0	1.1	1.9

Table 7 (cont'd)

N	Ulmus rubra	1	0.4	1.0	1.1	1.5
N	Veronica sp.	1	0.4	1.0	1.1	1.5
N	Viburnum acerifolium	3	1.2	3.3	3.8	4.9
S	Viburnum opulus	1	0.4	2.0	2.3	2.6
I	Viola papilionacea	4	1.6	1.0	1.1	2.7
N	Viola sororia	2	0.8	1.0	1.1	1.9
I	Vitis riparia	5	2.0	1.2	1.4	3.3
		256	100	88.6	100	200

Table 8. Preburn ground cover data (1986) combined from all East, West, and Center Woods study transects at Reed Turner Nature Preserve, Long Grove, IL.

NAME	AF	AC	RF	RC	IV
ACER SACCHARUM	2	0.5	1.0	0.9	1.4
ACTAEA PACHYPODA	1	0.3	1.0	0.9	1.2
AGRIMONIA GRYPOSEPALA	1	0.3	1.0	0.9	1.2
ALLIUM CANADENSIS	2	0.5	2.5	2.2	2.8
ALLIUM TRICOCCUM	2	0.5	2.5	2.2	2.8
ANEMONELLA THALICTROIDES	5	1.4	1.6	1.4	2.8
ARISAEMA TRIPHYLLUM	14	3.8	1.1	0.9	4.7
ASTER SAGITTIFOLIUS	1	0.3	1.0	0.9	1.2
ASTER SP.	2	0.5	1.0	0.9	1.4
CAMASSIA SCILLOIDES	2	0.5	1.0	0.9	1.4
CAREX GRACILLIMA	1	0.3	1.0	0.9	1.2
CAREX PENSYLVANICA	1	0.3	1.0	0.9	1.2
CARYA OVATA	1	0.3	1.0	0.9	1.2
CELASTRUS ORBICULATUS	1	0.3	2.0	1.8	2.0
CIRCAEA QUADRISULCATA	29	7.9	2.0	1.8	9.6
CLAYTONIA VIRGINIANA	1	0.3	1.0	0.9	1.2
CORNUS RACEMOSA	11	3.0	2.5	2.2	5.2
CRATAEGUS CRUSGALLI	1	0.3	1.0	0.9	1.2
DENTARIA LACINIATA	12	3.3	1.0	0.9	4.1
ERYTHRONIUM ALBIDUM	32	8.7	2.1	1.9	10.5
FRAGARIA VIRGINIANA	1	0.3	1.0	0.9	1.2
FRAXINUS AMERICANA	28	7.6	2.4	2.1	9.7
GERANIUM MACULATUM	1	0.3	2.0	1.8	2.0
LITTER, LEAF	50	13.6	11.4	10.1	23.6
LITTER, WOODY	49	13.3	1.9	1.7	15.0
MOSS	1	0.3	8.0	7.1	7.4
OSTRYA VIRGINIANA	1	0.3	2.0	1.8	2.0
PARTHENOCISSUS INSERTA	7	1.9	1.1	1.0	2.9
POA SP.	1	0.3	1.0	0.9	1.2
POTENTILLA SIMPLEX	1	0.3	1.0	0.9	1.2
PRUNUS SEROTINA	8	2.2	2.3	2.0	4.2
PRUNUS VIRGINIANA	10	2.7	3.5	3.1	5.8
QUERCUS BOREALIS	2	0.6	3.0	2.7	3.2
RANUNCULUS ABORTIVUS	1	0.3	1.0	0.9	1.2
RHAMNUS CATHARTICA	3	0.8	2.3	2.1	2.9
RHAMNUS FRANGULA	2	0.5	2.5	2.2	2.8
RHAMNUS SP.	1	0.3	4.0	3.5	3.8
RHUS RADICANS	2	0.5	1.0	0.9	1.4
RIBES AMERICANA	1	0.3	6.0	5.3	5.6
RIBES MISSOURIENSE	12	3.3	3.5	3.1	6.4
ROSA MULTIFLORA	1	0.3	1.0	0.9	1.2
RUBUS OCCIDENTALIS	4	1.1	3.5	3.1	4.2
RUBUS SP.	1	0.3	1.0	0.9	1.2
SMILACINA RACEMOSA	35	9.5	1.6	1.4	10.9
SMILACINA STELLATA	1	0.3	1.0	0.9	1.2
SMILAX ECIRRHATA	1	0.3	1.0	0.9	1.2
SOLIDAGO CAESIA	1	0.3	2.0	1.8	2.0
TARAXACUM OFFICINALE	2	0.5	1.5	1.3	1.9
TILIA AMERICANA	6	1.6	1.2	1.0	2.7
TRAIL	1	0.3	2.0	1.8	2.0
TRILLIUM GRANDIFLORA	1	0.3	1.0	0.9	1.2
TRILLIUM RECURVATUM	1	0.3	1.0	0.9	1.2
ULMUS AMERICANA	3	0.8	1.0	0.9	1.7
VIBURNUM OPULUS	3	0.8	2.0	1.8	2.6

Table 8. (cont'd)

VIBURNUM DENTATA	1	0.3	1.0	0.9	1.2
VIOLA PAPILIONACEA	1	0.3	1.0	0.9	1.2
VITIS RIPARIA	2	0.5	1.0	0.9	1.4
	369	100	112.	100	200

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