

BFS Technical Report # 14**REPORT ON THE 3RD YEAR
OF MONITORING THE NEW YORK POWER
AUTHORITY TRANSMISSION LINE RIGHT-
OF-WAY WITHIN GREENWOODS
CONSERVANCY, OTSEGO COUNTY, NY
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Monitoring vegetative succession on established transects across the
Volney-Marcy South right of way through
Greenwoods Conservancy summer 2001

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ABSTRACT

This report is a continuation of research on two established belt transects across the Right of Way (ROW), owned and operated by the Power Authority of the State of NY (NYSPA), located in Greenwoods Conservancy, Burlington, NY. Since 1999 the Biological Field Station has monitored to document successional changes relating to ROW maintenance and habitat suitability for local fauna. Transect A, with a west facing aspect and 25% slope, was observed to have 72 species and an increased cover by woody and herbaceous species of Rosaceae, now representing 49% of the transect, and *Viburnum recognitum* (Northern Arrowwood) with 18% percent coverage. Transect B, with an east facing aspect and a 20% slope, has 80 species and is dominated by woody and herbaceous species of Rosaceae and Asteraceae, representing approximately 28% and 19%, respectively. Transect A has not been managed since the establishment of the ROW in 1988, whereas transect B was clear-cut in 1998.

INTRODUCTION

Greenwoods, located in Burlington, NY, is a 1000+-acre nature preserve that is protected by a conservation easement through the Otsego Land Trust. The Volney Marcy-south power transmission line runs through Greenwoods. The 200-mile long line provides power to lower NY on a 345-kv line ending in East Fishkill, Dutchess County. Maintaining the Right of Way (ROW) is necessary to prevent interference from tall trees and to provide a corridor for maintenance access. The ROW is maintained using Integrated Vegetation Management (IVM), which includes clear cutting and the use of herbicides. IVM reduces the potential for a ground line fault and interference that may cause transmission interruptions for the consumer (Abrahamson et al., 1998).

From a conservation perspective, the ROW has many effects. Ecotones (boundaries between the corridor and the adjacent forest) are created which increase floral and faunal biodiversity. Removal of tall trees provides an opportunity for an invasion of shade intolerant species and associated communities. Corridors also lead to habitat fragmentation and foster an island effect characterized by dispersal barriers for many species, and artificial introduction for others (Brothers, 1990).

This research has been conducted annually to determine the floral species found in the corridor and to estimate the percent cover of each. This information is useful for the NYSPA to determine the most effective way to maintain the ROW, as well as to

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evaluate successional changes and related wildlife usage. It is thought that if the ROW is maintained in an early successional stage, smaller, dense vegetation such as *Rubus allegheniensis* (black berry) and *Rumus idaeus* (red raspberry) will keep the larger "woody" seedlings from receiving light, thus minimizing the need for active IVM practices.

METHODS

Methods for this survey followed those of Austin (2000) and Fickbohm (2001). Two transects (A and B) were established in 1999 (Austin, 2000) on the Greenwoods Conservancy property located across the ROW due west of Zakow Road (Figure 1.) Both transects include 17 quadrats, approximately 3x 10m, for a total of 50m wide across the belt transect. Each transect was permanently marked with stakes during their creation in 1999 and numbered from 1 through 17 from the North to South along the transect. Transect A is located approximately 100m west of Zakow Road along the corridor and has had no impact since the construction of the ROW. This transect has a west-facing aspect with a 25% slope (Austin, 2000). Transect B is located approximately 300m west of Zakow Road along the corridor and was clear cut in 1998. This transect has a east-facing aspect and a with a 20% slope. Both transects run perpendicular across the width of the ROW.

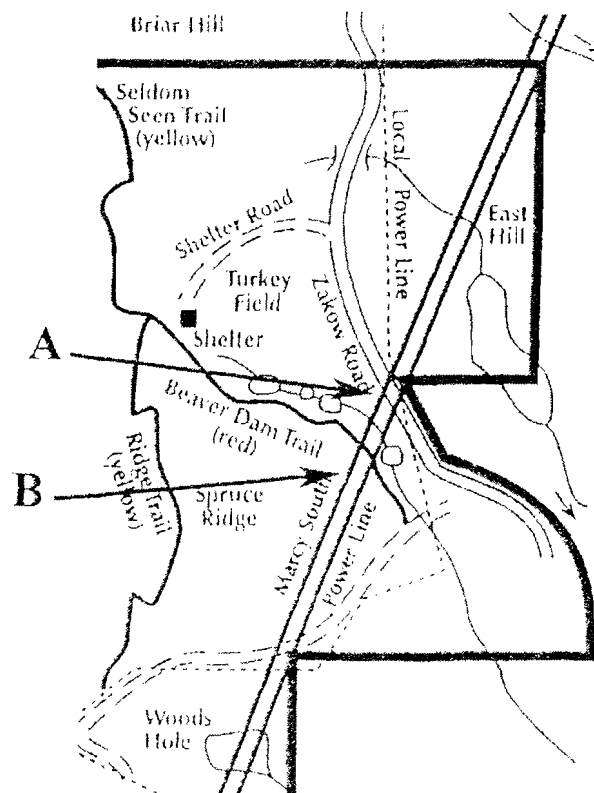


Figure 1. Location of Transects A and B, Greenwoods Conservancy, Burlington, NY.

Starting in transect A, quadrant 1, (A1), a string was left attached to each stake comprising the four corners of the quadrant (Fickbom, 2001.) This was done for each quadrant up through quadrant 17, (A17). Species within each 3x 10 m quadrant were identified. This process was repeated again for the quadrates in transect B. Any species not immediately identifiable was flagged and later revisited. A compilation of pressed specimens from prior years (Fickbohm, 2001) was extensively used as a reference.

The sites were revisited in August with the corresponding list of species observed earlier and percent cover was evaluated. Percent cover was determined by estimating the percent aerial and ground coverage from each species located within each quadrant. Two observers did this independently; if estimates differed a consensus was reached. The data were then put into a cover class and a mid-point of each class was used in accordance with methodology adapted from Mueller-Dombois et al. (1994) (Table 1).

Class	Cover Range (%)	Mid-point
1	0-5	2.5
2	5-25	15
3	25-50	37.5
4	50-75	62.5
5	75-95	85
6	95-100	97.5

Table 1. Percent cover classes, ranges, and midpoints (Mueller-Dombois, 1974).

RESULTS AND DISCUSSION

Transect A was found to have 72 species and exhibited an increased cover by woody and herbaceous species of Rosaceae, now representing 49% of the transect, and *Viburnum recognitum* (Northern Arrowwood) with 18% percent coverage. Transect B had 80 species and was dominated by woody and herbaceous species of Rosaceae and Asteraceae, representing approximately 28% and 19% respectively. Nine new species were found on transect A and 14 new species were documented on transect B.

Figure 2-5 provide transect-wide percent covers of pteridophytes (ferns), gymnosperms, dicots and monocots, respectively, for the summers of 1999-2001. The percent cover of pteridophytes increased in transect A over all three years and decreased in transect B. These results may be because the ferns that were found, including lady fern, wood fern and sensitive fern, all require a shady environment. As transect A has not been actively managed since 1988, it would be expected that the canopy is becoming thicker, allowing for the increase of shade loving species. Ferns tend to grow on any soil, as long as they can take up sufficient water and nutrients. They do thrive best on soil that is rich in humus (Anon., 2000).

Figure 3 shows that gymnosperms (conifers) are an insignificant group in both transects. Dicots continue to dominate transect A, though have declined by 20% since 1999 (Figure 4). That group has been quite variable in transect B, comprising as little as 38% of the community in 1999 and as much as 118% of the community in 2000. Monocots in both transects increased between 1999-2000, then decreased in 2001 (Figure 5), though the variability was considerably greater in transect B.

Transect A

The species diversity in transect A is a result of the consequences of the belt transect not having IVM practices applied to it since 1988. At that time, the ROW was generally cleared of all vegetation by physical means (i.e. "brush hog"), followed by a herbicide application. A trend of diversity is decreasing and forest trees and shrubs are invading ROW. The ROW now represents a successional stage characterized by shrub communities and young trees (Fickbohm, 2001).

Ten species on transect A are considered "undesirable" in terms of ROW IVM practices: Red Spruce (*Picea rubens*), White Pine (*Pinus Strobus*), Beech (*Fagus grandifolia*), Red Oak (*Quercus rubus*), Black Cherry (*Prunus serotina*), Mountain Ash (*Sorbus americana*), White Ash (*Fraxinus americana*), Red Maple (*Acer rbrum*), and Sugar Maple (*Acer saccharum*), which have all been documented to grow to heights exceeding 40feet (Petrides, 1998).

Sixty-three species were observed during the 2000 inventory of transect A (Fickbohm, 2001) and 72 species observed during this most recent survey (Table 2.) This reflects the appearance of 9 new species since last year's survey. Percent cover was estimated at approximately 36% for "woody" species (including *Spiraea latifolia*) and 84% for herbaceous species. Percent coverage was greater than 100 because estimates were made to include overlapping foliage due to varied heights of different individual plants (Fickbohm, 2001.) Within this transect, there was a increase in "woody" species by 14% from 1999 to 2000 and a decrease in woody species by approximately 1% from 2000 to 2001, totaling 13% over all increase in the last three years.

Of the woody species Northern Arrowwood (*Viburnum recognitum*) was the largest single contributor with a percent cover of 16%. The remaining majority was coming from the woody species in the Rosaceae. Blackberry (*Rubus allegheniensis*) and Red Raspberry (*Rubus idaeus*), both were the largest contributors each with approximately 24%. The remaining majority of percent cover came from the other herbaceous Rosaceae. For all three years, the Rosaceae was the single largest family represented on the transect. The distribution of this species, as well as Northern Arrowwood, was heaviest towards the center of the ROW, i.e. quadrants A4-A14.

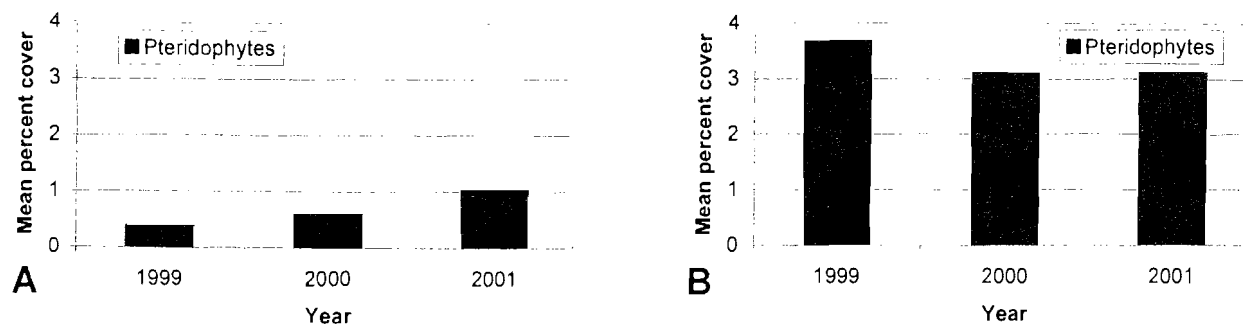


Figure 2. Mean percent cover, 1999-2001, of pteridophytes (ferns), Transects A and B.

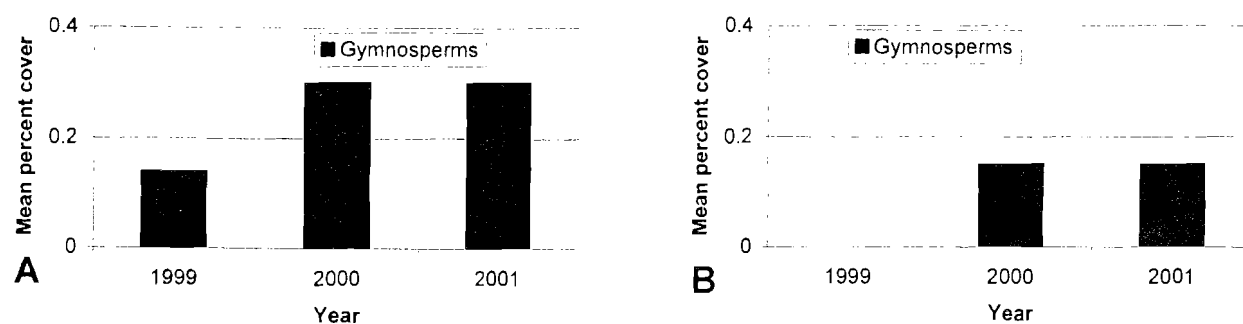


Figure 3. Mean percent cover, 1999-2001, of gymnosperms (conifers), Transects A and B.

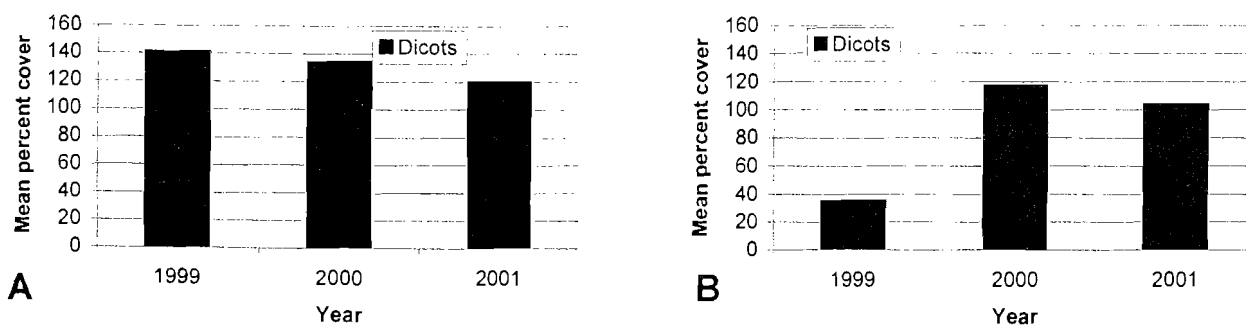


Figure 4. Mean percent cover, 1999-2001, of dicots, Transects A and B.

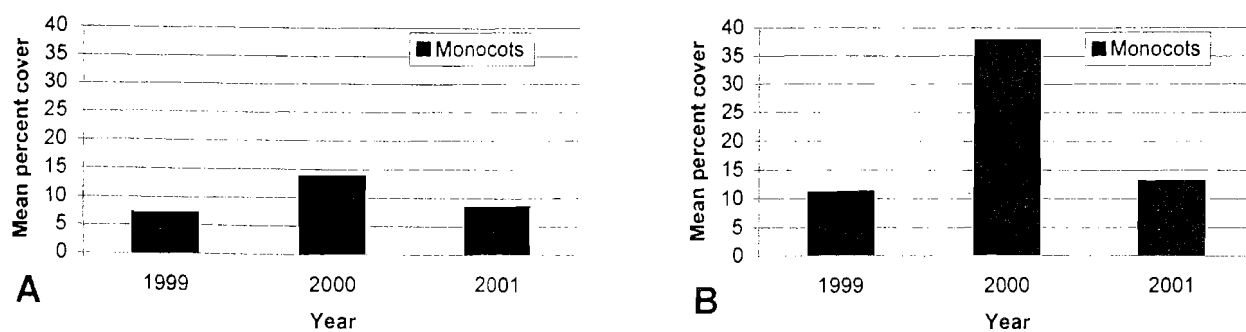


Figure 5. Mean percent cover, 1999-2001, of monocots, Transects A and B.

Plant Group	Family	Genus and Species Name	Common Name	Mean percent cover																			
				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
Pteridophytes																							
Dryopteridaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Athyrium filix-femina</i>	Lady Fern																		0.15	0	0
		<i>Dryopteris</i> sp.	Wood Fern	2.5																	0.07	0.15	0.15
		<i>Onoclea sensibilis</i>	Sensitive Fern								2.5	2.5									0.15	0.29	0.29
		<i>Dryopteris intermedia</i>	Wood Fern																		0	0.15	0
		<i>Athyrium thelypteroides</i>	Silvery spleenwort							2.5					2.5						0	0	0.29
		<i>Thelypteris noveboracensis</i>	New York Fern							2.5	2.5										0	0	0.29
Gymnosperms																							
Pinaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Picea rubens</i>	Red Spruce					2.5													0.07	0.15	0.15
		<i>Pinus strobus</i>	White Pine							2.5											0.07	0.15	0.15
Angiosperms																							
Dicots																							
Ranunculaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Ranunculus acris</i>	Tall Buttercup		2.5									2.5					2.5	2.5	0.22	0.15	0.59
Fagaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Fagus grandifolia</i>	Beech					2.5													0.07	0.29	0.15
		<i>Quercus rubra</i>	Red Oak	2.5			2.5	2.5						2.5	2.5	2.5		2.5			0.51	0.59	1.03
Betulaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Alnus incana</i>	Speckled Alder			2.5								2.5							5.15	0.29	0.29
Polygonaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Rumex acetosella</i>	Sheep Sorrel							2.5											0	0	0.15
Clusiaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Hypericum perforatum</i>	St. John's Wort		3.0		2.5						2.5								0	1.03	0.47
Salicaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Populus tremuloides</i>	Quaking Aspen	2.5	2.5	2.5	2.5														0.66	0.29	0.59
Solanaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Solanum physalifolium</i>	Enchanters Nightshade																2.5	0	0	0.15	
Ericaceae				A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
		<i>Vaccinium angustifolium</i>	Low Bush Blueberry									2.5					2.5		2.5	0	0.44	0.44	

Table 2. Summary of mid-point percent cover by quadrat (A1-A17) of species observed on transect A, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Grossulariaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Ribes glandulosum</i>	Skunk Currant																		0.15	0	0

Rosaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Crataegus sp.</i>	Hawthorn	2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5			2.5		2.5	2.5	2.5	1.54	1.76	1.76
<i>Fragaria virginiana</i>	Common Strawberry	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5	2.5	8.6	3.82	2.06
Geum sp.	Avens sp.															2.5	2.5		0	0	0.29
<i>Geum canadense</i>	White Avens	2.5	2.5															2.5	0	0.44	0.44
<i>Malus pumila</i>	Common Apple	15.0																	1.1	0.88	0.88
<i>Potentilla simplex</i>	Common Cinquefoil	15.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	0.51	3.09	3.09
<i>Potentilla canadensis</i>	Canadian Cinquefoil															2.5	2.5		0	0	0.29
<i>Prunus serotina</i>	Black Cherry	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	9.9	2.35	2.35
<i>Prunus virginiana</i>	Choke Cherry	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.13	2.35	2.35
<i>Prunus pensylvanica</i>	Fire Cherry																		4.25	32.5	0
<i>Rubus allegheniensis</i>	Blackberry	2.5	15.0	15.0	15.0	2.5	2.5	15.0	15.0	2.5		2.5	2.5	15.0	63.0	2.5	2.5	2.5	17.65	10.21	10.32
<i>Rubus idaeus</i>	Red Raspberry	38.0	15.0	2.5	15.0	15.0	15.0	15.0	15.0	2.5	15.0	2.5	15.0	37.5	15.0	38.0	63.0	38.0	9.56	12.56	21.00
<i>Spiraea latifolia</i>	Meadow Sweet	2.5	15.0	15.0	15.0	15.0	38.0	15.0	15.0	15.0		15.0	2.5	15.0	38.0	2.5	2.5	15.0	32.65	11.82	13.88
<i>Spiraea tomentosa</i>	Hardhack	2.5	2.5																0	0	0.29
<i>Rubus flagellaris</i>	Dewberry	2.5	2.5	2.5	15.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0	1.91	3.24
<i>Amerlanchier spp.</i>	Shadbush		2.5			2.5					2.5						3.0	3.0	0	0.88	0.79
<i>Sorbus americana</i>	Mountain Ash																		0	0.44	0
<i>Corunus alterniflora</i>	Dogwood				2.5	2.5						2.5							0.22	1.03	0.44

Vitaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Parthenocissus quinquefolia</i>	Virginia Creeper																		0	1.03	0

Aceraceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Acer rubrum</i>	Red Maple	2.5		3.0		15.0	15.0	2.5	2.5	2.5		2.5	2.5	2.5					4.04	2.21	2.97
<i>Acer saccharum</i>	Sugar Maple																	2.5	0.22	0.29	0.15
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit		2.5	2.5			2.5		2.5			2.5	2.5						0	0.29	0.88

Oxalidaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Oxalis stricta</i>	Yellow Wood Sorrel	2.5	2.5		2.5	3.0				2.5	2.5	2.5	2.5			2.5			0.15	1.47	1.35
<i>Impatiens capensis</i>	Jewel Weed																	2.5	0	0	0.15

Apiaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Daucus carota</i>	Queen Anne's Lace																		0.37	0	0
<i>Pastinaca sativa</i>	Wild Parsnip																		0.15	0	0

Gentianaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Gentiana clausa</i>	Closed Bottle Gentain	2.5						2.5	2.5	2.5	2.5	2.5						2.5	2.28	1.18	1.03

Table 2 (cont.). Summary of mid-point percent cover by quadrat (A1-A17) of species observed on transect A, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Lamiaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Clinopodium vulgare</i>	Wild Basil	15.0	2.5	2.5												2.5	2.5	0.22	0.74	1.47	
<i>Galeopsis tetrahil</i>	Hemp-Nettle						2.5					2.5	2.5		2.5				0.07	1.178	0.59
<i>Prunella vulgaris</i>	Heal-All																		0	0.29	0

Oleaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Fraxinus americana</i>	White Ash	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5				2.5	2.5	2.5	1.69	1.76	1.91

Scrophulariaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Veronica officinalis</i>	Common Speedwell	2.5					2.5	2.5	2.5	2.5	2.5	2.5		2.5		2.5	2.5	2.5	1.02	1.76	1.62
<i>Veronica serpyllifolia</i>	Thyme-Leaved Speedwell																		0	0.29	0

Rubiaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Galium triflorum</i>	Bedstraw																	2.5	0	0	0.15
<i>Mitchella repens</i>	Partridge-berry	2.5																	0	0	0.15

Caprifoliaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Viburnum lentago</i>	Nannyberry	2.5	2.5	15.0	2.5				2.5		2.5	2.5			2.5	2.5	2.5	2.5	3.09	2.21	2.35
<i>Viburnum recognitum</i>	Nothem Arrowwood	2.5	38.0	15.0	37.5	38.0	37.5	2.5	15.0	38.0	2.5	63.0	15.0	15.0	2.5	15.0	2.5	2.5	22.98	18.09	20.12
<i>Viburnum vinca</i>						2.5													0	0	0.15
<i>Lonicera sp.</i>	Honeysuckle																	2.5	0	0	0.15

Asteraceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Aster sp.</i>	Wood Aster sp.					2.5	2.5	2.5	2.5	2.5			2.5	2.5		2.5	2.5	2.5	0	1.32	1.47
<i>Aster prenanthoides</i>	Crooked Stem Aster	2.5	2.5	2.5														2.5	0	0	0.59
<i>Aster umbellatus</i>	Flat Topped White Aster				2.5														0	0	0.15
<i>Aster divaricatus</i>	White Wood Aster																		0.15	0	0
<i>Aster lateriflorus</i>	Calico Aster		2.5	2.5									2.5	2.5	2.5	2.5			0	0.88	0.88
<i>Cirsium discolor</i>	Field Thistle																	2.5	0	0	0.15

Asteraceae (cont.)		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Lencanthemum vulgare</i>	Ox-Eye Daisy							2.5	2.5	2.5	2.5								0.22	0.74	0.59
<i>Solidago graminifolia</i>	Lance-Leave Goldenrod	2.5	15.0	2.5	2.5	2.5	2.5	2.5	15.0	2.5	15.0	15.0	15.0			2.5	2.5	2.5	3.6	2.35	5.88
<i>Solidago rugosa</i>	Rough-Stemmed Goldenrod			2.5	2.5	2.5	2.5	2.5	15.0	2.5	2.5	2.5	15.0			2.5	2.5		5.44	3.53	3.24
<i>Solidago spp.</i>	Goldenrod		2.5	2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	0	1.91	2.06
<i>Taraxacum officinale</i>	Common Dandelion															2.5	2.5	2.5	0.07	0.29	0.44
<i>Hieracium spp.</i>	Hawkweed		2.5	2.5		2.5		2.5	2.5	2.5	2.5	2.5				2.5	2.5	2.5	0	0.88	1.62

Caryophyllaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Cerastium spp.</i>	Chickweed																		0	0.44	0

Table 2 (cont.). Summary of mid-point percent cover by quadrat (A1-A17) of species observed on transect A, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Saxifragaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Tiarella cordifolia</i>	Foam flower																2.5	2.5	0	0.15	0.29

Monacots

Juncaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Juncus tenuis</i>	Path Rush																		0	0.15	0

Cyperaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Carex</i> sp.	Sedge sp.			2.5		2.5	2.5	2.5			2.5	2.5	2.5	2.5	2.5		2.5	2.5	1.32	3.26	1.62
<i>Carex lurida</i>	Sedge sp.		2.5	2.5															1.32	0.29	0.29
<i>Carex scoparia</i>	Sedge sp.									2.5							2.5		0	2.38	0.29
<i>Carex Gracillimalon</i>	Sedge sp.			2.5													2.5	2.5	0	0.29	0.44
<i>Carex Crinada</i>	Sedge sp.																		0	0.15	0

Poaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Agrostis gigantea</i>	Red Top Grass													2.5					0	0	0.15
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	2.5	2.5	2.5			2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	1.91	2.65	2.06
<i>Dactylis glomerata</i>	Orchard Grass																		0.07	0	0
<i>Festuca heterophylla</i>	Fescue																		0	0.15	0
<i>Panicum clandestinum</i>	Deer-Tongue Grass		2.5								2.5								0	0.15	0.29
<i>Poa</i> sp.	Grass sp.	2.5						2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5		2.57	1.03	1.32

Agrostidaea		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Agrostis</i> spp.	Bentgrass																		0	3.12	0

Liliaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Maianthemum canadense</i>	Canadian May Flower					2.5										2.5	2.5		0	0	0.44

Iridaceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Sisyrinchium</i> sp.	Blue-eyed Grass		2.5	2.5						2.5		2.5	2.5			2.5	2.5	2.5	0	0.15	1.18

Araceae		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	1999	2000	2001
<i>Uvularia sessilifolia</i>	Sessile-leaf Bellwort															2.5	2.5		0	0	0.29

Table 2 (cont.). Summary of mid-point percent cover by quadrat (A1-A17) of species observed on transect A, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Plant Group Family Genus and Species Name Common Name

Pteridophytes

Mean percent cover

Dryopteridaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Athyrium filix-femina</i>	Lady Fern																		0	0.15	0
<i>Dryopteris</i> sp.	Wood Fern																		2.65	1.47	0
<i>Onoclea sensibilis</i>	Sensitive Fern							2.5	2.5		2.5				2.5	2.5			1.03	0	0.74
<i>Dryopteris intermedia</i>	Wood Fern		2.5	2.5	2.5				2.5										0	0.74	0.59
<i>Dryopteris carthusiana</i>			2.5	2.5	2.5							2.5			2.5	2.5		2.5	0	0	1.03
<i>Dryopteris cristata</i>	Crested fern							2.5											0	0	0.15
<i>Thelypteris noveboracensis</i>	New York Fern			2.5	2.5			2.5			2.5								0	0.74	0.59

Gymnosperms

Pinaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Picea rubens</i>	Red Spruce	2.5		2.5															0	0.15	0.29

Angiosperms

Dicots

Ranunculaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Ranunculus acris</i>	Tall Buttercup																	2.5	0.44	0.15	0.15

Fagaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Fagus grandifolia</i>	Beech	2.5																	0	0	0.15
<i>Quercus rubra</i>	Red Oak	2.5																	0	0.29	0.15

Betulaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Alnus incana</i>	Speckled Alder						2.5			2.5		2.5							0	0	0.44
<i>Betula lenta</i>	Black Birch																		0.15	0	0
<i>Betula lutea</i>	Yellow Birch	2.5																	0	0	0.15

Polygonaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Rumex acetosella</i>	Sheep Sorrel	2.5	2.5					2.5			2.5		2.5						0.44	0.29	0.74
<i>Polygonum sagittatum</i>	Tearthumb			2.5	2.5								2.5	2.5		2.5			0	0.15	0.74
<i>Polygonum scandens</i>	Fales buckwheat			2.5	2.5	2.5									2.5				0	0	0.59
<i>Rumex acetosa</i>	Garden Sorrel						2.5												0	0.15	0.15
<i>Rumex crispus</i>	Curled dock	2.5								2.5									0	0	0.29

Clusiaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Hypericum perforatum</i>	St. John's Wort	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5			0.74	2.9	1.76

Table 3. Summary of mid-point percent cover by quadrat (B1-B17) of species observed on transect B, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

saxifragaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Tiarella cordifolia</i>	Foam Flower				2.5		2.5												0	0	0.29
Salicaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Populus termuloides</i>	Quaking Aspen	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5								0.88	1.32	1.32
Ericaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Pyrola minor</i>	Lesser Pyrola	2.5	2.5																0.17	0	0.29
<i>Vaccinium angustifolium</i>	Low Bush Blueberry	2.5	2.5																0.95	0.29	0.29
<i>Vaccinium corymbosum</i>	High Bush BlueBerry																		0.59	0	0
Rosaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Crataegus</i> sp.	Hawthorn	2.5					2.5	2.5	2.5		2.5			2.5	2.5	2.5		2.5	0.15	1.03	1.32
<i>Fragaria virginiana</i>	Common Strawberry	2.5		2.5		2.5	2.5	2.5	2.5	15.0	2.5	15.0		15.0	2.5				2.72	8.53	3.82
<i>Geum aleppicum</i>	Yellow Avens									2.5			2.5		2.5	2.5			0.15	0	0.59
<i>Geum canadense</i>	White Avens						2.5	2.5	2.5		2.5				2.5				0.15	0.88	0.74
<i>Geum laciniatum</i>	Rough Avens																		0.29	0	0
<i>Potentilla simplex</i>	Common Cinquefoil	2.5		2.5		2.5	2.5	2.5	2.5	15.0	2.5	2.5		15.0					0.44	2.06	2.94
<i>Potentilla norvengica</i>	Rough Cinquefoil					2.5	2.5	2.5	2.5		2.5		2.5						0	0.44	0.88
<i>Prunus serotina</i>	Black Cherry	2.5	2.5	2.5	2.5				2.5			2.5						2.5	0.15	0.88	1.03
<i>Prunus virginiana</i>	Choke Cherry	2.5	2.5						2.5			2.5			2.5		2.5	2.5	1.19	0.88	1.03
<i>Prunus pensylvanica</i>	Fire Cherry																		0.29	0.15	0
<i>Rubus allegheniensis</i>	Blackberry	2.5		2.5	2.5	2.5			2.5	2.5				2.5	63.0	38.0	38.0		1.4	4.26	9.21
<i>Rubus idaeus</i>	Red Raspberry	2.5	63.0	15.0	15.0	15.0	15.0		2.5	2.5	2.5	2.5	2.5	2.5	38.0	38.0	63.0		3.38	19.79	16.44
<i>Spiraea latifolia</i>	Meadow Sweet					2.5			2.5	2.5	2.5	2.5		2.5	2.5				0.74	0.88	1.03
<i>Rubus flagellaris</i>	Dewberry	2.5	2.5	2.5			2.5	2.5	2.5	2.5	2.5			2.5	2.5	2.5			0	2.35	1.62
<i>Amerlanchier</i> sp.	Shadbush	2.5											2.5				2.5		0	0	0.44
Fabaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Mellilotus alba</i>	White Sweet Clover																		0.29	0	0
<i>Trifolium aureum</i>	Hop-clover	2.5							2.5										0	0.74	0.29
Cornaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Corunus alterniflora</i>	Dogwood	2.5	2.5				2.5											2.5	0.44	0	0.59
Vitaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Parthenocissus quinquefolia</i>	Virginia Creeper													2.5					0.15	0.29	0.15

Table 3 (cont.). Summary of mid-point percent cover by quadrat (B1-B17) of species observed on transect B, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Aceraceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Acer rubrum</i>	Red Maple		2.5		2.5						2.5					2.5		2.5	0.44	0.59	0.74
<i>Acer saccharum</i>	Sugar Maple	2.5	2.5																0.15	0.29	0.29
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit																2.5		0	0	0.15
Anacardiaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Rhus glabra</i>	Smooth Sumac														2.5	2.5			0.29	0	0.29
Oxalidaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Oxalis monata</i>	Common Wood Sorrel																		0.29	2.21	0
<i>Oxalis stricta</i>	Yellow Wood Sorrel	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5				1.4	0	2.06
Balsaminaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Impatiens capensis</i>	Jewel Weed		2.5	2.5	2.5										2.5	2.5	2.5		0.29	0	0.88
Gentianaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Gentiana clausa</i>	Closed Bottle Gentain										2.5	2.5	2.5						0	0.59	0.44
Lamiaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Clinopodium vulgare</i>	Wild Basil				2.5	2.5	2.5	2.5	2.5	2.5		2.5			2.5				0.29	0.44	1.18
<i>Galeopsis tetrahit</i>	Hemp-Nettle							2.5		2.5		2.5	2.5						0.29	0.29	0.59
<i>Prunella vulgaris</i>	Heal-All																		0	0.59	0
Oleaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Fraxinus americana</i>	White Ash	38.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	15.0	85.0	2.87	9.44	10.18
Scrophulariaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Verbascum thapsus</i>	Mullein																		0.29	1.18	0
<i>Veronica officinalis</i>	Common Speedwell	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5		2.5	1.99	9.56	2.06
<i>Veronica serpyllifolia</i>	Thyme-Leaved Speedwell																		0.74	0	0
Rubiaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Galium triflorum</i>	Bedstraw					2.5	2.5								2.5	2.5			0.15	0	0.59
Caprifoliaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Viburnum lentago</i>	Nannyberry					2.5			2.5	2.5	2.5	2.5	2.5						0.81	2.35	1.03
<i>Viburnum recognitum</i>	Nothorn Arrowwood	2.5	15.0	2.5				2.5	2.5	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	5	2.65
<i>Sambucus canadensis</i>	Elderberry					2.5					2.5								0	0.44	0.29

Table 3 (cont.). Summary of mid-point percent cover by quadrat (B1-B17) of species observed on transect B, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Asteraceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Anaphalis margaritacea</i>	Pearly Everlasting				2.5							2.5	2.5	2.5					0.15	0.44	0.59
Aster sp.	Wood Aster sp.				2.5	2.5	2.5	2.5	2.5	2.5	2.5			2.5					0.15	0.44	1.18
<i>Aster divaricatus</i>	White Wood Aster																		0	0.15	0
<i>Aster umbellatus</i>	Calico Aster	2.5												2.5					0	2.06	0.29
<i>Aster prenanthoides</i>	Crooked Stem Aster	2.5	2.5												2.5				0	0	0.4
<i>Cirsium discolor</i>	Field Thistle	2.5										2.5							1.03	1.47	0.29
<i>Lencanthemum vulgare</i>	Ox-Eye Daisy	2.5			2.5		2.5	2.5	2.5	2.5	2.5	2.5		2.5					1.03	1.62	1.32
<i>Solidago graminifolia</i>	Lance-Leave Goldenrod	2.5	2.5	2.5	2.5	2.5	15.0	15.0	38.0	15.0	38.0	63.0	38.0	38.0	2.5	2.5			0	10.59	16.32
<i>Solidago rugosa</i>	Rough-Stemmed Goldenrod					2.5	2.5	15.0	2.5	2.5		2.5	2.5		2.5				3.75	4.85	1.91
<i>Solidago</i> spp.	Goldenrod		2.5		2.5	2.5			2.5	2.5	38.0	2.5	15.0	15.0	2.5	2.5			0	7.79	5.18
<i>Taraxacum officinale</i>	Common Dandelion	2.5	2.5			2.5								2.5					0	0.44	0.59
<i>Rudbeckia hirta</i>	Black-Eyed-Susan																		0	0.15	0
<i>Heracium</i> sp.	Hawkweed		2.5																0	0	0.15

Boraginaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Myosotis</i> sp.	Forget-Me-Not																		0	1.76	0

Oragraceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Epilobium</i> sp.	Willow Herb				2.5	2.5	2.5	2.5		2.5	2.5		2.5	2.5					0	0.59	1.18

Primulaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Primula</i> sp.	Primrose																		0	0.44	0

Solanaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Solanum physalifolium</i>	Nightshade														2.5	2.5			0	0.15	0.29

Cerastium		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Cerastium fontanum</i>	Chickweed						2.5				2.5								0	0.15	0.29

Phytolaccaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Phytolacca americana</i>	Pokeberry																		0	0.15	0

Verbenaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Verbena</i> sp.	Vervain								2.5		2.5								0	0.29	0.29

Campanulaceae		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
<i>Lobelia inflata</i>	Indian Tobacco					2.5		2.5											0	1.32	0.29

Table 3 (cont.). Summary of mid-point percent cover by quadrat (B1-B17) of species observed on transect B, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Monocots		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	1999	2000	2001
Juncaceae																					
<i>Juncus effusus</i>	Soft Rush										2.5								0.15	0	0.15
<i>Juncus tenuis</i>	Path Rush																		0.59	0	0
Cyperaceae																					
<i>Carex</i> sp.	Sedge sp.					2.5	2.5									2.5			0	2.35	0.44
<i>Carex lurida</i>	Sedge sp.																		3.53	0	0
<i>Carex scoparia</i>	Sedge sp.	2.5				2.5		2.5		2.5	2.5		2.5						1.03	0.29	0.88
<i>Carex stricta</i>	Sedge sp.																		1.47	0	0
<i>Carex Gracillimalon</i>	Sedge sp.	2.5	2.5				2.5					2.5	2.5						0	0	0.74
Poaceae																					
<i>Agrostis</i> spp.	Grass sp.	2.5				2.5	2.5	2.5	2.5			2.5		2.5					0	9.41	1.03
<i>Agrostis gigantea</i>	Red Top Grass																		0.59	0	0
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	2.5		2.5							2.5		2.5		2.5				1.03	0.29	0.74
<i>Dactylis glomerata</i>	Orchard Grass																		0.15	0	0
<i>Festuca heterophylla</i>	Fescue																		0.29	0	0
<i>Glyceria striata</i>	Fowl Manna Grass																		0.6	0	0
<i>Panicum clandestinum</i>	Deer-Tongue Grass																		0.44	14.56	0
<i>Poa</i> sp.	Grass sp.	2.5	15.0	2.5	2.5	2.5	15.0	2.5	15.0	15.0	15.0	15.0	15.0						0	10.15	6.91
<i>Poa pratensis</i>	Kentucky Bluegrass																		0.44	0	0
<i>Danthonia</i> sp.	Oatgrass	2.5																	0	0.15	0.15
Liliaceae																					
<i>Trillium</i> sp.	Trillium																		0.15	0	0
<i>Maianthemum canadense</i>	Canadian May Flower		2.5																0	0	0.15
Iridaceae																					
<i>Sisyrinchium</i> sp.	Blue-eyed Grass	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5				0.74	0.59	1.91

Table 3 (cont.). Summary of mid-point percent cover by quadrat (B1-B17) of species observed on transect B, 2001, and mean percent cover, 1999-2001. See Table 1 for cover class midpoints. New species in bold.

Transect B

Transect B was cleared of all vegetation during the fall of 1998 in accordance with PASNY's IVM maintenance regime. As such, this transect represents a relatively early stage of vegetative succession where the plant species are represented by those that are shade intolerant and most able to adapt to recent disturbance (Fickbohm, 2001.) The transect supports relatively high species richness.

Six species on transect B are considered "undesirable": Black Cherry (*Prunus serotina*), Red Maple (*Acer rubrum*), Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), Red Spruce (*Picea rubens*), and Red Oak (*Quercus rubus*). All species are found predominately on the periphery of the corridor (Fickbohm, 2001.)

In comparing the 1999, 2000, and 2001 inventories from a quadrat-to-quadrat perspective it was apparent that all woody species and members of the Rosaceae were encroaching into the ROW from the edges, whereas the grasses and goldenrods are retreating towards, and dominating, the center (Fickbohm, 2001.)

This trend demonstrates the vegetative succession that exists temporally between transects B and A. Grasses and *Solidago* spp. dominate the former, recently cleared transect (B). The transect shows signs of slowly being invaded from the edges by woody species and shrubs, predominately from the Rosaceae, *Rubus allegheniensis* and *Rubus idaeus*. This trend in transect B will continue until the ROW is completely spanned, resembling the condition demonstrated by transect A (Fickbohm, 2001.)

Sixty-six species were observed during the 2000 survey (Fickbohm, 2001) and 80 species were observed during the 2001 survey (Table 3.) This reflects the appearance of 14 species not previously encountered. Percent cover for "woody" species was estimated at approximately 17% including Meadow Sweet (*Spirea latifolia*). For herbaceous species percent cover was found to be 147%. Percent coverage was greater than 100 because estimates were made to include overlapping foliage due to varied heights of different individual plants (Fickbohm, 2001.) The largest contributor to the woody species category was White Ash (*Fraxinus americana*) with 10% and Northern Arrowwood (*Viburnum recognitum*) with 4%. The majority of percent cover in the herbaceous category was divided among Rosaceae, Poaceae, and Asteraceae. The largest contributors within Rosaceae are *Rubus allegheniensis* (blackberry), 22% and *Rubus idaeus* (red raspberry) with 40%.

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