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Results from Vegetation Monitoring during 2010 in Terrestrial Communities at the North Chicago Wetland Mitigation Site, Lake County, Illinois

by

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INTRODUCTION

A vegetation monitoring program was established in 2009 at the North Chicago Wetland Mitigation Site in Lake County, Illinois (Figure 1). The principal goals of the monitoring are to further assess habitat quality in terrestrial and wetland communities throughout the site and to monitor vegetation changes resulting from habitat management. Proposed habitat management includes removal of invasive shrubs and trees, control efforts on selected herbaceous wetland species, localized seeding of native prairie and wetland species, and prescribed fire. Objectives for 2010 monitoring were to collect and analyze data on species composition, diversity, and structure from permanent vegetation sample plots and to compare results among vegetation types and to the 2009 baseline samples (Taft et al. 2010). Removal of invasive shrubs, saplings, and small trees was ongoing throughout the approximately 160-acre site during the 2010 field season. Consequently, some vegetation data were collected from recently treated areas and other data were collected from sample plots prior to removal of invasive woody species. This provided an opportunity to contrast early treatment effects from reference plots with no shrub removal. Previous work at this site includes extensive botanical surveys (e.g., Taft 1996 and 2006) and wetland mapping that identified 29 wetland acres (Olson et al. 1991; Plocher et al. 1996, Plocher and Ketzner 2006a, and Plocher and Ketzner 2006b).

2010 Study Questions - This report focuses exclusively on results from vegetation monitoring in treated and untreated terrestrial plant communities during 2010. No vegetation sample data were collected from wetlands during 2010 because no management activities appeared to have occurred during 2010 (Plocher, pers. comm.). Three questions the report will address are:

1. What are the differences in composition, species richness, and diversity between the 2009 baseline sample and 2010 data?

2. Do there remain substantial differences in composition, species richness, and diversity among plant community types identified in the baseline sample?

3. Are there changes in composition, species richness, diversity, and structure in prairie and old field/shrubland habitats compared to 2009 baseline levels that can be attributed to vegetation

management involving shrub and small tree removal?

METHODS

Sample Design - As reported previously (Taft et al. 2010), a stratified vegetation sampling design was utilized with 10 parallel transects running west to east, each separated by intervals of 500-ft (152 m). Five sample points were established on each transect separated by 250 ft (76 m) with the exception of the transect furthest to the north which had four sample points. This array provided 49 sampling stations including 37 in non-wetland terrestrial vegetation and 12 in areas previously determined (Plocher et al. 1996) to be jurisdictional wetlands. In addition, eight plots were established in prairie remnants in the far southern portion of the study area and five plots were placed in selected wetland communities, mostly in the southern half of the study area (Figure 2), for a total of 62 vegetation sample plots. Specific plot locations for targeted sampling were determined randomly. The location of one plot (10D) was occupied by a brush pile at the time of sampling in 2010; a new plot was established in the estimated nearest brush-free location.

Vegetation Sampling - Vegetation was sampled using 25-m^2 (5m x 5m) sampling plots with ground layer quadrats (1-m^2 [1 m x 1 m]) nested within. The baseline point for all sample plots was the southwest corner of the shrub/sapling plots, corresponding to the geographic coordinates associated with plot locations (Figure 2). Steel posts were placed at the SW corner during 2010, replacing plastic posts established in 2009 (intended to avoid damage to shrub-removal equipment), to permanently mark each plot with fire-resistant markers. Plot sides were oriented along cardinal directions (the southern boundary runs W-E at 90˚).

Composition and density of shrubs and saplings (all woody stems > 1-m tall and < 10 cm diameter-at-breast-height [dbh]) were recorded within the 25-m^2 plots. Stems and clumps of stems from root crowns, if connected above the soil line, were treated as separate individuals. For terrestrial vegetation plots, percent shrub cover was determined using digital photography with a hemi-view lens oriented vertically in the plot center on a tripod (about 45 cm above the ground) to photograph the canopy of the plot area (narrowed to the approximate plot area with a lens tube). Percent visible sky and leaf area index (LAI) were calculated from these images using HemiView Canopy Analysis Software, ver. 2.1. Percent canopy cover was calculated as

100 - % visible sky. A horizontal habitat image also was taken of each plot oriented from the southwest to the northeast corners. These will provide comparative images for tracking vegetation change following management including shrub removal and prescribed fire. Trees (woody stems $\geq$ 10 cm dbh) were sampled in 200-m^2 (14.14 m x 14.14 m) sample plots anchored at the SW corner of the shrub plot.

Ground layer vegetation in terrestrial plots was sampled with 3 quadrats nested within each shrub plot, with quadrats placed in the southwest and northeast corners and one in the plot center. Data collected from each quadrat includes species presence and percent cover for individaul species estimated with a modified Daubenmire cover-class scale (0-1 %, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%). All species rooted within quadrat frames were recorded including woody species < 1-m tall. Sample dates during 2010 were from 22 June to 13 July. Additional field trips were conducted during January 2010 and May 2010 to search for additional populations of *Amelanchier sanguinea*.

Data Analysis - Species abundance is measured by Importance Value (IV 200) calculated as the sum of relative frequency and relative cover for ground-layer samples. For the the shrub/sapling stratum, IV is calculated as the sum of relative frequency and relative density. For trees, IV is calculated as the sum of relative density and relative basal area. With the baseline data, cluster analysis was utilized to produce a hierarchical classification of sites from the quantitative sample data, based on the Sørensen similarity distance measure and flexible Beta linkage method (ß = -0.25). This procedure yielded 29 plots classified as old field/shrubland and 16 plots classified as prairie, including eight from the stratified array of plots and eight from the targeted prairie sampling effort (Taft et al. 2010). This classification was used as a framework for 2010 comparisons. Seven prairie plots and eight old field/shrubland plots remained untreated at the time of sampling and serve during 2010 as experimental control, or reference, plots. These plots all occur in the far southern portion of the site including transects 1-2 and the reference prairie plots.

Ground layer vegetation parameters were calculated at both quadrat and plot spatial scales. Quadrat means include the average among the 3 quadrats in each plot and the plot sum combines data from all 3 quadrats. Vegetation parameters include native and non-native species richness, Shannon-Wiener Index of diversity (H´ [native species only]), Simpson's

Index of Dominance (including all species), and metrics for Floristic Quality Assessment (FQA) including calculations based on native and total species. FQA metrics include Mean Coefficient of Conservatism and the Floristic Quality Index (Taft et al. 1997). Species richness at the quadrat scale is termed species density. These parameters, following Whittaker (1975) and Taft et al. (2006), were calculated as follows:

Ground Layer Vegetation

Native Species Density: Mean number of native species/quadrat (1 m^2)

Non-Native Species Density: Mean number of non-native species/quadrat (1 m^2)

Native Species Richness: Total number of native species/plot (sum of three quadrats)

Non-native Species Richness: Total number of non-native species/plot (sum of three quadrats)

Shannon-Wiener Index of Diversity (H'): $-\sum [p_i \ln(p_i)]$, where p_i is the relative abundance of each native species (based on importance values [IV200] calculated as the sum of relative cover and relative frequency),

Simpson's Dominance Index: $\sum p_i^2$, where p_i is the relative importance value for each species in the sample area (transect),

Percent Cover: Sum of the average cover for each species in sample area

Percent Bare Ground: Average estimate of bare ground for each quadrat

Floristic Quality Assessment (using ground-layer vegetation data)

Mean Coefficient of Conservatism (Mean C): $\sum$ CC/S, where CC = Coefficient of Conservatism and S = total species richness, and

Floristic Quality Index (FQI): Mean C ($\sqrt{N}$) where N = native species richness

Mean Cn and **FQIn** are calculated using only native species.

Shrub Layer

Shrub Density: Total stem number per plot (sum of all species)

Shrub Cover: 100 - % visible sky, as determined from analysis of digital canopy photos with Hemi-View Canopy Analysis Software (ver. 2.1).

Leaf Area Index (LAI): The amount of leaf surface area p er unit ground area as determined from analysis of digital canopy photos with Hemi-View Canopy Analysis Software (ver. 2.1).

Botanical nomenclature follows Taft et al. (1997), a modification from Mohlenbrock (1986). Non-native species in the report will be indicated with an asterisk (*).

Statistical Analysis - Comparisons of vegetation parameters among old field/shrubland and prairie vegetation types were examined with means comparison tests (t-tests). Comparisons between 2010 and baseline data were examined with paired t-tests; comparisons between vegetation types in 2010 were examined with two-sample t-tests. The untreated reference plots provide a means to compare effects of shrub removal to changes in untreated vegetation in both old field/shrubland and prairie vegetation types. The multiple comparison probability error rate was addressed with the Bonferroni adjustment ($p = 0.05/n$ [number of comparisons in each dataset]). These statistical tests were performed with Systat ver. 10 (SPSS 2000).

RESULTS AND DISCUSSION

TERRESTRIAL VEGETATION

Ground-Layer

Site Summary

Site Species Richness - A total of 216 taxa of vascular plants, one more than in 2009, were recorded from the combined ground-layer samples (45 plots, 135 quadrats) including 164 native and 38 non-native species; 14 remaining taxa, mostly sterile plants and seedlings, were undetermined to species (Appendix 1). There were 34 new species recorded in 2010 and 33 previously recorded species that were not found in 2010. Of the 33 taxa not found in 2010, all but one were scarce in the baseline sample. The exception is *Allium canadense,* a common species from 2009 that was redetermined in 2010 as the vegetatively similar *A. cernuum* (both may be present). Of the other species absent from the 2010 sample, about half either were woody plants (likely removed with management), short-lived taxa (annuals and biennials), or a few seedlings that were undetermined in 2009. The remaining taxa were perennial forbs and grasses found in only one or two quadrats during the baseline sample. The novel species recorded in 2010 mostly were infrequent, occurring in up to 5 quadrats. Some are woody plants that likely resprouted after cutting and newly qualified for the ground-layer sample (below 1 m in height). The non-native biennial *Cirsium vulgare* (bull thistle), the most abundant newly

recorded species, was found in 13 quadrats and may pose an emerging management concern. Combining results from general surveys (Taft 2006) and the 2009 (Taft et al. 2010) and 2010 monitoring efforts, a total of 368 vascular plant species (nearly 12% of the total known flora of the state) have been recorded from the North Chicago Wetland Mitigation Site site including three state threatened (*Elymus trachycaulus, Oenothera perennis,* and *Veronica scutellata)* and one state endangered (*Amelanchier sanguinea*) plant species.

Dominant Species - The top-10 dominant species in descending rank order overall in 2010 were *Rhamnus cathartica*, Cornus racemosa, Allium cernuum, Solidago juncea, Schizachyrium scoparium, Carex granularis, Daucus carota*, Agrostis alba, Poa pratensis*,* and *Fragaria virginiana* (underlined taxa also were among the 10 most dominant species in 2009). These top-ranking species accounted for 34% of the total importance value among all species in 2010 (see Appendix 1 for a listing of common names associated with scientific names used for species throughout the report). The additions to the top-ranking species in 2010 replaced *Aster drummondii, Potentilla simplex, Lonicera* X *bella*,* and *Andropogon gerardii*, taxa still relatively abundant but not ranking among the top ten species.

Increasers and Decreasers - Species increasing greatest in frequency were *Cirsium vulgare*, Plantago rugelii, Carex granularis, Aster sagittifolius, Rhamnus frangula*,* and *Prunella vulgaris* var. *elongata* and species increasing greatest in percent cover were *Carex granularis, Agrostis alba, Calamagrostis canadensis, Daucus carota**, and *Parthenium integrifolium* (Table 1). Species decreasing greatest in frequency were *Fragaria virginiana, Ratibida pinnata, Crataegus pruinosa, Aster drummondii*, and *Lobelia spicata* and species decreasing greatest in percent cover were *Rhamnus cathartica*, Solidago juncea, Carex pellita, Antennaria neglecta,* and *Cornus racemosa* (Table 1). Decreasing species outnumbered increasers 117 to 94 and by a sum total of 451 occurrences compared to 289.

Structure, Species Richness and Diversity - Throughout the study area there was an average species density per quadrat (1-m^2) of 16.98 native and 5.35 non-native species. Native species density declined slightly and non-native species increased slightly, but the differences were not significant (Table 2). Total native species richness per plot (combining results from three

quadrats) declined from 29.4 to 28.3 species and non-native richness increased from 6.76 to 8.02 and the latter increase was significant (p = 0003; Table 2). Average vegetative cover was 107.8%, and average bare ground was 33.5%, indicating a significant decline in percent vegetative cover (p = 0.0003) and significant increase (p = 0.0017) in percent bare ground (Table 2**)**.

Floristic Quality Assessment - Results based on mean quadrat values indicated a Mean C of 2.28 (Mean Cn = 2.98) and FQI of 9.67 (FQIn = 12.4). These FQA values declined slightly from the baseline levels; however, the differences are not significant (Table 2). These changes probably are a result of the recent management activities that included extensive brush removal in most plots prior to sampling. Soil disturbances can release soil-stored seeds of predominately ruderal species.

2010 Habitat Differences

Species Composition - The two most dominant species are the same in both the old field/shrubland and prairie vegetation types: *Rhamnus cathartica** and *Cornus racemosa* (Appendix 2). These have been among the focal species for removal with the shrub and small tree management that was ongoing at the time of sampling. Despite shrub removal, these species remain dominant in the ground layer sample, which includes woody stems up to 1-m in height. Subsequent dominants are different for the two main terrestrial vegetation types. The top-ten dominants in the Old Field/Shrubland vegetation type, in descending rank order based on IV200, were *Rhamnus cathartica**, *Cornus racemosa*, *Allium cernuum* (formerly determined as *A. canadense*), *Lonicera* X *bella**, *Carex granularis*, *Aster lateriflorus*, *Fragaria virginiana*, *Potentilla simplex*, *Aster drummondii*, and *Dichanthelium villosissimum* (the latter total may include some seedlings of *D. acuminatum*). These species account for nearly 41% of the total importance value (IV) among species (Appendix 2).Dominant species in the p:rairie vegetation type were *Rhamnus cathartica**, *Cornus racemosa*, *Schizachyrium scop;arium*, *Solidago juncea*, *Parthenium integrifolium*, *Agrostis alba*, *Poa pratensis**, *Sorghastrum nutans*, *Andropogon gerardii*, and *Daucus carota**. These species account for about 32% of the total IV among species in the prairie vegetation type (Appendix 2). Underlined species also were among top-ten dominants in each respective vegetation type in the 2009 baseline sample.

Structure, Species Richness and Diversity - Old field/shrubland and prairie habitats continue to differ greatly in many vegetation parameters. The prairie vegetation type has greater species density, richness, diversity of native species, and % cover compared to the old field/shrubland community and the differences are significant; the old field/shrubland community has greater dominance and % bare ground and the differences are significant (Table 3). For example, mean native species density for the old field/shrubland plots was 13.6 compared to 23.1 for the prairie plots. Mean percent vegetation cover in the old field/shrubland vegetation averaged 68% compared to 179% for the prairie vegetation while mean percent bare ground was 45% in the old field/shrubland plots compared to 12% in the prairie plots (Table3). All comparisons of ground layer variables were significantly different at $p < 0.05$; however, with the Bonferroni adjustment to the multiple comparisios ($p = 0.05/8$ [0.0063]) the number of non-native species, at both the mean quadrat and plot scales, were not significantly different between vegetation types (Table 3).

Floristic Quality Assessment - FQA scores remain greater in the prairie habitat compared to the old field/shrubland habitat and the differences are significant (Table 3). For example, Mean C/quadrat was 2.00 for the old field/shrubland sample compared to 2.80 in the prairie sample and FQI was 7.49/quadrat for the old field/shrubland sample compared to 13.6 for the prairie sample data and these differences were significant (Table 3). The highest FQI scores across the study remain concentrated in the far southern portion of the study area among the targeted reference prairie samples. Among those plots, Mean C/quadrat was 3.58 (Mean Cn = 4.24) and FQI was 19.97 (FQIn = 21.68).

<u>Treatment Effects - Early Responses Following Shrub Removal</u>

Old Field/Shrubland - There was a slight decline in native species density and richness and an increase in non-native species density and richness; however, the differences were not significant with the probability adjustment for the multiple comparisons (Table 4). Percent cover in treated plots decreased from 88% to 60% but the difference ($p = 0.01$) was not significant with the adjustment for multiple comparisons. Bare ground increased from 34% to nearly 50% and the difference was significant ($p = 0004$; Table 4). In plots with no shrub removal (untreated plots), both native and non-native species density increased slightly but the

differences were not significant; native richness also increased slightly (Table 4). Non-native species richness increased from 3.6 to 5 species per plot and the difference was significant (p = 0.004). FQA variables in treated and untreated plots declined slightly but the differences were not significant (Table 4).

Prairie - In treated plots there was a slight decline in native species density and richness and an increase in non-native species density and richness; however, the differences were not significant (Table 4). Percent cover declined from the baseline in treatment plots from 172% to 137% and bare ground increased slightly but the differences were not significant. In plots with no shrub removal there were slight declines in species density of native and non-native species and slight increases in native and non-native species richness, but the differences were not significant (Table 4). FQA variables in treated and untreated plots declined slightly but the differences were not significant.

Shrub/Sapling Stratum

Site Summary - Combined data from transect plots and targeted prairie sampling indicated the total stem density of shrubs and saplings declined throughout the site during the sample period from 22,898 stems/ha in the 2009 baseline sample to 5,680 stems/ha (Table 5). Average stem density per plot (25-m^2) declined from 57.24 to 14.2 (Table 2), a significant difference (p < 0.00001). Average Leaf Area Index (LAI) declined from 1.21 to 0.49, a significant decline (p < 0.00001), and average percent shrub cover declined from 66% to 33%, also a significant decline (p < 0.00001) (Table 2). By the time sampling was completed in mid-July 2010, 30 of the 45 terrestrial sample plots had been treated with shrub and small tree removal. Desirable native species were, in some cases, left during the management activities. The great majority of stems from the shrub/sapling stratum were from the untreated plots.

Seventeen species of shrubs and small trees were recorded in the sampling. Dominant species in the combined old field/shrubland and prairie samples in descending rank order were *Rhamnus cathartica**, with 66% of total stems (by far, still the dominant species), *Viburnum lentago, Lonicera* X *bella**, and *Cornus racemosa* accounting, as in the baseline sample, for nearly 80% of the sum importance values for all shrubs (Table 5). Nine species recorded during the baseline sample were absent during 2010, including four *Crataegus* species (hawthorns),

Amelanchier arborea and *Cornus stolonifera*.

Plant Communities

Old Field/Shrubland - Seventy-two percent of plots (21 of 29) were treated prior to sampling. Stem density declined from about 22,221 stems/ha to 4,648 stems/ha (Table 6). Average LAI declined from 2.51 to 0.63 and average shrub cover declined from 87% to 38.4% (Table 3). Fifteen species were recorded. Dominants in descending rank order, as with the overall sample, were *Rhamnus cathartica*, Viburnum lentago, Lonicera* X *bella**, and *Cornus racemosa* and these dominants accounted for 87% of the total stem density (Table 6).

Prairie - About half the prairie plots were untreated at the time of sampling (9 of 16 were treated in part; 1 reference plot on the edge of the study site was only partially treated, but was included in the treated group). Nevertheless, stem density declined from 24,125 stems/ha to 7,550 stems/ha (Table 6). Mean shrub density declined from 60.3 to 18.9 stems per plot, LAI declined from 0.94 to 0.25, and percent shrub cover declined from 56% to 23% (Table 3). Nine species were recorded and the dominants were *Rhamnus cathartica*, Lonicera* X *bella**, and *Cornus racemosa* accounting for 95% of the total shrub and sapling density (Table 6).

Treatment Effects - Early Responses Following Shrub Removal

Old Field/Shrubland - Average shrub/sapling density in treated plots declined from 57.8 to 0.86, a significant decline ($p < 0.00001$) (Table 4). LAI also greatly declined and the difference was significant ($p < 0.00001$). Canopy cover declined from 77% to 26%, also a significant reduction ($p < 0.00001$). With significant shrub removal, the canopy cover measured by the hemi-view lens is influenced by any tall vegetation that is intercepted in the projected sun angle at the time of sampling, so includes tall vegetation such as trees, including stems outside of the plots. Untreated plots declined from 49.8 to 39.9 stems/plot but the difference was not significant ($p = 0.019$) with the probability adjustment for multiple comparisons. Percent cover and LAI did not change significantly from the baseline sample (Table 4). These data suggest a degree of self pruning during the past year in untreated plots, with a minor change in canopy cover and slight increase in LAI.

Prairie - Average shrub/sapling density in treated plots declined from 84.3 to 3.1, a significant reduction ($p < 0.00001$) (Table 4). LAI also greatly declined and the difference was significant ($p < 0.00001$). Canopy cover declined from 67% to 17%, also a significant reduction ($p < 0.00001$). Shrub density, LAI, and % canopy cover increased in untreated plots; however, the differences were not significant (Table 4).

Tree Stratum

Nine plots in the stratified transect samples included trees (woody stems > 10 cm dbh), 5 more than in the 2009 baseline. Evidently, by removing so much of the shrub cover, more trees were recognized in the larger tree plots than previously noted. Tree density nevertheless declined from 250 stems/ha and basal area of 12.2 m^2/ha to 133 stems/ha and 6.62 m^2/ha. Six species were recorded in the tree sample plots and *Populus deltoides* was the dominant with about 35% of the IV for all species followed by *Crataegus pruinosa/coccinea* (determination uncertain due to sterile condition of most individuals), *Prunus serotina*, and *Rhamnus cathartica** (Table 7).

Threatened and Endangered Species

Amelanchier sanguinea, an endangered species in Illinois (Illinois Endangered Species Protection Board 2009), was discovered in the study area during 2009. In January and May 2010, additional surveys were made to determine if other individuals were present. Several *Amelanchier* saplings are present but could not be determined to species in their sterile condition; several of these were flagged, with assistance from the management crew during shrub removal, and will be monitored in future years for flower and fruit production, features needed for positive identification. During 2010, only 2 stems confirmed to be *A. sanguinea* were found in the study area (plot 7D). In addition, seedlings of an *Amelanchier* species were found in 11 other sample plots; however, sterile individuals can not be determined with certainty to species.

Three of the four species listed by the Illinois Endangered Species Protection Board as threatened or endangered that are known from the site were recorded in quantitative sample plots. *Oenothera perennis* (State threatened), as with the baseline sample, was found in one plot (7B) in the stratified transects and numerous plants (too many to count) were found nearby,

about 170 m west of the *Amelanchier sanguinea* occurrence (Figure 3). Susanne Masi (Chicago Botanical Gardens), director of the Plants of Concern project in the Chicago region, visited this population during 2010 and indicated she believed it was by far the single largest for this species in Illinois. Five years ago, this was a difficult species to find at this site; however, the shrub removal management appears to have greatly improved the habitat suitability for this species. *Elymus trachycaulus* (State threatened) was recorded from two reference prairie plots and one of the old field/shrubland plots, increasing from the single individual found during 2009. *Veronica scutellata*, a species listed as threatened in Illinois, has been seen at two locations in the study in marsh habitat but was not recorded in any of the wetland plots sampled in 2009.

SUMMARY AND CONCLUSIONS

It is too early in the monitoring program at the North Chicago Mitigation Site to identify trends in the ground layer vegetation resulting from shrub removal. In some cases, the treatment occurred too soon prior to sampling for a clear treatment effect to develop. In addition, unavoidable soil disturbances associated with hand and mechanical shrub removal, piling, and burning of woody materials also likely modified the vegetation during the 2010 growing season. These effects can not be separated from the short-term effect of increasing available light resulting from shrub removal. Additional monitoring will help identify salient trends and determine more conclusively treatment effects. However, future sampling will not have the benefit of untreated reference plots, so the changes will have to be inferred from comparisons to baseline condition without an account of independent ambient trends. Returning to the central questions posed in the Introduction:

1. What are the differences in composition, species richness, and diversity between the baseline sample and 2010 data?
2. Do there remain differences in composition, species richness, and diversity among plant community types identified in the baseline sample?
3. Are there changes in composition, species richness, and diversity in prairie and old field/shrubland habitats compared to baseline levels recorded in 2009 that can be attributed to vegetation management involving shrub and small tree removal?

A nearly identical number of species were recorded in 2010 compared to the 2009 baseline sample. Differences include absence of some taxa from the baseline sample, mostly woody plants, short-lived taxa, and perennial forbs that were uncommon in the baseline sample, and emergence of a nearly equal number of novel species. All of the dominants remain among the most common species. Overall, richness of native species declined in sample plots and non-native species increased; however, only totals for non-native species at the plot scale were significantly different from the baseline. There were no significant differences among Floristic Quality Assessment metrics. Shrub density, percent cover, and leaf area index all declined significantly, a result of 30 of 45 sample plots having been treated with shrub removal management prior to sampling. This result contrasts with no significant changes in untreated sample plots.

As with the baseline sample, prairie and old field/shrubland vegetation types remain quite different in composition, diversity, and floristic quality. Levels of shrub density and percent cover were not significantly different, although more prairie plots remained untreated compared to the old field/shrubland plots. The baseline condition found greater density of shrubs in the prairie plots but higher percent cover and LAI in the old field/shrubland plots and this pattern continued in 2010. This pattern is likely due to a more recent invasion of prairie plots by a higher density of smaller stems; shrubs in the old field/shrubland plots are more mature, apparently have undergone some self-pruning, and have greater total canopy cover and LAI. Continued monitoring will determine if these community types begin to merge and become less distinct following removal of the shrub thicket, a likely barrier to species movement and reproduction.

There were few noteworthy changes in untreated prairie or old field/shrubland sample plots with the exception of a significant increase in total richness of non-native species in the old field/shrubland vegetation type. In treated plots, there were obvious changes resulting from target shrub removal in both the prairie and old field/shrubland communities, including declines in shrub density, percent canopy cover, and LAI (leaf area index). There also were declines in percent cover in the ground layer and increases in percent bare ground in both the prairie and old field/shrubland communities; the increase in percent bare ground in old field/shrubland was significant. These changes likely are the result of recent disturbances associated with the shrub removal effort. Floristic Quality Assessment metrics declined slightly in treated and untreated

plots in both vegetation types, but the differences were not significant. Continued monitoring will help determine the full effect of the shrub removal and other planned management activities including planned applications of prescribed fire.

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Table 1. Comparison of species frequency and cover from the baseline 2009 sample and 2010 showing species that increased by more than 5 sample quadrats or 5% cover and species that decreased by more than 5 sample quadrats or 5% cover. * indicates non-native species, + indicates new taxa sampled in 2010. North Chicago Wetland Mitigation Site.

----------INCREASERS----------			
SPP INCREASING BY > 5 QUADRATS	# Increase	SPP INCREASING BY > 0.5% COVER	% Increase
Cirsium vulgare+*	13	*Carex granularis*	1.25
Plantago rugelii	11	*Agrostis alba*	1.07
Carex granularis	11	*Calamagrostis canadensis*	0.86
Aster sagittifolius	10	*Daucus carota**	0.78
*Rhamnus frangula**	9	*Parthenium integrifolium*	0.71
Prunella vulgaris v. elongata	9	*Carex buxbaumii*	0.69
Populus deltoidies+	8	*Helianthus grosseserratus*	0.52
Juncus tenuis	8	*Prunella vulgaris v. elongata*	0.50
Erigeron philadelphicus	7		
Rhus glabra+	7		
*Medicago lupulina**	6		
Erigeron strigosus/annuus	6		

----------DECREASERS----------			
SPP DECREASING BY > 5 QUADRATS	# Decrease	SPP DECREASING BY > 0.5% COVER	% Decrease
Fragaria virginiana	-20	*Rhamnus cathartica**	-10.50
Ratibida pinnata	-17	*Solidago juncea*	-4.09
Crataegus cf *pruinosa*	-16	*Carex pellita*	-1.33
Aster drummondii	-16	*Antennaria neglecta*	-1.16
Lobelia spicata	-15	*Agrostis alba* v. *palustris*	-1.11
Cornus racemosa	-14	*Cornus racemosa*	-1.08
Sanicula canadensis	-13	*Andropogon gerardii*	-1.01
Zizia aptera	-13	*Aster drummondii*	-0.96
Solidago nemoralis	-10	*Fragaria virginiana*	-0.91
*Poa compressa**	-9	*Potentilla simplex*	-0.88
Solidago missouriensis	-9	*Carex stricta*	-0.80
Aster pilosus	-8	*Ratibida pinnata*	-0.73
Monarda fistulosa	-8	*Zizia aurea*	-0.67
Viburnum lentago	-8	*Solidago gigantea*	-0.62
Carex stricta	-8	*Rhamnus frangula**	-0.55
*Taraxacum officinale**	-7	*Solidago nemoralis*	-0.51
*Cerastium vulgatum**	-7		
Aster simplex	-7		
Viola peditifida	-7		
Sisyrinchium albidum	-7		
Equisetum arvense	-7		
*Rhamnus cathartica**	-7		
Vitis riparia	-6		
Oxalis stricta	-6		
Amelanchier cf. *sanguinea*	-6		
Acer saccharinum	-6		
Glyceria striata	-6		
Anemone virginiana	-6		
Antennaria neglecta	-6		

Table 2. Comparisons between 2009 baseline and 2010 vegetation sample data combining results from all 45 terrestrial vegetation sample plots. Paired t-tests were used for comparison of means using data collected from permanent vegetation sample plots. North Chicago Wetland Mitigation Site. SE = standard error. df = degrees of freedom. **Bold** indicates significant difference.

	2009		2010		Results of Means Comparison Tests		
GROUND LAYER	**Mean**	**SE**	**Mean**	**SE**	**t-stat**	**df**	***prob.***
Species Diversity & Structure							**(*p* = 0.0063)**
Native Spp. Density/Quadrat	17.31	1.21	16.98	1.17	0.66	44	0.51395
Non-Native Sp Density/Quadrat	4.66	0.34	5.35	0.37	2.68	44	0.01023
Native Richness/Plot	29.42	1.78	28.29	1.77	1.43	44	0.16101
Non-Native Richness/Plot	6.76	0.54	8.02	0.51	3.96	44	**0.00027**
Shannon-Wiener Diversity (natives)	2.43	0.08	2.45	0.08	0.44	44	0.65924
Simpson's Dominance Index (all spp.)	0.21	0.03	0.16	0.02	2.79	44	0.00778
% Vegetation Cover	135.07	13.12	107.75	11.29	3.96	44	**0.00027**
% Bare Ground	25.34	2.89	33.54	3.90	3.34	44	**0.00171**
Florisitic Quality Assessment							**(*p* = 0.0125)**
Mean C	2.39	0.12	2.28	0.12	2.19	44	0.03357
Mean Cn	3.05	0.11	2.98	0.13	1.23	44	0.22372
FQI	10.22	0.77	9.67	0.74	2.46	44	0.01786
FQIn	12.80	0.86	12.40	0.82	1.72	44	0.09310
SHRUB LAYER							**(*p* = 0.0167)**
Shrub Density	57.24	5.08	14.20	3.57	6.60	44	**< 0.00001**
% Canopy Cover	66.48	3.40	33.08	3.71	7.37	44	**< 0.00001**
LAI	1.21	0.17	0.49	0.09	6.21	44	**< 0.00001**

Table 3. Results from means comparison tests using 2-sample t-tests comparing vegetation parameters between the old field/shrubland and prairie vegetation types during 2010. Data collected from the North Chicago Wetland Mitigation Site. There were 29 old field (OF)/shrubland plots and 16 prairie plots in the comparisons. Alpha (probability significance) was determined with the Bonferroni adjustment for multiple comparisons with the required alpha levels shown above each section (e.g., for Ground Layer Species Diversity & Structure, $p = 0.05/8$ [$p = 0.00625$]). SE = standard error. df = degrees of freedom.

2010 SAMPLES	**OF/Shrub-land**		**Prairie**		**Results of Means Comparison Tests**		
	Mean	**SE**	**Mean**	**SE**	**t-stat**	**df**	***prob.***
Ground Layer Species Diversity & Structure							**($p = 0.0063$)**
Native Spp. Density/Quadrat *	13.61	1.32	23.08	1.28	5.16	40	**0.00001**
Non-Native Sp Density/Quadrat*	4.67	0.44	6.58	0.57	2.67	32	0.01190
Native Richness/Plot ++	23.59	1.95	36.81	2.32	4.36	34	**0.00011**
Non-Native Richness/Plot ++	7.17	0.60	9.56	0.82	2.36	31	0.02498
Shannon-Wiener Diversity (natives)	2.33	0.12	2.67	0.06	2.59	40	**0.01342**
Simpson's Dominance Index (all spp.)	0.20	0.02	0.09	0.01	4.72	34	**0.00004**
% Vegetation Cover	68.18	7.69	179.47	17.86	5.72	21	**0.00001**
% Bare Ground	44.93	4.34	12.39	3.99	5.52	41	**< 0.00001**
Florisitic Quality Assessment							**($p = 0.0125$)**
Mean C /quadrat (1-m^2)	2.00	0.12	2.80	0.21	3.29	24	**0.00304**
Mean Cn/quadrat	2.66	0.13	3.55	0.19	3.83	22	**0.00063**
FQI /quadrat	7.49	0.62	13.61	1.26	4.35	23	**0.00025**
FQIn /quadrat	9.77	0.71	17.15	1.24	5.14	24	**0.00003**
Shrub Stratum							**($p = 0.0167$)**
Shrub Density/ 5-m2 plot	11.62	3.51	18.88	7.81	0.85	21	0.40619
% Canopy Cover	38.41	4.97	23.43	4.52	2.23	41	0.03121
LAI	0.63	0.13	0.25	0.06	2.58	39	**0.01373**

Table 4. Results from means comparison tests using paired t-tests comparing vegetation parameters between treated and untreated old field/shrubland and prairie vegetation types during 2010. Data collected from the North Chicago Wetland Mitigation Site. There were 21 treated old field (OF)/shrubland plots, 8 untreated old field/shrubland plots, 9 treated prairie plots and 8 untreated prairie plots in the comparisons to the baseline conditions. Alpha (probability significance) was determined with the Bonferroni adjustment for multiple comparisons with the required alpha levels shown above each section (e.g., for Ground Layer Species Diversity & Structure, p = 0.05/8 [p = 0.00625]). SE = standard error. df = degrees of freedom. **Bold** indicates statistically significant difference.

	PAIRED COMPARISONS						
TREATED (SHRUB REMOVAL)	**2009 Prairie**		**2010 Prairie**		**Results from Means Comparison Tests**		
	Mean	**SE**	**Mean**	**SE**	**t-stat**	**df**	***prob.***
Ground Layer Species Diversity & Structure							**(*p* = 0.0063)**
Native Spp. Density/Quadrat	21.16	1.36	20.85	1.59	0.30	8	0.76851
Non-Native Sp Density/Quadrat	6.41	0.85	7.67	0.67	2.77	8	0.02416
Native Richness/Plot	35.00	2.18	32.78	2.97	1.85	8	0.10102
Non-Native Richness/Plot	9.89	1.26	11.11	0.96	1.85	8	0.10207
Shannon-Wiener Diversity (natives)	2.60	0.09	2.75	0.07	2.07	8	0.07191
Simpson's Dominance Index (all spp.)	0.11	0.02	0.08	0.004	1.75	8	0.11813
% Vegetation Cover	172.15	25.18	137.26	19.33	1.96	8	0.08554
% Bare Ground	12.59	3.24	18.15	6.35	0.78	8	0.45798
Florisitic Quality Assessment							**(*p* = 0.0125)**
Mean C	2.33	0.14	2.16	0.17	1.69	8	0.12907
Mean Cn	3.01	0.09	2.96	0.12	0.74	8	0.47956
FQI	10.72	0.95	10.01	1.22	1.31	8	0.22567
FQIn	13.80	0.77	13.52	1.05	0.56	8	0.58785
Shrub Stratum							**(*p* = 0.0167)**
Shrub Density	84.33	9.17	3.11	1.82	7.97	8	**0.00005**
% Canopy Cover	67.26	6.11	17.08	5.61	4.88	8	**0.00122**
LAI	1.18	0.31	0.18	0.08	4.18	8	**0.00308**
REFERENCE (NO SHRUB REMOVAL) Ground Layer Species Diversity & Structure							**(*p* = 0.0063)**
Native Spp. Density/Quadrat	27.48	1.58	25.95	1.60	1.37	6	0.21891
Non-Native Sp Density/Quadrat	5.43	0.96	5.19	0.71	0.48	6	0.64546
Native Richness/Plot	41.86	2.19	42.00	2.79	0.09	6	0.93024
Non-Native Richness/Plot	7.00	1.21	7.57	1.02	1.33	6	0.23081
Shannon-Wiener Diversity (natives)	2.72	0.07	2.58	0.11	2.27	6	0.06401
Simpson's Dominance Index (all spp.)	0.09	0.00	0.11	0.01	1.53	6	0.17777
% Vegetation Cover	291.69	7.67	233.74	17.58	3.71	6	0.00994
% Bare Ground	4.45	1.37	4.98	2.41	0.26	6	0.80445
Florisitic Quality Assessment							**(*p* = 0.0125)**
Mean C	3.73	0.21	3.61	0.11	0.91	6	0.39795
Mean Cn	4.40	0.16	4.32	0.11	0.77	6	0.46966
FQI	19.32	0.74	18.24	0.44	1.63	6	0.15355
FQIn	22.89	0.87	21.81	0.69	1.61	6	0.15825
Shrub Stratum							**(*p* = 0.0167)**
Shrub Density	29.43	9.19	39.14	14.86	1.25	6	0.25657
% Canopy Cover	25.93	6.09	31.60	6.54	1.47	6	0.19172
LAI	0.24	0.11	0.35	0.10	1.51	6	0.18066

	PAIRED COMPARISONS						
TREATED (SHRUB REMOVAL)	**2009 OF/Shrubland**		**2010 OF/Shrubland**		**Results from Means Comparison Tests**		
	Mean	**SE**	**Mean**	**SE**	**t-stat**	**df**	***prob.***
Ground Layer Species Diversity & Structure							**(*p* = 0.0063)**
Native Spp. Density/Quadrat	13.97	1.63	13.83	1.65	0.16	20	0.87432
Non-Native Sp Density/Quadrat	4.17	0.42	5.16	0.56	2.14	20	0.04497
Native Richness/Plot	25.43	2.68	23.81	2.45	1.07	20	0.29671
Non-Native Richness/Plot	6.52	0.67	8.00	0.71	2.44	20	0.02393
Shannon-Wiener Diversity (natives)	2.35	0.15	2.32	0.15	0.25	20	0.80763
Simpson's Dominance Index (all spp.)	0.28	0.05	0.18	0.03	2.91	20	0.00873
% Vegetation Cover	88.08	8.68	59.97	9.43	2.82	20	0.01059
% Bare Ground	34.41	4.04	49.25	5.24	4.21	20	**0.00043**
Florisitic Quality Assessment							**(*p* = 0.0125)**
Mean C	2.02	0.13	1.93	0.15	1.15	20	0.26208
Mean Cn	2.69	0.12	2.60	0.18	0.72	20	0.47718
FQI	7.79	0.81	7.32	0.78	1.49	20	0.15267
FQIn	10.05	0.91	9.68	0.91	1.01	20	0.32603
Shrub Stratum							**(*p* = 0.0167)**
Shrub Density	57.76	8.12	0.86	0.37	6.96	20	**<0.00001**
% Canopy Cover	76.57	3.32	26.03	4.07	14.13	20	**<0.00001**
LAI	1.50	0.21	0.32	0.06	12.92	20	**<0.00001**
REFERENCE (NO SHRUB REMOVAL) Ground Layer Species Diversity & Structure							**(*p* = 0.0063)**
Native Spp. Density/Quadrat	12.83	2.22	13.04	2.19	0.51	7	0.62528
Non-Native Sp Density/Quadrat	3.29	0.55	3.38	0.39	0.37	7	0.72198
Native Richness/Plot	22.75	3.35	23.00	3.14	0.28	7	0.78488
Non-Native Richness/Plot	3.63	0.80	5.00	0.73	4.25	7	**0.00382**
Shannon-Wiener Diversity (natives)	2.20	0.20	2.34	0.20	1.12	7	0.30090
Simpson's Dominance Index (all spp.)	0.25	0.04	0.25	0.04	0.08	7	0.94213
% Vegetation Cover	79.67	10.45	89.75	9.95	2.41	7	0.04659
% Bare Ground	34.17	5.98	33.58	6.51	0.24	7	0.81814
Florisitic Quality Assessment							**(*p* = 0.0125)**
Mean C	2.27	0.16	2.20	0.13	0.69	7	0.51406
Mean Cn	2.88	0.18	2.81	0.12	0.61	7	0.55912
FQI	8.05	1.09	7.95	0.99	0.21	7	0.83917
FQIn	10.09	1.25	10.02	1.12	0.13	7	0.89874
Shrub Stratum							**(*p* = 0.0167)**
Shrub Density	49.75	5.02	39.88	4.51	3.01	7	0.01953
% Canopy Cover	74.61	2.87	70.90	5.03	1.07	7	0.31820
LAI	1.35	0.24	1.42	0.30	0.28	7	0.78667

Table 5. Shrub species recorded during 2010 at the North Chicago Wetland Mitigation Site. Species are shown in descending rank order of abundance, according to the IV200 (sum of relative frequency and relative density). Species with no occurrences were present in the 2009 baseline sample. This condition is temporary and already has changed as a result of the completion of shrub-removal management on site during the latter portion of 2010.

SPECIES	**% Freq.**	**Density/ ha**	**IV 200**
*Rhamnus cathartica**	44.44	3,724.44	93.74
Viburnum lentago	24.44	542.22	25.04
Lonicera X *bella**	17.78	551.11	20.97
Cornus racemosa	17.78	391.11	18.15
Crataegus pruinosa/coccinea	11.11	142.22	9.55
*Rhamnus frangula**	8.89	62.22	6.73
Cornus obliqua	6.67	26.67	4.69
Rhus glabra	4.44	35.56	3.44
Malus ioensis	4.44	17.78	3.13
Populus tremuloides	2.22	97.78	3.13
Amelanchier sanguinea	2.22	17.78	1.72
Juniperus virginiana	2.22	17.78	1.72
Prunus americana	2.22	17.78	1.72
Prunus virginiana	2.22	8.89	1.56
*Viburnum opulus**	2.22	8.89	1.56
Viburnum recognitum	2.22	8.89	1.56
Vitis riparius	2.22	8.89	1.56
Amelanchier arborea	0.00	0.00	0.00
Cornus stolonifera	0.00	0.00	0.00
Crataegus calpodendron	0.00	0.00	0.00
Crataegus mollis	0.00	0.00	0.00
Crataegus punctata	0.00	0.00	0.00
Crataegus species	0.00	0.00	0.00
Fraxinus pennsylvanica var. *subintegerrima*	0.00	0.00	0.00
*Malus pumila**	0.00	0.00	0.00
Zanthoxylum americanum	0.00	0.00	0.00
	157.78	5,680.00	200.00

Table 6. Shrub species recorded in old field/shrubland and prairie vegetation types at the North Chicago Wetland Mitigation Site during 2010. Species are shown in descending rank order by IV200 (sum of relative frequency and relative density). Species shown with 0.00 occurrences in 2010 were present in 2009. * = non-native species.

	OLDFIELD/SHRUBLAND				PRAIRIE		
SPECIES	**% Freq.**	**Density/ ha**	**IV200**	**SPECIES**	**% Freq.**	**Density/ ha**	**IV200**
*Rhamnus cathartica**	37.93	2,317.24	74.30	*Rhamnus cathartica**	31.03	6,275.00	117.73
Viburnum lentago	31.03	772.41	36.62	*Lonicera* X *bella**	10.34	675.00	20.48
Lonicera X *bella**	17.24	482.76	21.50	*Cornus racemosa*	13.79	225.00	18.36
Cornus racemosa	13.79	482.76	19.27	*Viburnum lentago*	6.90	125.00	9.35
Crataegus pruinosa/coccinea	17.24	220.69	15.86	*Amelanchier sanguinea*	3.45	50.00	4.51
*Rhamnus frangula**	10.34	82.76	8.45	*Juniperus virginiana*	3.45	50.00	4.51
Populus tremuloides	3.45	151.72	5.49	*Cornus obliqua*	3.45	25.00	4.18
Cornus obliqua	6.90	27.59	5.04	*Prunus virginiana*	3.45	25.00	4.18
Malus ioensis	6.90	27.59	5.04	*Rhamnus frangula**	3.45	25.00	4.18
Rhus glabra	3.45	41.38	3.11	*Rhus glabra*	3.45	25.00	4.18
Prunus americana	3.45	27.59	2.82	*Viburnum recognitum*	3.45	25.00	4.18
*Viburnum opulus**	3.45	13.79	2.52	*Vitis riparia*	3.45	25.00	4.18
Amelanchier arborea	0.00	0.00	0.00	*Amelanchier arborea*	0.00	0.00	0.00
Amelanchier sanguinea	0.00	0.00	0.00	*Cornus stolonifera*	0.00	0.00	0.00
Cornus stolonifera	0.00	0.00	0.00	*Crataegus calpodendron*	0.00	0.00	0.00
Crataegus calpodendron	0.00	0.00	0.00	*Crataegus mollis*	0.00	0.00	0.00
Crataegus mollis	0.00	0.00	0.00	*Crataegus pruinosa/coccinea*	0.00	0.00	0.00
Crataegus punctata	0.00	0.00	0.00	*Crataegus punctata*	0.00	0.00	0.00
Fraxinus pennsylvanica var. *subintegerrima*	0.00	0.00	0.00	*Fraxinus pennsylvanica* var. *subintegerrima*	0.00	0.00	0.00
Juniperus virginiana	0.00	0.00	0.00	*Malus ioensis*	0.00	0.00	0.00
*Malus pumila**	0.00	0.00	0.00	*Malus pumila**	0.00	0.00	0.00
Prunus virginiana	0.00	0.00	0.00	*Populus tremuloides*	0.00	0.00	0.00
Viburnum recognitum	0.00	0.00	0.00	*Prunus americana*	0.00	0.00	0.00
Vitis riparia	0.00	0.00	0.00	*Viburnum opulus**	0.00	0.00	0.00
Zanthoxylum americanum	0.00	0.00	0.00	*Zanthoxylum americanum*	0.00	0.00	0.00
	155.17	4,648.28	200.00		89.66	7,550.00	200.00

Table 7. Tree species recorded during 2010 at the North Chicago Wetland Mitigation Site. Trees include all woody stems ≥ 10 cm dbh.

	Basal Area m^2/ha	Density/ha	IV200
Populus deltoidies	3.55	22.23	70.29
Crataegus pruinosa/coccinea	0.51	50.02	45.25
Prunus serotina	0.81	33.34	37.19
Rhamnus cathartica	0.46	16.67	19.42
Quercus macrocarpa	0.75	5.56	15.49
Ulmus americana	0.54	5.56	12.36
Acer negundo	0.00	0.00	0.00
	6.62	133.37	200.00

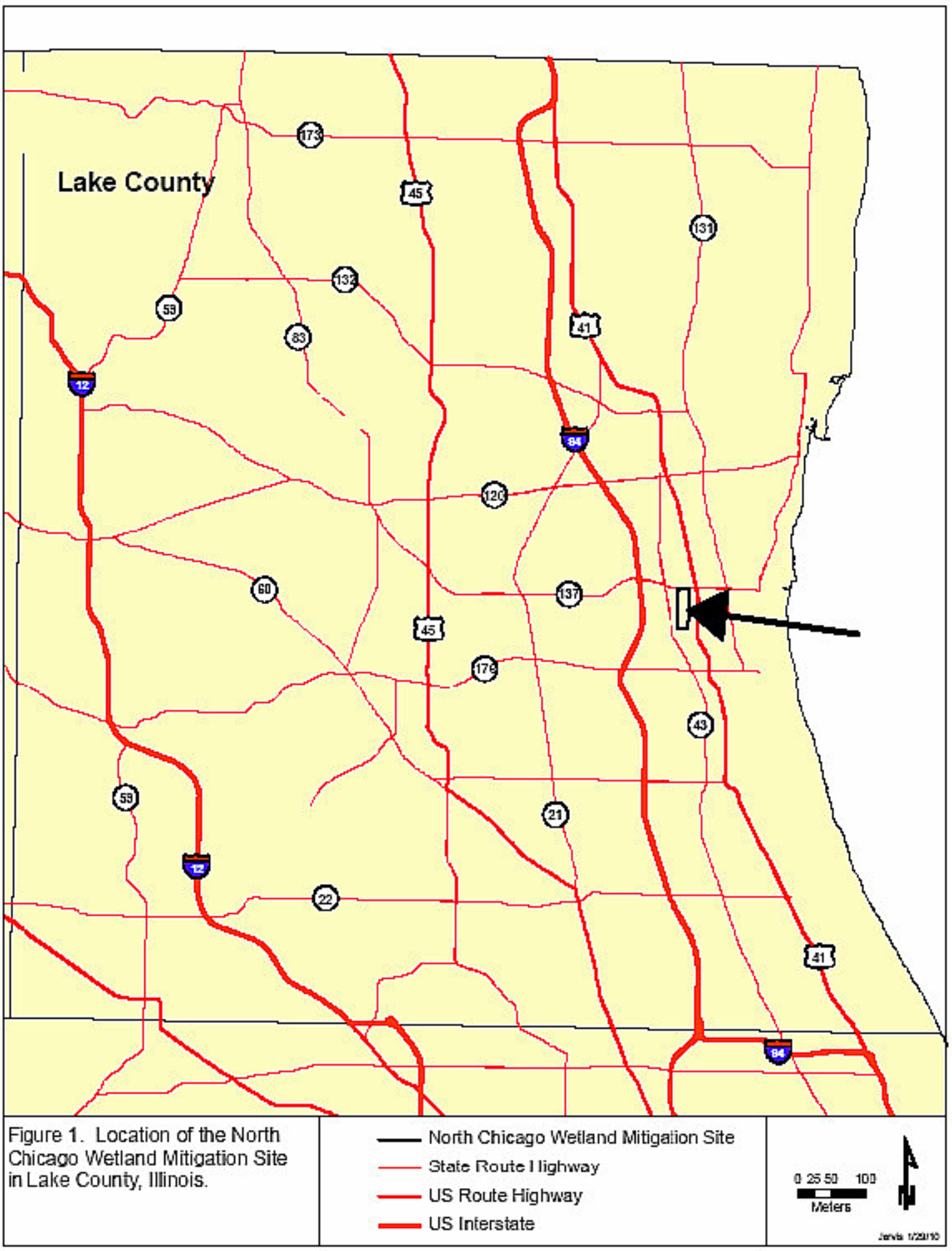

Figure 1. Location of the North Chicago Wetland Mitigation Site in Lake County, Illinois.

Figure 2. Stratified vegetation sampling grid in upland and wetland habitats with additional targeted prairie and wetland sampling locations at the North Chicago Wetland Mitigation Site in Lake County, Illinois.

Figure 3. Locations of threatened and endangered plants and high-quality natural communities in the North Chicago Wetland Mitigation Site in Lake County, Illinois.

Appendix 1. Comprehensive list of plant species recorded in terrestrial vegetation sample plots during 2010 and the 2009 baseline. North Chicago Wetland Mitigation Site. Occur. = occurrences, IV 200 = sum relative frequency and relative cover, CC = Coefficient of Conservatism, WC = Wetness Coefficient. * = non-native species. % Frequency is based on 135 quadrats sampled in 2010 and 145 quadrats sampled in 2009.

	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
SPECIES	% Freq.	% Cover	IV 200	% Freq.	% Cover	IV 200	**CC**	**WC**	**Wetness**	**Physiog-nomy**	**Common Name**
Acer negundo	5.19	0.026	0.26	4.83	0.024	0.24	1	-2	FACW-	Tree	Boxelder
Acer saccharinum	0.74	0.004	0.04	4.83	0.024	0.24	1	-3	FACW	Tree	Silver Maple
*Achillea millefolium**	22.96	0.767	1.74	22.07	0.586	1.45	0	3	FACU	P-Forb	Common Milfoil
Agrimonia gryposepala	4.44	0.041	0.24	4.14	0.124	0.28	3	2	FACU+	P-Forb	Tall Agrimony
Agrostis alba	32.59	2.778	4.04	28.28	1.703	2.58	0	-3	FACW	P-Grass C3	Red Top
Agrostis alba var. *palustris*	0.00	0.000	0.00	2.07	1.110	0.94	8	-3	FACW	P-Grass C3	Creeping Bent Grass
*Alliaria petiolata**	0.00	0.000	0.00	1.38	0.024	0.08	0	0	FAC	B-Forb	Garlic Mustard
Allium cernuum (canadense)	37.78	4.244	5.63	37.24	4.548	5.15	7	5	UPL	P-Forb	Nodding Wild Onion
Ambrosia artemisiifolia	2.96	0.033	0.16	2.07	0.010	0.10	0	3	FACU	A-Forb	Common Ragweed
Amelanchier sanguinea	3.70	0.019	0.18	7.59	0.038	0.38	10	5	UPL	Shrub	Round-leaved Serviceberry
Andropogon gerardii	9.63	2.704	2.94	9.66	3.717	3.26	5	1	FAC-	P-Grass C4	Big Bluestem
Anemone cylindrica	2.22	0.048	0.14	3.45	0.052	0.20	8	5	UPL	P-Forb	Candle Anemone
Anemone virginiana	47.41	0.807	2.87	48.28	0.983	2.95	4	5	UPL	P-Forb	Tall Anemone
Antennaria neglecta	16.30	0.281	0.99	19.31	1.445	1.98	4	5	UPL	P-Forb	Cat's Foot
Apocynum androsaemifolium	0.74	0.111	0.14	0.69	0.021	0.05	6	5	UPL	P-Forb	Spreading Dogbane
Apocynum sibiricum	0.00	0.000	0.00	0.69	0.003	0.03	2	-1	FAC+	P-Forb	Indian Hemp
Aquilegia canadensis	0.00	0.000	0.00	0.69	0.021	0.05	5	1	FAC-	P-Forb	Columbine
Arctium cf *minus**	1.48	0.007	0.07	0.00	0.000	0.00	0	5	UPL	B-Forb	Common Burdock
Arisaema triphyllum	0.74	0.111	0.14	0.69	0.103	0.11	4	-2	FACW-	P-Forb	Indian Turnip
Asclepias incarnata	0.00	0.000	0.00	0.69	0.021	0.05	4	-5	OBL	P-Forb	Swamp Milkweed
Asclepias purpurascens	0.00	0.000	0.00	0.69	0.021	0.05	7	3	FACU	P-Forb	Purple Milkweed
Asclepias tuberosa var. *interior*	0.74	0.111	0.14	2.07	0.028	0.12	5	5	UPL	P-Forb	Butterflyweed
Aster azureus	9.63	0.374	0.78	10.34	0.524	0.87	7	5	UPL	P-Forb	Sky-blue Aster
Aster drummondii	44.44	1.048	2.96	52.41	2.003	3.91	3	3	FACU	P-Forb	Drummond's Aster
Aster ericoides	27.41	0.504	1.69	28.97	0.790	1.92	4	4	FACU-	P-Forb	Heath Aster
Aster lateriflorus	34.81	1.030	2.51	31.03	1.193	2.32	2	-2	FACW-	P-Forb	Side-flowering Aster
Aster novae-angliae	7.41	0.111	0.43	5.52	0.148	0.36	4	-3	FACW	P-Forb	New England Aster
Aster pilosus	1.48	0.026	0.09	6.90	0.069	0.37	0	4	FACU-	P-Forb	Hairy Aster

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
	% Freq.	% Cover	IV 200	% Freq.	% Cover	IV 200	CC	WC	Wetness	Physiog-nomy	Common Name
Aster praealtus	12.59	0.830	1.33	11.03	0.628	0.98	4	-5	OBL	P-Forb	Willow Aster
Aster sagittifolius	8.89	0.244	0.62	1.38	0.024	0.08	4	5	UPL	P-Forb	Arrow-leaved Aster
Aster simplex	14.07	0.144	0.76	17.93	0.210	0.98	3	-5	OBL	P-Forb	Panicled Aster
*Avena satvia**	1.48	0.044	0.11	0.00	0.000	0.00	0	5	UPL	A-Grass C3	Oats
*Barbarea vulgaris**	4.44	0.022	0.22	0.69	0.003	0.03	0	0	FAC	B-Forb	Winter Cress
Bidens frondosa	3.70	0.019	0.18	0.69	0.003	0.03	1	-3	FACW	A-Forb	Common Beggar's Ticks
Botrychium dissectum	0.00	0.000	0.00	0.69	0.003	0.03	4	0	FAC	Fern	Bronze Fern
*Bromus commutatus**	0.74	0.004	0.04	0.00	0.000	0.00	0	5	UPL	A-Grass C3	Hairy Brome
Bromus kalmii	2.96	0.052	0.18	2.76	0.066	0.18	10	0	FAC	P-Grass C3	Prairie Brome
Cacalia tuberosa	2.96	0.159	0.28	2.76	0.166	0.25	10	0	FAC	P-Forb	Prairie Indian Plantain
Calamagrostis canadensis	2.96	0.867	0.94	0.69	0.003	0.03	3	-5	OBL	P-Grass C3	Blue Joint Grass
Carex blanda	3.70	0.548	0.67	6.90	0.255	0.51	2	0	FAC	P-Sedge	Common Wood Sedge
Carex buxbaumii	2.22	1.563	1.55	1.38	0.869	0.72	9	-5	OBL	P-Sedge	Dark-scaled Sedge
Carex cf *brevior* (sterile)	0.74	0.111	0.14	0.00	0.000	0.00	4	0	FAC	P-Sedge	Sedge
Carex cf *radiata* (sterile)	0.74	0.004	0.04	0.00	0.000	0.00	5	5	UPL	P-Sedge	Sedge
Carex cristatella	2.96	0.141	0.26	1.38	0.124	0.16	3	-4	FACW+	P-Sedge	Crested Oval Sedge
Carex granularis	48.89	2.359	4.38	37.93	1.107	2.57	2	-4	FACW+	P-Sedge	Pale Sedge
Carex grisea	0.74	0.004	0.04	0.00	0.000	0.00	3	5	UPL	P-Sedge	Sedge
Carex hirsutella	4.44	0.363	0.54	5.52	0.372	0.53	5	4	FACU-	P-Sedge	Hairy Green Sedge
Carex pellita	12.59	1.026	1.52	11.72	2.352	2.32	4	-5	OBL	P-Sedge	Wooly Sedge
Carex spp. (sterile; 4 diff. taxa)	5.19	0.033	0.16	0.69	0.021	0.17				P-Sedge	Sedge
Carex stricta	0.00	0.000	0.00	5.52	0.797	0.86	5	-5	OBL	P-Sedge	Common Tussock Sedge
Carex tenera	0.74	0.111	0.14	2.07	0.062	0.14	5	-1	FAC+	P-Sedge	Narrow-leaved Oval Sedge
Carex umbellata	11.11	0.222	0.70	8.28	0.110	0.46	6	5	UPL	P-Sedge	Early Oak Sedge
Castilleja coccinea	0.00	0.000	0.00	2.07	0.045	0.13	8	0	FAC	A-Forb	Indian Paintbrush
*Centaureum pulchellum**	1.48	0.007	0.07	0.00	0.000	0.00	0	4	FACU-	A-Forb	Showy Centaury
*Cerastium vulgatum**	14.07	0.089	0.71	17.93	0.124	0.91	0	3	FACU	P-Forb	Common Mouse-ear Chickweed
*Chemopodium albidum**	0.74	0.004	0.04	0.00	0.000	0	0	1	FAC-	A-Forb	Lamb's Quarters
Cicuta maculata	0.00	0.000	0.00	0.69	0.003	0.03	4	-5	OBL	B-Forb	Water Hemlock
Circaea lutetiana var. *canadensis*	11.85	0.511	1.01	13.10	0.745	1.16	2	3	FACU	P-Forb	Enchanter's Nightshade
*Cirsium arvense**	0.00	0.000	0.00	0.69	0.003	0.03	0	3	FACU	P-Forb	Field Thistle

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
	% Freq.	% Cover	IV 200	% Freq.	% Cover	IV 200	CC	WC	Wetness	Physiog-nomy	Common Name
Cirsium discolor	0.00	0.000	0.00	0.69	0.003	0.03	3	5	UPL	B-Forb	Pasture Thistle
*Cirsium vulgare**	9.63	0.048	0.48	0.00	0.000	0.00	0	4	FACU-	B-Forb	Bull Thistle
Comandra umbellata	3.70	0.126	0.28	4.83	0.193	0.37	6	3	FACU	Hemi-par	Bastard Toad-flax
Cornus alternifolia	0.00	0.000	0.00	0.69	0.021	0.05	7	5	UPL	Tree	Alternate-leaved Dogwood
Cornus obliqua	1.48	0.044	0.11	0.69	0.021	0.05	4	-5	OBL	Shrub	Pale Dogwood
Cornus racemosa	75.56	7.230	10.09	80.00	8.310	9.96	2	-2	FACW-	Shrub	Gray Dogwood
Corylus americana	0.74	0.281	0.29	0.69	0.586	0.48	4	0	FAC	Shrub	American Filbert
Crataegus cf. *coccinea*	6.67	0.089	0.38	2.76	0.031	0.15	5	5	UPL	Tree	Scarlet Hawthorn
Crataegus cf. *pruinosa*	0.00	0.000	0.00	11.03	0.224	0.67	3	5	UPL	Tree	Frosted Hawthorn
Crataegus crus-galli	3.70	0.019	0.18	5.52	0.028	0.27	2	0	FAC	Tree	Cock-spur Hawthorn
Crataegus mollis	0.00	0.000	0.00	0.69	0.003	0.03	2	-2	FACW-	Tree	Downy Hawthorn
Crataegus seedlings	22.22	0.167	1.15	20.69	0.255	1.14				Tree	Hawthorn
Cuscuta sp.	0.74	0.022	0.05	0.00	0.000	0.00	2	-3	FACW	A-Forb	Dodder
*Dactylus glomerata**	1.48	0.044	0.11	0.00	0.000	0.00	0	3	FACU	P-Grass C3	Orchard Grass
Danthonia spicata	4.44	0.167	0.35	2.76	0.166	0.25	3	5	UPL	P-Grass C3	Poverty Oat Grass
*Daucus carota**	40.00	2.722	4.32	33.79	1.945	3.02	0	4	FACU-	B-Forb	Queen Anne's Lace
*Dianthus armeria**	4.44	0.022	0.22	1.38	0.007	0.07	0	5	UPL	A-Forb	Deptford Pink
Dichantelium implicatum	3.70	0.037	0.20	17.24	0.224	0.96	2	0	FAC	P-Grass C3	Old Field Panic Grass
Dichanthelium oligosanthes	0.00	0.000	0.00	3.45	0.017	0.17	3	3	FACU	P-Grass C3	Scribner's Panic Grass
Dichanthelium villosissimum	48.15	0.896	2.99	31.03	0.428	1.74	5	5	UPL	P-Grass C3	White-haired Panic Grass
dicot seedlings combined (up to 4)	3.70	0.019	0.18	4.14	0.021	0.20					
*Dipsacus laciniatus**	0.74	0.022	0.05	0.69	0.021	0.05	0	5	UPL	B-Forb	Cut-leaved Teasel
*Eleusine indica**	2.22	0.307	0.38	0.00	0.000	0.00	0	3	FACU	A-Grass C4	Goose Grass
Elymus trachycaulus	2.22	0.030	0.13	0.69	0.021	0.05	8	3	FACU	P-Grass C3	Bearded Wheat Grass
Elymus virginiana	0.00	0.000	0.00	0.69	0.003	0.03	4	-2	FACW-	P-Grass C3	Virginia Wild Rye
Epilobium coloratum	2.96	0.015	0.15	0.00	0.000	0.00	3	-5	OBL	P-Forb	Cinnamon Willow Herb
Equisetum arvense	10.37	0.359	0.80	14.48	0.610	1.12	0	0	FAC	Fern	Common Horsetail
Eragrostis cf *pectinacea*	0.74	0.022	0.05	0.00	0.000	0.00	0	0	FAC	A-Grass C4	Small Love Grass
Erigeron annuus	31.85	0.833	2.20	17.24	0.190	0.93	1	1	FAC-	B-Forb	Annual Fleabane
Erigeron philadelphicus	9.63	0.159	0.58	4.14	0.138	0.29	3	-3	FACW	P-Forb	Marsh Fleabane
Erigeron strigosus	8.15	0.222	0.57	15.86	0.369	1.00	2	1	FAC-	P-Forb	Daisy Fleabane

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
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Eupatorium altissimum	2.22	0.011	0.11	2.07	0.028	0.12	2	3	FACU	P-Forb	Tall Boneset
Eupatorium perfoliatum	0.74	0.022	0.05	0.69	0.003	0.03	4	-4	FACW+	P-Forb	Common Boneset
Eupatorium rugosum	0.00	0.000	0.00	1.38	0.041	0.09	2	3	FACU	P-Forb	White Snakeroot
Euphorbia corollata	2.22	0.030	0.13	2.07	0.062	0.14	3	5	UPL	P-Forb	Flowering Spurge
Euthamia graminifolia	15.56	0.441	1.11	11.03	0.245	0.69	3	-2	FACW-	P-Forb	Grass-leaved Goldenrod
Fragaria virginiana	54.07	1.548	3.86	64.14	2.455	4.79	2	1	FAC-	P-Forb	Wild Strawberry
Fraxinus pennsylvanica var. *sub.*	5.93	0.193	0.44	6.21	0.117	0.37	2	-3	FACW	Tree	Green Ash
Galium obtusum	6.67	0.126	0.42	6.21	0.252	0.47	5	-4	FACW+	P-Forb	Wild Madder
Galium triflorum	9.63	0.193	0.61	8.97	0.097	0.48	4	2	FACU+	P-Forb	Sweet-scented Bedstraw
Gentiana alba	8.89	0.063	0.46	11.03	0.210	0.66	9	3	FACU	P-Forb	Pale Gentian
Gentiana andrewsii	2.22	0.030	0.13	2.76	0.048	0.16	7	-3	FACW	P-Forb	Closed Gentian
Gentianella quinquefolia	4.44	0.022	0.22	3.45	0.034	0.18	7	0	FAC	A-Forb	Stiff Gentian
Geum aleppicum	22.96	0.133	1.15	18.62	0.179	0.99	6	-1	FAC+	P-Forb	Yellow Avens
Geum canadense	1.48	0.007	0.07	2.76	0.031	0.15	2	0	FAC	P-Forb	White Avens
Glyceria striata	0.00	0.000	0.00	4.14	0.107	0.27	4	-5	OBL	P-Grass C3	Fowl Manna Grass
Guara biennis	3.70	0.037	0.20	0.00	0.000	0.00	2	4	FACU-	B-Forb	Biennial Guara
Hackelia virginiana	0.00	0.000	0.00	0.69	0.003	0.03	1	1	FAC-	P-Forb	Stickseed
Helianthus grosseserratus	16.30	1.519	2.14	11.72	0.997	1.29	2	-2	FACW-	P-Forb	Sawtooth Sunflower
Helianthus rigidus	13.33	0.744	1.29	13.10	0.755	1.17	6	5	UPL	P-Forb	Prairie Sunflower
Helianthus strumosus	0.00	0.000	0.00	2.07	0.010	0.10	3	5	UPL	P-Forb	Pale-leaved Sunflower
*Hieracium caespitosum**	25.93	0.963	2.05	26.90	1.028	2.01	0	5	UPL	P-Forb	Field Hawkweed
Hieracium canadense	0.74	0.022	0.05	0.00	0.000	0.00	5	5	UPL	P-Forb	Canada Hawkweed
Hierochloe odorata	0.74	0.004	0.04	0.00	0.000	0.00	7	-3	FACW	P-Grass C3	Sweet Grass
*Hypericum perforatum**	1.48	0.007	0.07	1.38	0.024	0.08	0	5	UPL	P-Forb	Common St. John's Wort
Hypericum punctatum	23.70	0.174	1.22	18.62	0.110	0.93	3	-1	FAC+	P-Forb	Spotted St. John's Wort
Hypoxis hirsuta	3.70	0.359	0.50	4.14	0.290	0.41	6	0	FAC	P-Forb	Yellow Star Grass
Impatiens capensis	0.74	0.004	0.04	0.00	0.000	0.00	2	-3	FACW	A-Forb	Jewelweed
Juncus dudleyi	3.70	0.181	0.33	0.69	0.021	0.05	4	0	FAC	P-Forb	Dudley's Rush
Juncus interior	0.00	0.000	0.00	3.45	0.134	0.26	3	-1	FAC+	P-Forb	Inland Rush
Juncus tenuis	21.48	0.311	1.25	14.48	0.276	0.87	0	0	FAC	P-Forb	Path Rush
Juniperis virginiana	3.70	0.019	0.18	4.83	0.041	0.25	1	3	FACU	Tree	Eastern Red Cedar

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
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Krigia biflora	6.67	0.107	0.40	5.52	0.297	0.48	5	3	FACU	P-Forb	Glaucous White Lettuce
Lactuca canadensis	0.74	0.004	0.04	0.00	0.000	0.00	1	2	FACU+	B-Forb	Wild Lettuce
Lactuca serriola	0.74	0.004	0.04	0.69	0.003	0.03	0	0	FAC	B-Forb	Prickly Lettuce
Lactuca sp.	0.74	0.004	0.04	1.38	0.007	0.07				B-Forb	Wild Lettuce
Laythrus paulustris	1.48	0.026	0.09	0.00	0.000	0.00	7	-5	OBL	P-Forb	Marsh Vetchling
Lespedeza capitata	4.44	0.363	0.54	4.14	0.107	0.27	4	3	FACU	P-Forb N2	Round-headed Bush Clover
*Leucanthemum vulgare**	32.59	0.596	2.01	33.79	0.341	1.80	0	5	UPL	P-Forb	Ox-eye Daisy
Liatris aspera	0.74	0.022	0.05	2.07	0.045	0.13	7	5	UPL	P-Forb	Rough Blazing Star
Liatris spicata	8.15	0.170	0.52	8.28	0.393	0.68	7	0	FAC	P-Forb	Marsh Blazing Star
Liatris pycnostachya	0.74	0.022	0.05	0.69	0.021	0.05	6	1	FAC-	P-Forb	Prairie Blazine Star
Liatris sp. (seedling)	1.48	0.115	0.17	0.00	0.000	0.00	6	1	FAC-	P-Forb	
Lilium michiganense	2.22	0.030	0.13	1.38	0.024	0.08	6	-1	FAC+	P-Forb	Michigan Lily
Lithospermum canescens	10.37	0.089	0.55	8.28	0.145	0.49	6	5	UPL	P-Forb	Hoary Puccoon
Lobelia spicata	15.56	0.207	0.89	24.83	0.279	1.35	4	0	FAC	P-Forb	Pale Spiked Lobelia
Lonicera X *bella**	37.78	2.044	3.59	35.17	2.410	3.44	0	3	FACU	Shrub	Showy Fly Honeysuckle
Lycopus americanus	1.48	0.007	0.07	1.38	0.024	0.08	3	-5	OBL	P-Forb	Common Water Horehound
Lycopus uniflorus	2.22	0.011	0.11	1.38	0.007	0.07	7	-5	OBL	P-Forb	Nothern Bugle Weed
Lythrum alatum	0.74	0.004	0.04	0.00	0.000	0.00	5	-5	OBL	P-Forb	Winged Loosestrife
*Lythrum salicaria**	4.44	0.041	0.24	1.38	0.024	0.08	0	-5	OBL	P-Forb	Purple Loosestrife
*Malus pumila**	0.74	0.004	0.04	0.69	0.003	0.03	0	5	UPL	Tree	Apple
*Medicago lupulina**	6.67	0.178	0.46	2.07	0.028	0.12	0	1	FAC-	A-Forb N2	Black Medick
*Melilotus alba**	13.33	0.211	0.79	8.97	0.214	0.57	0	3	FACU	B-Forb N2	White Sweet Clover
Monarda fistulosa	35.56	0.493	2.05	38.62	0.693	2.29	4	3	FACU	P-Forb	Wild Bergamot
*Morus alba**	0.74	0.004	0.04	0.00	0.000	0.00	0	0	FAC	Tree	White Mulberry
Oenothera biennis	0.00	0.000	0.00	0.69	0.003	0.03	1	3	FACU	B-Forb	Common Evening Primrose
Oenothera perennis	0.74	0.004	0.04	0.69	0.021	0.05	8	0	FAC	P-Forb	Small Sundrops
Osmorhiza claytonii	0.00	0.000	0.00	0.69	0.003	0.03	3	4	FACU-	P-Forb	Hairy Sweet Cicely
Oxalis stricta	22.22	0.256	1.23	24.83	0.176	1.27	0	3	FACU	P-Forb	Tall Wood Sorrel
Oxypolis rigidor	3.70	0.019	0.18	4.83	0.093	0.29	7	-5	OBL	P-Forb	Cowbane
Parthenium integrifolium	10.37	3.011	3.26	9.66	2.300	2.19	8	5	UPL	P-Forb	Wild Quinine
Parthenocissus quinquefolia	7.41	0.433	0.73	9.66	0.710	0.98	2	1	FAC-	W-Vine	Virginia Creeper

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
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Penstemon digitalis	2.22	0.137	0.23	2.76	0.307	0.36	4	1	FAC-	P-Forb	Foxglove Beard Tongue
*Phalaris arundinacea**	0.00	0.000	0.00	0.69	0.021	0.05	0	-4	FACW+	P-Grass C3	Reed Canary Grass
*Phleum pratense**	0.00	0.000	0.00	0.69	0.003	0.03	0	3	FACU	P-Grass C3	Timothy
Phlox glaberrima	1.48	0.007	0.07	2.07	0.028	0.12	6	-3	FACW	P-Forb	Smooth Phlox
Phlox pilosa	0.74	0.004	0.04	1.38	0.024	0.08	7	1	FAC-	P-Forb	Sand Prairie Phlox
Phryma leptostachya	1.48	0.026	0.09	0.69	0.003	0.03	4	5	UPL	P-Forb	Lopseed
Plantago rugelii	9.63	0.141	0.56	1.38	0.024	0.08	0	0	FAC	A-Forb	Red-stalked Plantain
Poa bulbosa (cf)	0.00	0.000	0.00	0.69	0.003	0.03	0	5	UPL	P-Grass C3	Bulbous Blue Grass
*Poa compressa**	37.04	1.415	2.97	40.69	1.559	3.04	0	2	FACU+	P-Grass C3	Canadian Blue Grass
*Poa pratensis**	32.59	2.670	3.94	31.03	2.193	3.08	0	1	FAC-	P-Grass C3	Kentucky Blue Grass
Poaceae (sterile)	0.74	0.004	0.04	0.69	0.021	0.05				P-Grass C3	
Polygala verticillata	2.96	0.015	0.15	0.69	0.003	0.03	5	5	UPL	A-Forb	Whorled Milkwort
Polygonatum commutatum	1.48	0.007	0.07	3.45	0.052	0.20	4	3	FACU	P-Forb	Great Solomon Seal
Populus deltoidies	5.93	0.030	0.29	0.00	0.000	0.00	2	-1	FAC+	Tree	Cottonwood
Populus tremuloides	0.00	0.000	0.00	2.07	0.045	0.13	3	0	FAC	Tree	Quaking Aspen
Potentilla arguta	2.22	0.030	0.13	1.38	0.007	0.07	10	4	FACU-	P-Forb	Prairie Cinquefoil
*Potentilla recta**	1.48	0.007	0.07	1.38	0.007	0.07	0	5	UPL	P-Forb	Sulfur Cinquefoil
Potentilla simplex	42.22	1.126	2.94	42.07	2.003	3.44	3	4	FACU-	P-Forb	Common Cinquefoil
Prunella vulgaris var. *elongata*	51.11	0.970	3.19	41.38	0.466	2.24	1	0	FAC	P-Forb	Self-heal
Prunus americana	6.67	0.233	0.52	6.90	0.286	0.53	3	5	UPL	Tree	American Plum
Prunus serotina	11.85	0.078	0.60	9.66	0.083	0.50	1	3	FACU	Tree	Wild Black Cherry
Prunus virginiana	2.22	0.048	0.14	2.76	0.066	0.18	3	1	FAC-	Shrub	Common Choke Cherry
Pycnanthemum tenuifolium	0.74	0.004	0.04	0.00	0.000	0.00	4	0	FAC	P-Forb	Slender Mountain Mint
Pycnanthemum virginianum	10.37	0.289	0.73	10.34	0.700	1.00	5	-4	FACW+	P-Forb	Common Mountain Mint
Quercus macrocarpa	0.00	0.000	0.00	0.69	0.003	0.03	5	1	FAC-	Tree	Burr Oak
Quercus palustris	0.00	0.000	0.00	1.38	0.007	0.07	4	-3	FACW	Tree	Pin Oak
Quercus rubra	2.22	0.011	0.11	0.00	0.000	0.00	5	3	FACU	Tree	Red Oak
Quercus velutina	1.48	0.007	0.07	0.00	0.000	0.00	5	5	UPL	Tree	Black Oak
Ranunculus abortivus	4.44	0.022	0.22	1.38	0.007	0.07	1	-2	FACW-	A-Forb	Little-leaf Buttercup
Ranunculus recurvatus	0.00	0.000	0.00	1.38	0.007	0.07	5	-3	FACW	A-Forb	Hooked Buttercup
Ratibida pinnata	28.15	0.659	1.87	37.93	1.393	2.79	4	5	UPL	P-Forb	Yellow Coneflower

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
	% Freq.	% Cover	IV 200	% Freq.	% Cover	IV 200	CC	WC	Wetness	Physiog-nomy	Common Name
*Rhamnus cathartica**	95.56	18.889	21.81	93.79	29.390	26.59	0	3	FACU	Shrub	Common Buckthorn
*Rhamnus frangula**	38.52	0.430	2.12	29.66	0.983	2.10	0	-1	FAC+	Shrub	Glossy Buckthorn
Rhus glabra	5.19	0.081	0.31	0.00	0.000	0.00	1	5	UPL	Shrub	Smooth Sumac
Rosa blanda	0.00	0.000	0.00	1.38	0.107	0.14	4	3	FACU	Shrub	Early Wild Rose
Rosa carolina	28.15	0.867	2.06	24.83	1.083	1.96	4	4	FACU-	Shrub	Pasture Rose
*Rosa multiflora**	5.93	0.193	0.44	8.28	0.145	0.49	0	3	FACU	Shrub	Japanese Rose
Rubus flagellaris	5.19	0.315	0.52	6.21	0.459	0.63	2	4	FACU-	Shrub	Common Dewberry
Rubus occidentalis/idaeus	3.70	0.200	0.35	3.45	0.169	0.29	2	3	FACU	Shrub	Black Raspberry
Rubus pensylvanicus	31.11	1.511	2.80	28.97	1.459	2.43	2	1	FAC-	Shrub	Yankee Blackberry
Rudbeckia hirta	38.52	0.689	2.36	36.55	0.562	2.10	2	3	FACU	P-Forb	Black-eyed Susan
Rudbeckia subtomentosa	1.48	0.133	0.19	0.00	0.000	0.00	5	-3	FACW	P-Forb	Sweet Black-Eyed Susan
Rumex cf. *verticillatus*	2.96	0.015	0.15	0.00	0.000	0.00	5	-5	OBL	P-Forb	Dock
Sanicula canadensis	10.37	0.270	0.72	18.62	0.248	1.04	4	2	FACU+	B-Forb	Canadian Black Snakeroot
Schizachyrium scoparium	14.07	4.533	4.84	12.41	4.459	3.95	5	4	FACU-	P-Grass C4	Little Bluestem
Scirpus pendulus	2.22	0.067	0.16	2.07	0.476	0.46	3	-5	OBL	P-Sedge	Red Bulrush
Scutellaria leonardii	3.70	0.037	0.20	5.52	0.028	0.27	5	3	FACU	P-Forb	Small Skullcap
Senecio paperculus	8.15	0.133	0.49	4.14	0.021	0.20	3	-1	FAC+	P-Forb	Balsam Ragwort
Silphium integrifolium	0.74	0.004	0.04	1.38	0.041	0.09	5	5	UPL	P-Forb	Rosin Weed
Silphium terebinthinaceum	11.85	2.252	2.62	9.66	2.497	2.34	4	1	FAC-	P-Forb	Prairie Dock
Sisyrinchium albidum	2.22	0.011	0.11	6.90	0.086	0.38	4	3	FACU	P-Forb	Common Blue-eyed Grass
Sisyrinchium campestre	1.48	0.044	0.11	1.38	0.007	0.07	6	5	UPL	P-Forb	Prairie Blue-eyed Grass
Sisyrinchium sp. (sterile)	2.22	0.030	0.13	0.69	0.003	0.03				P-Forb	Blue-Eyed Grass
Smilax ecirrhata	2.96	0.015	0.15	2.76	0.031	0.15	5	5	UPL	P-Forb	Upright Carrion Flower
*Solanum dulcamara**	2.96	0.015	0.15	1.38	0.007	0.07	0	0	FAC	W-Vine	Bittersweet Nightshade
Solanum ptychanthum	2.96	0.015	0.15	0.00	0.000	0.00	0	4	FACU-	A-Forb	Black Nightshade
Solidago canadensis	42.96	1.444	3.26	38.62	1.683	3.04	1	3	FACU	P-Forb	Canada Goldenrod
Solidago gigantea	6.67	0.448	0.71	6.21	1.066	1.09	3	-3	FACW	P-Forb	Late Goldenrod
Solidago juncea	48.15	3.607	5.50	46.90	7.697	7.98	4	5	UPL	P-Forb	Early Goldenrod
Solidago missouriensis	8.89	0.211	0.59	14.48	0.648	1.15	4	5	UPL	P-Forb	Missouri Goldenrod
Solidago nemoralis	16.30	0.211	0.93	22.07	0.724	1.56	3	5	UPL	P-Forb	Old Field Goldenrod
Solidago riddellii	2.22	0.011	0.11	0.00	0.000	0.00	7	-5	OBL	P-Forb	Riddell's Goldenrod

SPECIES	2010 - OVERALL			2009 - OVERALL			ECOLOGY AND GROWTH FORM				
	% Freq.	% Cover	IV 200	% Freq.	% Cover	IV 200	CC	WC	Wetness	Physiog-nomy	Common Name
Solidago rigida	13.33	0.644	1.20	13.79	1.076	1.45	4	4	FACU-	P-Forb	Rigid Goldenrod
Sorghastrum nutans	7.41	2.659	2.80	8.28	2.924	2.60	4	2	FACU+	P-Grass C4	Indian Grass
Spartina pectinata	6.67	0.619	0.87	4.83	0.600	0.68	4	-4	FACW+	P-Grass C4	Prairie Cord Grass
Sphenopholis intermedia	2.22	0.030	0.13	4.14	0.090	0.26	5	0	FAC	P-Grass C3	Prairie Wedge Grass
Spiraea alba	1.48	0.007	0.07	1.38	0.007	0.07	6	-4	FACW+	Shrub	Meadowsweet
*Taraxacum officinale**	32.59	0.456	1.88	35.17	0.314	1.84	0	3	FACU	P-Forb	Common Dandelion
Thalictrum dasycarpum	4.44	0.078	0.27	2.76	0.048	0.16	5	-2	FACW-	P-Forb	Purple Meadow Rue
Thalictrum revolutum	2.22	0.030	0.13	0.00	0.000	0.00	5	0	FAC	P-Forb	Waxy Meadow Rue
Toxicodendron radicans	2.96	0.070	0.20	4.14	0.172	0.32	1	3	FACU	W-Vine	Poison Ivy
Tradescantia ohiensis	3.70	0.056	0.22	4.83	0.059	0.26	3	2	FACU+	P-Forb	Common Spiderwort
*Trifolium hybridum**	0.74	0.004	0.04	0.69	0.021	0.05	0	1	FAC-	P-Forb N2	Alsike Clover
*Trifolium pratense**	0.00	0.000	0.00	0.69	0.003	0.03	0	2	FACU+	P-Forb N2	Red Clover
*Trifolium repens**	2.96	0.122	0.25	3.45	0.117	0.25	0	2	FACU+	P-Forb N2	White Clover
Typha angustifolia	0.74	0.467	0.47	0.69	0.021	0.05	0	-5	OBL	P-Forb	Narrow-leaved Cattail
Ulmus americana	2.22	0.048	0.14	3.45	0.117	0.25	5	-2	FACW-	Tree	American Elm
Verbena hastata	1.48	0.007	0.07	0.00	0.000	0.00	3	-4	FACW+	P-Forb	Blue Vervain
Veronicastrum virginicum	2.22	0.067	0.16	1.38	0.007	0.07	6	0	FAC	P-Forb	Culver's Root
Viburnum lentago	20.74	0.856	1.72	24.83	1.234	2.07	4	-1	FAC+	Shrub	Nannyberry
*Viburnum opulus**	3.70	0.019	0.18	5.52	0.079	0.31	0	0	FAC	Shrub	European High-bush Cranberry
Viburnum prunifolium	2.22	0.011	0.11	2.07	0.145	0.20	4	3	FACU	Shrub	Black Haw
Viburnum recognitum	5.19	0.063	0.29	4.14	0.055	0.23	6	-2	FACW-	Shrub	Smooth Arrowwood
Vicia americana	5.93	0.141	0.40	4.83	0.110	0.30	6	5	UPL	P-Forb	American Vetch
Viola missouriensis	0.74	0.004	0.04	0.00	0.000	0.00	4	-3	FACW	P-Forb	Missouri Violet
Viola peditifida	7.41	0.056	0.38	11.72	0.128	0.63	9	4	FACU-	P-Forb	Prairie Violet
Viola pratincola	44.44	0.426	2.39	43.45	0.645	2.47	1	0	FAC	P-Forb	Common Blue Violet
Viola sororia	0.74	0.111	0.14	4.14	0.055	0.23	3	1	FAC-	P-Forb	Woolly Blue Violet
Vitis riparia	51.11	1.022	3.24	51.72	0.834	2.99	2	-2	FACW-	W-Vine	Rivervbank Grape
Zanthoxylum americanum	2.22	0.504	0.57	2.07	0.793	0.70	4	5	UPL	Shrub	Prickly Ash
Zizia aptera	8.15	0.204	0.55	16.55	0.566	1.18	9	3	FACU	P-Forb	Heart-leaved Meadow Parsnip
Zizia aurea	3.70	0.163	0.32	5.52	0.838	0.89	6	-1	FAC+	P-Forb	Golden Alexanders
TOTALS	**216**	**107.77**	**200.00**	**215**	**131.69**	**200.00**					

Appendix 2. Species recorded in the ground layer samples of the old field/shrubland and prairie vegetation types at the North Chicago Wetland Mitigation Site. Species are shown in descending rank order of importance based on IV200 (sum of relative frequency and relative cover). * = non-native species; + = new species recorded in 2010.

	OLD FIELD/SHRUBLAND				PRAIRIE		
SPECIES	% Freq (29 plots)	% Cover	IV 200	SPECIES	% Freq (16 plots)	% Cover	IV 200
*Rhamnus cathartica**	100.00	19.29	31.36	*Rhamnus cathartica**	100.00	18.16	12.17
Cornus racemosa	89.66	5.10	10.22	*Cornus racemosa*	100.00	11.09	8.24
Allium cernuum	48.28	5.72	9.88	*Schizachyrium scoparium*	43.75	12.75	8.00
*Lonicera X bella**	72.41	2.82	6.35	*Solidago juncea*	93.75	8.03	6.40
Carex granularis	68.97	1.51	4.32	*Parthenium integrifolium*	37.50	8.47	5.49
Aster lateriflorus	65.52	1.49	4.19	*Agrostis alba*	93.75	6.36	5.47
Fragaria virginiana	75.86	1.17	4.04	*Poa pratensis**	81.25	6.53	5.31
Potentilla simplex	65.52	1.17	3.72	*Sorghastrum nutans*	25.00	7.48	4.68
Aster drummondii	65.52	1.16	3.71	*Andropogon gerardii*	25.00	7.28	4.57
Dichanthelium villosissimum	72.41	0.99	3.68	*Daucus carota**	75.00	4.94	4.29
*Daucus carota**	48.28	1.47	3.63	*Silphium terebinthinaceum*	37.50	6.26	4.26
*Poa compressa**	58.62	1.25	3.63	*Carex granularis*	81.25	3.91	3.85
Prunella vulgaris v. elongata	65.52	1.05	3.55	*Rubus pensilvanicus*	62.50	3.11	3.02
Vitis riparia	82.76	0.63	3.46	*Helianthus grosseserratus*	37.50	3.70	2.83
Viburnum lentago	51.72	1.25	3.42	*Fragaria virginiana*	81.25	1.99	2.78
Solidago juncea	55.17	1.17	3.40	*Solidago canadensis*	68.75	2.29	2.69
Solidago canadensis	62.07	0.97	3.33	*Rosa carolina*	68.75	2.23	2.66
Anemone virginiana	65.52	0.81	3.20	*Rudbeckia hirta*	93.75	1.17	2.58
*Taraxacum officinale**	62.07	0.54	2.69	*Carex buxbaumii*	6.25	4.40	2.58
*Rhamnus frangula**	62.07	0.30	2.34	*Achillea millefolium**	68.75	2.05	2.56
Oxalis stricta	58.62	0.36	2.33	*Vitis riparia*	75.00	1.74	2.51
Viola pratincola	55.17	0.41	2.29	*Poa compressa**	68.75	1.91	2.48
Agrostis alba	37.93	0.76	2.28	*Ratibida pinnata*	81.25	1.43	2.47
*Poa pratensis**	48.28	0.52	2.25	*Hieracium caespitosum**	75.00	1.66	2.47
Circaea lutetiana canadensis	34.48	0.79	2.22	*Erigeron annuas*	81.25	1.40	2.45
Rubus pensilvanicus	41.38	0.64	2.21	*Monarda fistulosa*	93.75	0.93	2.44
Rudbeckia hirta	41.38	0.45	1.92	*Aster ericoides*	87.50	1.09	2.41
*Leucanthemum vulgare**	34.48	0.50	1.79	*Prunella vulgaris v. elongata*	93.75	0.80	2.37
Sanicula canadensis	37.93	0.42	1.78	*Dichanthelium villosissimum*	87.50	0.86	2.28
Erigeron annuus	31.03	0.52	1.72	*Helianthus rigidus*	50.00	2.09	2.19
Parthenocissus quinquefolia	24.14	0.67	1.72	*Anemone virginiana*	81.25	0.80	2.12
Crataegus spp. seedlings	48.28	0.16	1.71	*Solidago rigida*	50.00	1.78	2.02
Hypericum punctatum	44.83	0.21	1.68	*Lonicera X bella**	75.00	0.66	1.91
*Hieracium caespitosum**	24.14	0.58	1.59	*Rhamnus frangula**	75.00	0.66	1.91
Carex umbellata	34.48	0.34	1.56	*Aster drummondii*	68.75	0.88	1.90
Monarda fistulosa	34.48	0.27	1.45	*Allium cernuum*	50.00	1.56	1.90
Carex blanda/grisea	6.90	0.82	1.41	*Potentilla simplex*	62.50	1.07	1.88
Juncus tenuis	37.93	0.14	1.37	*Leucanthemum vulgare**	68.75	0.72	1.81
Aster simplex	34.48	0.15	1.28	*Viola pratincola*	75.00	0.45	1.79
Carex pellita	24.14	0.36	1.27	*Aster praealtus*	25.00	2.04	1.65
Helianthus grosseserratus	24.14	0.32	1.20	*Carex pellita*	18.75	2.23	1.63
*Rosa multiflora**	24.14	0.29	1.17	*Antennaria neglecta*	56.25	0.72	1.56
Typha angustifolia	3.45	0.72	1.17	*Solidago nemoralis*	62.50	0.48	1.55
Erigeron philadelphicus	27.59	0.21	1.16	*Crataegus* sp. (seedlings)	68.75	0.19	1.52
Rosa carolina	31.03	0.12	1.12	*Aster azureus*	43.75	1.05	1.49
Ratibida pinnata	24.14	0.24	1.09	*Calamagrostis canadensis*	6.25	2.38	1.45
Lobelia spicata	27.59	0.15	1.06	*Euthamia graminifolia*	50.00	0.68	1.41
Cirsium vulgare+*	31.03	0.07	1.05	*Juncus tenuis*	50.00	0.56	1.34
Prunus serotina	31.03	0.06	1.04	*Zizia aptera*	50.00	0.51	1.31

	OLD FIELD/SHRUBLAND				PRAIRIE		
SPECIES	% Freq (29 plots)	% Cover	IV 200	SPECIES	% Freq (16 plots)	% Cover	IV 200
Equisetum arvense	17.24	0.34	1.03	*Liatris spicata*	50.00	0.48	1.30
Galium triflorum	20.69	0.24	0.99	*Cerastium vulgatum**	56.25	0.17	1.25
Euthamia graminifolia	17.24	0.31	0.98	*Taraxacum officinale**	50.00	0.30	1.20
Geum sp (rosette)	27.59	0.06	0.93	*Spartina pectinata*	18.75	1.30	1.11
Danthonia spicata	17.24	0.25	0.90	*Erigeron strigosus*	37.50	0.58	1.10
Aster ericoides	20.69	0.18	0.90	*Melilotus alba**	37.50	0.48	1.04
Aster sagittifolius	13.79	0.25	0.79	*Lespedeza capitata*	18.75	1.02	0.95
Aster praealtus	17.24	0.16	0.76	*Aster lateriflorus*	37.50	0.32	0.95
Plantago rugelii	17.24	0.15	0.75	*Lobelia spicata*	37.50	0.30	0.94
Antennaria neglecta	20.69	0.04	0.69	*Zanthoxylum americanum*	6.25	1.42	0.92
Rubus flagellaris	10.34	0.25	0.68	*Lithospermum canescens*	37.50	0.25	0.91
Crataegus cf *coccinea*	17.24	0.07	0.64	*Pycnanthemum virginianum*	25.00	0.67	0.89
Carex cristatella	10.34	0.22	0.64	*Geum aleppicum*	37.50	0.16	0.86
Senecio paperculus	17.24	0.07	0.63	*Vicia americana*	31.25	0.39	0.86
*Medicago lupulina**	17.24	0.06	0.61	*Hypericum punctatum*	37.50	0.11	0.84
Fraxinus pennsylvanica v. *sub.*	10.34	0.19	0.60	*Carex hirsutella*	12.50	1.01	0.82
Juniperis virginiana	17.24	0.03	0.57	*Solidago gigantea*	12.50	1.00	0.81
Rhus glabra+	13.79	0.09	0.56	*Hypoxis hirsuta*	12.50	0.94	0.78
Viburnum recognitum	13.79	0.08	0.54	*Medicago lupulina**	25.00	0.40	0.73
Solidago gigantea	10.34	0.14	0.53	*Solidago missouriensis*	25.00	0.39	0.73
Guara biennis+	13.79	0.05	0.50	*Viola peditifida*	31.25	0.15	0.72
Solidago missouriensis	10.34	0.11	0.49	*Comandra umbellata*	25.00	0.35	0.71
*Cerastium vulgatum**	13.79	0.04	0.48	*Geum* sp (rosette)	31.25	0.07	0.68
Aster novae-angliae	10.34	0.11	0.48	*Krigia biflora*	25.00	0.29	0.68
Acer negundo	13.79	0.03	0.47	*Prunus americana*	18.75	0.51	0.67
Ranunculus abortivus	13.79	0.03	0.47	*Aster sagittifolius*	25.00	0.23	0.64
Andropogon gerardii	6.90	0.18	0.47	*Eleusine indica*+*	6.25	0.86	0.61
Crataegus crus-galli	13.79	0.03	0.46	*Crataegus* cf *coccinea*	25.00	0.15	0.60
*Viburnum opulus**	13.79	0.03	0.46	*Viburnum lentago*	25.00	0.15	0.60
Spartina pectinata	3.45	0.24	0.46	*Aster novae-angliae*	25.00	0.11	0.58
*Solanum dulcamara**	13.79	0.02	0.46	*Prunus serotina*	25.00	0.11	0.58
Prunus americana	10.34	0.08	0.44	*Galium triflorum*	25.00	0.10	0.57
Solidago nemoralis	10.34	0.06	0.41	*Corylus americana*	6.25	0.79	0.57
*Achillea millefolium**	10.34	0.06	0.40	*Gentiana alba*	25.00	0.07	0.55
*Melilotus alba**	10.34	0.06	0.40	*Plantago rugelii*	25.00	0.06	0.55
Galium obtusum	10.34	0.05	0.39	*Cacalia tuberosa*	12.50	0.45	0.51
Dichantelium implicatum	10.34	0.05	0.39	*Juncus dudleyi*	12.50	0.44	0.50
Tradescantia ohiensis	10.34	0.05	0.38	*Rubus flagellaris*	12.50	0.44	0.50
Toxicodendron radicans	6.90	0.11	0.37	*Rubus occidentalis/idaeus*	12.50	0.44	0.50
Populus deltoidies+	10.34	0.03	0.37	*Zizia aurea*	12.50	0.44	0.50
Veronicastrum virginicum	6.90	0.10	0.36	*Equisetum arvense*	12.50	0.40	0.48
*Barbarea vulgaris**	10.34	0.03	0.36	*Aster simplex*	18.75	0.15	0.47
Apocynum androsaemifolium	3.45	0.17	0.36	*Bromus kalmii*	18.75	0.15	0.47
Arisaema triphyllum	3.45	0.17	0.36	*Rudbeckia subtomentosa+*	12.50	0.38	0.47
Carex tenera	3.45	0.17	0.36	*Agrimonia gryposepala*	18.75	0.08	0.43
Viola sororia	3.45	0.17	0.36	*Ambrosia artemisiifolia*	18.75	0.08	0.43
Amelanchier cf. *sanguinea*	10.34	0.03	0.36	*Gentiana andrewsii*	18.75	0.08	0.43
Erigeron strigosus	10.34	0.02	0.35	*Gentianella quinquefolia*	18.75	0.05	0.41
Rumex cf. *verticillatus+*	10.34	0.02	0.35	*Scutellaria leonardii*	18.75	0.03	0.40
Solanum ptychanthum+	10.34	0.02	0.35	*Viburnum recognitum*	18.75	0.03	0.40
Bidens frondosa	10.34	0.02	0.34	*Galium obtusum*	12.50	0.26	0.40
Geum aleppicum	10.34	0.02	0.34	*Senecio paperculus*	12.50	0.25	0.40

SPECIES	OLD FIELD/SHRUBLAND % Freq (29 plots)	% Cover	IV 200	SPECIES	PRAIRIE % Freq (16 plots)	% Cover	IV 200
*Lythrum salicaria**	10.34	0.02	0.34	*Fraxinus pennsylvanica* v. *sub.*	12.50	0.20	0.37
Solidago rigida	10.34	0.02	0.34	*Thalictrum dasycarpum*	12.50	0.14	0.33
Pycnanthemum virginianum	6.90	0.08	0.33	*Liatris* sp. (seedling)*+	6.25	0.32	0.31
Anemone cylindrica	6.90	0.07	0.32	*Lythrum salicaria**	12.50	0.08	0.30
Scirpus pendulus	6.90	0.07	0.31	*Potentilla arguta*	12.50	0.08	0.30
Gentiana alba	6.90	0.06	0.30	*Thalictrum revolutum+*	12.50	0.08	0.30
Aster pilosus	6.90	0.04	0.27	*Asclepias tuberosa*	6.25	0.31	0.30
Penstemon digitalis	6.90	0.04	0.27	*Carex* cf *brevior+*	6.25	0.31	0.30
Prunus virginiana	6.90	0.04	0.27	*Penstemon digitalis*	6.25	0.31	0.30
Oxypolis rigidor	6.90	0.02	0.25	*Trifolium repens**	6.25	0.31	0.30
Agrimonia gryposepala	6.90	0.02	0.24	*Sphenopholis intermedia*	12.50	0.07	0.30
Epilobium coloratum+	6.90	0.02	0.24	*Oxalis stricta*	12.50	0.05	0.29
Eupatorium altissimum	6.90	0.02	0.24	*Dianthus armeria**	12.50	0.03	0.27
Smilax ecirrhata	6.90	0.02	0.24	*Sisyrinchium albidum*	12.50	0.03	0.27
*Dianthus armeria**	6.90	0.01	0.23	*Bidens frondosa*	12.50	0.02	0.27
Arctium minus+*	6.90	0.01	0.23	*Dichantelium implicatum*	12.50	0.02	0.27
Lactuca sp.+	6.90	0.01	0.23	*Elymus trachycaulus*	12.50	0.02	0.27
Carex sp.+	6.90	0.01	0.23	*Polygala verticillata*	12.50	0.02	0.27
Centaureum pulchellum+*	6.90	0.01	0.23	*Populus deltoidies+*	12.50	0.02	0.27
Geum canadense	6.90	0.01	0.23	*Dactylus glomerata*+*	6.25	0.13	0.20
Lycopus americanus	6.90	0.01	0.23	*Ulmus americana*	6.25	0.13	0.20
Quercus rubra+	6.90	0.01	0.23	*Euphorbia coralata*	6.25	0.08	0.17
Solidago riddellii+	6.90	0.01	0.23	*Laythrus paulustris+*	6.25	0.07	0.17
Viburnum prunifolium	6.90	0.01	0.23	*Tradescantia ohiensis*	6.25	0.07	0.17
Avena satvia+*	3.45	0.07	0.21	*Carex blanda/grisea*	6.25	0.06	0.16
Cornus obliqua	3.45	0.07	0.21	*Carex* sp. (sterile)	6.25	0.06	0.16
Rubus occidentalis/idaeus	3.45	0.07	0.21	*Cuscuta* sp.+	6.25	0.06	0.16
Lilium michiganense	3.45	0.05	0.17	*Eragrostis pectinacea+*	6.25	0.06	0.16
Thalictrum dasycarpum	3.45	0.05	0.17	*Erigeron philadelphicus*	6.25	0.06	0.16
Hypoxis hirsuta	3.45	0.04	0.16	*Eupatorium perfoliatum*	6.25	0.06	0.16
Juncus dudleyi	3.45	0.04	0.16	*Hieracium canadense+*	6.25	0.06	0.16
Phryma leptostachya	3.45	0.04	0.16	*Liatris aspera*	6.25	0.06	0.16
Scutellaria leonardii	3.45	0.04	0.16	*Liatris pycnostachya*	6.25	0.06	0.16
Silphium terebinthinaceum	3.45	0.04	0.16	*Prunus virginiana*	6.25	0.06	0.16
Calamagrostis canadensis	3.45	0.03	0.16	*Rhus glabra+*	6.25	0.06	0.16
*Dipsacus laciniatus**	3.45	0.03	0.16	*Scirpus pendulus*	6.25	0.06	0.16
Elymus trachycaulus	3.45	0.03	0.16	*Sisyrinchium campestre*	6.25	0.06	0.16
Sisyrinchium campestre	3.45	0.03	0.16	*Potentilla recta**	6.25	0.02	0.14
Zizia aptera	3.45	0.03	0.16	*Sisyrinchium* sp. (sterile)	6.25	0.02	0.14
*Trifolium repens**	3.45	0.02	0.13	*Acer negundo*	6.25	0.01	0.13
Dicot seedling 1	3.45	0.01	0.12	*Acer saccharinum*	6.25	0.01	0.13
Lycopus uniflorus	3.45	0.01	0.12	*Amelanchier* cf. *sanguinea*	6.25	0.01	0.13
Polygala verticillata	3.45	0.01	0.12	*Barbarea vulgaris**	6.25	0.01	0.13
Spiraea alba	3.45	0.01	0.12	*Bromus commutatus*+*	6.25	0.01	0.13
Zizia aurea	3.45	0.01	0.12	*Carex* sp. (sterile)	6.25	0.01	0.13
Ambrosia artemisiifolia	3.45	0.01	0.11	*Cirsium vulgare**	6.25	0.01	0.13
Carex cf *radiata* (sterile)+	3.45	0.01	0.11	*Crataegus crus-galli*	6.25	0.01	0.13
Carex grisea+	3.45	0.01	0.11	*Danthonia spicata*	6.25	0.01	0.13
Carex hirsutella	3.45	0.01	0.11	*Epilobium coloratum*	6.25	0.01	0.13
Chemopodium albidum+*	3.45	0.01	0.11	*Guara biennis*	6.25	0.01	0.13
Dicot seedling 2	3.45	0.01	0.11	*Hypericum perforatum*	6.25	0.01	0.13
Gentianella quinquefolia	3.45	0.01	0.11	*Impatiens capensis*	6.25	0.01	0.13

SPECIES	OLD FIELD/SHRUBLAND % Freq (29 plots)	% Cover	IV 200	SPECIES	PRAIRIE % Freq (16 plots)	% Cover	IV 200
Hierochloe odorata+	3.45	0.01	0.11	*Lactuca serriola**	6.25	0.01	0.13
*Hypericum perforatum**	3.45	0.01	0.11	*Lactuca* sp.	6.25	0.01	0.13
Krigia biflora	3.45	0.01	0.11	*Lycopus uniflorus*	6.25	0.01	0.13
Lactuca canadensis+	3.45	0.01	0.11	*Lythrum alatum+*	6.25	0.01	0.13
*Malus pumila**	3.45	0.01	0.11	*Oenothera perennis*	6.25	0.01	0.13
Morus alba+*	3.45	0.01	0.11	*Oxypolis rigidor*	6.25	0.01	0.13
Phlox glaberrima	3.45	0.01	0.11	*Parthenocissus quinquefolia*	6.25	0.01	0.13
Phlox pilosa	3.45	0.01	0.11	*Phlox glaberrima*	6.25	0.01	0.13
Poaceae 1+	3.45	0.01	0.11	*Polygonatum commutatum*	6.25	0.01	0.13
Polygonatum commutatum	3.45	0.01	0.11	*Quercus rubra+*	6.25	0.01	0.13
Pycnanthemum tenuifolia+	3.45	0.01	0.11	*Quercus velutina+*	6.25	0.01	0.13
Quercus velutina+	3.45	0.01	0.11	*Rosa multiflora**	6.25	0.01	0.13
Sphenopholis intermedia	3.45	0.01	0.11	*Silphium integrifolium*	6.25	0.01	0.13
Ulmus americana	3.45	0.01	0.11	*Smilax ecirrhata*	6.25	0.01	0.13
Verbenea hastata+	3.45	0.01	0.11	*Solidago riddellii+*	6.25	0.01	0.13
Vicia americana	3.45	0.01	0.11	*Trifolium hybridum**	6.25	0.01	0.13
Viola peditifida	3.45	0.01	0.11	*Verbenea hastata+*	6.25	0.01	0.13
				*Viburnum opulus**	6.25	0.01	0.13
				Viburnum prunifolium	6.25	0.01	0.13
				Viola missouriensis+	6.25	0.01	0.13
TOTALS	**170.00**	**68.18**	**200.00**		**173.00**	**179.47**	**200.00**