

Monitoring Vegetation After a Reduction in Deer Browsing at Long Point, Lake Erie: 2003



Produced For Canadian Wildlife Service, Ontario Region

December 2003

Michael S.W. Bradstreet and Jane M. Bowles



BIRD STUDIES CANADA
ÉTUDES D'OISEAUX CANADA

understand appreciate conserve
comprendre apprécier conserver

Bird Studies Canada / Études D'Oiseaux Canada

Canadian co-partner of
un partenaire canadien de



P.O. Box/B.P. 160, 115 Front St., Port Rowan, ON Canada N0E 1M0 www.bsc-eoc.org

ABSTRACT

This report summarizes the important changes found in shrub stem number, ground layer species cover and trees in 15 breeding bird census plots (BBC) at Long Point, Lake Erie from 1991 to 2003. It represents the 13th year of a long-term study to monitor the effects of reduced browsing by White-tailed Deer.

The number of stems of tree and shrub species has generally increased in the years since deer were removed, although since 1997 numbers have tended to fluctuate. Shrubs in middle successional plots have shown the most consistent increase in the number of species represented. Shannon diversity of shrubs has increased in early successional plots and the disturbed plot, but has decreased in late and middle successional plots because of the dominance of Wild Red Raspberry. Tree species recruits in the two largest size classes have continued to increase over the study period.

Ground cover in all plots has decreased since 2001, likely the result of continuing drought in southern Ontario. Floristic quality measures show little change over the study period. Early successional plots have the highest mean conservatism coefficient (MCC) and the lowest sum of weediness score. Late successional plots have a high level of weediness and relatively low MCC. The disturbed plot has the lowest MCC, but also a relatively low sum of weediness. The disturbed plot also shows great fluctuation in the relative cover of alien species, mainly because of cyclic growth and crash of Common St. John's-wort.

TABLE OF CONTENTS

ABSTRACT	i
INTRODUCTION.....	1
METHODS	1
Field Methods:.....	1
Data Analysis:	2
RESULTS AND DISCUSSION.....	2
Shrub stem counts:	2
Ground layer vegetation:	6
ACKNOWLEDGEMENTS	10
REFERENCES	11
APPENDIX A	13
SHRUB STEM COUNTS IN FOUR HEIGHT CLASSES.....	13
APPENDIX B	33
LEGEND TO SPECIES CODES	33
APPENDIX C	36
TABLES OF VEGETATION COVER FOR BBC PLOTS AT LONG POINT IN 1992 TO 1998.....	36
APPENDIX D	53
BREEDING BIRD CENSUSES	53

INTRODUCTION

During the fall and winter of 1989-1990 and 1990-1991, the Canadian Wildlife Service organized the removal of nearly 500 White-tailed Deer from Long Point, Lake Erie, Ontario. In the fall of 1994, an additional 42 deer were removed. In 1991, a long-term monitoring study was established by the Bird Studies Canada (formerly Long Point Bird Observatory) to document vegetation and breeding bird communities in the period following the removal of deer. Methodology was established in 1991. Bradstreet et al. (1991) reported results from the first year of effort and results from subsequent years have been reported in Bradstreet and Bowles (1992; 1994; 1995; 1996; 1997, 1998, 1999, 2000, 2001 and 2002). This report summarizes the major findings from the thirteenth year of monitoring in 2003.

METHODS

One hundred and fifty permanent vegetation quadrats, ten established in each of fifteen breeding bird census (BBC) plots, have been monitored annually since 1991 and were revisited during June and July 2003. Some of the quadrats had to be moved slightly in 1992 and the results reported here represent the changes between 1992 and 2003 for the new plot positions. Details of the methods used to establish the plots were reported in Bradstreet and Bowles (1992). Sampling protocol and monitoring methods are given in Bradstreet et al. (1991).

The BBC plots can be grouped into three successional classes: early, middle and late, based on age of dune, position on Long Point, and vegetation characteristics (Bradstreet et al., 1991). One plot is classed as disturbed because the tree cover was removed by fire and has never regenerated.

Field Methods:

In 2003, as in previous years, shrub stems in four height classes were counted in ten permanent 10 x 1 m quadrats in each of the 15 BBC plots. Stem counts were made for all shrub and tree species occurring in the 10 x 1 m quadrats. Height classes were recorded as 0-0.5 m, >0.5-1 m, >1-2 m and >2-5 m. All individual shrub stems emerging from the ground were counted. In the case of Common Juniper (*Juniperus communis*) and Eastern Red Cedar (*J. virginiana*) growing in loose sand this count was difficult because of the partial burial by sand of some branches. Vines that sprawl and root along their length cause additional difficulties in determining individuals and assigning height classes.

Vegetation cover was estimated in ten 1 x 1 m quadrats nested within the shrub quadrats. Cover-abundance estimates were made for all species occurring in the 1 x 1 m quadrats. A 5-point Braun-Blanquet scale (see Mueller-Dumbois and Ellenberg, 1974) was used to estimate cover in each quadrat. Cover values for quadrats in each BBC plot were converted to percentage midpoints and then averaged over the plot. Ground cover estimates for non-living material (litter, sand, water, wood, etc.) were also made. In 1991, 1992 and 1994 to 2003 plots were sampled in late June and early to mid July, but in 1993, sampling was done in mid June.

In 2003, photographs were taken from permanent sampling points chosen in 1991. In each BBC plot, eight photographs were taken, one east and one west from each of 4 sampling points determined in 1991. Photographs were framed to match as closely as possible to framing in 1991.

Data Analysis:

All data for 1992 to 2003 are stored in Paradox database format. Paradox queries were used to extract subsets of data and to sum values over species, successional stage and year. Shrub stem counts and ground cover estimates for each species were summarized over the 10 quadrats in each of the BBC plots for each year. Data were summarized in spreadsheet format.

Shannon Diversity was calculated for woody species (shrubs and trees) and for ground cover species as follows:

$$H' = -\sum p_i \ln p_i$$

where p_i is the proportion of species i . Shannon diversity of plant form (fern, forb, graminoid, shrub) was calculated for ground layer species.

Floristic Quality Assessment (Oldham et al., 1995) was performed on ground layer species for each plot in each year. Mean conservatism coefficient (MCC) and sum of weediness were calculated from pre-assigned scores of conservatism for native species and weediness for alien species.

RESULTS AND DISCUSSION

Shrub stem counts:

The total number of woody stems of all species counted in all plots for twelve years, 1992-2003, is given in Table 1. The numbers of stems counted in each height class for each species are presented in Appendix A. Values in Table 1 and Appendix A should be multiplied by a factor of 100 to represent the estimated number of stems per hectare. A legend to BBC plot codes is given in Table 2.

Overall there has been an increase in the number of shrub stems over the study period, but patterns of increase vary among the plots and the successional stages (Table 1). In the early successional stage, peak numbers of shrubs were reached in 1996. Since then shrub numbers have fluctuated. In 2002 shrub stem numbers reached the lowest of any years since the study started, but they recovered slightly in 2003. In the disturbed plot, Bluegrass Grassland (BGGR), there was a consistent increase from 12 stems in 1992 to over 1300 in 2001, but in 2002 and again in 2003 the numbers dropped. The number of shrub stems in middle successional plots increased steadily until 1996. In 1997 there was a drop, partly caused by high water levels in some of the plots. Between 1997 and 2000 the number of shrub stems increased again, but since then they have been fluctuating. Numbers of shrubs in the late successional plots have also fluctuated, but show an increasing trend except for a sharp drop in 2002.

Table 1: Total number of shrub stems counted for each BBC plot in twelve years 1992-2003.

STAGE	PLOT	YEAR											
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
EARLY	DCSD	5	14	19	16	55	66	103	98	146	190	215	266
	SRS1	84	278	256	785	260	38	2	214	138	38	6	36
	SRS2	1120	1222	1208	1674	1703	620	579	1246	1572	326	325	325
	IDSS	560	993	983	1386	1356	618	265	158	92	66	63	93
	DCJS	1397	1710	1778	1729	2372	1051	869	1183	987	594	354	484
	TOTAL	3166	4217	4244	5590	5746	2393	1818	2899	2935	1214	963	1204
MIDDLE	STDP	358	283	421	540	588	527	614	707	900	849	752	803
	TMSL	757	940	1008	1008	1423	901	882	890	1091	1086	1050	1169
	WPWC	744	693	688	697	975	1027	1097	1150	1348	902	817	927
	TOTAL	1859	1916	2117	2245	2986	2455	2593	2747	3339	2837	2619	2899
LATE	ROWB	230	308	376	522	811	909	982	1314	1556	1596	1532	1684
	ROWP	43	152	290	557	1204	881	696	743	891	1059	711	1091
	ROIS	10	12	39	32	26	52	32	63	39	40	50	94
	RORA	359	414	538	963	1737	1655	1687	1616	1716	1570	987	977
	ROMS	236	348	632	648	769	467	569	973	1307	1388	1372	1510
	ROSF	144	2086	714	593	575	831	719	704	920	1276	812	917
	TOTAL	1022	3320	2589	3315	5122	4795	4685	5413	6429	6929	5464	6273
DISTURBED	BGGR	12	31	103	267	462	665	738	953	1239	1305	362	255
OVERALL TOTAL		6053	9469	9002	11284	14085	9976	9465	11536	13323	11633	9227	10504

Increases in shrub stems in all plots during the early years of the study can probably be attributable to a reduction in deer browse, but other factors affect shrub numbers and have caused the numbers to fluctuate since then. The response of different species in different successional stages was discussed in Bradstreet and Bowles (2001, 2002).

Overall the number of woody species (shrubs and trees) has changed only slightly over the study (Figure 1). The most consistent increase, though small, has been in the middle successional plots. The disturbed plot has the fewest number of species recorded and the late plots have the greatest. The middle successional plots by 2003 had 23 species, the average number in the late successional plots.

Shannon diversity of woody species in each plot in each year is presented in Figure 2. Diversity in the disturbed plot was zero until 1998 because there was only one species represented. Since 2001 it has increased rapidly, but still remains lower than in the other plots. Diversity is also low in early successional plots, but has been increasing since 1999. This is probably due to low water levels in the last few years that have allowed the establishment of more species.

Table 2: Legend to breeding bird census plot codes and successional stage.

CODE	BBC PLOT NAME	SUCCESSIONAL STAGE
DCSD	Dry Cottonwood Sand Dune	EARLY
SRS1	Sedge - Rush Swale #1	EARLY
SRS2	Sedge - Rush Swale #2	EARLY
IDSS	Intergrading Dune Swale Savannah	EARLY
DCJS	Dry Cottonwood - Juniper Savannah	EARLY
TMSL	Tamarack Slough	MIDDLE
WPWC	White Pine - White Cedar Savannah	MIDDLE
STDP	Sedge Tamarack Dune Pond	MIDDLE
ROWB	Red Oak - White Birch Savannah	LATE
ROWP	Red Oak - White Pine Savannah	LATE
ROIS	Red Oak - Ironwood Savannah	LATE
RARO	Red Ash - Red Oak Savannah	LATE
ROMS	Red Oak - Sugar Maple Savannah	LATE
ROSF	Red Oak - Sugar Maple Forest	LATE
BGGR	Blue Grass Grassland	DISTURBED

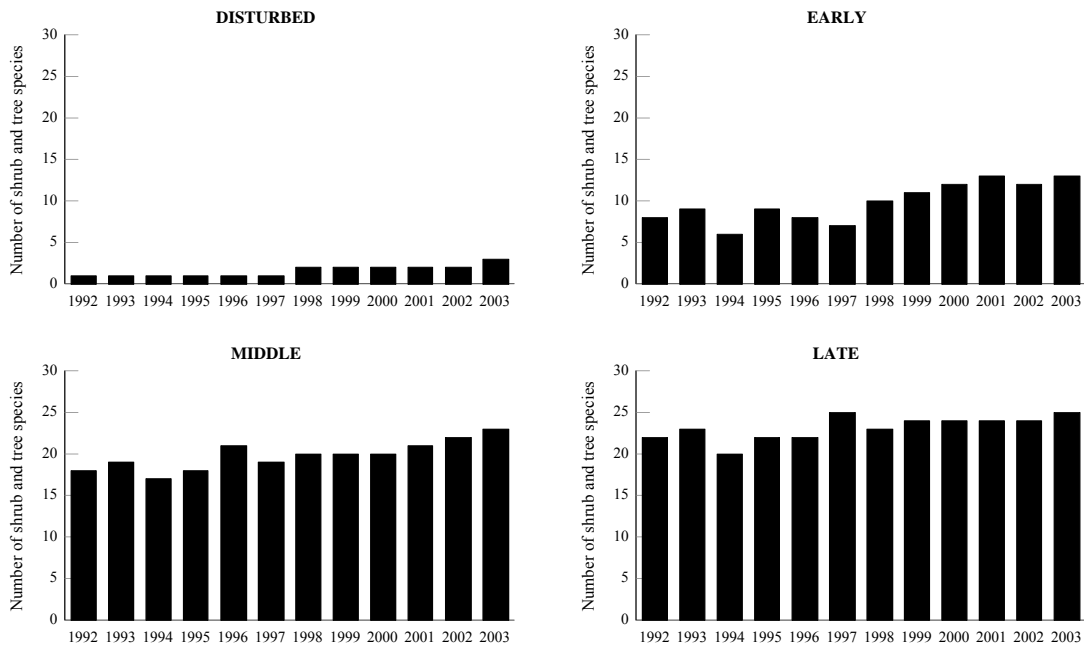


Figure 1: Number of shrub and tree species in early middle and late successional and the disturbed Breeding Bird Census plots on Long Point from 1992 to 2003.

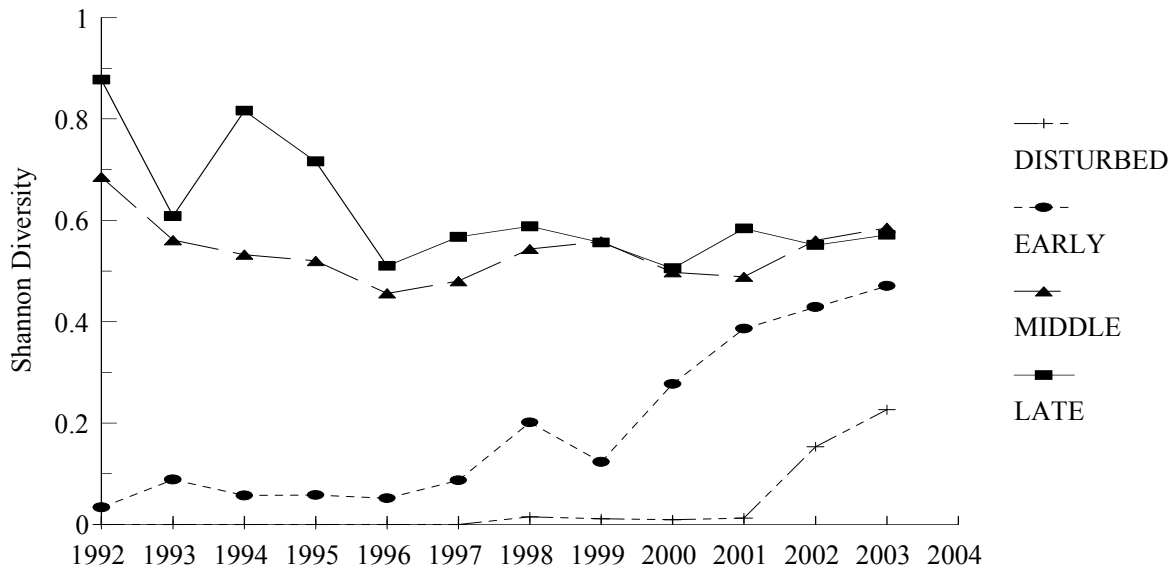


Figure 2: Shannon Diversity of shrub and tree species in early middle and late successional and the disturbed Breeding Bird Census plots on Long Point from 1992 to 2003.

Diversity in the middle and late successional plots had a declining trend during the first few years of the study, but has remained reasonably constant since 1996. The initial decline can be attributed to the spread of Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*) to become a dominant shrub in these plots.

Although the number of tree species recruits in all plots has fluctuated due to germination and attrition of seedlings (Bradstreet and Bowles, 2002), there has nevertheless been an overall increase in the size and number of seedlings that survive to grow in to the larger size classes. Figure 3 shows the increasing number of tree stems growing from seedling recruits in the two largest size classes (1-2 m and >2 m) summed over all plots in all successional stages. Sassafras (*Sassafras albidum*) is not included in the count because this species grows mainly from root suckers.

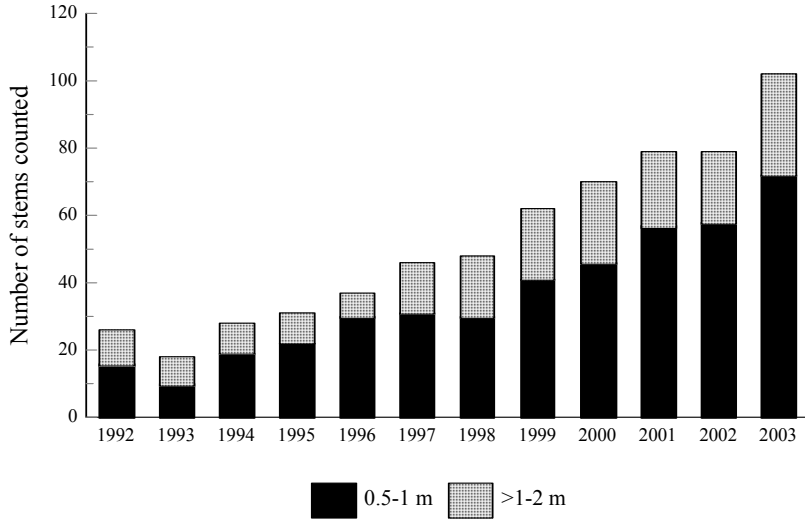


Figure 3: Numbers of tree recruits (not Sassafras) in the two largest size classes in all Breeding Bird Census plots from 1992 to 2003.

Ground layer vegetation:

Tables of ground cover estimates for all species in each plot for 1992 to 2003 are presented in Appendix C. The tables show estimated ground cover for species with a percent cover of at least 1% in at least one year, or present in at least two quadrats in the plot in at least one year. Table 3 summarizes the estimated total ground cover for all plots from 1992 to 2003 and gives the means for each successional stage. Mean values are plotted in Figure 4.

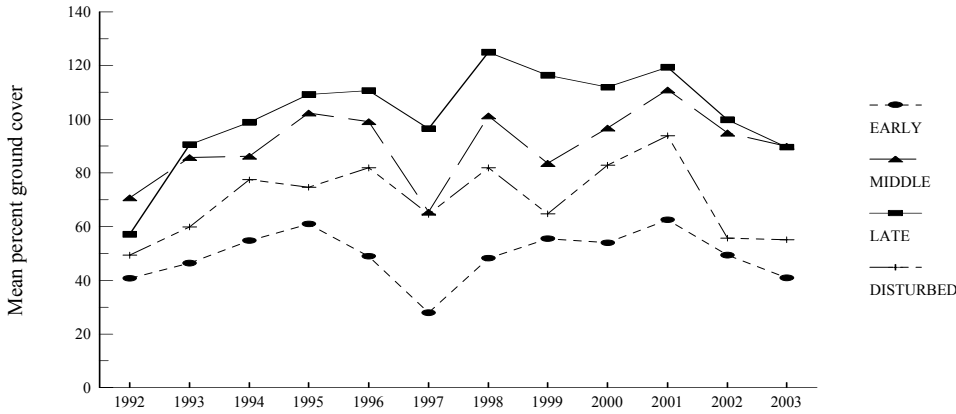


Figure 4: Mean percent ground cover in early, middle and late successional and the disturbed Breeding Bird Census plots from 1992 to 2003.

Table 3: Estimated total percent ground cover for vegetation in BBC plots at Long Point, Ontario from 1992 to 2003.

STAGE	PLOT	YEAR											
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
EARLY	DCJS	34	50	59	54	69	42	63	66	54	48	49	33
	DCSD	36	49	62	68	54	51	70	88	77	84	73	76
	IDSS	56	64	86	90	58	32	67	73	57	57	20	33
	SRS1	33	8	12	31	14	2	12	13	28	62	43	24
	SRS2	44	62	54	63	50	13	29	38	54	62	62	39
	Mean	40.8	46.4	54.8	61.0	48.9	27.9	48.2	55.4	54.0	62.5	49.4	40.9
MIDDLE	STDP	74	91	102	128	107	85	129	99	104	144	117	113
	TMSL	70	84	75	91	99	51	80	70	92	87	90	82
	WPWC	69	82	82	88	91	61	95	81	94	102	77	74
	Mean	70.7	85.7	86.3	102.3	99.1	65.4	101.3	83.6	96.7	111.0	94.9	89.9
LATE	ROWP	49	109	118	123	126	123	143	143	125	139	97	111
	ROWB	69	104	99	102	116	79	123	124	103	108	104	89
	RARO	55	95	107	122	129	87	143	110	99	121	114	92
	ROIS	71	57	84	103	97	88	109	91	100	113	87	64
	ROMS	58	105	92	102	105	125	118	118	145	135	92	101
	ROSF	40	74	92	104	92	78	113	112	99	99	103	79
Mean	57.1	90.6	98.9	109.2	110.7	96.5	124.9	116.3	111.9	119.3	99.8	89.6	
DISTURBED	BGGR	49	60	77	75	82	65	82	65	83	94	56	55

In general ground cover vegetation in all plots has shown a fairly consistent pattern. Except in 1992 and 2003 when the total ground cover in middle successional plots was greater than or equal to the cover in late successional plots, the relative amount of cover has remained late successional > middle successional > disturbed > early. Furthermore the year to year fluctuations have been more or less parallel. There was low cover years in 1997 due to high water (Bradstreet and Bowles, 1997) and relatively high cover in 1998 and 2001. Since 2001 the decline in all stages may be due to continuing drought and water deficit conditions in southern Ontario. Overall, only late and middle successional plots appear to have consistently more cover than at the beginning of the study, even though there was an increase in all plots in the first few years after deer removal. It is possible that short term gains in the more open plots (early successional and disturbed) are overwhelmed by long term fluctuations such as climate. Dry summers that are predicted under climate change models are likely to have most impact in conditions such as sand dunes where edaphic conditions exaggerate water deficits.

Not only is the quantity of cover important, but the type of species that make up the cover is a reflection of the quality and condition of the site. Disturbed sites tend to have more generalist and weedy species, while more pristine sites will tend to have fewer opportunistic plants and more native species adapted to the particular habitat.

Floristic Quality Assessment (FQA) was first developed in the Chicago Region (Wilhelm and Ladd, 1988) and has more recently been developed for Ontario (Oldham *et al.*, 1995). The method relies on conservatism coefficients pre-assigned to native species and weediness coefficients assigned to non-native species. Conservatism scores from 0 to 10 are assigned to a species based on its fidelity to particular habitat types and its sensitivity to disturbance. Scores of 10 are assigned to the most conservative species, while the least conservative species are scored 0. Weediness scores are assigned based on the species' ability to invade natural habitats, with -1 being the least invasive and -3 being the most invasive. For any site that has a list of species, the mean conservatism coefficient (MCC) and sum of weediness scores can be calculated to provide indices of site quality.

Figure 5 shows the mean conservatism coefficient for plots in each successional stage over the study period. MCC has not changed very much and the relative values for each successional stage have remained the same. The high MCC in early successional plots reflects the highly specialized strand-line, fen and Great Lakes meadow marsh and sand dune species found in these plots. Many of these species have high conservatism coefficients. In contrast late successional plots have a more generalized woodland flora, with fewer specialized elements. The low MCC of the disturbed plot reflects the disturbed nature of this area.

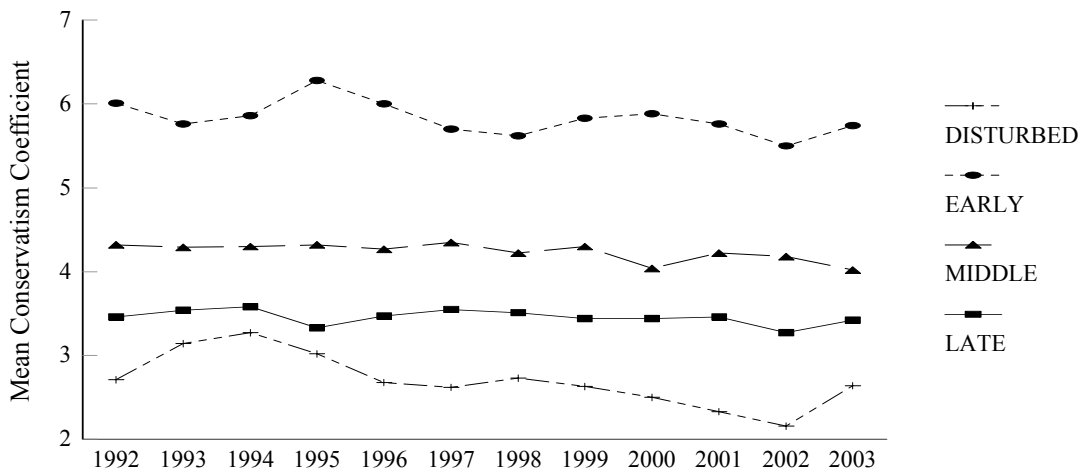


Figure 5: Mean conservatism coefficient of early, middle and late successional and disturbed Breeding Bird Census Plots from 1992 to 2003.

Figure 6 plots mean sum of weediness for each successional stage in each year. Early successional plots with their specialized native flora have the lowest weediness scores. Middle and late successional plots fluctuate somewhat, but the overall weediness scores are about equivalent. The total weediness of the disturbed plot varies greatly from year to year (see below).

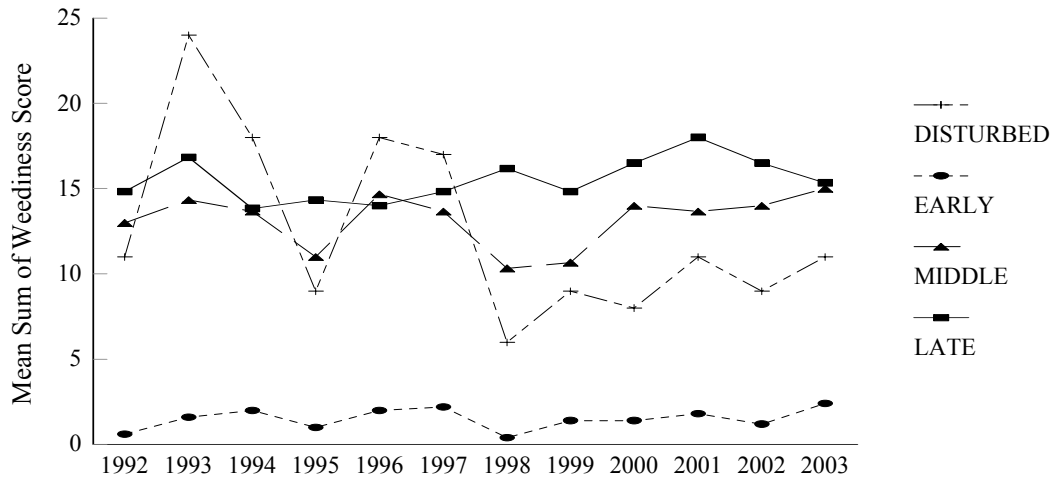


Figure 6: Sum of weediness in early, middle and late successional and the disturbed Breeding Bird Census Plots from 1992 to 2003.

Another measure of site quality is the proportion of alien (non-native) species present. Figure 7 gives the proportion of ground cover that is occupied by not native species. The proportion in early, middle and late successional plots is in the order of late > middle > early. The disturbed plot, however shows a completely different pattern, with strong fluctuations in the amount of cover due to alien species, with high cover (20-25%) of the total in 1992 and 2000 and intermediate cover in other years.

Proportion of alien species

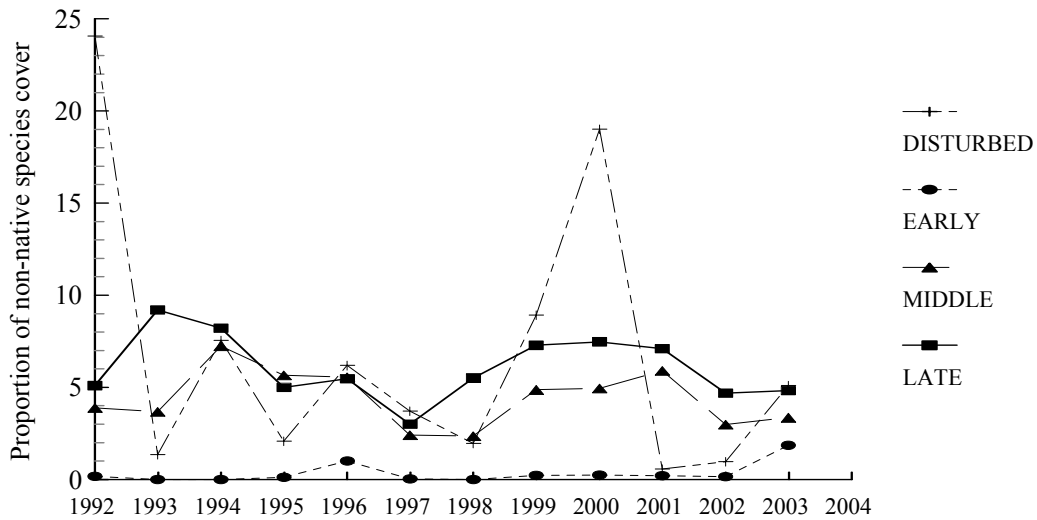


Figure 7: Mean percent ground cover of alien species in early middle and late successional and the disturbed Breeding Bird Census plots from 1992 to 2003.

This fluctuation is mainly due to cyclical changes in the cover of one species Common St. John's-wort (*Hypericum perforatum*), a common weed of the open dune grassland at this site (Figure 8). As with percent cover, it appears that year to year changes in the species composition overwhelm changes due to reduced deer browsing. A fresh cull of deer was done the fall of 2003. It will be interesting to see if changes in species responses are detectable in the next few years.

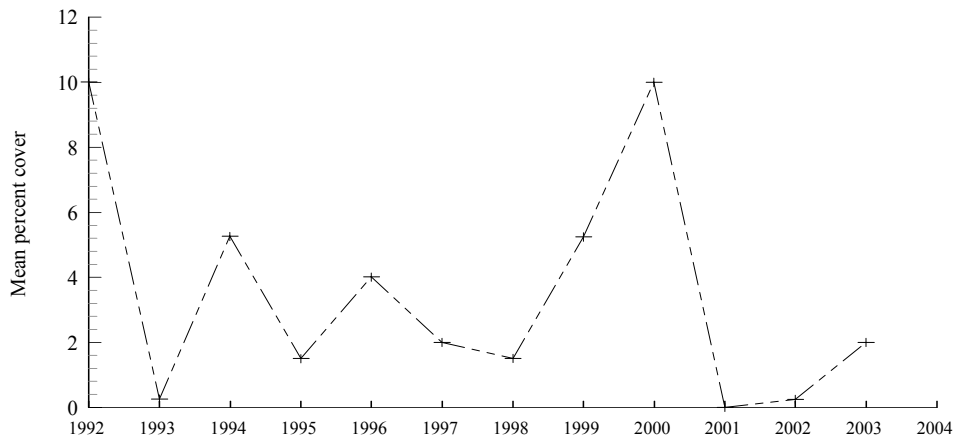


Figure 8: Changes in mean percent cover of Common St. John's-wort in the disturbed Breeding Bird Census plot from 1992 to 2003.

ACKNOWLEDGEMENTS

Our appreciation is extended to the Canadian Wildlife Service for project development, funding and permission to access the plots. Our thanks to Bird Studies Canada staff and volunteers who helped us in various ways.

REFERENCES

- Andreas, B. K. and R. W. Lichvar 1995 Floristic index for establishing assessment standards: a case study for northern Ohio. Wetlands Research Program Technical Report WRP-DE-8, U.S. Army Corps of Engineers, Waterways Experiment Station, Washington, D. C. 12 pp.
- Bradstreet, M.S.W., J.M. Bowles, J.D. McCracken, K.M. Thomas and M. Dyer. 1991. Monitoring vegetation and breeding bird communities after a reduction in deer browsing at Long Point, Lake Erie: 1991. Canadian Wildlife Service, Ontario Region. 63 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 2002.. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 2002. Canadian Wildlife Service, Ontario Region. 62 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 2001. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 2001. Canadian Wildlife Service, Ontario Region. 49 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 2000. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 2000. Canadian Wildlife Service, Ontario Region. 47 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1999. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1999. Canadian Wildlife Service, Ontario Region. 46 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1998. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1998. Canadian Wildlife Service, Ontario Region. 44 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1997. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1997. Canadian Wildlife Service, Ontario Region. 42 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1996. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1996. Canadian Wildlife Service, Ontario Region. 45 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1995. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1995. Canadian Wildlife Service, Ontario Region. 48 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1994. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1994. Canadian Wildlife Service, Ontario Region. 31 pp.
- Bradstreet, M.S.W. and J.M. Bowles. 1992. Monitoring vegetation after a reduction in deer browsing at Long Point, Lake Erie: 1992. Canadian Wildlife Service, Ontario Region. 31 pp.
- Morton, J.K. and J.M. Venn 1990. A checklist of the flora of Ontario: Vascular Plants. University of Waterloo Biology Series #34. University of Waterloo Press, Waterloo, Ontario. 218 pp.
- Mueller-Dumbois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, New York. 547 pp.
- Oldham, M.J. 1993. Distribution and status of the vascular plants of southern Ontario. Draft. Ontario.

- Oldham, M.J., W.D. Bakowsky, and D. A. Sutherland. 1995. Floristic quality assessment system for southern Ontario. Natural Heritage Information Centre, Ontario Ministry of Natural Resources, Peterborough, Ontario.
- Swink, F. A. and G. S. Wilhelm. 1994. Plants of the Chicago region. Fourth edition. Indiana Academy of Science, Indianapolis, Indiana.
- Wilhelm, G. S. and L. A. Masters. 1995. Floristic Quality Assessment in the Chicago Region and Application Computer Programs. The Morton Arboretum, Lisle, Illinois.
- Wilhelm, G. S. and D. Ladd. 1988. Natural area assessment in the Chicago region. Transactions of the 53rd North American Wildlife and Natural Resources Conference: 361-375.

APPENDIX A

**SHRUB STEM COUNTS IN FOUR HEIGHT CLASSES
FOR BBC PLOTS AT LONG POINT IN 1992 TO 2002**

A legend to plant species codes is given in Appendix B.

EARLY SUCCESSIONAL PLOTS:

Dry Cottonwood Sand Dune:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
JUNCOMM	<0.5 m							1	2	5	5	2	2
	0.5 - 1 m												
	1-2 m												
	>2 m												
JUNVIRG	<0.5 m							2	2			3	6
	0.5 - 1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m				1								
	0.5 - 1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m	1	1	1		9	3	1			1		1
	0.5 - 1 m		1	2	2	2	1	1	2				
	1-2 m						2	2	2	3	3	3	2
	>2 m												1
ROSRUBI	<0.5 m	1	1	3	2			1					
	0.5 - 1 m				2	1	3	2	2	1	1	1	2
	1-2 m												
	>2 m												
RUBIDAE	<0.5 m								2	33	39	19	24
	0.5 - 1 m										1	1	4
	1-2 m												
	>2 m												
VITRIPA	<0.5 m	2	3	12	2	23	29	51	42	67	84	115	125
	0.5 - 1 m	1	8	1	7	20	28	36	41	33	52	70	97
	1-2 m							6	3	4	4	1	2
	>2 m												
GRAND TOTAL		5	14	19	16	55	66	103	98	146	190	215	266

Dry Juniper – Cottonwood:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
HYPKALM	<0.5 m	1393	1706	1775	1727	2365	1045	866	1174	979	588	348	475
	0.5 - 1 m					3	2		6				2
	1-2 m												
	>2 m												
JUNCOMM	<0.5 m	1					2	1	1				
	0.5 - 1 m												
	1-2 m												
	>2 m												
JUNVIRG	<0.5 m	2	3	2	1	2	1	1	1	5	3	3	2
	0.5 - 1 m									1	1	1	1
	1-2 m												
	>2 m												
LARLARI	<0.5 m										1		
	0.5 - 1 m												
	1-2 m												
	>2 m												
PINSTRO	<0.5 m					1							
	0.5 - 1 m												
	1-2 m												
	>2 m												
ROSPALU	<0.5 m									1		1	2
	0.5 - 1 m												
	1-2 m												
	>2 m												
RUBIDAE	<0.5 m												1
	0.5 - 1 m												
	1-2 m												
	>2 m												
THUOCCI	<0.5 m	1	1		1	1	1	1	1	1	1	1	1
	0.5 - 1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m			1									
	0.5 - 1 m												
	1-2 m												
	>2 m												
GRAND TOTAL		1397	1710	1778	1729	2372	1051	869	1183	987	594	354	484

Intergrading Dune – Swale Savannah:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
HYPKALM	<0.5 m	491	765	717	1073	1070	410	58	72	34	9	3	6
	0.5 - 1 m	44	72	186	209	232	187	123	36	17	2		
	1-2 m							3	1		1		
	>2 m												
JUNCOMM	<0.5 m	1	1	1	6		1	2	1			1	2
	0.5 - 1 m												2
	1-2 m												
	>2 m												
JUNVIRG	<0.5 m				1	2	2	1	1	4	5	4	7
	0.5 - 1 m	1	2	2	1	2	1	4	2	1	4	3	4
	1-2 m	5	5	5	3	2	3	3	2	3	3	5	7
	>2 m	2	3	3	3	3	4	3	5	7	2	3	5
POPDELT	<0.5 m							51	10	6	4	4	4
	0.5 - 1 m												1
	1-2 m												
	>2 m												
PRUNUS.	<0.5 m		1										
	0.5 - 1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m			1									
	0.5 - 1 m												
	1-2 m												
	>2 m												
RHURADI	<0.5 m		1		1			1	3	3	2	2	1
	0.5 - 1 m												
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m	4	9	2	4	2	2	4	2	1		1	2
	0.5 - 1 m			2	2	2			2	1	1	2	3
	1-2 m												
	>2 m												
RUBIDAE	<0.5 m	2						2	5	2	8	7	23
	0.5 - 1 m									1		1	2
	1-2 m												
	>2 m												
SALEXIG	<0.5 m									4	11	11	15
	0.5 - 1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m	8	131	60	78	39	4	5	13	5	13	11	5
	0.5 - 1 m	2	3	3	5	1	2	2		2		3	3
	1-2 m					1	2	3	3	1	1	1	1
	>2 m			1								1	
GRAND TOTAL		560	993	983	1386	1356	618	265	158	92	66	63	93

Sedge – Rush Swale 1:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
CORSTOL	<0.5 m												3
	0.5 - 1 m												
	1-2 m												
	>2 m												
HYPKALM	<0.5 m	84	278	255	782	236	38	2	212	27	15	4	21
	0.5 - 1 m			1		24							
	1-2 m												
	>2 m												
JUNCOMM	<0.5 m				2				1		1		
	0.5 - 1 m												
	1-2 m												
	>2 m												
POPDELT	<0.5 m									110	22	2	11
	0.5 - 1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m				1				1	1			1
	0.5 - 1 m												
	1-2 m												
	>2 m												
GRAND TOTAL		84	278	256	785	260	38	2	214	138	38	6	36

Sedge – Rush Swale 2:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m										1		
	0.5 - 1 m												
	1-2 m												
	>2 m												
HYPKALM	<0.5 m	1117	1212	1206	1665	1655	593	546	1222	1432	317	311	309
	0.5 - 1 m	2	7	2	5	44	26	23	18	10			
	1-2 m							9					
	>2 m												
JUNCOMM	<0.5 m								2	6	1		
	0.5 - 1 m												
	1-2 m												
	>2 m												
JUNVIRG	<0.5 m	1	3		3	2	1	1		1	1	1	2
	0.5 - 1 m												
	1-2 m												
	>2 m												
POPDELT	<0.5 m									99	2		
	0.5 - 1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m				1	2							
	0.5 - 1 m												
	1-2 m												
	>2 m												
ROSPALU	<0.5 m								3	23		5	2
	0.5 - 1 m											1	4
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m										4		
	0.5 - 1 m												
	1-2 m												
	>2 m												
RUBIDAE	<0.5 m								1	1		3	4
	0.5 - 1 m												
	1-2 m												
	>2 m												
THUOCCI	<0.5 m											1	1
	0.5 - 1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m											3	3
	0.5 - 1 m												
	1-2 m												
	>2 m												
GRAND TOTAL		1120	1222	1208	1674	1703	620	579	1246	1572	326	325	325

MIDDLE SUCCESSIONAL PLOTS:

Sedge – Tamarack Dune Pond:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m				2			1	1			1	
	0.5-1 m	1											
	1-2 m	1			2	2	2						
	>2 m							2	2		1	2	1
BETPAPY	<0.5 m												1
	0.5-1 m	1		1				1					1
	1-2 m				1	1	1		1	2	1		
	>2 m										1	1	1
CEPOCCI	<0.5 m	1		2	4	2	1	5	6	4	11	5	8
	0.5-1 m	1	2	4	8	6	8	8	11	3	7	12	10
	1-2 m	3	5	2	5	2	2	5		3	2	2	5
	>2 m	2	1				1		1		1	2	
DECVERT	<0.5 m	33	28	45	28	36	28	20	51	33	10	38	17
	0.5-1 m	103	4	54	81	48	3	42	61	39	42	25	22
	1-2 m	4		7	1			10					
	>2 m												
LARLARI	<0.5 m			1		1				1		1	2
	0.5-1 m												
	1-2 m												
	>2 m	1	1	1	1	1	1	1	1	1	1	1	1
PARINSE	<0.5 m											4	4
	0.5-1 m										1	2	3
	1-2 m												
	>2 m												
PINSTRO	<0.5 m												
	0.5-1 m	1			1								
	1-2 m		1	1		1	1						
	>2 m												
ROSPALU	<0.5 m									2			2
	0.5-1 m										4	10	20
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m							1					
	0.5-1 m	3							1				
	1-2 m	1	4	2		2	2		1	3		1	1
	>2 m												
RUBIDAE	<0.5 m	88	150	185	221	318	311	323	429	618	476	412	456
	0.5-1 m	101	68	96	160	148	137	153	107	160	262	202	208
	1-2 m	1	3	2	9	6	2	4		5	1		
	>2 m												
THUOCCI	<0.5 m					1							
	0.5-1 m						1		1	1	1	1	1
	1-2 m												
	>2 m												
VITRIPA	<0.5 m	9	8	8	1	11	2	17	10	11	13	10	15
	0.5-1 m	3	8	10	15	2	24	17	21	13	13	17	20
	1-2 m							4	2	1	1	3	4
	>2 m												
GRAND TOTAL		358	283	421	540	588	527	614	707	900	849	752	803

Tamarack Slough:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m		1			1							
	0.5-1 m												
	1-2 m												
	>2 m												
BETPAPY	<0.5 m	3	16	11	3	4	4	1	3	46			
	0.5-1 m	9	7	1	5			1	3	3	1		1
	1-2 m	7		5	4	8	3	3	5	5	4	1	4
	>2 m							1	3	3	2	1	1
CELSCAN	<0.5 m		4		3	6	3	3	5	3	4	6	5
	0.5-1 m			1	1	1	1	3	3	7	5	3	11
	1-2 m							1	2	3	4	1	2
	>2 m											2	
CEPOCCI	<0.5 m	3	1	9	14	13		18	16	26	27	33	21
	0.5-1 m	1	1		4	2		1	2	2	4	4	6
	1-2 m					1	1	1	1	1	1	1	1
	>2 m												
DECVERT	<0.5 m							1					
	0.5-1 m												
	1-2 m												
	>2 m												
HYPKALM	<0.5 m	12	3	8	16	10						1	
	0.5-1 m												
	1-2 m												
	>2 m												
JUNCOMM	<0.5 m	86	47	58	31	34	39	24	27	13	10	25	29
	0.5-1 m	47	40	20	24	40	39	50	44	43	40	34	36
	1-2 m			3		1		15	5	7	1	4	7
	>2 m												
JUNVIRG	<0.5 m				1	1							
	0.5-1 m				1		1	1	1				
	1-2 m									1	1	1	1
	>2 m												
LARLARI	<0.5 m								1		1		
	0.5-1 m			2	1	1	1	1	1	2	1	2	2
	1-2 m		2	2	1	4	2	1	1	1	2	2	2
	>2 m	6	2	4	4	2	5	5	4	4	4	4	3
PARINSE	<0.5 m	5	13	7	14	21	13	23	18	24	14	28	44
	0.5-1 m			2		3	4	17	11	6	7	9	11
	1-2 m						1				2	1	1
	>2 m									1	1		
PARQUIN	<0.5 m	1											
	0.5-1 m												
	1-2 m												
	>2 m												
PINSTRO	<0.5 m										1		
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
PRUNUS.	<0.5 m		2										
	0.5-1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m	1				2	1	1	4	3	1	2	1
	0.5-1 m								1	1			
	1-2 m										1	1	1
	>2 m												
RHURADI	<0.5 m					1	3	4	5	11	8	13	13
	0.5-1 m												
	1-2 m												
	>2 m												
ROSLAN	<0.5 m					1							
	0.5-1 m					1							
	1-2 m												
	>2 m												
ROSMULT	<0.5 m					1	5	1	1	1			1
	0.5-1 m					1	3	6	10	2			
	1-2 m					10		4	11	8	4	10	7
	>2 m						4	3	2	4	3		1
ROSPALU	<0.5 m		7					1		5	13	9	5
	0.5-1 m		2					1	1	2	14	19	36
	1-2 m		4										
	>2 m												
ROSRUBI	<0.5 m	9	3	2	3	5	10	2	2	5	10	1	1
	0.5-1 m	7		2	1	1	2	6	1	2	1	2	3
	1-2 m			3	1								
	>2 m												
RUBIDAE	<0.5 m	160	414	364	286	379	300	199	359	549	599	579	542
	0.5-1 m	338	327	429	494	773	364	402	279	256	246	208	329
	1-2 m	19	5	38	60	50	51	41	20	7	19	16	20
	>2 m												
THUOCCI	<0.5 m		2	3	1	1		1			1	1	
	0.5-1 m						1			1	1		
	1-2 m											1	1
	>2 m												
VITRIPA	<0.5 m	29	29	27	13	22	19	13	17	15	17	11	12
	0.5-1 m	11	6	7	16	18	17	12	19	11	8	9	6
	1-2 m	2	2		6	4	3	12	2	6	3	5	
	>2 m	1					1	2		1			2
GRAND TOTAL		757	940	1008	1008	1423	901	882	890	1091	1086	1050	1169

White Pine – White Cedar:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m	1											
	0.5-1 m												
	1-2 m												
	>2 m												
AROMELA	<0.5 m												
	0.5-1 m												1
	1-2 m												
	>2 m												
BETPAPY	<0.5 m			1			1			14		6	2
	0.5-1 m								1				
	1-2 m	1							1		1		1
	>2 m		1				1						
CEPOCCI	<0.5 m												
	0.5-1 m										1		
	1-2 m												
	>2 m												
FRAXIN.	<0.5 m												3
	0.5-1 m												
	1-2 m												
	>2 m												
HYPKALM	<0.5 m	1											
	0.5-1 m												
	1-2 m												
	>2 m												
JUNCOMM	<0.5 m	232	160	100	62	92	60	47	55	42	31	35	76
	0.5-1 m	112	116	71	115	142	135	150	165	165	92	80	98
	1-2 m	3	6	2	2	1	9	36	23	10	8	18	27
	>2 m							2					
JUNVIRG	<0.5 m	55	28	2	16	4	1	1					2
	0.5-1 m	24	42	33	33	15	27	13	22	9	8	3	5
	1-2 m	1	2	6	8	8	16	15	18	17	20	20	22
	>2 m										2	1	2
LARLARI	<0.5 m					2		2					1
	0.5-1 m							1					
	1-2 m												
	>2 m												
PARINSE	<0.5 m									1	2		
	0.5-1 m												
	1-2 m												
	>2 m												
PINSTRO	<0.5 m			2	1			2	3	4	4	3	6
	0.5-1 m	1		1									
	1-2 m				1	1	1						
	>2 m							1	1	1	1	1	1
PRUSERO	<0.5 m	1											
	0.5-1 m							1		1			1
	1-2 m										1	1	
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
PRUVIRG	<0.5 m		1	1	1						2		2
	0.5-1 m					1	1		1				
	1-2 m												
	>2 m												
QUERUBR	<0.5 m										2	1	2
	0.5-1 m												
	1-2 m												
	>2 m												
RHACATH	<0.5 m								1				
	0.5-1 m									1			
	1-2 m												
	>2 m												
ROSPALU	<0.5 m	29	23	29	13	7	20	18	24	28	17	58	43
	0.5-1 m	23	25	26	28	50	47	43	48	61	28	34	37
	1-2 m			1	3	1		24	13	9	30	26	35
	>2 m										1		
ROSRUBI	<0.5 m	13	7	12	7	5	5	1		4	17	4	4
	0.5-1 m	2	4	4	6	11	2	7	8	14	1	8	2
	1-2 m	1	1	1			1	2	2	2	4	3	7
	>2 m												
RUBIDAE	<0.5 m	150	192	300	263	407	397	396	540	741	392	361	343
	0.5-1 m	48	56	57	105	184	240	261	154	148	147	60	62
	1-2 m	2			2		1	13	2		1	2	3
	>2 m												
SYMALBU	<0.5 m	30	12	20	16	22	34	37	38	51	57	51	73
	0.5-1 m	5	8	10	6	8	12	12	17	20	24	30	47
	1-2 m							2					
	>2 m												
THUOCCI	<0.5 m			1	1							1	1
	0.5-1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m	8	8	7	7	12	12	5	9	5	3	9	13
	0.5-1 m	1	1	1	1	2	4	4	2		5	1	4
	1-2 m							1	2				1
	>2 m												
GRAND TOTAL		744	693	688	697	975	1027	1097	1150	1348	902	817	927

LATE SUCCESSIONAL PLOTS:

Red Oak – White Pine:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
BETPAPY	<0.5 m									1			
	0.5-1 m												
	1-2 m												
	>2 m												
CELSCAN	<0.5 m					1	3	1	2	4	7	4	18
	0.5-1 m						3	2	3	4	5	11	9
	1-2 m												
	>2 m												
FRAXIN.	<0.5 m					1	2	2	2	2			1
	0.5-1 m										1	1	1
	1-2 m												
	>2 m												
JUNCOMM	<0.5 m									1			
	0.5-1 m												
	1-2 m												
	>2 m												
JUNVIRG	<0.5 m	3											
	0.5-1 m	2											
	1-2 m	1											
	>2 m	1	1	1	1	1	1	1	1	1	1	1	1
PARINSE	<0.5 m		8	14	35	38	27	65	79	49	38	19	86
	0.5-1 m				3	4	36	19	19	16	8	14	8
	1-2 m						3	7	1		2	1	7
	>2 m									1	2		
PINSTRO	<0.5 m								1	1	1		
	0.5-1 m												
	1-2 m												
	>2 m												
PRUNUS.	<0.5 m		1										
	0.5-1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m				2	2				1			
	0.5-1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m	1		1		4		2	2	4	3		4
	0.5-1 m										1	2	2
	1-2 m											1	1
	>2 m												
QUERUBR	<0.5 m							1	5	2	2	3	4
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ROSRUBI	<0.5 m	1		2	2						1	1	11
	0.5-1 m	1	3	4	3				1	2	3	3	4
	1-2 m		2	1	1	2	2	2	2	2		1	1
	>2 m								1				
RUBIDAE	<0.5 m	20	107	189	275	585	433	134	296	583	624	391	386
	0.5-1 m	2	10	53	203	515	283	384	189	111	246	49	154
	1-2 m					1					1		
	>2 m												
TILAMER	<0.5 m		5	6	6	10	8	10	15	9	5	4	5
	0.5-1 m						4	9	1	7	5	7	5
	1-2 m							1	6	2	3	4	5
	>2 m												
VITRIPA	<0.5 m	9	9	13	15	22	31	13	70	33	54	73	270
	0.5-1 m	2	6	6	10	18	42	25	42	39	39	111	96
	1-2 m				1		3	18	5	16	7	10	11
	>2 m												1
GRAND TOTAL		43	152	290	557	1204	881	696	743	891	1059	711	1091

Red Oak – White Birch:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m	2	6	4	2	7	5	10	14	16	8	2	7
	0.5-1 m		3		2	2	4		1	1			
	1-2 m												
	>2 m												
ACESACC	<0.5 m						2	1					
	0.5-1 m						2						
	1-2 m												
	>2 m												
BETPAPY	<0.5 m	17	32	21	36	37	87	10	4	4	12	10	21
	0.5-1 m			3	1	1	3	2	1		1	1	2
	1-2 m				2	3	1			1			4
	>2 m						3	4	4	4	5	2	4
CEPOCCI	<0.5 m	14											
	0.5-1 m						1						
	1-2 m												
	>2 m												
DECVERT	<0.5 m	3	38	16	10	21	10	10	22	9	22	4	33
	0.5-1 m	16	12	25	52	15	60	43	43	48	51	75	50
	1-2 m	8						31	1		5	1	1
	>2 m												
FRAXIN.	<0.5 m				1		1					1	2
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
JUNCOMM	<0.5 m								1				
	0.5-1 m												
	1-2 m												
	>2 m												
OSTVIRG	<0.5 m			2		3	9	8	9	4	10	7	4
	0.5-1 m							1	2	1	1	1	1
	1-2 m												
	>2 m												
PRUNUS.	<0.5 m		2										
	0.5-1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m												1
	0.5-1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m							1					
	0.5-1 m												
	1-2 m												
	>2 m												
QUERUBR	<0.5 m			37	24	31	19	10	19	17	25	20	22
	0.5-1 m											4	
	1-2 m												
	>2 m												
RHUTYPH	<0.5 m						1		1				
	0.5-1 m												
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m		5	4	4	3	3	2	1		1	8	3
	0.5-1 m	1	1		1	2	2		2	1	1	1	1
	1-2 m												1
	>2 m												
RUBIDAE	<0.5 m	68	90	129	166	376	408	498	775	1127	1023	998	969
	0.5-1 m	22	55	83	152	242	220	279	326	257	350	291	453
	1-2 m				1	1	9	11	6	5	15	15	15
	>2 m												
SASALBI	<0.5 m	37	15	6	24	32	36	32	48	36	32	45	60
	0.5-1 m	29	33	17	16	19	10	10	18	9	15	13	11
	1-2 m	1	1	15	12	2			2	2		6	1
	>2 m												
THUOCCI	<0.5 m	2											
	0.5-1 m												
	1-2 m												
	>2 m												
VITAEST	<0.5 m	3	7	9	6	6	6	10	4	5	8	4	2
	0.5-1 m	2	2	2	6	2	4	4	6	4	6	8	10
	1-2 m					2		3	1	1	3	7	3
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
VITRIPA	<0.5 m	5	6	2	4	3	3	2	3	3	1	6	
	0.5-1 m			1		1				1	1	1	2
	1-2 m											1	
	>2 m												
GRAND TOTAL		230	308	376	522	811	909	982	1314	1556	1596	1532	1684

Red Oak – Ironwood Savannah:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
BETPAPY	<0.5 m		4										
	0.5-1 m												
	1-2 m												
	>2 m												
CEPOCCI	<0.5 m												
	0.5-1 m		1										
	1-2 m	1		1	1	1	1	1	1				
	>2 m												
FRAXIN.	<0.5 m					1	1			1	1	2	2
	0.5-1 m												
	1-2 m												
	>2 m												
OSTVIRG	<0.5 m			4	1	1		1	1	1	1	2	
	0.5-1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m	2	1	1									
	0.5-1 m												
	1-2 m												
	>2 m												
QUERUBR	<0.5 m			18	14	8	6	4	4	3	2		1
	0.5-1 m												
	1-2 m												
	>2 m												
QUEVELU	<0.5 m										1		
	0.5-1 m												
	1-2 m												
	>2 m												
ROSMULT	<0.5 m						2						
	0.5-1 m												
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m	1		3	2					1	3		
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
SASALBI	<0.5 m		1	1	2		1		1	1			
	0.5-1 m	1			1						1	1	1
	1-2 m					1	1	1	1				
	>2 m									1	1		1
TILAMER	<0.5 m		1	5	2	1	1		1	1	2	2	2
	0.5-1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m	3	1	2	1	4	30	3	12	2	14	7	54
	0.5-1 m	2	3	4	8	8	7	12	39	17	13	32	23
	1-2 m					1	2	9	1	10	3	4	10
	>2 m							1			1		
GRAND TOTAL		10	12	39	32	26	52	32	63	39	40	50	94

Red Ash – Red Oak Savannah:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m	3	6	3		1	4	1			3		
	0.5-1 m												
	1-2 m												
	>2 m												
ACESACC	<0.5 m				2	1			1	2	1		1
	0.5-1 m												
	1-2 m												
	>2 m												
BETPAPY	<0.5 m			2		2						5	
	0.5-1 m					1					1		
	1-2 m										1		
	>2 m												
DECVERT	<0.5 m	29	59	9	27	24	28	6	63	31	34	10	2
	0.5-1 m	113	71	106	101	97	35	96	48	4	14	26	2
	1-2 m	4		7	2			47					
	>2 m												
FRAPENN	<0.5 m				2								
	0.5-1 m												
	1-2 m												
	>2 m												
FRAXIN.	<0.5 m	12	10	12	21	40	26	28	24	28	126	30	35
	0.5-1 m						1	2	2	2	1	1	1
	1-2 m							1	1	1	1	1	1
	>2 m												
JUNCOMM	<0.5 m						1	1	1		1		
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
JUNVIRG	<0.5 m				1	1				1		1	1
	0.5-1 m												
	1-2 m												
	>2 m												
OSTVIRG	<0.5 m	2	5	2	5	3	4	5	3	5	6	1	3
	0.5-1 m							3	3				
	1-2 m										1	1	1
	>2 m												
PRUPENS	<0.5 m												4
	0.5-1 m												
	1-2 m												
	>2 m												
PRUSERO	<0.5 m	9	12	15	17	6	5	5	3	5	5	3	
	0.5-1 m												
	1-2 m												
	>2 m												
PRUVIRG	<0.5 m			3		1							
	0.5-1 m												
	1-2 m												
	>2 m												
QUERUBR	<0.5 m			22	21	16	9	8	5		4		
	0.5-1 m												
	1-2 m												
	>2 m												
RUBALLE	<0.5 m										1		
	0.5-1 m										1		
	1-2 m							1	2				
	>2 m							1					
RUBIDAE	<0.5 m	8	59	149	326	511	483	390	639	735	568	354	333
	0.5-1 m	5	17	75	294	865	872	803	593	595	451	319	422
	1-2 m		1	6	15	44	84	124	85	19	164	71	25
	>2 m												
SASALBI	<0.5 m	120	129	70	75	75	71	132	114	108	149	114	99
	0.5-1 m	48	34	25	9	11	7	7	5	3	9	10	15
	1-2 m	6	11	30	18	14	7	2			2	3	3
	>2 m			2	24	19	15	15	14	10	10	7	10
TILAMER	<0.5 m					4	2	4	5	2	2	2	3
	0.5-1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m				3	1	1	2	3	15	6	17	8
	0.5-1 m							1		5	5	8	4
	1-2 m							1	2	2	3	3	4
	>2 m							1					
GRAND TOTAL		359	414	538	963	1737	1655	1687	1616	1573	1570	987	977

Red Oak – Sugar Maple Savannah:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m	4	7	2	4	5	3	2	2	4	48	2	29
	0.5-1 m												
	1-2 m												
	>2 m												
ACESACC	<0.5 m	4	67	12	10	9	8	4	3	17	7	15	12
	0.5-1 m						1	2	2	2	1	1	1
	1-2 m												
	>2 m												
BETPAPY	<0.5 m		2										
	0.5-1 m												
	1-2 m												
	>2 m												
CEPOCCI	<0.5 m	1	8			1	1	18	6	3	3	6	1
	0.5-1 m	5	11	11	16	5	10	7	7	3	7	5	
	1-2 m	2	2	1		1			2				
	>2 m												
DECVERT	<0.5 m	23	26	9	6	16	22	11	46	20	12	8	6
	0.5-1 m	99	41	93	124	96	8	42	200	206	135	127	82
	1-2 m	16		35	60	22		6	46	5	47	36	10
	>2 m												
FRAXIN.	<0.5 m			1								1	
	0.5-1 m												
	1-2 m												
	>2 m												
OSTVIRG	<0.5 m	9	5	12	10	24	20	13	10	9	6	13	8
	0.5-1 m				1	3	5	7	10	5	6	7	5
	1-2 m							2	2	4	5	4	5
	>2 m											1	4
PRUSERO	<0.5 m	36	47	59	50	47	35	35	25	16	16	17	25
	0.5-1 m				1	12	10	21	19	23	20	9	9
	1-2 m						1	1	3	6	10	15	17
	>2 m												2
PRUVIRG	<0.5 m		1	1	4		1						
	0.5-1 m				2		2	3	1	1			
	1-2 m												
	>2 m												
QUERUBR	<0.5 m	3	1	136	45	37	18	3	7	7	22	16	8
	0.5-1 m												
	1-2 m												
	>2 m												
RHURADI	<0.5 m		3										
	0.5-1 m												
	1-2 m												
	>2 m												
ROSPALU	<0.5 m											2	1
	0.5-1 m											1	
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ROSRUBI	<0.5 m		1	3	1	2	2	3	4	14	5	3	1
	0.5-1 m	2	2	5	2	3	2	2	4	9	1	1	8
	1-2 m	5	1	3	4	3	2	2	1	5	4	4	2
	>2 m												
RUBALLE	<0.5 m								4		9	10	13
	0.5-1 m						1	5	14	33	48	24	38
	1-2 m							2	10	17	13	5	11
	>2 m												
RUBIDAE	<0.5 m	14	64	62	35	130	51	157	260	286	270	462	442
	0.5-1 m	9	57	178	246	340	242	171	226	533	606	488	562
	1-2 m			7	25	9	19	43	45	57	68	47	135
	>2 m												
RUBOCCI	<0.5 m									2			11
	0.5-1 m									7		5	12
	1-2 m									2		8	22
	>2 m												
TILAMER	<0.5 m	4	2	2	1	3	1	1	2	1	1	1	3
	0.5-1 m							1	1		1	1	
	1-2 m												
	>2 m												
VITRIPA	<0.5 m				1	1	2	1	5	1	4	13	10
	0.5-1 m							4	3	7	10	10	12
	1-2 m								3	2	3	4	3
	>2 m												
GRAND TOTAL		236	348	632	648	769	467	569	973	1307	1388	1372	1510

Red Oak – Sugar Maple Forest:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	<0.5 m	20	44	21	40	25	78	23	13	38	340	4	2
	0.5-1 m		1					1	1			1	2
	1-2 m									1			
	>2 m												
ACESACC	<0.5 m	68	1962	526	400	305	468	396	176	328	366	215	189
	0.5-1 m		1	1	1	1	4	16	8	4	13	11	31
	1-2 m							1	1	1	3	2	
	>2 m									3	1	2	4
BETPAPY	<0.5 m		2								1		
	0.5-1 m												
	1-2 m												
	>2 m												
DECVERT	<0.5 m	4	9	3	3	2			3	3			1
	0.5-1 m	7	4	15	7	4		1	2	3	4	2	8
	1-2 m	3		2	6						4	6	
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
FRAXIN.	<0.5 m		1	5	6	1				3	1	6	5
	0.5-1 m												
	1-2 m												
	>2 m												
OSTVIRG	<0.5 m	6	7	4	5	15	11	15	17	15	11	19	20
	0.5-1 m	1	1	2	2	3	5	3	3	5	3	1	2
	1-2 m												
	>2 m												
PINSTRO	<0.5 m	1	1						1				
	0.5-1 m			1	1	1	1						
	1-2 m							1		1			1
	>2 m										1	1	
PRUSERO	<0.5 m	8	2	6	2	2		5	3	3	1		1
	0.5-1 m												
	1-2 m							1					
	>2 m												
PRUVIRG	<0.5 m				1	1	1					1	
	0.5-1 m				1	1	1						
	1-2 m												
	>2 m												
QUEMUEH	<0.5 m	1											
	0.5-1 m												
	1-2 m												
	>2 m												
QUERUBR	<0.5 m	1	1	29	16	13	6	6	6	7	9	6	5
	0.5-1 m										4		
	1-2 m												
	>2 m												
ROSRUBI	<0.5 m		1										
	0.5-1 m												
	1-2 m												
	>2 m												
RUBALLE	<0.5 m	2	3	5	2	2	5	8	9	11	4	12	6
	0.5-1 m	1	2	7	13	6		16	31	26	17	34	19
	1-2 m	1	1	1		21	9	32	36	76	84	69	89
	>2 m								9	8	8	4	5
RUBIDAE	<0.5 m	9	31	34	36	16	57	68	85	70	110	147	128
	0.5-1 m	9	11	50	45	119	134	60	241	229	211	226	273
	1-2 m			1	4	34	48	64	50	81	77	41	120
	>2 m												
SAMCANA	<0.5 m	2	1			1	1	1					
	0.5-1 m								1		1	1	
	1-2 m												2
	>2 m												
SAMPUBE	<0.5 m				1								
	0.5-1 m												
	1-2 m												
	>2 m												

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
SANCANA	<0.5 m												
	0.5-1 m									1			
	1-2 m												
	>2 m												
SASALBI	<0.5 m			1	1	1	2	1	1	1			1
	0.5-1 m												
	1-2 m												
	>2 m												
TILAMER	<0.5 m					1				7	1		2
	0.5-1 m												
	1-2 m												
	>2 m												
VITRIPA	<0.5 m									1	2	1	1
	0.5-1 m												
	1-2 m												
	>2 m												
GRAND TOTAL		144	2086	714	593	575	831	719	704	920	1276	812	917

DISTURBED PLOT:

Bluegrass Grassland:

SP_CODE	SIZE CLASS	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ROSRUBI	<0.5 m												2
	0.5-1 m												
	1-2 m												
	>2 m												
RUBIDAE	<0.5 m	12	31	90	234	423	621	687	907	1126	1218	320	196
	0.5-1 m			13	33	39	44	47	42	109	81	1	10
	1-2 m												
	>2 m												
VITRIPA	<0.5 m							2		1	3	29	41
	0.5-1 m							2	4	2	3	12	6
	1-2 m									1			
	>2 m												
GRAND TOTAL		12	31	103	267	462	665	738	953	1239	1305	362	255

APPENDIX B

LEGEND TO SPECIES CODES

The following plant species codes are based on a seven-letter formula using the first three names of the genus name and the first four letters of the species name. Scientific names follow Morton and Venn (1990), common names follow Oldham (1993) in most cases.

SP. CODE	SCIENTIFIC NAME	COMMON NAME
ACERUBR	<i>Acer rubrum</i> L.	Red Maple
ACESACC	<i>Acer saccharinum</i> Marshall	Sugar Maple
ACESPP.	<i>Acer</i> spp.	Unspecified Maple species
ACHMILL	<i>Achillea millefolium</i> L.	Common Yarrow
AMMBREV	<i>Ammophila breviligulata</i> Fern.	American Beach Grass
APOANDRO	<i>Apocynum androsaemifolium</i> L. ssp. <i>androsaemifolium</i>	Spreading Dogbane
ARALYRA	<i>Arabis lyrata</i> L.	Lyre-leaved Rock-cress
ARESERP	<i>Arenaria serpyllifolia</i> L.	Thyme-leaved Sandwort
ARTCAMP	<i>Artemisia campestris</i> L.	Tall Wormwood
ASCSYRI	<i>Asclepias syriaca</i> L.	Common Milkweed
ASTLANC	<i>Aster lanceolatus</i> Willd. ssp. <i>lanceolatus</i>	Panicled Aster
ASTER..	<i>Aster</i> sp.	Unknown Aster
BETPAPY	<i>Betula papyrifera</i> Marshall	Paper Birch
BIDCERN	<i>Bidens cernua</i> L.	Nodding Beggarticks
CALCANA	<i>Calamagrostis canadensis</i> (Michaux) P. Beauv.	Canada Blue-joint
CALSEPI	<i>Calystegia sepium</i> (L.) R. Br.	Hedge Bindweed
CAMAPAR	<i>Campanula aparinoides</i> Pursh	Marsh-bellflower
CARALAT	<i>Carex alata</i> Torrey	Sedge
CARAQUA	<i>Carex aquatilis</i> Wahlenb.	Water Sedge
CARCEPD	<i>Carex cephaloidea</i> (Dewey) Dewey	Thin-leaf Sedge
CARCOMO	<i>Carex comosa</i> Boott	Bearded Sedge
CARCRAW	<i>Carex crawei</i> Dewey	Crawe's Sedge
CAREBUR	<i>Carex eburnea</i> Boott ex Hooker	Bristle-leaf Sedge
CARINTE	<i>Carex interior</i> L. Bailey	Inland Sedge
CARLACU	<i>Carex lacustris</i> Willd.	Lake Sedge
CARLASI	<i>Carex lasiocarpa</i> Ehrh.	Hairy-fruited Sedge
CARPENS	<i>Carex pensylvanica</i> Lam.	Pennsylvania Sedge
CARPSEU	<i>Carex pseudo-cyperus</i> L.	Cyperus-like Sedge
CARRADI	<i>Carex radiata</i> (Wahlenb.) Small	Sedge
CARSTRI	<i>Carex stricta</i> Lam. Tussock	Sedge
CELSCAN	<i>Celastrus scandens</i> L. Climbing	Bittersweet
CEPOCCI	<i>Cephalanthus occidentalis</i> L.	Buttonbush
CHARA	<i>Chara vulgaris</i>	Stonewort
CICBULB	<i>Cicuta bulbifera</i> L.	Bulb-bearing Water-hemlock
CIRARVE	<i>Cirsium arvense</i> (L.) Scop.	Canada Thistle
CIRMUTI	<i>Cirsium muticum</i> Michaux	Swamp Thistle

CLAMARI	<i>Cladium mariscoides</i> (Muhlenb.) Torrey	Twig-rush
CORHYSS	<i>Corispermum hyssopifolium</i> L.	Bugseed
DECVERT	<i>Decodon verticillatus</i> (L.) Elliott	Swamp Loosestrife
ELEACIC	<i>Eleocharis acicularis</i> (L.) Roemer & Schultes	Needle Spike-rush
ELEERYT	<i>Eleocharis erythropoda</i> Steudel	Red-based Spike-rush
ELEQUAD	<i>Eleocharis quadrangulata</i> (Michaux) Roemer & Schultes	Four-angled Spike-rush
ELETENU	<i>Eleocharis tenuis</i> (Willd.) Schultes	Elliptic Spike-rush
ELYVILL	<i>Elymus villosus</i> Muhlenb. ex Willd.	Hairy Wild-rye
EPIHELL	<i>Epipactis helleborine</i>	Hellerborine
EQUARVE	<i>Equisetum arvense</i> L.	Field Horsetail
EQUVARI	<i>Equisetum variegatum</i> Schleicher ex Weber & Mohr	Variiegated Scouring-rush
EUPESCU	<i>Euphorbia esula</i> L.	Leafy Spurge
EUPPERF	<i>Eupatorium perfoliatum</i> L.	Boneset
FRAVIN.	<i>Fraxinus</i> spp.	Unspecified Ash species
GALAPAR	<i>Galium aparine</i> L.	Cleavers
GALTINC	<i>Galium tinctorium</i> L.	Dyer's Bedstraw
HYPKALM	<i>Hypericum kalmianum</i> L.	Kalm's St. John's-wort
HYPPERF	<i>Hypericum perforatum</i> L.	Common St. John's-wort
IMCAPE	<i>Impatiens capensis</i> Meerb.	Spotted Touch-me-not
JUNCOMM	<i>Juniperus communis</i> L.	Common Juniper
JUNVIRG	<i>Juniperus virginiana</i> L.	Red Cedar
LARLARI	<i>Larix laricina</i> (Duroi) K. Koch	Tamarack
LATPALU	<i>Lathyrus palustris</i> L.	Marsh Pea
LEEORYZ	<i>Leersia oryzoides</i> (L.) Swartz	Rice Cut Grass
LEMMINO	<i>Lemna minor</i> L.	Common Duckweed
LEMTRIS	<i>Lemna trisulca</i> L.	Star Duckweed
LIACYLI	<i>Liatris cylindracea</i> Michaux	Cylindric Blazing-star
LICHEN	Various lichen species (unspecified)	
LINBORE	<i>Linnaea borealis</i> L.	Twinflower
LINMEDI	<i>Linum medium</i> (Planchon) Britton var. <i>texanum</i> (Planch.) Fern.	Stiff Yellow Flax
LYCUNIF	<i>Lycopus uniflorus</i> Michaux	Bugleweed
LYSTHYR	<i>Lysimachia thyrsoflora</i> L.	Tufted Loosestrife
MELALBA	<i>Melilotus alba</i> Medicus	White Sweet-clover
MOELATE	<i>Moehringia lateriflora</i> (L.) Fenzl.	Grove Sandwort
MOSS	Various moss species (unspecified)	
MUHFRON	<i>Muhlenbergia frondosa</i> (Poiret) Fern.	Wire-stemmed Muhly
NUPVARI	<i>Nuphar variegata</i> Engelm. ex Durand in Clinton	Bullhead Lily
OSTVIRG	<i>Ostrya virginiana</i> (Miller) K. Koch	Hop-hornbeam
PANIMPL	<i>Panicum implicatum</i> Britton	Hairy Panic Grass
PANVIRG	<i>Panicum virgatum</i> L.	Switch Grass
PARGLAU	<i>Parnassia glauca</i> Raf.	Grass-of-Parnassus
PARINSE	<i>Parthenocissus inserta</i> (A. Kerner) Fritsch	Virginia Creeper
PARPENS	<i>Parietaria pensylvanica</i> Muhlenb. ex Willd.	Pellitory
PHAARUN	<i>Phalaris arundinacea</i> L.	Reed Canary Grass
PHYHETE	<i>Physalis heterophylla</i> Nees	Clammy Ground-cherry
PILFONT	<i>Pilea fontana</i> (Lunell) Rydb.	Clearweed
PINSTRO	<i>Pinus strobus</i> L.	White Pine
POACOMP	<i>Poa compressa</i> L.	Canada Blue Grass
POAPRAT	<i>Poa pratensis</i> L. ssp. <i>pratensis</i>	Kentucky Blue Grass
POLDODE	<i>Polanisia dodecandra</i> (L.) DC	Clammy-weed
POLHYDR	<i>Polygonum hydropiper</i> L.	Water-pepper

POLPERS	<i>Polygonum persicaria</i> L.	Lady's-thumb
POPDELT	<i>Populus deltoides</i> Bartram ex Marshall	Cottonwood
POTGRAM	<i>Potamogeton gramineus</i> L.	Variable-leaved Pondweed
POTNATA	<i>Potamogeton natans</i> L.	Floating Pondweed
PRUSERO	<i>Prunus serotina</i> Ehrh.	Black Cherry
PRUVIRG	<i>Prunus virginiana</i> L. ssp. <i>virginiana</i>	Choke Cherry
PTEAQUI	<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken
QUERUBR	<i>Quercus rubra</i> L.	Red Oak
RHURADI	<i>Rhus radicans</i> L.	Poison Ivy
RHUTYPH	<i>Rhus typhina</i> L.	Staghorn Sumac
RHYCAPI	<i>Rhynchospora capillacea</i> Torrey	Hair-like Beak-rush
ROSPALU	<i>Rosa palustris</i> Marshall	Swamp Rose
ROSRUBI	<i>Rosa rubiginosa</i> L.	Sweetbrier
RUBALLE	<i>Rubus allegheniensis</i> Porter	Common Blackberry
RUBIDAE	<i>Rubus idaeus</i> L. ssp. <i>melanolasius</i> (Dieck) Focke	Wild Red Raspberry
RUMACEC	<i>Rumex acetosella</i> L.	Sheep Sorrel
SAGLATI	<i>Sagittaria latifolia</i> Willd.	Common Arrowhead
SALKALI	<i>Salsola kali</i> L. ssp. <i>ruthenica</i> (Iljin) Soo	Russian-thistle
SAMCANA	<i>Sambucus canadensis</i> L.	Common Elder
SASALBI	<i>Sassafras albidum</i> (Nutt.) Nees	Sassafras
SCHSCOP	<i>Schizachyrium scoparium</i> (Michaux) Nees	Little Bluestem
SCIPUNG	<i>Scirpus pungens</i> M. Vahl	Threesquare
SCIVALI	<i>Scirpus validus</i> Vahl.	Soft-stem Bulrush
SCLVERT	<i>Scleria verticillata</i> Muhlenb. ex Willd.	Low Nut-rush
SCUGALE	<i>Scutellaria galericulata</i> L.	Common Skullcap
SOLCASL	<i>Solidago canadensis</i> L. sensu lato	Canada Goldenrod group
SOLDULC	<i>Solanum dulcamara</i> L.	Climbing Nightshade
SOLPTAR	<i>Solidago ptarmicoides</i> (Nees) Boivin	Upland White Aster
SORNUTA	<i>Sorghastrum nutans</i> (L.) Nash	Indian Grass
SPAEURO	<i>Sparganium eurocarpum</i> Engelm. ex A. Gray	Giant Bur-reed
SPAPECT	<i>Spartina pectinata</i> Link	Tall Cord Grass
SPOCRYP	<i>Sporobolus cryptandrus</i> (Torrey) A. Gray ssp. <i>fuscicollis</i>	Sand Dropseed
STAHISP	<i>Stachys hispida</i> Pursh	Woundwort
STEGRAM	<i>Stellaria graminea</i> L.	Grass-leaved Stitchwort
SYMALBU	<i>Symphoricarpos albus</i> (L.) S.F. Blake	Snowberry
THEPALU	<i>Thelypteris palustris</i> (Salisb.) Schott	Marsh Fern
THUOCCI	<i>Thuja occidentalis</i> L.	White Cedar
TILAMER	<i>Tilia americana</i> L.	Basswood
TYPANGU	<i>Typha angustifolia</i> L.	Narrow-leaved Cattail
URTDIOI	<i>Urtica dioica</i> L. ssp. <i>dioica</i>	European Stinging Nettle
UTRCORN	<i>Utricularia cornuta</i> Michaux	Horned Bladderwort
UTRRESU	<i>Utricularia resupinata</i> Greene ex Bigelow	Bladderwort
VERTHAP	<i>Verbascum thapsus</i> L.	Common Mullein
VIOSPP.	<i>Viola</i> spp.	Unspecified Violet species
VITAEST	<i>Vitis aestivalis</i> Michaux	Summer Grape
VITRIPA	<i>Vitis riparia</i> Michaux	Riverbank Grape

APPENDIX C

TABLES OF VEGETATION COVER FOR BBC PLOTS AT LONG POINT IN 1992 TO 1998

Species listed in the following tables are those that contributed important ground cover in each BBC plot. Important species had over 1% mean cover in at least 1 year, or were present in at least 2 quadrats in the plot in any year.

For each year listed (1992 to 2002) the estimated mean percent cover (%COV) for each species in the BBC plot is given, as well as the proportion of the total vegetation cover represented for each species (%VEG). Plot summaries include the estimated TOTAL percent ground cover for all species, the COUNT of all species recorded from the plots and the SUM of ground cover and relative ground cover for the species listed.

Species are listed in alphabetic order by species code. A legend to species codes is given in Appendix B.

EARLY SUCCESSIONAL PLOTS

Dry Cottonwood Sand Dune:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AMMBREV	0.25	3.77	1.76	1.52	0.50	0.29	0.52	2.00	0.27	0.27	0.01	0.26
ARALYRA			0.01		0.01	0.25						0.01
ASCSYRI	0.01	0.01	0.26	0.26	0.28	1.52	1.53	0.52	0.76	0.76	0.26	0.25
ELYVIRG			0.01	0.01	0.01							
LATJAPO		0.01	0.01	0.25	1.50	1.50	1.50	0.25	0.25	0.01		
MOSS	0.25	4.02	6.27	15.00	3.75	6.25	1.78	9.00	9.50	2.00	9.00	4.01
PANVIRG	2.54	4.54	4.28	0.53	2.28	1.77	3.53	3.76	3.77	4.75	0.75	2.52
PHYHETE	0.01	0.01	0.01	0.01	0.01	0.01	0.25	0.25	1.50	1.75	0.25	2.00
POACOMP	13.25	15.51	16.50	25.25	21.76	15.50	24.25	24.51	21.77	27.76	26.00	22.25
POAPRAT	0.25	1.51	5.28	3.75	3.75	4.51	4.25	3.25	3.03	8.00	4.50	5.25
POPDELT		0.50	0.50	0.50	0.50	7.50	10.01	12.50	12.50	10.00	10.00	12.50
SCHSCOP	19.52	19.01	23.02	19.25	14.52	9.25	16.01	20.75	16.25	16.76	8.52	11.00
SOLHISP									0.50			
SOLNEMO				0.01		0.25	0.26	0.25		0.52	0.52	1.00
SPOCRYP	0.29	0.06	0.30	0.29	0.78	0.78	0.78	1.75	0.79	0.76	0.03	0.51
VITRIPA	0.01	0.25	3.75	1.50	3.75	1.75	5.25	9.00	5.50	10.50	13.00	13.75
Total Cover	36.39	49.2	61.97	68.13	53.66	51.17	69.92	88.06	76.66	84.37	73.1	75.83
Number of species	12	12	17	14	18	18	13	17	17	18	15	18

Sedge - Rush Swale 1:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASTDUMO					0.01					0.02		
ASTLANC	0.03		0.01									
ASTLATE				0.02								0.01
CALCANA				0.01					0.01	1.50	1.50	1.50
CARAQUA					0.25	0.25	1.50					
CARCRAW									2.01			
CARSTRI				0.01				1.50	0.25	0.25		
CARVIRI	0.01									0.50		
CHARA	11.51	4.00					0.25	0.01		15.00	26.25	
CLAMARI	6.02	1.26	5.53	6.78	0.51	0.27	1.53	1.53	1.57	6.03	3.27	7.51
ELEACIC	3.76	0.27						2.03	1.76			0.25
ELEERYT			0.26	0.26	4.26			0.26	0.25			
ELEPAUC	0.25	0.01		0.52						3.25		
ELEQUAD	3.26	0.52	3.02	9.25	0.52	0.25	1.76	0.26	1.75	4.00	1.75	0.02
EUPPERF									0.01	0.02	0.02	0.25
HELAUTU									0.01	0.01	0.27	0.53
HYPKALM	0.00			0.01				0.00	0.01	0.00	0.01	0.01
HYPMAJU											0.01	
LYCAMER												1.50
LYCUNIF	0.02		0.01		0.01			0.00	0.25	0.25	0.25	
NUPVARI											1.50	1.50
PANIMPL				0.01				0.25	0.01	0.01	0.00	0.26
POPDELT									0.00	0.01		
POTGRAM			1.50									
POTNATA	0.01	0.25	1.50	0.04	0.01	0.26	3.76	0.26	0.01		0.50	
QUEVELU									0.01			
RHYCAPI	6.26		0.01	0.01				0.01	3.77	8.00	0.50	3.50
SCIPUNG	1.77	1.78	0.52	9.51	8.02	0.55	3.27	3.75	4.78	8.51	7.04	3.53
SCLVERT	0.00			3.79				0.26	11.50	12.50	0.25	3.79
SCUGALE		0.00		0.25								
SEEDLNG				0.03				2.26	0.00			
SOLPTAR									0.01		0.01	
UTRCORN								0.25		1.75		
Total Cover	32.92	8.1	12.37	30.5	13.59	1.58	12.07	12.64	28.24	61.86	43.13	24.19
Number of species	16	9	10	16	9	5	6	16	24	19	16	17

Sedge - Rush Swale 2:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASTDUMO			0.01									
ASTLANC			0.02									
ASTLATE	0.05	0.03	0.01		0.01		0.01		0.53	0.28		0.53
CALCANA	3.75	3.75	1.50	3.75	0.25	0.01	0.25	3.75	1.50	5.25	5.25	1.76
CALTUBE	0.00		0.00	0.00	0.00							
CARVIRI	0.03	0.01								0.26		0.26
CLAMARI	5.30	3.29	8.30	8.30	5.79	4.53	12.02	5.52	15.02	11.51	5.51	8.01
ELEACIC	0.02							2.00	0.27		0.25	0.26
ELEERYT		0.25	0.02		0.52	0.50	0.26	0.04	0.01			
ELEPAUC		1.77	0.01	4.01	0.51					0.52		
EQUVARI	0.03	0.02	0.03	0.04		0.01	0.27	0.25	0.51	0.03	0.02	0.02
EUPPERF	0.00	0.02	0.02	0.00	0.02			0.26	0.26	0.02	0.04	0.28
FRAVIRG			0.01	0.01	0.01			0.00	0.01	0.25	0.02	0.50
HELAUTU									0.03	0.51	0.28	0.53
HYPKALM	6.28	6.53	9.26	10.76	12.00	5.75	4.00	5.52	5.53	1.78	4.01	2.27
HYPMAJU											0.01	
LEMMINO			0.01									
LINMEDI	0.02	0.02	0.01	0.26	0.02				0.03	0.01		0.01
LYCAMER	0.01	0.01							0.26	0.25	0.01	0.26
LYCUNIF	0.01	0.03	0.03	0.00	0.00	0.01		0.26	0.50	0.27	0.27	0.03
MOSS	8.00	25.00	22.50	20.00	22.00		6.75	13.00	10.25	6.75	29.00	2.00
PANIMPL	0.26	1.53	1.51	1.50	0.25			0.00	0.01	0.01	0.26	0.02
PANVIRG		0.25	0.02	0.02	0.01	0.00			0.50	0.50	0.50	1.77
PARGLAU	0.01	0.02	0.03	0.02	0.02			0.00	0.01	0.01		0.02
PHRAUST	0.01	0.25	1.50	3.75	1.50	1.50	1.50	3.75	3.75	3.76	0.25	0.25
RHYCAPI	16.28	12.50	7.00	6.51	4.26			0.26	7.76	17.50	1.75	3.27
SCHSCOP				0.01		0.01		0.01	0.25	0.50		0.25
SCIPUNG	0.31	0.54	0.53	0.55	2.27	0.77	2.01	2.26	3.51	3.52	3.28	2.01
SCLVERT	3.75	5.52	1.76	1.76	0.01			0.27	1.78	4.50	7.51	10.00
SEEDLNG	0.02			0.02	0.00			0.27	0.01			
SELAPOD		0.02	0.00						0.25	0.01		0.01
SOLPTAR	0.05	0.05		0.04	0.04	0.02		0.25	0.01		2.04	0.25
SORNUTA	0.03											
THEPALU	0.01	0.01	0.02	0.25	0.25	0.01	1.50	0.25	0.50	1.75	0.50	1.75
TRIFRAS			0.00		0.00		0.01	0.02	0.01	0.00		
TRIGLO.	0.00	0.02	0.02	0.28	0.02			0.26	0.27	0.76		0.02
TRIMARI						0.00	0.27				0.28	
UTRCORN	0.01			0.50				0.01	0.26	0.50		0.27
UTRRESU				0.02								
VERSCUT												1.50
Total Cover	44.25	61.7	54.13	62.62	49.79	13.15	29.1	38.25	54.11	61.54	61.55	38.64
Number of species	26	26	27	28	29	16	13	27	33	33	24	33

Intergrading Dune - Swale Savannah:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AMMBREV	0.01	0.01	0.01	0.02	0.01	0.02	0.01	0.26	0.02	0.25	0.25	0.25
ARALYRA						0.01	0.25					0.02
ARTCAMP	0.00	0.27	1.52	0.02	0.28	0.25		0.26	0.51	0.26	0.02	0.50
ASTDUMO			0.02									
ASTLANC		0.02	0.05									
ASTLATE	0.01			0.27	0.02	0.26	0.25	0.25	0.25			
CALCANA	7.50	11.26	17.51	16.50	3.25	0.51	4.25	9.00	9.25	11.25	4.50	4.50
CARAURE	0.00	0.02	1.50	0.01		0.01	0.01	0.25				
CARCRAW		0.26	0.02	0.25	0.02	0.25	0.25	0.25	0.01			
CARLASI			0.25				3.75	0.25				
CARVIRI	0.02	0.02		0.01	0.00							
CLAMARI	0.28	0.27	3.02	0.75	4.25	6.75	11.75	16.50	3.26	3.77	0.26	0.26
CORHYSS	0.00	0.01	0.01								0.03	
ELEERYT		0.25	0.25	3.75	0.01	0.02	0.50					
EQUVARI	0.26	0.03	0.26	0.27	0.01	0.26	1.53	4.00	0.25		0.01	1.52
EUPPERF	0.00	0.01	0.00	0.01								
FRAVESC	0.01											
FRAVIRG		1.51	1.51	3.76	4.00	3.75	3.75	1.50	1.50	1.50		
HYPKALM	7.77	6.51	15.26	16.26	13.76	11.75	5.25	3.76	0.25			
JUNCOMM				0.00							1.50	
JUNVIRG	0.01	1.50		0.01	1.50	1.50			0.01			
LIACYLI	0.01		1.50	0.25	0.25	0.26	0.01	0.03	0.50	0.50	0.50	1.75
LYCUNIF	0.03	0.01	0.02	0.01	0.25			0.02	0.00	1.50	1.50	
MOSS	16.50	23.75	18.75	30.00	19.00	1.76	17.75	20.50	27.50	19.00	1.75	9.00
PANIMPL	0.04	0.25	0.01	0.00	0.00		0.02	0.03	0.03	0.01		
PANVIRG	0.26	1.50	1.52	1.75	1.76	0.51	1.50	0.50	3.00	1.75	0.26	0.50
PARGLAU	0.01	0.01	0.02	0.02	0.25	0.01	1.50		0.00			
POACOMP	2.25	4.77	5.27	9.02	2.01	2.25	5.26	5.51	1.51	3.25	1.77	1.76
POAPRAT			7.50						0.25		0.25	
RHYCAPI	8.75		3.75				0.01					
SALKALI	0.25				0.02							
SCHSCOP	4.51	4.51	1.53	3.01	2.25	0.50	5.26	3.01	2.02	5.50	0.27	3.01
SCLVERT	3.76	0.26			0.01	0.25						
SOLNEMO				0.00		0.25	0.25	0.25		0.25	0.02	0.01
SOLPTAR	0.03	0.01				0.01				0.02	0.25	0.01
SONCHU.												1.50
SPOCRYP	0.03	0.27	1.51	0.26	1.51	0.27	1.52	0.25	0.26	1.50	0.26	0.01
THEPALU	3.75	6.25	3.75	3.75	3.75	0.25	1.50	6.25	6.25	6.25	6.50	7.75
Total Cover	56.31	63.57	86.35	89.98	58.2	31.93	66.7	72.64	56.66	56.57	20.16	32.91
Number of species	34	33	33	29	29	27	32	24	24	18	24	25

Dry Cottonwood - Juniper Savannah:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AMMBREV	0.01	1.50	0.25	0.01								
ARALYRA		0.02	0.01						1.51			
ARESERP		0.01			0.25	0.02						
ARTCAMP			0.02	0.04	3.51	0.76	0.51	0.76	1.77	0.75	0.75	3.25
ASTLANC			0.02									
ASTLATE	0.00			0.27	0.02				0.25	0.03		0.51
CALTUBE	0.01	0.02	0.25	0.01	0.01							0.01
CARCRAW		0.01	0.01	0.03	0.02	1.51	1.51	0.25	0.01	0.01	0.25	
CARVIRI		0.01										
CLAMARI	0.02	0.01	1.51	1.50	1.76	3.01	7.75	10.25	4.50	2.00	3.00	2.00
CORHYSS	0.00	0.00	0.01	0.00		0.00	0.01		0.00		0.00	0.01
ELEACIC		0.02										
ELEERYT					0.01	0.27	0.01	0.01				
HELAUTU									0.26	0.75	0.50	
HYPKALM	5.25	5.25	10.00	7.76	10.00	7.51	5.50	7.75	3.25	3.25	3.00	1.75
JUNBALT	0.02	1.75	1.50	1.75	0.26	0.25	4.00	1.76	0.75	2.00	1.75	1.75
LIACYLI	0.27	0.27	5.25	1.50	0.26	0.25	0.25	1.50	1.50	1.50	1.50	0.26
LINMEDI	0.01	0.01	0.01	0.01	0.00	0.01	0.01					
MELALBA		0.00	0.01	0.01	1.50	0.01		0.25	0.25	0.25	0.25	1.50
MOSS	14.02	15.75	12.75	19.50	24.25	12.25	22.76	19.02	19.25	16.51	26.75	14.25
PANIMPL	0.02	0.01	0.00	0.01	0.00	0.51	0.02	0.02	0.25			0.01
PANVIRG	0.28	0.29	0.05	0.28	0.26		0.77	0.76	2.00	2.50	1.25	1.25
PARGLAU	0.02	0.50	1.75	1.75	3.00	1.75	0.27	0.50	0.02	1.75	0.50	0.26
POACOMP	0.28	5.53	9.01	9.01	9.25	6.76	6.76	9.00	7.25	6.00	3.27	1.78
POAPRAT									0.25		2.00	1.75
RHYCAPI	1.51	1.51	7.50	3.75	1.50	0.01	1.51					
SCHSCOP	4.27	7.79	5.52	4.29	6.26	6.27	11.01	12.25	10.00	9.51	3.27	0.54
SCLVERT	6.25	3.75	1.50	1.50	6.26							0.01
SOLOHIO												0.01
SOLPTAR	0.02	0.01	0.01			0.01		0.51	0.25		0.03	
SPOCRYP	1.53	5.28	1.78	0.29	0.77	0.28	0.53	0.76	0.51	0.76	0.51	1.76
STEMEDI				0.25								
Total Cover	33.85	49.56	58.99	53.54	69.19	41.73	63.44	65.61	54.1	48.33	48.84	32.94
Number of species	27	26	26	24	25	24	19	18	23	19	19	22

MIDDLE SUCCESSIONAL PLOTS:

Tamarack Slough:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR		3.75										
ASCINCA	0.01		0.26	0.01	0.25	0.25	0.25	0.25	0.01	0.25	0.01	0.00
ASCSYRI	0.00	1.50	0.01	0.01			1.50	0.25	1.50	0.01	0.01	0.01
ASTDUMO					0.01							
ASTLATE	0.01		0.01	0.01			0.25		0.26	0.00	0.25	0.02
BETPAPY	0.01	0.01	0.01	0.00				0.00	4.01			
BOECYLI		0.01	0.01	1.77	3.78	0.51	3.25	3.25	8.26	4.26	1.76	4.26
CALCANA	5.52	4.54	5.78	6.02	5.01	2.50	3.75	3.52	2.27	3.76	4.25	4.79
CAMAPAR	0.01	0.03	1.50	1.52	0.25	0.25	0.01	0.01	0.00	0.51	0.52	0.51
CARAQUA		0.25	0.27			3.75	1.50	3.76	0.25	0.02		
CARDIAN												0.26
CAREBUR	7.50	7.75	7.75	9.00	9.00	4.00	5.25	5.25	7.50	10.01	10.01	7.51
CARLASI	0.01	3.76	3.75	6.26		4.00	3.75	3.75	3.75	3.75	3.75	
CARSTRI	0.02	7.76	0.01	3.25	6.52	2.00	11.75	3.00	3.01	1.52	1.52	0.27
CELSCAN		0.01	0.01	0.25	0.25	0.25	0.25	0.25	0.25	0.01	0.50	0.25
CEPOCCI	0.00	0.00		0.01	0.01		0.25	0.25	1.50	1.50	1.50	1.50
CHARA	6.25	0.25	0.01	8.75	0.01							
CICBULB			0.01		0.01		0.01					0.00
CIRARVE										1.50	0.25	1.50
CIRMUTI			1.50	0.25								
CLAMARI	11.25	6.75	4.01	5.51	13.75	1.51	4.00	1.50	1.50	1.50	0.01	1.52
DULARUN	0.02	0.25	0.26	0.25	0.25	0.01	0.25	0.01	0.00			
FRAVIRG		0.25	0.25	0.01	0.25	0.01	1.50	1.50	1.50	0.25	0.25	1.50
GALAPAR	0.01				0.00				0.01			
GLYSTRI		0.01								0.00	0.02	0.00
IMPCAPE		0.25	0.00	0.00	0.01	0.01	0.02	0.26	0.50	6.27	10.26	7.76
JUNCOMM	1.50	1.50	0.25	0.25		0.25	0.25	0.25	0.25	0.25	0.25	1.50
LATPALU	0.02	0.27	0.26	0.26	0.02	0.26	0.26	0.02		0.50	0.26	0.51
LEEVRG								1.50				
LYCAMER	0.01	0.00	0.00				0.25		0.01	0.03	0.50	0.51
LYCUNIF	0.03	0.02	0.26		0.01	0.25		0.26	0.51	0.26	0.02	0.27
LYSTHYR	0.00		0.01	0.01	0.02	0.27	0.01	0.51	0.01	0.26	0.26	0.01
MOSS	1.51	10.00		0.25	9.01	3.75	3.25	1.76	5.50	1.75	2.25	2.01
NUPVARI	0.01	1.50	0.25	0.01		0.25	1.50	0.01	0.25	0.25	0.01	0.25
PANIMPL	0.02		0.00	0.01				0.01		0.00	0.25	0.02
PARINSE		0.00	0.00	0.00	0.01			0.25	1.50	1.75	4.00	1.75
PHAARUN		0.26					0.01	0.25			1.51	3.01
PILFONT	6.28	1.50	1.52								0.27	
PLAHYPE	0.00	0.00	0.00	0.00	0.00	0.01		0.01				0.00
POACOMP	0.26	1.76	1.51	1.75	0.50	1.51	4.00	1.50	0.51	1.51	4.00	4.00
POAPRAT	0.02		0.01		0.00	0.01				0.01	0.01	0.25
PROPALU				0.01	0.01		0.25		0.01		0.26	0.26
RHYCAPI										1.50		
RUBIDAE	9.26	13.02	18.25	14.50	14.26	9.50	9.00	10.50	13.25	16.00	16.75	12.25
SCHSCOP				0.01		0.01	0.25	1.50	0.25	0.25	0.01	0.25
SCIACUT	4.25	7.76	10.01	6.51		3.01	3.77	3.76	6.27	6.26		
SCIPUNG	0.02	0.01	0.25	0.01	0.25	0.01	0.25	0.25	0.01	0.01	0.01	0.01
SCIVALI					7.76						6.50	3.76

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
SCLVERT	3.75								0.25			
SCUGALE		0.01	0.01	0.02	0.02	0.01		0.01	0.03	0.28	0.01	0.01
SOLCASL		0.27	0.01	0.01								
SOLDULC	4.01	0.26	3.78	6.52	7.76	1.77	4.01	6.77	4.76	5.76	1.79	0.76
SOLGIGA						0.01	0.25				0.25	0.27
SOLHISP			0.01		0.25			1.50				
SOLNEMO				0.25		1.50				0.25	0.01	0.26
SOLOHIO			1.50		1.50	0.25	1.50	0.25	1.50	0.25	0.01	
STAHISP			0.01	0.00	0.00			0.01	0.01	0.26	1.52	
STAPALU												0.02
STEMEDI		0.01			0.00		0.01		1.50			0.00
TAROFFI		0.00	0.01			0.01			0.01	0.02	0.01	0.26
THEPALU	8.01	4.01	8.01	7.76	7.78	0.50	5.26	5.75	11.50	9.00	8.01	13.02
TRIFRAS			0.00	0.00	0.01				0.25	0.25	0.02	0.01
TYPANGU			0.02	0.01	0.26	0.75	4.50	0.75	1.76	1.51	0.75	0.50
VIOLA..	0.02	0.26	1.50	1.50	0.25	0.25	1.50	1.50	1.50	1.50	0.25	0.26
VITRIPA	0.28	4.01	1.75	7.75	10.02	7.51	1.75	3.25	3.25	1.51	5.50	3.75
Total Cover	70.0	84.4	75.2	91.1	99.4	51.0	79.9	70.0	91.5	87.1	90.2	82.2
Number of species	52	54	58	51	51	41	46	51	49	52	53	58

Sedge - Tamarack Dune Pond:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASCSYRI	0.00		0.01	0.01	0.26	0.25	0.25	0.00	0.25			0.25
BIDFRON						0.02			0.01	0.25	0.01	
BOECYLI				7.51	6.27	2.26	3.76	7.26	5.25	1.01	5.26	3.51
CALCANA	5.79	2.30	2.53	3.53	4.26	9.77	23.52	2.26	1.28	2.51	5.52	6.54
CAMAPAR	0.27	0.28	0.25	2.00	0.52	0.29	0.01	0.00	0.02	0.76	1.00	0.01
CARCOMO	0.26			0.25								
CARDIAN					0.25			0.01	0.25	0.25	0.01	0.02
CARINTE								0.02				
CARLACU	0.01	0.01	1.51	0.01	0.01	0.50	0.25	0.01	0.01	1.52	0.01	0.25
CARLASI	0.02	0.25	0.01			0.25			0.01			
CARPRAI			1.50	0.25								
CARSTRI	8.51	16.51	8.76	13.76	11.00	26.50	20.76	9.76	6.26	14.76	5.50	11.02
CEPOCCI	3.75	3.75	6.25	6.25	3.75	3.75	3.75	1.50	0.01	1.50	1.50	1.50
CICBULB		0.01	0.01		0.02	0.02	0.28	0.00		0.25	0.01	0.00
CIRARVE								0.25	0.01	0.26		0.01
DECVERT	5.25	1.51	5.25	3.00	1.75	0.26	7.50	5.25	3.00	7.50	3.00	0.50
DULARUN	0.01	0.01	0.25	0.01							0.01	
HYPPERF	0.25	0.01	0.25	0.01	0.01	0.01	0.01	0.01	0.25	0.01	1.50	1.50
IMPCAPE	0.01	0.01	0.00	0.01	0.01			0.01	0.26	0.01	0.01	0.26
LICHEN	0.25	6.25	0.01									
LYCUNIF	0.02	0.01	0.02	0.03	0.01			0.03	0.26	0.25	0.27	0.03
LYSTHYR	0.01	0.02		0.25	0.01	0.02	0.25		0.02	0.25	0.02	
MOSS	3.78	12.01	10.50	13.50	17.00	1.51	5.25	7.75	7.75	14.00	2.25	13.00
PILFONT	4.05	3.81	7.03	0.03	0.01					0.25		
POACOMP	3.75	3.76	4.00	6.25	3.75	1.50	4.00	4.00	3.00	1.50	1.50	1.50
POAPRAT	0.01	4.25	0.01	0.51	1.50	3.76	0.26	0.01	0.02	1.51	7.76	0.25
POLAMPH				0.01	0.01		0.01	0.26	0.50		0.50	1.51
PTEAQUI	6.50	7.75	6.50	7.75	7.75	10.00	12.50	10.00	10.00	10.00	7.50	7.50
RUBIDAE	4.50	1.51	2.01	7.00	10.52	5.50	5.50	9.75	16.00	32.75	10.25	13.00
SAGLATI	0.01		0.02	0.26	0.26	0.25	0.26	0.27	0.51	1.75	0.26	0.25
SCUGALE	0.04				0.01	0.04	0.78	0.26		0.25	0.02	0.02
SEEDLNG				0.50								
SOLCANA	0.03											
SOLCASL		0.31	2.26	2.25								
SOLDULC	3.02	2.25	8.25	3.50	3.50	2.26	2.25	2.50	3.51	7.00	2.25	1.00
SOLGIGA					0.77	0.54	2.50	0.28	0.04	8.75	8.75	1.50
THEPALU	23.01	21.77	32.25	45.25	32.00	10.26	31.75	35.75	40.50	31.75	38.00	40.75
TRIFRAS	0.01	0.00	0.01	0.02	0.01		0.01	0.25	0.01	0.01		
TYPLATI	0.25	1.50	0.25	3.75	1.50	1.50	1.50	1.50	1.50	1.75	0.25	0.01
UTRCORN					0.01	0.26						
UTRVULG	0.25		0.01				1.75		0.01	0.01		
VIOLA..	0.00	0.25		0.25	0.26	0.25		0.01		0.00	0.01	0.26
VITRIPA	0.01	0.25	1.50	0.25		1.50	0.25		3.75	1.50	13.25	7.00
Total Cover	73.7	90.9	102.0	128.3	107.3	84.6	129.2	99.2	104.3	144.2	116.9	113.5
Number of species	34	34	36	37	39	37	30	34	35	36	35	34

White Pine - White Cedar Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASCSYRI	0.01	0.01	0.02	0.03	0.28	0.27	0.27	0.01	0.26	0.26	0.03	0.26
BETPAPY	0.01	0.00	0.01		1.50	1.50		3.75	6.25	6.25	6.25	1.50
BOECYLI		1.50		1.76	3.00	0.01	1.75	1.75	0.50	1.75		1.75
CALCANA	6.75	2.00	2.00	6.75	5.25	5.25	10.26	2.00	4.00	4.00	5.25	4.01
CAMAPAR	0.01	0.02	0.02	0.01	0.01	0.01			0.00	0.01	0.01	0.01
CAREBUR	10.26	12.51	7.77	5.27	1.52	3.77	4.00	4.02	3.26	4.26	1.76	4.51
CARINTE	0.25	3.76	1.50	4.00	3.75	3.76	0.25	3.75	1.50	1.50	1.50	0.25
CARLASI		0.25	0.01	0.25	0.25	0.25	6.25	0.01		3.75	3.75	
CERFONT	0.00	0.01										
ELYCANA		0.01										
GALAPAR	0.02											
GALASPR		0.01	0.01	0.01							0.25	0.01
GALTRIF			0.01		0.02	0.26	0.25	0.25	0.26	0.25		
GLYSTRI		0.01		0.25	0.25	0.02				0.25		
JUNCOMM	24.25	26.50	28.75	31.25	33.75	28.75	31.50	24.01	33.00	25.50	16.26	20.25
JUNVIRG											6.25	
LATPALU	0.01	0.01	3.76	0.01	0.00	0.01					0.25	0.01
LYCAMER			0.01								0.26	
LYCUNIF	0.01	0.01	0.03	0.01	0.26	0.00		0.00	0.01	1.50		0.02
MOSS	1.50	9.27	1.51	9.25	9.00	0.50	9.25	9.75	8.50	11.75	9.26	7.26
ORYASPE							3.75					
ORYRACE	1.50	3.75	3.75	1.50	3.75			3.75	3.75	1.50	1.50	3.75
PHRAUST									0.25	1.50	3.75	1.50
PILFONT	7.50	1.50	7.50	0.25							0.50	
POACOMP	3.77	3.77	3.76	3.76	1.51	1.51	1.51	1.51	1.51	1.51	1.75	1.75
PRUSERO	0.00						0.25		1.50	1.50	1.50	1.50
PRUVIRG		0.01		0.01	1.50	0.25		1.50				
RUBIDAE	1.50	5.25	7.75	9.26	13.00	8.50	16.50	10.75	10.75	12.75	5.00	5.00
SCHSCOP	0.26	0.26	0.26	0.26	0.51	0.25	0.26	0.26	0.25	0.01	0.25	
SCUGALE	0.00	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.26	0.26	0.03	0.02
SOLCANA	0.02			0.25								
SOLDULC	5.26	5.25	5.25	5.25	3.00	0.51	0.50	1.75	3.01	3.25	2.00	3.02
SOLGIGA			1.50		0.25	0.26	0.02	0.26		0.50	0.26	0.01
SYMALBU	0.01	0.25	0.25	0.02	1.51	3.01	1.76	3.25	4.50	4.75	4.75	10.50
TAROFFI	0.00	0.02	0.02	0.01	0.00	0.02			0.01	0.02	0.03	0.02
THEPALU	5.26	5.50	5.25	7.75	5.26	1.51	5.26	7.50	5.26	7.50	3.00	5.26
THUOCCI			0.00	0.00					3.75	3.75		
TRIBORE	0.01	0.02	0.26	0.02	0.01	0.25	0.26	1.50	1.51	0.50	1.75	0.26
VITRIPA			0.25		0.25		0.25	0.02	0.26	0.01		0.25
Total Cover	68.5	81.8	81.6	87.6	90.5	60.8	94.6	81.4	94.4	101.6	77.5	74.0
Number of species	39	39	43	42	44	38	25	31	36	37	37	40

LATE SUCCESSIONAL PLOTS:

Red Oak - White Birch Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASCSYRI	0.29	0.76	2.02	0.29	0.53	0.76	4.51	0.50	3.25	3.25	1.75	0.26
BETPAPY				0.25	1.50	0.01	1.50	0.25			0.25	0.25
BIDFRON			0.00				1.50		0.25		0.01	0.25
BOECYLI		0.01		6.76	3.26	0.01	0.50	5.75	7.00	3.25	6.76	4.50
CALCANA	8.52	12.28	6.27	11.26	6.75	3.55	6.01	6.50	3.53	4.50	5.53	3.78
CARAQUA	1.50	4.00	0.26		1.75	5.25	1.50					1.50
CARCEPH	0.02	0.02				0.52		0.25	1.50	1.50		0.25
CARCOMO	0.25	1.50										
CAREBUR	3.00	10.00	4.00	5.50	3.00	4.50	4.25	3.75	3.75	3.75	0.01	0.25
CARLACU				0.02				0.25			0.26	0.25
CARPENS		0.01		0.50	0.51	0.25	10.25	1.50	0.01	0.25	1.75	0.25
CARSTRI	0.03	3.00	0.02	1.00	0.75	0.50	1.77	3.25	1.51	0.50	0.25	0.01
CHARA	0.01	3.75				1.50	1.50		1.50			
CICBULB				0.01	0.01	0.01	0.25	0.26		0.26	0.25	0.26
DECVERT	1.50	1.50	3.75	6.25	1.50	1.50	6.25	3.75	3.75	3.75	3.75	1.50
ELYVIRG	0.01					0.26					0.01	
EPIHELL					0.01			0.25	0.28	0.53	0.25	0.03
EQUARVE						0.01	0.01	0.25	0.25	1.50	1.50	0.01
GALPALU		0.01		0.25	0.26	0.02	0.27	0.01	0.01	1.51	0.26	0.26
LYCUNIF	0.02	0.01	0.02	0.26	0.02	0.01	0.25	1.75	0.02	0.26	0.27	0.50
LYSTHYR	0.01	0.25	0.25	1.50	0.26	0.26	1.75	0.26	0.26		0.01	0.26
MOSS	11.75	12.75	11.50	15.25	20.25	0.75	10.25	10.00	5.75	11.52	5.50	5.51
ORYASPE	0.02	0.01				0.01						
PHYHETE	0.27	0.01	0.01	0.01	0.25			0.25		0.00		
PILFONT	3.26	1.51	6.76		0.25		0.26			2.00		
POACOMP	1.75	4.00	6.75	4.51	9.00	4.00	8.25	12.00	4.01	1.75	6.26	5.51
POAPRAT	17.52	19.50	16.75	7.76	11.50	9.01	3.01	1.51	5.50	4.01	0.76	0.03
PTEAQUI	11.51	15.50	10.01	10.25	16.50	18.75	13.75	16.25	16.25	14.00	21.50	21.25
QUERUBR										0.25		
RUBIDAE			1.50	7.50	10.25	16.50	18.75	21.25	18.75	21.25	16.26	19.01
SAGLATI	0.01	0.25	3.75	0.25	0.01	1.50	1.50	1.50	1.50	1.50	0.25	0.25
SASALBI	0.01	1.50		0.25	0.25	0.25	1.50	0.50	0.50	1.50	1.50	1.51
SOLALTI							0.25		1.51		0.01	
SOLCANA	0.02		4.00			0.01						
SOLCASL		0.01		0.02			0.01	0.52				
SOLDULC	0.51	3.01	7.76	4.50	4.25	2.00	0.75	9.00	8.00	4.75	1.00	0.26
SOLGIGA					0.51	0.27	0.25		0.01	0.26	3.75	0.28
TAROFFI		0.02		0.01	0.01	0.26	0.25		0.01	0.01	0.01	
THEPALU	6.77	7.25	13.25	16.75	18.00	3.26	16.75	16.00	8.27	15.75	18.26	15.76
TYPLATI					0.01	0.25	1.50	0.25	1.50	0.25	1.50	1.50
VITAEST	0.25	1.50		1.50	3.75	1.50	3.75	6.25	3.75	3.75	3.75	3.75
Total Cover	68.9	104.0	99.4	102.5	115.7	78.8	123.4	124.3	103.0	107.6	103.7	89.3
Number of species	32	37	29	31	38	43	40	35	36	33	36	37

Red Oak - White Pine Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACHMILL	0.26	1.75	0.50	1.75	0.26	1.75	1.75	0.50	0.25	0.25	0.25	0.25
APOANDR								1.75	3.00			
APOCANN		0.26	3.76	1.75			1.50			3.00	0.26	0.26
APOCYN.					4.00	1.50						
ARESERP	0.26				0.01							
ASCSYRI	0.02	1.50	5.27	1.76	0.25	0.75	0.26	0.52	1.77	0.75	0.27	0.26
CALCANA	3.03	5.51	7.00	8.28	8.27	3.52	7.01	13.01	7.01	12.25	0.25	1.77
CARCEPH					0.00			0.00		0.25		
CARCRAW			0.03									
CARLASI		1.77		0.01		0.26	3.00	0.01				
CARSTRI	2.02	2.25	3.30	1.01	2.05	2.27	0.76	5.50	7.01	5.25	1.54	1.01
CELSCAN					0.25	1.50	1.50	1.50	1.50	0.25	1.50	1.50
CIRARVE	0.26		0.01								0.01	0.01
CIRSIU.		0.01										
ELYRIPA								0.02				0.01
EPIHELL		0.02	0.00			0.02	0.01	0.25	0.02	0.50	0.01	
IMPCAPE	0.00	1.75	0.00		0.00	0.02	0.25					0.01
JUNCOMM		1.50										
JUNVIRG	3.75		3.75	1.50	3.75	6.25	3.75	3.75	3.75	6.25	6.25	6.25
LATPALU	0.00	0.01	0.02	0.01	0.25	1.51	2.01	4.50	1.26	0.01		0.05
MAISTEL						0.01	0.01		0.26	0.75	0.75	0.52
MOELATE	0.27	3.25	5.25	5.50	8.00	5.51	6.76	3.76	1.01	9.50	5.51	3.26
MOSS	0.26	1.76	2.00	1.75	1.50	3.75	1.50	1.50	1.50	1.50	1.50	1.50
MUHFRON		0.02	1.75	0.25		1.75	3.76	1.51	0.25			
MUHMEXI					1.51							
PANVIRG	0.25	5.25	9.00	5.25	5.25	3.00	3.00	4.00	4.00	3.75	1.75	1.51
PARINSE		0.01	0.00	0.01		0.25	0.01	1.51	3.76	3.75	1.50	3.75
PHYHETE		0.25	0.25	1.75	0.51	2.00	0.51	0.26	0.01	0.01	0.01	0.25
POACOMP	9.53	6.77	20.25	27.02	25.75	16.25	14.00	35.75	9.00	23.00	6.51	10.50
POAPRAT	24.76	53.01	25.25	36.25	37.25	36.25	44.25	23.00	30.27	20.50	35.75	30.75
RUBIDAE	1.50	7.75	15.00	17.50	17.50	17.50	19.00	11.50	14.00	11.50	5.25	5.25
RUMACET						0.25	0.50	0.50	0.01	0.01		0.01
SCUGALE								0.01				
SILANTI		0.01				0.01						1.50
SOLALTI					1.50	0.25	7.75		5.25	7.75	3.01	3.25
SOLCANA	1.52		4.00			3.75		7.75				
SOLCASL		3.75		3.75								
SOLDULC	0.01	1.51	0.02	0.26	0.25	0.25	0.25	0.25	0.01		0.25	0.25
SOLGIGA							1.50	1.51	0.26			
SPAPECT	0.51	3.25	4.01	0.01	0.51	0.50	2.01	0.50	0.25		0.02	0.03
STACHY.										1.77		
STAHISP	0.53	4.27	2.02	1.78	2.02	3.76	1.26	2.27	5.76		0.01	0.27
STEMEDI		0.26	0.00								0.00	
THEPALU	0.01	1.50	0.25	1.50	1.50	3.75	3.75	0.25	1.50	0.01		
TILAMER				0.00	0.01	0.25	0.25	0.26	0.25	1.50	1.50	1.75
URTDIDI											0.02	
VITRIPA	0.01	0.01	5.25	4.00	3.77	4.26	10.00	15.51	21.75	24.50	23.25	35.50
Total Cover	49.0	109.0	118.2	122.7	126.0	122.9	142.9	143.2	125.0	139.1	97.2	111.3
Number of species	24	32	32	28	30	35	38	35	32	29	32	35

Red Oak - Ironwood Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ASCSYRI	0.26	3.76	3.77	3.25	5.50	8.00	1.53	1.52	1.77	0.50	3.79	2.01
BIDFRON				1.50								
BOECYLI		0.01		0.26	0.01			0.02	1.52	0.01	0.26	1.51
CALCANA	10.76	3.76	12.25	13.25	6.50	2.50	5.00	4.76	8.75	7.02	0.52	5.51
CALSEPI			0.26		1.50	0.25	1.50		0.25		0.25	0.26
CARAQUA		1.50	0.27	0.28	1.79	0.25						
CARLACU	0.01	0.03	0.26			2.01	4.01	3.02	1.51	1.50	0.01	0.26
CARPENS	4.00	3.25	10.26	1.50	10.50	8.75	17.76	8.00	1.76	5.25	3.50	3.01
CARSTRI	3.00	0.25	0.50	5.27	3.26	4.01	7.00	8.00	1.76	0.51	0.53	0.51
CICBULB			0.02		0.01							
CICMACU	0.00	0.25		0.01								
CIRARVE	0.26			0.25	0.01	0.00	0.01	0.51	0.26	1.75	1.50	0.25
CIRSIU.		0.26	0.26									
CONARVE		0.01		0.25				0.25				
ELYVIRG			0.02		1.50	0.02		0.00			0.01	0.01
EPIHELL	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.00		0.02		
EQUARVE	0.02	1.75	1.51	1.51	4.25	2.00	3.25	1.50	1.51	9.00	5.26	3.25
EQUPRAT								3.75				
EUPESUL	6.25	8.75	6.25	6.25	8.75		8.75	6.25	3.75	6.25	3.75	1.50
GALAPAR						0.00						0.27
HYRMORS							11.50					
IMPCAPE	6.27	1.79	4.02	10.26	10.25	3.25	0.50	8.00	20.26	35.00	20.26	6.25
IRIVIRG						1.50	1.50	1.50	0.25	1.50	1.50	1.50
LATPALU	0.01	0.00				0.03	0.01	0.01	0.50	0.50	0.25	
LEEORYZ	0.25	0.00	0.01									
LEEVIRG				0.01	0.01			0.00				
LEMMINO	6.25	3.76	6.50	8.76	1.75	7.75	1.51					
LYSTHYR		0.00	0.01	0.02	0.01	0.01						
MOELATE	0.02	1.52	5.25	5.26	5.25	5.50	1.76	5.25	2.00	4.25	0.51	0.26
MOSS	1.50			0.25				1.50				0.25
PARPENS		0.01						0.01			0.01	
PHAARUN		3.75				0.25		0.01			1.50	
PHRAUST							0.25	0.01	3.75	7.75	3.00	6.26
PILFONT	0.01	0.00	0.26	0.01				0.01				
POACOMP		0.27		3.75				12.01				
POAPRAT	16.76	14.51	18.50	32.75	29.00	31.50	22.75	7.00	27.75	13.50	24.00	14.76
POLCONV					0.00	0.00				1.75		
POLHYDR			0.01						3.75	0.26	0.01	0.00
POLPERS	0.01							3.75				
QUERUBR			0.26	0.01	0.01	0.01				0.01		
RUMACET									0.01	0.25	0.25	1.50
SAGLATI	7.50	0.50	5.26	1.76	0.75	0.26	1.76	0.51	0.50	0.25	0.02	0.01
SCIVALI	1.50	0.25	0.01	0.01	0.01							
SCUGALE						0.01	0.01	0.26	0.25			
SOLCANA												1.50
SOLDULC			0.00		0.01	0.01	1.50	4.00	4.00	1.50	3.75	3.76
SPAEURY	1.50	1.50	1.50		0.25	0.01		0.01				
STAHISP	0.02	0.02	0.02	0.50	0.26	0.26	0.03				0.26	

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
STAPALU												0.50
THEPALU	4.25	3.25	1.75	0.51	2.00	2.00	5.25	5.25	5.25	4.25	0.02	3.01
TYPANGU	0.25	1.50	5.25	5.25	4.00	7.75	10.00	1.51	1.51	0.50	1.50	0.25
URTDIDI	0.01	0.27	0.01					1.51	1.50	4.00	0.25	1.50
VITRIPA					0.25		1.50	1.50	5.25	5.25	10.00	3.75
Total Cover	70.7	56.5	84.3	102.7	97.4	88.2	109.0	91.2	99.9	113.3	87.5	63.9
Number of species	31	36	35	30	34	34	31	41	30	30	34	33

Red Ash - Red Oak Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	0.00	0.00	0.01		0.00	0.01	0.01					
ASCSYRI	1.77	1.78	1.77	0.78	0.54	0.52	1.00	0.51	1.50	1.76	0.26	0.26
BOECYLI				3.75	3.75				0.26	0.25	1.51	0.25
CALCANA	11.76	12.27	9.01	12.51	11.25	4.50	10.26	5.01	4.01	13.76	4.52	5.77
CARBLAN							1.50	0.25	0.25	1.50	1.50	1.50
CARCEPH	0.50	1.75	0.01	0.25	0.25	0.01		0.25		0.25	1.50	1.50
CARLACU	0.01	0.25	1.50	0.01	5.25	3.00	5.25				1.50	1.50
CARPENS	1.76	3.76	3.75	3.75	6.27	0.26	10.50	2.00	0.27	3.00	4.00	4.75
CARSTRI	1.50	1.76	5.25	5.25	4.00	1.75	6.50	3.00	0.50	0.25		
CICBULB			0.01				0.02	0.00				
CRDPENS						0.01					4.01	
ELYVIRG									3.00		0.02	
EPIHELL	0.00	0.01	0.02	0.02	0.01	0.01	0.26	0.02	0.02	0.76	0.02	
EQUARVE		1.50	0.01	1.75	0.50	1.75	0.25	0.50	1.51	3.00		0.50
EQUPRAT											1.75	
FRAXIN.	0.00	0.01	0.25	0.25	0.25	0.27	1.50	0.25	0.27	0.28	0.01	0.01
GALAPAR									0.26		2.50	4.75
GALASPR				0.25						1.75		
GALCIRC				0.01	0.25		0.01		0.25	1.50	1.50	1.50
GALPALU		0.02	0.01	1.50	0.50		0.02	0.01	0.02		1.75	0.26
GALTINC	1.75											
GALTRIF										1.50		0.25
IMPCAPE					0.00	0.00				0.25	7.76	15.25
LEMMINO		1.50	1.50				0.50					
LUDPALU					1.50							
LYCUNIF	0.01		0.01		0.01							
LYSTHYR						0.01					1.50	0.01
MAICANA							0.01	0.26	0.25	1.50	3.75	1.50
MAIRACE												0.01
MOELATE	2.00	9.26	11.51	11.50	10.50	9.25	9.25	3.27	5.75	3.51	4.76	3.51
MOSS	1.51	5.25	1.51	3.00	3.75	1.50	3.00	2.01		0.25	0.25	0.25
MUHFRON		3.75	3.75	3.75	3.75	0.25	3.75	1.50	1.50		0.01	0.01
OSTVIRG									0.00	0.01		0.01
PARPENS	0.26	0.01			0.50	1.50	0.25	0.01	1.52	1.75	6.75	3.01
PILFONT	7.50	1.51	3.75	0.02	0.00					0.25	0.25	
POACOMP	0.29	1.52	9.00	20.76	8.02	4.51	11.50	10.51	6.00	1.50	6.26	3.75
POAPRAT	19.51	29.25	29.50	22.25	26.75	19.50	25.75	13.00	12.75	10.75	12.00	9.76
POLHYDR								3.75	5.25	7.50	0.26	

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
POLPERS	0.02											
POLSAGI				3.76								
PRUSERO	0.00	0.01		0.01		0.01	0.01	0.01	0.25	0.25	0.25	
QUERUBR			1.50	0.01	0.01	0.01	0.01					
RUBIDAE		3.75	6.51	11.50	16.50	20.50	31.50	31.50	27.50	38.76	20.51	17.01
RUMACET	0.25	3.75	3.75	0.25	0.02	0.50	0.51	0.25	0.25		0.03	1.50
SASALBI	4.00	5.25	7.50	10.00	15.00	12.50	17.50	17.50	17.50	17.50	17.50	7.50
SCUGALE				0.01	0.02	0.00		0.00	1.50			
SCULATE										1.50		
SOLDULC	0.50	4.02	4.02	3.01	8.00	4.26	2.00	1.76	5.26	4.50	4.00	3.26
THEPALU	0.25	1.50	1.50	0.25	1.50	0.01	0.25					0.01
URTDIDI	0.02	1.50	0.01	1.50	0.01	0.25	0.25					
VITRIPA							0.01	1.75	1.75	1.50	1.76	3.00
Total Cover	55.5	95.0	107.0	121.7	128.9	86.7	143.4	99.2	99.2	121.3	114.5	92.4
Number of species	29	29	32	29	36	34	35	31	29	32	37	35

Red Oak - Sugar Maple Savannah:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	0.00	0.51	0.01		0.25	0.25	0.26		0.25	0.25	0.25	0.25
APOCANN							1.50					
ASCSYRI	6.77	3.27	4.51	3.75	8.51	5.76	9.01	10.75	14.01	9.50	7.25	3.27
BIDCERN	0.25			1.50								3.75
BIDFRON		0.01	0.01	0.01	0.01		1.50	0.01	0.25	0.25	1.50	
BOECYLI		0.00		0.26	0.01	1.75	0.50	3.00	0.01	0.50	0.26	0.01
CALCANA	4.26	9.77	10.26	9.78	8.54	7.51	12.25	18.52	12.25	5.76	0.51	0.05
CALSEPI		0.00			0.25	1.77			0.25			
CARALAT						0.01			0.01	1.50	0.25	0.01
CARCOMO		1.50	1.50	1.50	0.01							
CAREX..				1.50			0.01					
CARLACU	0.01		0.01			1.75	1.75	0.50	0.50	5.25	1.75	3.00
CARPENS	3.00	7.51	6.76	10.77	13.02	10.25	10.75	7.76	3.75	7.51	3.25	5.75
CARPSEU						0.25	1.50			0.25		
CARSTRI	1.75	1.76	0.27	1.75	1.76	1.51	3.00	1.75	1.75	1.51	0.50	0.25
CARXCOP	4.00											
CICBULB	0.25	1.50	0.25	0.01	0.25	0.26	3.75	0.25	0.25	3.75	0.25	0.25
CONARVE	0.03	0.01	0.02	1.50		0.25		0.75			0.01	0.01
DECVERT	3.75	3.75	1.50	3.75	1.50	1.50	3.75	6.25	3.75	3.75	6.25	1.50
DRYCART							0.25	0.25	0.25		0.25	1.50
DRYINTE										1.50		
ELYREPE						0.25					0.26	
ELYRIPA								1.50				1.50
ELYVILL	1.52		0.01		0.50							
ELYVIRG		0.26		0.01		0.26	3.75			0.25	0.26	0.25
EPIHELL		0.01		0.01	0.01			0.26	0.51	0.50	0.26	0.02
EQUARVE	0.77	6.00	7.01	8.26	9.26	4.75	3.50	4.51	17.75	15.75	20.50	22.00
GALAPAR	1.50				0.28				0.03	1.51	0.25	0.01

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
GALASPR		6.26	3.75			1.78			0.25			
HYSPTU				0.01		0.01		0.01	3.75			
IMPCAPE	0.01	1.50	0.01	0.25	0.25	3.77	0.50	0.25	1.76	2.00	0.01	0.01
LATPALU	1.51	4.00	1.75	0.27	0.51	3.25	0.27	0.25	1.75	0.52		0.01
LEMMINO	6.25	6.25	6.25	3.76			0.01	3.75				
LEMTRIS						8.75	3.75		3.75			
LYCUNIF	0.02	0.03	0.26	0.26	0.50	0.50	0.27	0.27	1.77	0.26		0.25
MOELATE	0.05	0.78	2.52	4.28	7.00	8.77	3.29	6.01	5.00	5.25	5.00	5.02
MOSS	0.01	0.50	0.02	0.01	0.01	0.25	1.51	0.26	1.50	4.01	1.50	2.00
MUHFRON	0.25	0.01	0.25	0.25	0.25	0.01	0.26	0.25	0.01	0.01	0.25	0.25
NEPCATA	0.01	0.00	0.01	0.01	0.25		0.26	0.25		0.25	0.25	0.25
ORYASPE	0.25	0.25		0.25	0.25	0.25	1.50	1.50				
PARPENS		0.00	0.02		0.25	0.26	0.25	0.26	0.25	0.26	0.01	
PHYHETE	0.02	0.01		0.01								
PILFONT	0.01	0.01	0.26	0.25			0.01	0.01			0.25	0.25
POACOMP		0.26		3.02	3.75	0.25	0.25	4.00				1.50
POAPRAT	13.76	28.76	20.51	25.26	23.25	36.75	20.52	13.51	20.50	7.75	11.25	5.25
POLCONV					0.02				1.51	2.01	0.26	
QUERUBR	0.00	0.02	1.51	0.26	0.02	0.50	0.25	0.25	0.25	1.50	0.25	1.50
ROSRUBI		1.50	1.50	0.25	0.25						0.25	
RUBALLE											0.01	1.50
RUBIDAE		1.50	6.25	8.75	8.75	8.75	10.25	16.25	23.75	23.75	18.75	18.75
RUMACET	1.51	3.76	4.00	0.26	0.25	0.01	0.01			0.01	0.25	0.50
RUMVERT												1.50
SAGLATI	1.50	0.25	1.50	1.50	1.50	0.00	0.01	0.01	1.50	3.75	1.50	1.50
SCIACUT					0.25							1.50
SCIVALI						1.50	1.50	1.50	1.50	1.50	0.25	
SCULATE							1.51					
SOLCANA	0.25		0.01					0.01				
SOLDULC	0.01	0.25	3.76	1.76	3.25	2.00	3.26	3.26	5.26	7.51	1.75	4.51
SOLGIGA					0.25	0.25		0.25	0.26	0.25	0.25	0.02
STEGRAM	0.01			0.27	0.01	0.25		0.25	0.01			
STEMEDI		1.50	0.01				1.50				0.01	
THEPALU	4.00	10.00	5.25	5.25	7.50	5.25	5.25	4.00	1.75	1.51	0.02	0.02
URTDIDI	0.51	0.76	0.28	0.28	1.76	2.03	3.51	0.77	5.75	3.51	0.51	0.76
VEROFFI	0.02	0.00										
VITRIPA				0.00	0.01	0.02	0.25	3.01	7.50	10.00	5.25	10.00
Total Cover	58.3	104.8	92.4	101.9	104.8	124.5	118.3	117.5	145.4	135.2	92.4	101.3
Number of species	42	48	46	47	47	48	49	50	47	44	46	50

Red Oak - Sugar Maple Forest:

SP_CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ACERUBR	0.01	0.03	0.01	0.01	0.02	1.51	0.26		0.50	1.76		
ACESACC	0.02	4.02	4.03	0.28	1.54	1.27	3.28	0.78	4.27	2.27	1.02	2.51
ASCSYRI	1.52	4.25	7.75	1.76	4.26	4.50	5.75	5.75	4.26	4.25	8.25	3.50
BIDCERN										6.25		0.25
BIDFRON	0.25		0.01	3.75	0.00		0.01	3.75	1.50		1.50	
BOECYLI				0.51	0.50	0.01	1.50	8.01	2.00	4.00	4.25	3.00
CALCANA	8.26	9.75	14.01	13.50	15.51	4.00	14.51	9.75	12.50	8.27	11.01	9.78
CALSEPI	0.01	0.01	1.50		0.01	0.25	0.25					0.01
CARGRAC									0.00	0.25		
CARLACU		0.01		0.01	0.01	0.50	0.25	0.25	1.50	1.75	4.00	3.75
CARPENS	1.75	9.50	6.25	3.00	12.51	7.51	0.26	4.25	3.76	1.76	5.51	9.01
CARSTRI						0.01	0.02	0.25			0.01	0.01
DECVERT	0.25	0.01	1.50	1.50	0.25			0.25	1.50	3.75	3.75	1.50
ELYVIRG												1.50
EPIHELL									0.01	0.02	0.01	0.01
GALAPAR	0.26		0.01		0.28	0.26						0.01
GALASPR		0.02							1.51			0.01
GERROBE											1.50	0.01
IMPCAPE			1.50	6.25	3.76	0.01	3.75	1.50	4.02	13.00	12.76	5.51
LEMMINO	0.01	3.75	1.50		0.00	3.75	15.00					
LEMTRIS			1.50									
LYCUNIF		0.01	0.00		0.01		0.25	0.00	0.01		0.01	
LYSTHYR	1.50	0.25						0.01		0.01		
MOELATE	0.27	1.54	6.76	14.01	16.75	17.76	16.75	16.50	10.00	8.51	5.75	4.77
MOSS	1.50	1.50		6.25	0.25		0.25	3.75	0.01	1.50	3.75	1.50
MUHFRON		0.01	0.27	0.03	1.51	0.25	3.75	0.01	0.01	0.01		0.01
MUHTENU	0.26											
ORYASPE	0.25	1.50			0.01							
OSTVIRG						0.01	0.25	0.25	0.25		0.25	1.50
PARPENS	0.00	0.26		0.25	0.25	0.26	0.01	0.25	0.01		0.01	0.01
PHAARUN				0.25		3.75						
PILFONT	4.01	0.26	3.01	1.75	0.01			0.25		1.50		
POACOMP	5.50	2.01	8.00	11.76	5.50	5.26	11.50	9.50	4.00	5.25	7.50	7.50
POAPRAT	10.50	16.75	11.75	13.00	8.01	15.75	17.76	13.00	20.25	13.00	15.25	4.25
POLCONV									0.50	3.75	0.01	
POLHYDR			1.50		0.25				6.25			
POLPERS								3.75				
POLYGO.				3.75								
QUERUBR			0.26	0.02	0.01	0.25	0.25	0.25	0.25	0.25	0.50	0.51
RICCIA							3.75	1.50				
RUBIDAE				3.75	6.25	6.25	6.25	8.75	4.00	10.50	6.75	12.51
RUMACET		0.01	0.25	0.01	0.26							
SOLDULC	0.26	5.26	7.50	5.50	4.00	0.76	2.00	7.75	4.26	4.25	1.76	4.25
STEGRAM				1.50		0.00						
STEMEDI	0.02		1.50								3.75	0.25
THEPALU	1.52	4.01	5.50	9.00	6.75	1.75	4.00	9.00	4.25	2.00	4.25	1.75
URTDIDI	2.26	9.25	5.50	2.01	3.00	1.76	0.50	1.75	7.51	0.51	0.02	0.26
Total Cover	40.3	74.2	91.9	103.7	91.5	77.7	112.6	111.6	99.2	99.1	103.4	79.5
Number of species	29	28	29	32	32	28	30	34	30	30	29	30

DISTURBED PLOT:

Blue Grass Grassland:

SP-CODE	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ARALYRA		0.01					0.01		0.00	0.00		
ARESERP		0.51	0.01		0.02	0.01						
ASCSYRI	0.00	0.01	0.01	0.02	0.52	2.01	2.01	3.01	1.76	3.26	0.28	0.28
CALCANA	3.77	6.50	7.75	10.25	5.25	10.25	12.50	7.50	12.50	5.25	0.01	0.00
CORHYSS		0.27	3.76	0.01	0.26	1.51		0.01	0.00		0.01	0.28
ELYRIPA						0.50		0.01				
ELYTRAC	0.25		0.25	1.50	0.01		0.25					
ELYVIRG			1.51						0.26			
HYPPERF	10.01	0.26	5.26	1.50	4.01	2.00	1.51	5.25	10.00	0.00	0.25	2.00
MOSS	1.52	1.75	7.50	1.75	16.50	3.25	5.26	3.25	9.26	3.00	1.76	11.01
PANVIRG	5.77	8.51	8.51	8.51	6.26	5.77	7.03	11.03	17.01	19.50	18.51	15.77
PHYHETE	0.26	0.01	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	
POACOMP	17.25	29.25	33.50	34.50	29.51	19.76	33.00	16.01	4.75	18.25	15.25	11.02
POAPRAT	5.51	4.26		1.75	1.77	1.75	1.01	0.25	8.51	0.50	3.03	1.51
POLDODE	0.01	0.02	1.51	0.00	0.27	0.02	0.01	0.00	0.25	0.01	0.02	0.01
ROSRUBI									3.75			
RUBIDAE	1.50	6.25	6.25	11.50	13.75	13.75	14.00	12.75	10.75	28.00	6.26	4.76
RUMACET		0.01	0.01	0.00							0.01	0.25
SALKALI	1.51									0.01		
SOLCASL		0.02										
SORNUTA											1.50	
SPOCRYP	0.51	0.52	0.04	1.77	2.01	1.77	2.01	2.25	0.76	3.50	0.27	0.01
TAROFFI		0.00	0.00	0.01	0.01	0.26						
THEPALU	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	3.75	3.75	3.75
VITRIPA						0.25	1.50	1.50	1.50	7.51	4.01	4.01
Total Cover	49	60	77	75	82	65	82	65	83	94	56	55
Number of species	16	22	20	22	22	22	18	18	22	26	23	18

APPENDIX D

BREEDING BIRD CENSUSES

WHITE PINE-WHITE CEDAR SAVANNAH

SAVANA DE PINO BLANCO-CEDRO BLANCO

MATT TIMPF

Bird Studies Canada
P.O. Box 160
Port Rowan, Ontario NOE 1M0

Location: Ontario; Municipality of Haldimand-Norfolk; Port Rowan; Long Point National Wildlife Area; 4°32'45"N, 80°6'45"W; Gravelly Bay Quadrangle, DEMR. **Continuity:** Established 1973; 7 yr. **Size:** 9.3 ha. **Description of Plot:** See *Am. Birds* 28:1018-1019 (1974), *J. Field Ornithol.* 63 (Suppl.):69-70 (1992), *J. Field Ornithol.* 65 (Suppl.):72-73 (1994) and *J. Field Ornithol.* 67(Suppl.):57-58 (1996). The plot contains rolling sand dunes along the south side, but much of it is occupied by low dunes and swampy areas. The dominant canopy trees are White Pine (*Pinus strobus*), Eastern White Cedar (*Thuja occidentalis*) and standing dead trees. The understory is dominated by Common Juniper (*Juniperus communis*) on the dunes and Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*) in low-lying areas. The ground layer is composed of sedges (*Carex eburnea*, *Carex lasiocarpa*, *C. interior*), Marsh Fern (*Thelypteris palustris*) and Canada Blue-joint (*Calamagrostis canadensis*). There has been annual monitoring of the shrubs and ground cover since 1991. Canopy cover measured in both 2002 was 38% compared with 26% in 1997, based on 10 vegetation profile readings above 2 m at each of 20 sampling points. The ground cover estimate, based on readings below 2 m, was 58% in 2002 compared with 74% in 1997. Vegetation profile estimates in 2002 based on 10 line intersect readings at each of 20 sampling points were: <0.5 m, 54%; 0.5-1 m, 25%; 1-2 m 15%; 2-5 m 18%; >5 m 21% compared with 25, 21, 6, 13, 13 in 1997. Number of shrub stems/ha in 2003 based on counts in 10 1x10 m quadrats: 92,700 compared with 109,700 in 1998. Size class distribution: <0.5 m, 57,100; 0.5-1.0 m, 25,700; 1.0-2.0 m, 9,600; >2 m 300 (compared with 50,900; 49,200; 9,300; 300 in 1998). Shrub species in order of total abundance: Wild Red Raspberry 34,300 stems <0.5 m, 6,200 stems 0.5-1.0 m, 300 stems 1.0-2.0 m, 0 stems >2m; Common Juniper 7,600, 9,800, 2,700, 0; Swamp Rose (*Rosa palustris*) 4,300, 3,700, 3,500, 0; Snowberry (*Symphoricarpos albus*) 7,300, 4,700, 0, 0; Eastern Red Cedar (*Juniperus virginiana*) 200, 500, 2,200, 100; Riverbank Grape (*Vitis riparius*) 1,300, 400, 100, 0; Sweetbrier (*Rosa rubiginosa*) 400, 200, 700, 0; White Pine 600, 0, 0, 100; White Birch (*Betula papyrifera*) 200, 0, 100, 0; Ash (*Fraxinus* sp.) 300, 0, 0, 0; Choke Cherry (*Prunus virginiana*) 200, 0, 0, 0; Red Oak (*Quercus rubra*) 200, 0, 0, 0; Black Cherry (*Prunus virginiana*) 100, 0, 0, 0; Chokeberry (*Aronia melanocarpa*) 100, 0, 0, 0; Eastern White Cedar (*Thuja occidentalis*) 100, 0, 0, 0; Tamarack (*Larix laricina*) 100, 0, 0, 0. Changes from 1998 include new records for Black Cherry, Chokeberry, White Birch, Ash, Choke Cherry, Red Oak and Eastern White Cedar and increases in the number of shrub stems for the following species: Eastern Red Cedar (3,100 stem from 2,900 in 1998); White Pine (700, 300); Swamp Rose (11,500, 8,500); Sweetbrier (1,300, 1,000); Snowberry (12,000, 5,100); Riverbank Grape (1,800, 1,000). The number of stems of the following species declined: Wild Red Raspberry (40,800 stems from 67,000 in 1998); Common Juniper (20,100, 23,500); Tamarack (100, 300). Ground layer species making up 90% of the vegetation cover, based on estimates in 10 1x1 m quadrats, or present in three or more quadrats: Common Juniper 20% in 4 quadrats; Snowberry 11, 4; mosses 7, 6; Marsh Fern 5, 3; Wild Red Raspberry 5, 5; Bristle-leaf Sedge (*Carex eburnea*) 5, 4; Canada Blue-joint 4, 4; Mountain-rice (*Oryzopsis asperifolia*) 4, 1; Climbing Nightshade

(*Solanum dulcamara*) 3, 4; Canada Bluegrass (*Poa compressa*) 2, 2 and False nettle (*Boehmeria cylindrica*) 2, 2. Changes of 5% or more between 1995 and 1998 in the mean estimated cover for ground layer species, based on 10 1x1 m quadrats, include an increase of 8% for Snowberry and decreases of 12% for Common Juniper and Wild Red raspberry. Non-living ground cover based on estimates in 10 1x1 m quadrats: litter 83%, sticks and wood 8%, bare sand 15%, muck 18% and water 3% compared with 78, 11, 4, 3, 3 in 1998. **Weather:** Mean start temp. 16.3°C (range 12-20°C). Mostly clear and calm. **Coverage:** 40hr 15min; 10.5 visits (7.5 sunrise, 3 sunset); 6, 7, 10, 15, 17, 20, 22, 24, 25, 26 June. Maximum number of observers/visit, 3. **Census:** Yellow Warbler 14 (60); House Wren 8.5 (37); Chipping Sparrow, 7 (30, 2FL); Common Yellowthroat, 6.5 (28); Gray Catbird, 5.5 (24); Eastern Towhee, 5 (22, 1N, 1FL); Eastern Wood Peewee, 4.5 (19, 3N); Red-eyed Vireo, 4 (17, 1N); Northern Cardinal, 2.5; Baltimore Oriole, 2.5 (1N); Great-crested Flycatcher, 2; White-eyed Vireo, 2 (1N); Eastern Kingbird, 2 (1N); Red-winged Blackbird, 2; Song Sparrow, 2; Black-capped Chickadee, 2 (1FL); Carolina Wren, 1.5; American Redstart, 1; Mourning Dove, 1; Brown-headed Cowbird, 1; Blue Jay, 1; Field Sparrow, 1; Pine Warbler, 1; Whip-poor-will, 1; Cooper's Hawk, 1; American Robin, 0.5 (1FL). **Total:** 26 species, 82 territories (353/40 ha). **Visitors:** Nashville Warbler, Ovenbird, White-throated Sparrow, Black-and-White Warbler, Red-breasted Nuthatch, Veery, Yellow-billed Cuckoo, Common Grackle, Cedar Waxwing Brown Thrasher, American Goldfinch, American Woodcock. **Remarks:** This study is part of a long-term project designed to monitor the response of vegetational and breeding bird communities to a reduction in deer browsing at Long Point, Lake Erie. **Other Observers:** Taeko Knockaert, John Brett, Crissy Ranelucci **Acknowledgments:** Thanks to Jon McCracken for project supervision, Jane Bowles and Michael Bradstreet for measuring vegetation parameters, and the Canadian Wildlife Service for financial support.

SEDGE-TAMARACK DUNE POND

DUNA DE ESPARGANIO-LARICE AMERICANO

MATT TIMPF

Bird Studies Canada

P.O. Box 160

Port Rowan, Ontario NOE IM0

Location: Ontario; Municipality of Haldimand-Norfolk; Port Rowan; Long Point National Wildlife Area; 9.0 km W of Long Point Lighthouse; 42°32'54"N, 80°09'45"W; Little Creek Ridges Quadrangle, DEMR. **Continuity:** Established 1978. 4 yr. **Size:** 10.0 ha. **Description of Plot:** See *Am. Birds* 33:103-104 (1979), *J. Field Ornithol.* 63 (Suppl.):93-94 (1992) and *J. Field Ornithol.* 65 (Suppl.): 103 (1994). An open pond occupies most of the area (70%) of this plot, with a steep sand dune to the south. To the north, a Tamarack (*Larix laricina*) swamp gradually rising to a dune. Dominant trees are Tamarack and Red Ash (*Fraxinus pennsylvanica*). The shrubs include Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*), Water-willow (*Decodon verticillatus*) and Buttonbush (*Cephalanthus occidentalis*). There has been annual monitoring of the shrubs and ground cover since 1991. Canopy cover measured in 2002 was 11% based on 10 vegetation profile readings above 2 m at each of 20 sampling points, compared with 3% in 1997. The ground cover estimate, based on readings below 2 m, was 74% in 2002 compared with 90% in 1997. Vegetation profile estimates in 2002, based on 10 line intersect readings at each of 20 sampling points were: <0.5 m, 71%, 0.5-1 m, 74%, 1-2 m, 33%, 2-5 m, 9%, >5 m, 5% compared with 26, 73, 46, 3, 1 in 1997. The number of shrub stems/ha in 2003 based on counts in 10 1x10 m quadrats was 80,300 compared with 61,400 in

1998 and 24,000 in 1991. Size class distribution: <0.5 m, 50,500; 0.5-1 m, 28,500; 1-2 m, 1,000; >2 m, 300 (compared with 36,700, 22,100, 2,300, 300 in 1998). Shrub species in order of total abundance: Wild Red Raspberry 45,600 stems <0.5 m, 20,800 stems 0.5-1 m, 0 stems 1-2 m, 0 stems >2 m; Water-willow 1,700, 2,200, 0, 0; Swamp Rose (*Rosa palustris*) 200, 2,000, 0, 0; Riverbank Grape (*Vitis riparia*) 1,500, 2,000, 400, 0; Buttonbush 800, 1,000, 500, 0; Thicket Creeper (*Parthenocissus inserta*); Tamarack 200, 0, 0, 100; White Birch (*Betula papyrifera*) 100, 100, 0, 100; Red Maple (*Acer rubrum*) 0, 0, 0, 100; Sweetbrier (*Rosa rubiginosa*) 0, 0, 0, 100. Significant changes from 1998 include an increase in the abundance of the following species: Wild Red Raspberry (from 48,000 stem/ha in 1998 to 66,400 stems/ha in 2003); Swamp Roase (0, 2,200) and Thicket Creeper (0 700) and a decrease in Water-willow (7,200, 3,900). Ground layer species making up 90% of the vegetation cover, based on estimates in 10 1x1 m quadrats, or present in three or more quadrats: Marsh Fern (*Thelypteris palustris*) 41% in 9 quadrats; mosses 13, 4; Wild Red Raspberry 13, 8; Tussock Sedge (*Carex stricta*) 11, 8; Bracken Fern (*Pteridium aquilinum*) 8, 2; Riverbank Grape 7, 4; Canada Blue-joint (*Calamagrostis canadensis*) 7, 10; False Nettle (*Boehmeria cylindrica*) 4, 5; Goldenrod (*Solidago gigantea*) 2, 7; Climbing Nightshade (*Solanum dulcamara*) 1, 4; Northern Bugleweed (*Lycopus uniflorus*) <1, 3. Changes of 5% or more between 1993 and 1998 in the mean estimated cover for ground layer species based on 10 1x1 m quadrats include increases of 9% in Marsh Fern, 7% in mosses, 8% in Wild red Raspberry and decreases of 18% in Blue-joint Grass, 10% in Tussock Sedge, and 7% in Water-willow. Non-living ground cover based on estimates in 10 1x1 m quadrats: litter 83%, sticks and wood 15%, water 63%, muck 12% compared with 73, 38,17, 12 in 1998. **Weather:** Mean start temp. 14.6°C (range 10-18°C). Mostly calm and clear **Coverage:** 28hr 45min; 8 visits (5 sunrise, 2 sunset); 2, 8, 11, 14, 16, 18, 21, 23 June. Maximum number of observers/visit, 1. **Census:** Red-winged Blackbird, 31 (124; 14N, 16FL); Yellow Warbler, 8 (32, 2N); Common Yellowthroat, 7.5 (30, 2N, 2FL); Eastern Kingbird, 5.0 (20, 4N); Song Sparrow, 3.5 (14); Baltimore Oriole, 2.0 (2N); Tree Swallow, 2.0; Swamp Sparrow, 2.0; Chipping Sparrow, 1.5 (1N); Field Sparrow, 1.0 (1N); Mallard, 1.0 (3FL); Cedar Waxwing, 1.0; Sora, 1.0; Eastern Wood Peewee, 1.0; Whip-poor-will, +; Gray Catbird, +; Brown Thrasher, +. **Total:** 17 species, 67.5 territories (270/40 ha). **Visitors:** Wood Duck, Red-eyed Vireo, Black Tern, Yellow-billed Cuckoo, Marsh Wren, Pied-billed Grebe, Black-capped Chickadee, Killdeer, Mourning Dove, House Wren, Common Grackle, Hooded Merganser, Eastern Towhee, Belted Kingfisher, European Starling, Northern Flicker, American Robin, American Goldfinch. **Remarks:** This study is part of a long-term project designed to monitor the response of vegetational and breeding bird communities to a reduction in deer browsing at Long Point, Lake Erie. **Acknowledgments:** Thanks to Jon McCracken for project supervision, Jane Bowles and Michael Bradstreet for measuring vegetation parameters, and the Canadian Wildlife Service for financial support.

INTERGRADING DUNE-SWALE SAVANNAH

SAVANA CON GRADIENTE DE DUNA A CIENAGA

MARGARET A KURCZ

Bird Studies Canada

P.O. Box 160

Port Rowan, Ontario N0E 1M0

Location: Ontario; Municipality of Haldimand-Norfolk; Port Rowan; Long Point National Wildlife Area; 42°32'45"N, 80°4'00"W; Gravelly Bay Quadrangle, DEMR. **Continuity:** Established 1965; 7 yr. **Size:** 11.0 ha. **Description of Plot:** See *Aud. Field Notes* 19:630 (1965), *J. Field Ornithol.* 63 (Suppl.):82-83 (1992) and *J. Field Ornithol.* 65 (Suppl.):85-86 (1994).

Canopy cover measured in 2002 was 7% based on 10 vegetation profile readings above 2 m at each of 20 sampling points, compared with 4% in 1997. The ground cover estimate, based on readings below 2 m, was 60%, compared with 33% in 1997. Vegetation profile estimates in 2002, based on 10 line intersect readings at each of 20 sampling points were: <0.5 m, 49%; 0.5-1 m, 12%; 1-2 m, 5%; 2-5 m, 2%; >5 m, 2% compared with 48; 21; 5; 3; 3 in 1997. The number of shrub stems/ha in 2003 based on counts in 10 1x10 m quadrats was 9,300 compared with 61,800 in 1997. Size class distribution: <0.5 m, 6,500; 0.5-1 m, 1,500; 1-2 m, 800; >2 m, 500 compared with 41,900; 19,000; 500; 400 in 1997. Shrub species in order of total abundance: Eastern Red Cedar (*Juniperus virginiana*) 700 stems <0.5 m, 400 stems 0.5-1 m, 700 stems 1-2 m, 500 stems >2 m; Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*) 2,300, 200, 0, 0; Sandbar Willow (*Salix exigua*) 1,500, 0, 0, 0; Riverbank Grape (*Vitis riparia*) 500, 300, 100, 0; Kalm's St. John's-wort (*Hypericum kalmianum*) 600, 0, 0, 0; Sweetbrier (*Rosa rubiginosa*) 200, 300, 0, 0; Eastern Cottonwood (*Populus deltoides*) 400, 100, 0, 0; Common Juniper (*Juniperus communis*) 200, 200, 0, 0; Poison Ivy (*Rhus radicans*) 100, 0, 0, 0. Significant changes from 1997 include a reduction in the abundance of Kalm's St. John's-wort from 59,700 stems/ha in 1997 to 600 in 2003. Ground layer species making up 90% of the vegetation cover, based on estimates in 10 1x1 m quadrats, or present in three or more quadrats: mosses 9% in 2 quadrats; Marsh Fern (*Thelypteris palustris*) 8, 2; Blue-joint Grass (*Calamagrostis canadensis*) 5, 3; Little Bluestem (*Schizachyrium scoparium*) 3, 3; Canada Bluegrass (*Poa compressa*) 2, 3; Cylindrical Blazingstar (*Liatris cylindracea*) 2, 2; Variegated Scouring-rush (*Equisetum variegatum*) 2, 3. Changes of 5% or more between 1997 and 2002 in the mean estimated cover for ground layer species, based on 10 1x1 m quadrats, include increases of 7% in mosses and Marsh Fern and a reduction of 7% in Twig-rush (*Cladium mariscoides*). Non-living ground cover in 2003 based on estimates in 10 1x1 m quadrats: litter 37%, sand 56%, sticks and wood <1%, water 0% compared with 36, 45, 0, 27 in 1997. **Weather:** Mean start temp. 15.7⁰C (range 10-21⁰C). Mostly clear, winds variable. **Coverage:** 25.75 h; 9 visits (5 sunrise, 2 sunset); 5, 13, 15, 17, 18, 20, 22, 24, 25 June. Maximum number of observers/visit, 2. **Census:** Tree Swallow, 10.5 (38; 7N); Chipping Sparrow, 6.0 (22; 1N); Brown Thrasher, 5.0 (18, 3N, 1FL); Killdeer, 5.0 (18); Eastern Kingbird, 3.0 (11, 1N); Song Sparrow, 3.0 (11); Northern Mockingbird, 2.5; Common Grackle, 2.0 (2FL); European Starling, 2.0 (1N); Mourning Dove, 2.0; Warbling Vireo, 2.0 (1N); Brown-headed Cowbird, 1.0; House Wren, 1.0; Red-winged Blackbird, 1.0; Common Yellowthroat, 0.5; Yellow Warbler, 0.5. **Total:** 16 species, 47 territories (171/40 ha). **Visitors:** American Goldfinch, American Robin, Baltimore Oriole, belted Kingfisher, Bobolink, Eastern Wood Peewee, Field Sparrow, Great Crested Flycatcher, Northern Flicker, Red-eyed Vireo, Ruby-throated Hummingbird, Savannah Sparrow, Spotted Sandpiper, Yellow-billed Cuckoo. **Remarks:** This study is part of a long-term project designed to monitor the response of vegetational and breeding bird communities to a reduction in deer browsing at Long Point, Lake Erie. **Other Observers:** Matt Timpf, John Brett. **Acknowledgments:** I thank Jon McCracken for project supervision, Jane Bowles and Michael Bradstreet for measuring vegetation parameters, and the Canadian Wildlife Service for financial support.

BLUEGRASS - MILKWEED GRASSLAND

YERBASAL DE “YERBA-AZUL”

MARGARET A. KURCZ

Bird Studies Canada
P.O. Box 160
Port Rowan, Ontario NOE 1M0

Location: Ontario; Municipality of Haldimand-Norfolk; Port Rowan; Long Point National Wildlife Area; 42°32'48"N, 80°09'45"W; Little Creek Ridges Quadrangle, DEMR. **Continuity:** Established 1973; 5 yr. **Size:** 10.5 ha. **Description of Plot:** See *Am. Birds* 27:1013 (1973), *J. Field Ornithol.* 63 (Suppl.):107-108 (1992) and *J. Field Ornithol.* 67 (Suppl.):87-88 (1996). The plot contains open rolling dunes with some small, wet, interdune areas. The dominant trees are Red Ash (*Fraxinus pennsylvanica*), Red Oak (*Quercus rubra*) and Tamarack (*Larix laricina*). The understorey is absent except for scattered shrubs of Wild Red Raspberry (*Rubus idaeus* ssp. *melanolasius*). The ground layer is composed of Canada Blue Grass (*Poa compressa*), Canada Blue-joint (*Calamagrostis canadensis*) and Switch Grass (*Panicum virgatum*) on the dunes and Tussock Sedge (*Carex stricta*) and Marsh Fern (*Thelypteris palustris*) in the swales. There has been annual monitoring of the shrubs and ground cover since 1991. Canopy cover measured in 1997 and 2002 was <1%, based on 10 vegetation profile readings above 2 m at each of 20 sampling points. The ground cover estimate, based on readings below 2 m, was 52% in 2002 compared with 67% in 1997. Vegetation profile estimates in 2002 based on 10 line intersect readings at each of 20 sampling points were: <0.5 m, 50%; 0.5-1 m, 10%; 1-2 m 0%; 2-5 m 0%; >5 m 0% compared with 59; 22; 4; 0; 0 in 1997. Number of shrub stems/ha in 2003 based on counts in 10 1x10 m quadrats: 25,500 compared with 73,800 in 1998. Size class distribution: <0.5 m, 23,700; 0.5-1.0 m 1,600 (compared with 68,900, 4,900 in 1998). Shrub species in order of total abundance Wild Red Raspberry 19,600 stems <0.5 m; 1,000 stems 0.5-1 m; Riverbank Grape (*Vitis riparia*) 4,100, 600. Changes from 1998 include a decrease in Wild Red Raspberry from 73,400 stems in 1998 and an increase in Riverbank Grape 1,100, 400. Ground cover species making up 90% of the vegetation cover, based on estimates in 10 1x1 m quadrats, or present in three or more quadrats: Switch Grass 16% in 6 quadrats; Canada Blue Grass 11, 8; Moss 11, 6; Wild Red Raspberry 5, 5; Riverbank Grape 4, 3; Common St. John's-wort (*Hypericum perforatum*) 2, 3; Kentucky Blue Grass (*Poa pratensis*) 2, 2; Bugseed (*Coryspermum hysopifolium*) <1, 5; Common Milkweed (*Asclepias syriaca*) <1, 4. Changes of 5% or more between 1998 and 2003 in the mean estimated cover for ground layer species, based on 10 1x1 m quadrats, include an increase of 9% in Switch Grass and of 10% in mosses and a decrease of 22% in Canada Bluegrass and 9% Wild Red Raspberry. Non-living ground cover based on estimates in 10 1x1 m quadrats: bare sand 52%, litter 56%, sticks and wood 0% compared with 60, 38, 2 in 1998. **Weather:** Mean start temp. 15°C (range 10-19°C). Mostly clear and calm **Coverage:** 28hr; 8 visits (5 sunrise, 2 sunset); 2, 11, 14, 16, 18, 21, 23, 26 June. Maximum number of observers/visit, 1. **Census:** Field Sparrow, 6.0 (23, 2FL); Common Yellowthroat, 4.0 (15); Red-winged Blackbird, 4.0 (15, 1N); Chipping Sparrow, 3.0 (11); Eastern Kingbird, 3.0 (11, 1N); Killdeer, 3.0 (11, 1N); Song Sparrow 3.0 (11); Northern Rough-winged Swallow 3.0 (11, 3N); Bank Swallow 2.0 (1N); Mourning Dove, 2.0 (1N); Northern Mockingbird, 2.0; Tree Swallow, 2.0; Yellow Warbler, 2.0; Baltimore Oriole 1.5; European Starling, 1.0 (1N, 4FL); Northern Flicker 1.0. **Total:** 16 species, 42.5 territories (162/40 ha). **Visitors:** American Goldfinch, American Robin, Belted Kingfisher, Brown-headed Cowbird, Brown Thrasher, Common Grackle, Yellow-billed Cuckoo. **Remarks:** This study is part of a long-term project designed to monitor the response of vegetational and breeding bird communities to a reduction in deer browsing at Long Point, Lake Erie. **Acknowledgments:** Thanks to Jon McCracken for project supervision, Jane Bowles and Michael Bradstreet for measuring vegetation parameters, and the Canadian Wildlife Service for financial support.

