

Floristic Survey and Assessment (2006) of the Illinois Department of Transportation
North Chicago Wetland Mitigation Site,
Lake County, Illinois

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Technical Report
Illinois Natural History Survey
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28 September 2006

Report submitted to:

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INTRODUCTION

A request was received on 2 May 2006 from the Illinois Department of Transportation (IDOT) for a botanical survey of the North Chicago Wetland Mitigation Site (Figure 1). The specified goal of this study was to update a previously completed floristic survey (Taft 1996). This previous survey described the vegetation history of the site, soil characteristics, species composition including occurrences of three species listed as threatened or endangered by the Illinois Endangered Species Protection Board (IESPB), and an evaluation of the natural quality of the site with specific attention to prairie, sedge meadow, and marsh remnants. The study area is an approximately 65 ha (160 acres) rectangular unit that can be subdivided into four equal-sized quarter units, approximately 16 ha (40 acres) in size, along a north-to-south axis (Figure 1). These quarter units will be referred to in the text as the north-quarter, second-quarter, third-quarter, and south-quarter units.

The study area occurs in the Morainal Section of the Northeastern Morainal Natural Division; however, at only about 4 km (2.5 miles) from Lake Michigan, it is near the border of the Lake Michigan Dunes Section (Schwegman et al. 1973). The General Land Office (GLO) surveys between 1837 and 1840 mapped most of the study area as prairie with adjoining areas of wet prairie, marsh, and savanna (Moran 1978). Sedge meadow, currently locally common on site, was not a cover type recorded by the GLO surveys and probably was included among wet prairie and marsh mapping units. Aerial photography from 1967 (Figure 2) indicates that portions of the northern half of the study area were in agricultural land uses including cultivation, particularly the north-quarter unit. Evidence of fence rows and other vegetation patterns suggest that portions of the study area in the southern three quarter units were used for pasture. Shrubland and scattered trees are apparent in the southern half of the study area. A few small open-water marshes or ponds were present in 1967 (Figure 2). The threatened and endangered plant species previously found on site were *Elymus trachycaulus* (= *Agropyron trachycaulon* var. *unilaterale* [bearded wheat grass]), *Oenothera perennis* (small sundrops), and *Veronica scutellata* (marsh speedwell). Areas of prairie, sedge meadow, and marsh were identified in the previous survey that had excellent natural quality with strong potential for recovery with applied ecosystem management (Taft 1996).

In this current report, results are presented of an updated botanical survey and floristic assessment. A preliminary report for this survey update was submitted to IDOT presenting results of a rapid assessment conducted during May 2006 (Taft 2006). Other prior and current work at this mitigation site includes vegetation mapping and a wetland survey (Olson et al. 1991, Plocher et al. 1996, Plocher and Ketzner 2006, and Plocher et al. 2006).

METHODS

The study area was examined by walking throughout each of the quarter units and using the check list of species composition from previous work (Taft 1996) in an attempt to account for as many species as possible, add new species not previously documented, and make any necessary adjustments to previous species determinations and abundance estimates. In addition, the entire study area was evaluated for presence of high-quality or otherwise noteworthy natural areas as a follow up to previous assessments (Taft 1996, 2006). The habitats for three threatened and endangered species reported previously from within or immediately adjacent to the study area also were examined. Field work for this assessment was conducted on 10-11 May, 21-22

June, 29-30 June, 3 August, 15-16 August, and 31 August 2006. Botanical nomenclature follows Mohlenbrock (1986); exceptions are noted, particularly with regard to nomenclature used by the IESPB. Community classification follows White and Madany (1978). Evaluation of natural quality follows the criteria of the Illinois Natural Areas Inventory (White 1978). In addition, Floristic Quality Assessment (Taft et al. 1997) was applied to the survey data to support interpretations of vegetation quality, compare with previous results, and to contrast the floristic quality among the four quarter units. Following the first two field trips, an effort was made to indicate the distribution of species according to quarter units in the study area. Distribution patterns among the four quarter units for a few species seen only in the early surveys may be incomplete in this regard.

RESULTS AND DISCUSSION

Two species listed as threatened by the Illinois Endangered Species Protection Board were found in the study area. These species, *Elymus trachycaulus* (= *Agropyron trachycaulon* var. *unilaterale*) and *Veronica scutellata*, were found previously on site (Taft 1996). A third species previously found, *Oenothera perennis*, could not be relocated although suitable habitat remains. These species will be discussed in more detail in the section on **Threatened and Endangered Species**. *Ranunculus cymbalaria*, a species listed by the IESPB as endangered, previously was found just west of the study area at the edge of a parking lot (Taft 1996); however, this location has been reconfigured into a roadway and the population eliminated.

The results of the 2006 floristic survey yielded a total of 289 taxa of vascular plants from the study area, a 13% increase from the previous survey. These results will be described below in more detail in the **Floristic Survey** section of the report. The natural integrity of the vegetation reflects the past disturbance history with the northern quarter unit the most degraded and the southern quarter unit supporting the highest quality habitats. Some habitats, particularly sedge meadow and prairie remnants, continue to have excellent restoration potential with prompt applications of brush control and prescribed fire. The composition and natural quality of the vegetation will be discussed in more detail in the report section on **Natural Communities**.

Threatened and Endangered Species

Elymus trachycaulus (Link.) Gould - POACEAE. State Threatened (IESPB 2005). Synonymy: *Agropyron trachycaulon* (Link) Malte. var. *unilaterale* (Vasey) Malte., *Agropyron subsecundum* (Link.) Hitchcock, *Elymus trachycaulus* (Link.) Gould ssp. *subsecundus* (Link) Á. Löve & D. Löve, *Elymus pauciflorus* (Link.) Gould ssp. *subsecundus* (Link.) Gould.

Material attributable to this species is locally occasional in the study area with most individuals in the southeastern quarter of the study area (Figure 3). Eight separate colonies were found during 2006 field work, mostly in the eastern portion of the south-quarter unit (Figure 1). One colony occurs just outside the boundaries of the study area. All colonies had from one to five plants in 2006. Population estimates, species-associate data, and voucher information are summarized in Appendix 1. Two or three additional locations were found in previous work (Taft 1996) and the colonies shown for 2006 may be the same as found previously.

Three subspecies of *Elymus trachycaulus* will be recognized in the upcoming grass volume for the Flora North America (FNA) project (Barkworth et al., unpublished data) including

E. trachycaulus subsp. *subsecundus* (Link) Á. Löve & D. Löve (Unilateral Wheatgrass) and *E. trachycaulus* (Link) Gould subsp. *trachycaulus* (Slender Wheatgrass). Mohlenbrock (2002) recognizes two taxa in this complex: *E. pauciflorus* (Link.) Gould ssp. *subsecundus* (Link.) Gould (Bearded Wheatgrass) and *E. trachycaulus* (Link.) Gould (Slender Wheatgrass). The IESPB (2005) lists *E. trachycaulus* (Link.) Gould, but considers this Bearded Wheat Grass, seemingly to account for both subspecies. Bearded Wheatgrass is not a common name applied to any taxa in the upcoming FNA volume. These taxa differ in spikelet characteristics, particularly lemma awn length and glume width. Characters used in the most recent Illinois flora (Mohlenbrock 2002) are based on glume length; however, according the draft FNA account, this feature has widely overlapping characteristics for the two taxa. Confounding the issue, differences in spikelet morphology were seen at this study site among adjacent plants and among separate colonies that, following Mohlenbrock (1986, 2002) and Swink and Wilhem (1994), represent both taxa. Most material in the study area has intermediate characteristics between *E. trachycaulus* and the revised concept for *E. trachycaulus* ssp. *subsecundus* (Barkworth et al., unpublished data). Interspecific and intergeneric hybridization have been implicated as potential factors in this highly variable complex and there is a recognized need for detailed systematic research on these taxa; however, resolving these taxonomic issues is considered an extremely difficult challenge and hybrid origin for material such as with characteristics found in the study area is not a fully satisfying conclusion (Barkworth, pers. comm).

Elymus trachycaulus is a northern perennial grass species that ranges across northern North America extending from Greenland west throughout Canada to Alaska and south through the western U.S. to Mexico. It occurs in Illinois near its southern-range extent in the Midwest. As of 2002, 10 populations were known from six northern Illinois counties (IESPB unpublished data), including Lake and Cook counties. At least one other population was known previously from Lake County in sedge meadow habitat at Gavin Bog and Prairie Nature Preserve (Taft and Solecki 1990).

In this study area, *E. trachycaulus* occurs mostly in mesic prairie and at the margins of sedge meadow. Total area of mesic prairie appears to be declining due to shrub encroachment. If unchecked, it could lead to a decline in populations.

***Oenothera perennis* L. - ONAGRACEAE.** State Threatened (IESPB 2005).

Oenothera perennis (Small Sundrops) was found in the study area at two locations during the original botanical survey conducted in 1995-96 (Taft 1996) with one population near the east edge of the southern-quarter unit and another, discovered by Paul Tessene (INHS), in the southwestern portion of the second-quarter unit (Figure 1). Both populations had about 30 plants and the southernmost station was vouchered with a flowering specimen (Taft 1244 [ILLS]) and a photograph (Figure 4). Despite intensive searches of both locations on multiple occasions during 2006, no plants were found. Sterile material would closely resemble sterile (non-flowering) *Lithospermum canescens* (Hoary Puccoon) and there is an abundance of this species in the vicinity of the southern station for *O. perennis*. However, close inspection of leaves revealed all plants observed were *L. canescens*, identifiable by the presence of punctate glands on the leaves. The southern population occurred within a prairie-shrubland mosaic but lacking GPS technology at the time, no coordinates were taken. Re-locating the area of the plants during 2006 involved

estimation and correlation with associate species. All associates previously reported (Taft 1996) were found among some prairie openings but this species was not found among them.

Population trends for *O. perennis* in northeastern Illinois mostly have been positive (Susanne Masi, Chicago Botanical Gardens, pers. com.); however, most populations monitored have been within vegetation management units receiving periodic burns. Both stations in the Wetland Mitigation study site have extensive shrub encroachment that is pronounced since 1995-96, particularly by *Cornus racemosa*. Applications of prescribed fire in these areas may yield improved habitat conditions for *O. perennis* and may encourage flowering which would facilitate discovery.

Oenothera perennis is a slender herbaceous perennial reaching about 40 cm tall (based on Illinois plants observed) with a distribution that ranges throughout much of the eastern United States extending from Maine to Georgia and west to Minnesota and Nebraska; there is a disjunct occurrence in Montana (USDA Plants Database 2006). In Illinois it is known from 14 occurrences in 3 northeastern counties including Lake County where it has been reported previously from successional field habitat adjoining a prairie (Taft and Solecki 1990).

***Veronica scutellata* L. - SCROPHULARIACEAE. State Threatened (IESPB 2005).**

Veronica scutellata (Marsh Speedwell) was found previously in the study area (Taft 1996) as a single plant in a cat-tail marsh (Figures 1 and 5). Searches of this area during 2006 were unsuccessful in re-locating this plant and many of the recorded associate species also were absent from the location. However, Allen Plocher (INHS) found and vouchered a plant in a marsh located in the northeastern corner of the second-quarter unit (Figure 1). An intensive search of this marsh two weeks following the discovery was unsuccessful in locating the species. It was found in a cat-tail/sandbar willow-dominated marsh and was reported to be a single, small colony (Plocher, pers. comm). Evidently, it is quite scarce in this new location. This latter search lasted six hours in a small wetland area. This stresses the challenge of finding scarce species in tall vegetation and suggests that the diminutive *Veronica scutellata*, now found twice at this site at different locations, may occur at other yet undetected areas in the study area.

Veronica scutellata is a widespread species of marsh, swamp, and bog habitats occurring in northern Europe and from Newfoundland to northwest Canada and south through the northern half of the United States with an outlying occurrence in Louisiana (Gleason 1952; USDA Plants database 2006). In Illinois it has been found in the northeastern counties and locally along the central Illinois River valley (Herkert and Ebinger 2002). As of 2002, there were 20 known occurrences in six counties but the status of these occurrences is not precisely known and marsh speedwell typically occurs in small, localized populations. There is a previous report for *V. scutellata* at another location in marsh habitat in Lake County (Taft and Solecki 1990).

Other Species

Carex atherodes, a species formerly listed by the IESPB, remains occasional throughout much of the study area in sedge meadow, marsh, and locally in forested wetland habitats. This sedge was determined to be more common than previously believed. *Gentiana alba* (Pale Gentian) is locally occasional throughout the northern three-quarter units and may be present in all four units in the study area. It is surprisingly common for a species that otherwise is scarce

albeit widespread in Illinois. It is a midwestern U.S. species and is listed as rare, threatened, or endangered in six states (USDA Plants database 2006). This is one of the species monitored in northeastern Illinois because it is a scarce conservative species of native savanna and prairie habitats (Susanne Masi, Chicago Botanical Gardens, pers. comm.).

Floristic Survey

A total of 289 species of vascular plants were recorded during botanical surveys conducted in 2006 (Appendix 2), a 13% increase from the total of 255 species previously recorded. The total number of native species recorded during 2006 was 245, a 10% increase from the 222 native species previously recorded; observed adventive species increased from 33 to 44 taxa. Thirty-four species were found in 1995-96 that were not found in 2006 while 68 species found in 2006 were novel compared to the previous survey (Appendix 2). Percentage of native species in the study area remains relatively high at 85%. The differences in observed taxa between the two survey periods can be attributed to chance encounters with scarce species, a slightly greater survey effort in 2006 (10 days compared to nine), recent taxonomic modifications, and possibly ecological changes. Shrub encroachment in prairie habitat may explain disappearance or failure to record a few species and some open-water marshes have become nearly or completely closed by expansion of cat-tails. Some floating aquatic species that formerly were recorded in open-water zones of marshes were not recorded in 2006 (see further discussion below), possibly due to expansion of cat-tails. Some differences such as absence of *Solanum dulcamara* in 1995-1996 (common in 2006) and *Eupatorium altissimum* in 2006 (common in 1995-96) are likely due to failure to record observed species.

Of the approximately 323 species found in the study area, combining results from the 1995-96 and 2006 surveys (Appendix 3), most (49.5%) are perennial forbs followed in rank importance by perennial sedges (7.7%), perennial grasses (7.4%), shrubs (6.2%), and trees (5.3%). Of the 15% of the flora comprised of adventive species, most are perennial forbs (5% of total species) followed by adventive shrubs, biennial forbs, and perennial grasses. The largest plant family is Asteraceae with 59 species followed by Poaceae (32 species), Cyperaceae and Rosaceae (25 species each), Scrophulariaceae (13 species), and Fabaceae (12 species). The largest genus is *Carex* with 18 species recorded.

For comparison, a botanical survey of Gavin Bog and Prairie Nature Preserve, a 137-acre site also in Lake County that included prairie and wetland communities, yielded 249 taxa of vascular plants (Taft and Solecki 1990). Species-area quotients are equal at both sites (1.8 taxa). In contrast to the 15% adventive flora at the N. Chicago Wetland Mitigation site, only about 5% of the flora was adventive in the nature preserve. While the Gavin Bog and Prairie NP flora included a greater number of threatened and endangered species (15), the similar richness of species to the North Chicago Wetland Mitigation site highlights the significance of this study area.

Natural Communities

Presettlement vegetation, soil characteristics, and disturbance history previously have been described in detail for this study area (Taft 1996). In summary, according to the General Land Office surveys, most of the study area was prairie with local wetland areas (Moran 1978).

Soils are of the Frankfort-Montgomery-Wauconda association (Paschke and Alexander 1970) which are level to gently sloping, somewhat poorly drained, deep soils that have slow to moderately slow permeability. Included in this soil association are level to depressional sites with poorly to very poorly drained soils with slow permeability. Dominant soils are Frankfort silt loam and Montgomery silty clay. Frankfort soils are characterized by a seasonally high water table and slow permeability. Montgomery silty clay formed in clayey lake bed and/or glacial till deposits with marsh vegetation. This is the dominant wetland soil in the study area (Plocher et al. 1996) and is found throughout the study area in the depressions. Portions of the northern three quarter units have a past history of agricultural land use including cultivation, particularly in the northern two quarter units (Figure 2). Remaining areas may have been grazed but do not appear to have been cultivated. Remnant natural communities previously described were marsh, pond, sedge meadow, and wet, wet-mesic, and mesic tallgrass prairie.

The remnant natural communities previously described remain present. Boundaries between natural communities often are characterized by ecotonal areas with combinations of species from adjoining natural communities (e.g., mesic prairie and shrubland, wet-mesic prairie and sedge meadow, marsh-wet prairie and sedge meadow). Dominant and characteristic species for community types are described below.

Marsh - Dominant species include *Typha angustifolia*, *T. latifolia*, and the adventive forb *Lythrum salicaria* (purple loosestrife). Common to occasional species include *Alisma plantago-aquatica* var. *parviflorum*, *Asclepias incarnata*, *Aster puniceus* var. *firmus*, *Bidens cernua*, *B. frondosa*, *Calamagrostis canadensis*, *Carex lacustris*, *Eleocharis erythropoda*, *Equisetum arvense*, *Eupatorium maculatum*, *Galium obtusum*, *Geum allepicum*, *Glyceria striata*, *Helianthus grosseserratus*, *Iris shrevei*, *Liatris spicata*, *Lycopus americanus*, *Onoclea sensibilis*, *Oxypolis rigidior*, *Phalaris arundinacea*, *Polygonum amphibium*, *Pycnanthemum virginianum*, *Scirpus acutus*, *S. tabernaemontanii*, *Sium suave*, *Spartina pectinata*, *Thalictrum revolutum*, and *Verbena hastata*. The shrubs *Cornus racemosa*, *Rhamnus cathartica*, *R. frangula*, *Ribes americana*, and *Salix exigua* are common to occasional. A more comprehensive list of species recorded from Marsh-Sedge Meadow communities according to each quarter unit is in Appendix 2.

Veronica scutellata (marsh speedwell), a species listed by the IESPB as threatened, formerly was found in a marsh in the third-quarter unit (Figure 1); following searches of this area, no individuals were found during 2006 at this site. However, a small population of *V. scutellata* was found in August 2006 at a different marsh in the second-quarter unit by Allen Plocher (INHS) during wetland surveys in the study area (see discussion in section on Threatened and Endangered Species). Extensive habitat is present in the study area similar to the areas where marsh speedwell has been found. However, as demonstrated, this diminutive species can be difficult to locate, particularly during the mid-to-late summer months when often it is among tall cat-tails.

Much of the marsh habitat in the study area is strongly dominated by *Typha angustifolia*, *T. latifolia*, *Phalaris arundinacea*, and *Lythrum salicaria*, species that are tolerant of prolonged periods of inundation. More diverse and higher-quality examples of marsh occur in the southern-quarter unit (Figure 1) and total about 1.1 acres. Based on observations during the two survey periods, some areas that in 1995-96 were diverse wet prairie and marsh habitat now are

characterized by the dominant species listed above. The study area has become surrounded extensively by developed land over the past 40 years and since 1995-1996 it has become completely surrounded. During rain events in 2006, surface water was observed streaming across the interconnected wetlands in the middle and southern quarter of the study area. This may be a result of altered hydrological patterns related to development of the perimeter of the site. Managing water, nutrient, and sediment inputs from off-site sources may be key to restoring the degraded marsh and protecting the remaining higher-quality examples.

Sedge Meadow - Dominant species include *Carex stricta*, *C. lanuginosa*, *Calamagrostis canadensis*, and *Helianthus grosseserratus*. Common to occasional herbaceous species include *Agrostis alba**, *Asclepias incarnata*, *Bidens frondosa*, *Boehmeria cylindrica*, *Carex atherodes*, *C. buxbaumii*, *C. cristatella*, *C. granularis*, *C. haydenii*, *C. lacustris*, *C. sartwellii*, *C. tenera*, *Cicuta maculata*, *Eleocharis erythropoda*, *Epilobium coloratum*, *E. leptophyllum*, *Equisetum arvense*, *Eupatorium maculatum*, *Eupatorium perfoliatum*, *Euthamia graminifolia*, *Galium triflorum*, *G. obtusum*, *Geum aleppicum*, *Glyceria striata*, *Iris shrevei*, *Juncus dudleyi*, *J. nodosus*, *Lathyrus palustris*, *Liatris spicata*, *Lycopus americanus*, *Lysimachia quadriflora*, *Lythrum alatum*, *Mentha arvensis* var. *villosa*, *Onoclea sensibilis*, *Oxypolis rigidior*, *Phalaris arundinacea*, *Phlox glaberrima*, *Polygonum amphibium*, *Pycnanthemum virginiana*, *Scirpus acutus*, *S. atrovirens*, *S. cyperinus*, *Scutellaria galericulata*, *S. lateriflora*, *Solidago gigantea*, *Spartina pectinata*, *Thalictrum revolutum*, *Thelypteris palustris*, *Verbena hastata*, and *Vernonia fasciculata*. The shrubs *Cornus stolonifera*, *C. racemosa*, *Ribes americana*, *Rhamnus frangula**, *Salix discolor*, *S. petiolaris*, and *Spiraea alba* are common to occasional. A more comprehensive list of species found in Marsh-Sedge Meadow communities with records for each quarter unit is in Appendix 2.

Sedge meadow habitat in the study area often occurs in an intermediate landscape position between prairie and marsh. Of the natural communities in the study area, sedge meadow demonstrates the greatest resistance to invasion by adventive herbaceous or woody species. As a consequence, several areas throughout the study area were judged high quality (Figure 1), totaling about 2.9 ha (7.13 acres). Some areas, particularly in the south-quarter unit, resemble sedge meadow remnants at INAI sites qualifying as Category I natural areas (e.g., Grade B). These areas are characterized by a dominance by *Carex stricta* with well-developed sedge hummocks. The potential for these areas to meet the INAI Category I criteria as Grade B sedge meadow would be enhanced following a program of vegetation management involving prescribed fire.

Prairie - Remnants of wet prairie, wet-mesic prairie, and mesic prairie are present in the study area and about 3 ha (7.45 acres) were evaluated to be high-quality. Each community type present is characterized below. A more comprehensive list of species recorded from Prairie-Successional Field communities, according to each quarter unit, is in Appendix 2.

Wet Prairie - Wet prairie occurs in the zone bordering marsh and sedge meadow and is characterized by dominance of *Spartina pectinata*. *Hierochloë odorata* (sweet grass) is specific to wet to wet-mesic prairie in the study area and is occasional in the south-quarter unit. High-quality areas of wet prairie are limited to the south-quarter unit and typically occur associated

with wet-mesic prairie (Figure 1). One area formerly distinguished as a noteworthy area of wet prairie in the south-quarter unit (Taft 1996), is now dominated by marsh species and the adventive *Lythrum salicaria*, perhaps a result of altered hydrological conditions.

Wet-Mesic Prairie - Wet-mesic prairie occurs in the zone between sedge meadow and mesic prairie or shrubland. Dominant species include *Spartina pectinata*, *Silphium terebinthinaceum*, and *Andropogon gerardii*. Common to occasional species include *Cacalia plantaginea*, *Carex stricta*, *Euthamia graminifolia*, *Gentiana alba*, *Lysimachia quadriflora*, *Phlox glaberrima*, *Spiraea alba*, *Sphenopholis obtusata*, *Thalictrum revolutum*, and *Zizia aurea*. Local areas of high-quality wet-mesic prairie occur in the southeastern portion of the study area bordering sedge meadow and mesic prairie (Figure 1). Many species also found in sedge meadow communities are present in the wet-mesic prairie habitats.

Mesic Prairie - Most of the vegetation in the study area was prairie at the time of the Public Land Office surveys (Moran 1978) and probably much of this was mesic prairie with local areas of wet to wet-mesic prairie. Most of the better-drained prairie in the northern half of the study area was converted to agricultural land uses including row crop production (Figure 2). Local areas of prairie that were not cultivated, though probably grazed by livestock, provided refugia for prairie species and many have become re-established in previously disturbed portions of the study area, particularly in the northern half. The shrubland that dominates the study area has invaded areas of former mesic prairie and in many places prairie species (e.g., *Dodecatheon meadia*, *Gentiana alba*, *Hypoxis hirsuta*, *Pedicularis canadensis*, *Viola pedatifida*, *Zizia aptera*, and *Z. aurea*) persist in sterile condition beneath the shade of shrubs. The dominant shrub species invading prairie are *Cornus racemosa*, *Viburnum lentago*, *Lonicera x bella**, and *Rhamnus cathartica**.

High-quality prairie openings persist locally, particularly in the southern half of the study area, with some occurring at the interface between shrubland and sedge meadow. Mosaics of prairie openings within shrubland in the southern half of the study area also are present (Figure 1). When combined, these areas offer opportunities for restoring much larger, contiguous areas of tallgrass prairie. While some conservative species appear to be missing in the northern half of the study area, areas in the southern half support a full compliment of prairie species including many considered indicators of good-quality prairie (i.e., conservative species).

Common to occasional prairie species in the northern half of the study area include *Achillea millefolium**, *Allium cernuum*, *Andropogon garardii*, *Asclepias purpureascens*, *Aster ericoides*, *Carex granularis*, *Comandra umbellata*, *Dichanthelium villosissimum*, *Euphorbia corollata*, *Fragaria virginica*, *Gentiana alba*, *Helianthus grosseserratus*, *Hypoxis hirsuta*, *Lespedeza capitata*, *Liatris pycnostachya*, *Liatris spicata*, *Lobelia spicata*, *Monarda fistulosa*, *Penstemon digitalis*, *Polygala verticillata*, *Potentilla simplex*, *Ratibida pinnata*, *Rosa carolina*, *Rudbeckia hirta*, *Scutellaria leonardii*, *Silphium terebinthinaceum*, *Sisyrinchium albidum*, *Solidago nemoralis*, *S. riddellii*, *S. rigida*, *Spartina pectinata*, *Viola pedatifida*, and *Zizia aurea*. Some of these species are widespread in the northern half of the study area. However, there is a concentration of prairie species in the southern part of the second-quarter unit that appears to represent a remnant that, while probably grazed at one time, apparently was never cultivated (Figure 1). This is the area where *Oenothera perennis*, a species listed by the IESPB as threatened, previously was found.

Common to occasional species in the southern half of the project area include the following species:

<i>Allium cernuum</i>	<i>Liatris pycnostachya</i>
<i>Andropogon gerardii</i>	<i>Liatris spicata</i>
<i>Anemone cylindracea</i>	<i>Lithospermum canescens</i>
<i>Asclepias purpureascens</i>	<i>Lobelia spicata</i>
<i>Asclepias sullivantii</i>	<i>Monarda fistulosa</i>
<i>Asclepias tuberosa</i>	<i>Parthenium integrifolium</i>
<i>Aster azureus</i>	<i>Pedicularis canadensis</i>
<i>Aster ericoides</i>	<i>Penstemon digitalis</i>
<i>Aster novae-angliae</i>	<i>Physalis pubescens</i>
<i>Bromus kalmii</i>	<i>Potentilla simplex</i>
<i>Cacalia plantaginea</i>	<i>Pycnanthemum virginiana</i>
<i>Carex granularis</i>	<i>Ratibida pinnata</i>
<i>Carex molesta</i>	<i>Rosa carolina</i>
<i>Castilleja coccinea</i>	<i>Rudbeckia hirta</i>
<i>Comandra umbellata</i>	<i>Schizachyrium scoparium</i>
<i>Cornus racemosa</i>	<i>Scutellaria leonardii</i>
<i>Desmodium canadense</i>	<i>Senecio pauperculus</i>
<i>Dichanthelium leibergii</i>	<i>Silphium integrifolium</i>
<i>Dodecatheon meadia</i>	<i>Silphium terebinthinaceum</i>
<i>Echinacea pallida</i>	<i>Sisyrinchium albidum</i>
<i>Elymus trachycaulon</i>	<i>Smilacina stellata</i>
<i>Equisetum arvense</i>	<i>Solidago canadensis</i>
<i>Erigeron annuus</i>	<i>Solidago juncea</i>
<i>Erigeron philadelphicus</i>	<i>Solidago nemoralis</i>
<i>Erigeron strigosus</i>	<i>Solidago riddellii</i>
<i>Eryngium yuccifolium</i>	<i>Solidago rigida</i>
<i>Euphorbia corollata</i>	<i>Sorghastrum nutans</i>
<i>Euthamia graminifolia</i>	<i>Sporobolus heterolepis</i>
<i>Fragaria virginiana</i>	<i>Tradescantia ohiensis</i>
<i>Helianthus grosseserratus</i>	<i>Triosteum aurantiacum</i>
<i>Helianthus rigidus</i>	<i>Veronicastrum virginicum</i>
<i>Heuchera richardsonii</i>	<i>Viola pedatifida</i>
<i>Hypoxis hirsuta</i>	<i>Zizia aptera</i>
<i>Lespedeza capitata</i>	<i>Zizia aurea.</i>
<i>Liatris asper</i>	

Elymus trachycaulus, a species listed by the IESPB as threatened, is scattered throughout the southeastern portion of the study area (Figure 1). *Oenothera perennis*, also listed as

threatened by the IESPB, previously had been found in a prairie opening in the southeastern portion of the study area (Figure 1) but was not found during 2006 surveys.

While past cultivation, grazing, and shrub encroachment have led to degradation of many areas where prairie species occur, particularly in the northern half of the study area, the prairie remnants in the southern half appear to have been impacted primarily by shrub invasion alone. In these areas, there is an opportunity to restore large areas of relatively high-quality prairie with sustained efforts to reduce shrub cover and reintroduce fire. With such restoration efforts, it is quite possible that additional species of conservation concern would emerge, including *Platanthera leucophaea* (Eastern Prairie White-Fringed Orchid), a species listed by the U.S. Fish and Wildlife Service as threatened and by the IESPB as endangered.

Floristic Quality Assessment - Remnants of high-quality habitats occur locally in the second-quarter unit and more extensively in the southern half of the study area. Results from Floristic Quality Assessment are consistent with this assessment (Table 1, Appendix 3). The Floristic Quality Index (FQI) for the North Chicago Mitigation Site remains quite high at 57 (including adventive species), based on 2006 survey data, compared to the previous index of 59; Native FQI is about 68 for both survey periods (Table 1). The average coefficient of conservatism (Mean C) declined slightly from 3.96 to 3.67 (4.55 vs. 4.32 using native species only). This decline can be attributed to the differences in species previously documented and not found during the 2006 surveys and the novel species found during 2006. The 34 species found in the previous survey and not found in 2006 rank with a Mean C of 4.65 while the 68 novel species found in 2006 rank with a Mean C of 3.01. Several conservative taxa (species assigned coefficients of conservatism 7-10 for the statewide flora [Taft et al. 1997]) found in the original survey were not recorded this year (e.g., *Baptisia leucantha*, *Caltha palustris*, *Carex comosa*, *Carex lasiocarpa*, *Coreopsis palmata*, *Koeleria macrantha*, *Myriophyllum heterophyllum*, *Oenothera perennis*, *Pedicularis lanceolata*, *Utricularia gibba*, and *U. vulgaris*). The majority of these conservative species were scarce or highly localized in 1995-96 and may still be present but by chance were not found in the 2006 surveys. Shrub encroachment and expansion of cat-tails in some areas may have resulted in decline of some conservative species.

Table 1. Summary of Floristic Quality Assessment for the North Chicago Wetland Mitigation Site. Comparison of data from 1995-1996 and 2006 botanical surveys.

	1995-96	2006
Native Species	222	245
Adventive Species	33	44
Total Species	255	289
% Native	87.06	84.78
Mean C	3.96	3.67
Mean C (native)	4.55	4.32
FQI	59.07	57.3
FQI (native)	67.85	67.59

While several conservative species were not recorded during 2006 field work, several others remain (e.g., *Anemone cylindracea*, *Asclepias purpureascens*, *Bromus kalmii*, *Cacalia plantaginifolia*, *Carex buxbaumii*, *Castilleja coccinea*, *Epilobium leptophyllum*, *Gentiana quinquefolia*, *Hierochloa odorata*, *Parthenium integrifolium*, *Phlox pilosa*, *Potentilla arguta*, *Sporobolus heterolepis*, *Viola pedatifida*, and *Zizia aptera*). These species tend to be reliable indicators of habitat integrity, particularly when assembled together within natural communities.

The Mean C and FQI scores for each quarter unit support the interpretation that the study area is characterized by progressively higher-quality habitats in a north-to-south axis (Figure 6). Only the north-quarter unit scores with a FQI below 20 and a Mean C below 3.0; in sharp contrast, the south-quarter unit is characterized by an FQI of 53 and a Mean C of 4.3, values consistent with findings for other perceived high-quality natural areas. FQA scores for the second and third-quarter units, while intermediate between the north and south-quarter units, suggest there is substantial restoration potential with FQI scores greater than 39 and Mean C of 3.2 and 3.8, respectively. These results mirror interpretations of land-use history apparent in 1967 aerial photography (Figure 2).

The combined species recorded during 1995-96 and 2006 surveys (Appendix 3) yield an FQI of 67.6 (73.1 Native FQI) and Mean C of 3.8 (4.4 Native Mean C). While 289 species were recorded during 2006, the combined total of 323 species (85% native) found in both survey periods is perhaps the most accurate estimate of the current species richness on site. Habitats are extensive enough and navigating through the shrub thickets difficult enough that scarce species are likely to have been missed in the current survey which had a major focus on searching for previously discovered threatened and endangered species (*Elymus trachycaulus*, *Oenothera perennis*, and *Veronica scutellata*).

CONCLUSIONS

Populations of two plants listed as threatened by the Illinois Endangered Species Protection Board, *Elymus trachycaulus* and *Veronica scutellata*, were recorded from the North Chicago Wetland Mitigation Site during 2006. An additional species previously found on site, *Oenothera perennis* (Figure 4), was not recorded during 2006 field work although suitable habitat remains. However, due to extensive shrub encroachment, its prairie habitat is in need of ecological restoration involving shrub removal and prescribed fire. Habitat restoration has the potential to yield recovery of these and possibly other populations.

Noteworthy remnants of native natural communities are present in the study area. The most significant natural community remnants are found in the south-quarter unit. Following restoration efforts including applications of prescribed fire, many of these (e.g., sedge meadow and wet-mesic to mesic prairie) have a strong potential to meet the criteria for inclusion as Category I natural areas for the Illinois Natural Areas Inventory. Prairie and sedge meadow remnants present in the second and third-quarter units are somewhat degraded but support a rich assemblage of native species; there also is good potential for restoration of these habitats with ecological restoration. Other areas, such as in the majority of the north-quarter unit and much of the second-quarter unit, have been greatly disturbed by past agricultural activities (e.g., row crops) and many species appear to have been eliminated although many other native species have colonized these areas. There is opportunity for some rehabilitation of prairie, sedge meadow, and marsh habitat with applications of vegetation management. However, with only a few exceptions

(Figure 1), unlike habitat remnants in the southern half of the study area, these areas probably can not be fully restored to conditions pre-existing the site's agricultural land uses.

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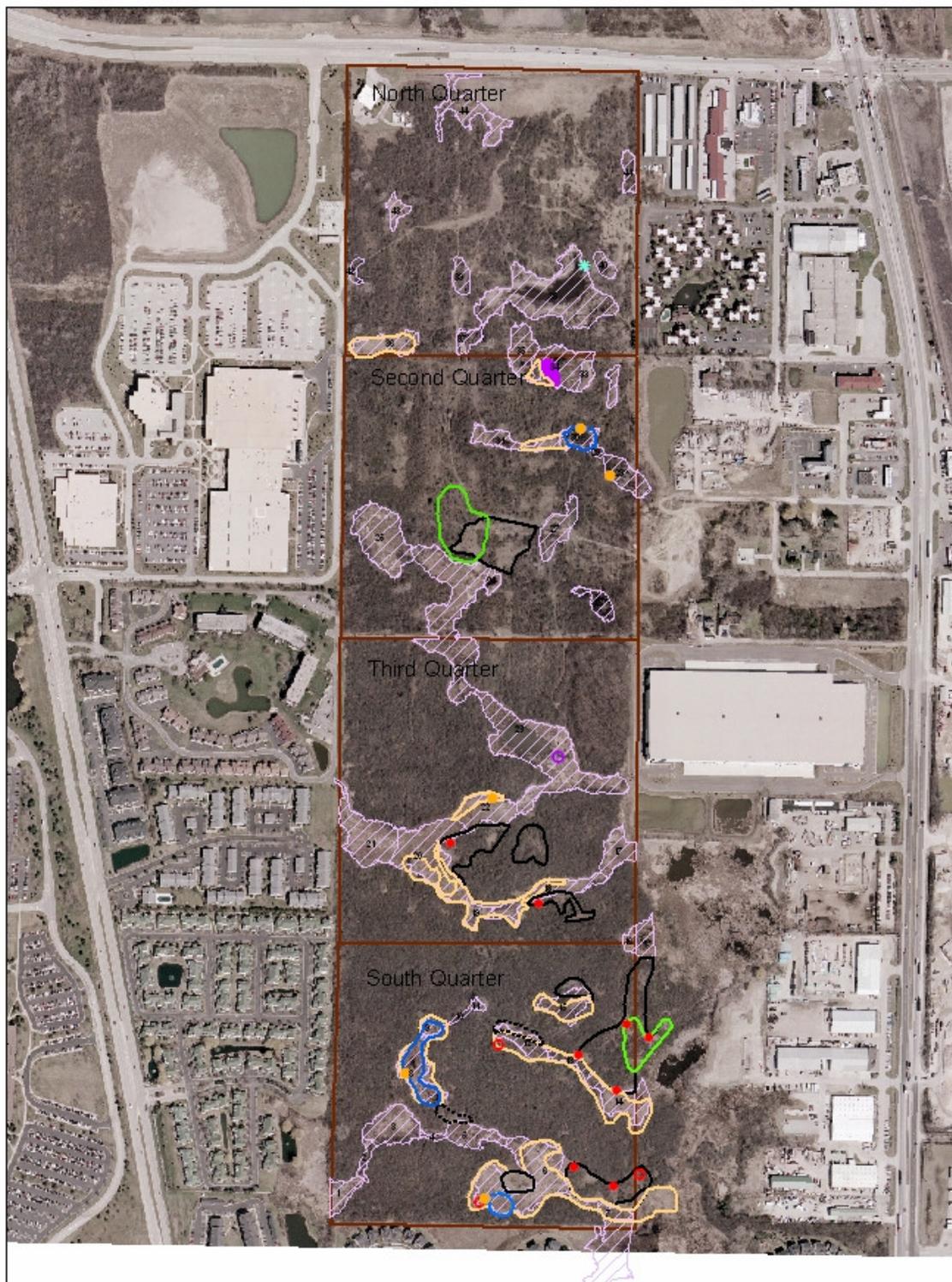


Figure 1. Wetland and endangered plant and birds, high-quality natural areas, and delineated wetlands formal during 2004 basin surveys at the Illinois Department of Transportation North Chicago Wetland Mitigation Site, Lake County, Illinois. *Carex alleghaniensis* also is the wetland as designated by the Illinois Endangered Species Protection Board. Data from 1995-94 botanical surveys also is the wetland.

- *Byrrhus tadycaulus* (2005)
- *Oenothera petenalis* (1995)
- *Byrrhus tadycaulus* (1995)
- *Veronica scutellata* (1995)
- *Carex alleghaniensis* (2005)
- *Veronica scutellata* (2005)
- Common Moorhen

- High Quality Areas**
- Sedge Meadow
 - Marsh
 - Prairie
 - Wetland Prairie
 - Wetland

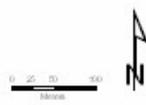




Figure 2. Aerial photograph from 1967 of the North Chicago Wetland Mitigation Site, shown outlined in red, Lake County, Illinois.



Figure 3. *Elymus trachycaulus* (State Threatened) photographed in the North Chicago Wetland Mitigation Site, Lake County, Illinois, during 2006 botanical surveys.



Figure 4. *Oenothera perennis* (State Threatened) photographed in 1995 in the North Chicago Wetland Mitigation Site, Lake County, Illinois.



Figure 5. *Veronica scutellata* (State Threatened) photographed in the North Chicago Wetland Mitigation Site during 1995 survey. It was found again during 2006 wetland surveys and a different location (A. Plocher [INHS]).

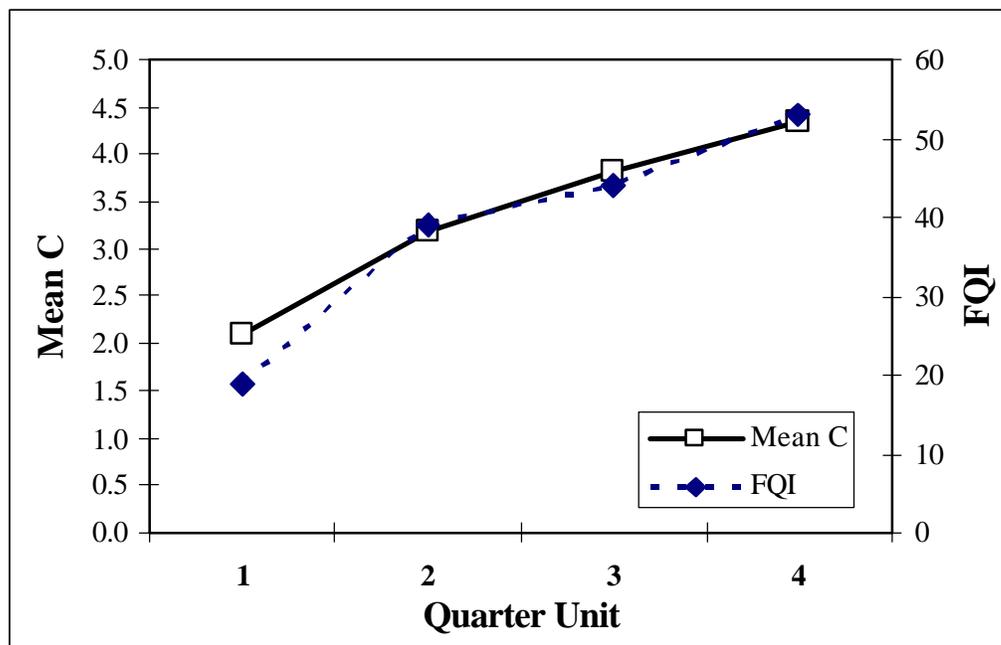


Figure 6. Floristic Quality Assessment of the North Chicago Wetland Mitigation Site for each quarter unit. Quarter Unit 1 is the North-Quarter Unit and Quarter Unit 4 is the South-Quarter Unit.

APPENDIX 1

THREATENED AND ENDANGERED SPECIES SUMMARY FORM**PROJECT AREA** – North Chicago Wetland Mitigation Site**COUNTY** - Lake**DATE** - 21-22 June, 29-30 June, 3 August,
15-16 August, and 31 August 2006**TAXON** - *Elymus trachycaulus* (Link.) Gould **STATUS** - Illinois Threatened**LOCATION IN THE PROJECT AREA:**

Latitude	Longitude
42.29468	87.88076
42.29632	87.88137
42.29589	87.88073
42.29655	87.88018
42.29672	87.88056
42.29491	87.88143

see Figure 1 for two additional locations lacking GPS coordinates

POPULATION DATA:**population size** - colony sizes range from 1 to 5 plants for a total of about 20 plants observed**reproductive state** - flowering/fruitletting**vouchers** - Taft # 1252, 1253, 1261 (ILLS) from previous survey (1995-96);
Taft # 2254, 2255 (2006)**DESCRIPTION OF THE COMMUNITY:****community classification** - Mesic prairie; sedge meadow**community dominants** - *Andropogon gerardii*, *Solidago rigida*, *Cornus racemosa*,
*Silphium terebinthinaceum***species' associates** - *Achillea millefolium**, *Andropogon gerardii*, *Bromus kalmii*,
Cornus racemosa, *Desmodium canadense*, *Helianthus rigidus*, *Lobelia spicata*, *Monarda*
fistulosa, *Monarda fistulosa*, *Parthenium integrifolium*, *Rhamnus cathartica**, *Rhanmus*
*frangula**, *Rosa carolina*, *Rudbeckia hirta*, *Silphium terebinthinaceum*, *Solidago gigantea*,

Solidago juncea

comments - See species account in text of report for a review of nomenclature and taxonomy for this species. Two taxa may be present in the study area; however, these may be included under *E. trachycaulus* as interpreted by the Illinois Endangered Species Protection Board (2005).

Appendix 2. Composition of vascular plants in the U.S. Route 41/IL Route 137, Illinois Department of Transportation Wetland Mitigation Site, Lake County. Threatened and endangered species are shown in bold. Adventive species are indicated with asterisks (*). An "X" indicates the species was seen during the respective survey times.

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
1 to 2	<i>Acer negundo</i>			X		∴	∴	∴	∴
3	<i>Achillea millefolium</i> *		X		X	∴		∴	∴
1	<i>Agrimonia gryposepala</i>		X	X	X			∴	
1	<i>Agrimonia parviflora</i>			X				∴	∴
2	<i>Agrostis alba</i> var. <i>palustris</i>	X		X		∴	∴	∴	
2	<i>Agrostis alba</i> *		X		X	∴	∴	∴	
2	<i>Alisma plantago-aquatica</i> var. <i>parviflorum</i>	X		X		∴	∴	∴	∴
2	<i>Alliaria petiolata</i> *				X		∴	∴	
2	<i>Allium canadense</i>		X		X	∴			
3	<i>Allium cernuum</i>		X		X	∴	∴	∴	∴
1	<i>Alnus glutinosa</i> *			X	X			∴	
3 to 4	<i>Ambrosia artemisiifolia</i>		X	X	X	∴	∴		
1	<i>Ambrosia trifida</i>				X	∴			
3	<i>Andropogon gerardii</i>		X		X		∴	∴	∴
1 to 2	<i>Anemone cylindracea</i>		X		X	∴		∴	∴
1 to 2	<i>Anemone virginica</i>		X		X	∴	∴		∴
2	<i>Antennaria neglecta</i>		X		X				∴
1	<i>Apocynum cannabinum</i>				X	∴			
2	<i>Apocynum sibericum</i>	X	X	X		∴		∴	
1	<i>Arctium minus</i> *				X		∴		
2	<i>Asclepias incarnata</i>	X		X			∴	∴	∴
2	<i>Asclepias purpurescens</i>		X		X		∴	∴	∴
2	<i>Asclepias sullivantii</i>		X		X		∴		∴
1 to 2	<i>Asclepias syriaca</i>		X		X	∴			
2	<i>Asclepias tuberosa</i>		X		X				∴
2	<i>Asclepias verticillata</i>				X	∴			
3	<i>Aster azureus</i>		X		X				∴
2	<i>Aster drummondii</i>				X	∴			
3	<i>Aster ericoides</i>		X		X	∴	∴	∴	∴
2	<i>Aster novae-angliae</i>	X	X	X	X	∴		∴	∴
2	<i>Aster pilosus</i>	X		X		∴			
2	<i>Aster praealtus</i>	X	X	X			∴	∴	
2	<i>Aster puniceus</i> var. <i>firmus</i>	X		X				∴	
2	<i>Aster simplex</i>	X		X				∴	
1	<i>Baptisia lactea</i>		X						
1	<i>Baptisia leucophaea</i>		X						
2	<i>Barbarea vulgaris</i> *				X	∴			
2	<i>Bidens cernua</i>	X		X			∴		
2	<i>Bidens connata</i>						∴		
2 to 3	<i>Bidens frondosa</i>	X		X		∴	∴		
3	<i>Boehmeria cylindrica</i>			X	X	∴	∴	∴	∴
2	<i>Bromus kalmii</i>		X		X				∴
2	<i>Cacalia plantaginea</i>		X		X				∴
3	<i>Calamagrostis canadensis</i>	X		X		∴	∴	∴	∴
1	<i>Caltha palustris</i>	X							

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
2	<i>Calystegia sepium</i>		X		X				
	<i>Carex annectans</i> var. <i>xanthocarpa</i>	X		see <i>C. vulpinoidea</i>					
2	<i>Carex atherodes</i>	X		X					
2	<i>Carex buxbaumii</i>	X		X					
2	<i>Carex comosa</i>	X							
2	<i>Carex cristatella</i>	X		X					
3	<i>Carex granularis</i>		X	X	X				
2	<i>Carex haydenii</i>	X		X					
2	<i>Carex hirsutella</i>		X		X				
2	<i>Carex lacustris</i>	X		X					
3	<i>Carex lanuginosa</i>	X		X	X				
1	<i>Carex lasiocarpa</i>	X							
2	<i>Carex molesta</i>				X				
2	<i>Carex sartwellii</i>	X		X					
2	<i>Carex stipata</i>			X					
3 to 4	<i>Carex stricta</i>	X		X					
2	<i>Carex tenera</i>	X			X				
1 to 2	<i>Carex tetanica</i>	X			X				
2	<i>Carex vulpinoidea</i> var. <i>ambigua</i>			X					
2	<i>Castilleja coccinea</i>		X		X				
2	<i>Centaureum pulchellum</i> *				X				
2	<i>Ceratophyllum demersum</i>	X							
2	<i>Cichorium intybus</i> *		X		X				
2	<i>Cicuta maculata</i>	X		X					
2	<i>Cinna arundinacea</i>	X		X				?	
1	<i>Circaea lutetiana</i>		X		X				
2	<i>Cirsium arvense</i> *	X		X	X				
1 to 2	<i>Cirsium discolor</i>	X	X		X				
1	<i>Cirsium vulgare</i> *	X		X					
2	<i>Comandra umbellata</i>		X		X				
1	<i>Coreopsis palmata</i>		X						
1	<i>Cornus obliqua</i>		X	X					
3 to 4	<i>Cornus racemosa</i>	X	X	X	X				
1 to 2	<i>Cornus stolonifera</i>	X		X					
1	<i>Corylus americanus</i>		X		X				
2	<i>Crataegus crusgalli</i>				X				
2	<i>Crataegus flabellata</i>		X		X			?	
1	<i>Crataegus mollis</i>		X		X				
2	<i>Crataegus succulenta</i>				X	?			
2	<i>Dactylis glomerata</i> *		X		X				
1	<i>Dalea purpurea</i>				X				
2	<i>Danthonia spicata</i>				X				
3	<i>Daucus carota</i> *		X		X				
2	<i>Desmodium canadense</i>		X		X				
2	<i>Dichanthelium acuminatum</i> var. <i>implicatum</i>		X		X				
1 to 2	<i>Dichanthelium leibergii</i>		X		X				
2	<i>Dichanthelium villosissimum</i>				X				
1	<i>Dipsacus laciniatus</i> *		X		X				
2	<i>Dodecatheon meadia</i>		X		X				

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
1	<i>Echinacea pallida</i>		X		X				1
2	<i>Echinochloa crus-galli</i>				X	1			
1	<i>Eleagnus angustifolia</i> *		X						
3	<i>Eleocharis erythropoda</i>	X		X				1	
2	<i>Elymus trachycaulus</i>	X	X	X	X			1	1
2	<i>Epilobium coloratum</i>	X		X			1	1	1
2	<i>Epilobium leptophyllum</i>	X			X			1	
3 to 4	<i>Equisetum arvense</i>	X	X	X	X	1	1	1	
2	<i>Equisetum x ferrissii</i>	X							
1	<i>Erechtites hieracifolia</i>	X		X					1
2	<i>Erigeron annuus</i>				X			1	
2	<i>Erigeron philadelphicus</i>	X		X	X		?	?	
3	<i>Erigeron strigosus</i>				X	1	1	1	1
2	<i>Eryngium yuccifolium</i>		X		X				1
3	<i>Eupatorium altissimum</i>		X						
3	<i>Eupatorium maculatum</i>	X		X		1	1	1	1
2	<i>Eupatorium perfoliatum</i>	X		X			1	1	1
1 to 2	<i>Euphorbia corollata</i>		X		X		1		1
2	<i>Euthamia graminifolia</i>	X	X		X	1	1	1	1
3	<i>Festuca pratense</i> *		X		X	1			
3	<i>Fragaria virginiana</i>		X		X	1	1	1	1
1	<i>Fraxinus pensylvanica</i>	X		X			1		
2	<i>Fraxinus pensylvanica</i> var. <i>subintegerrima</i>			X	X		1	1	1
2	<i>Galium obtusum</i>	X		X	X		1	1	
1	<i>Galium tinctorium</i>			X			?	?	
2 to 3	<i>Galium triflorum</i>			X	X		1	1	
2	<i>Gentiana alba</i>				X	1	1	1	
1	<i>Gentiana andrewsii</i>		X		X				1
1	<i>Gentiana</i> cf. <i>quinquefolia</i>				X				1
2	<i>Geranium maculatum</i>		X						
2	<i>Geum aleppicum</i>	X		X	X	1	1	1	
2	<i>Geum laciniatum</i>	X		X			1	1	
1	<i>Glechoma hederacea</i> *				X	?			
1 to 2	<i>Glyceria septentrionalis</i>	X		X					1
3	<i>Glyceria striata</i>	X		X			1	1	
2	<i>Helenium autumnale</i>	X		X			?	?	
3 to 4	<i>Helianthus grosseserratus</i>	X	X	X	X	1	1	1	1
2	<i>Helianthus rigidus</i>		X		X	1	1		1
1	<i>Helianthus strumosus</i>	X							
2	<i>Heuchera richardsonii</i>		X		X				1
1	<i>Hieracium aurantiacum</i> *		X						
3	<i>Hieracium caespitosum</i> *		X		X	1	1		
1	<i>Hieracium scabrum</i>		X						
1 to 2	<i>Hierochloa odorata</i>	X	X	X	X				1
3	<i>Hypericum perforatum</i> *		X		X	1	1	1	
2	<i>Hypoxis hirsuta</i>		X		X		1		1
2	<i>Impatiens capensis</i>			X				1	1
1	<i>Ipomoea pandurata</i>				X	?			
3	<i>Iris shrevei</i>	X		X		1	1	1	1

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
3	<i>Juncus dudleyi</i>	X	X	X	X				
2	<i>Juncus nodosus</i>	X		X					
2	<i>Juncus tenuis</i>				X				
1	<i>Juncus torreyi</i>			X	X				
2	<i>Juniperus virginicus</i>		X		X				
1 to 2	<i>Koeleria macrantha</i>		X						
1	<i>Krigia biflora</i>		X		X				
1 to 2	<i>Lathyrus palustris</i>	X		X					
2	<i>Lathyrus palustris</i> var. <i>myrtifolius</i>	X		X					
1 to 2	<i>Leersia oryzoides</i>	X		X					
2	<i>Lemna minor</i>	X		X					
2 to 3	<i>Lemna trisulca</i>	X		X					
2	<i>Lespedeza capitata</i>				X				
2	<i>Leucanthemum vulgare</i> *		X		X				
2	<i>Liatris asper</i>		X		X				
2	<i>Liatris pycnostachya</i>		X		X				
3	<i>Liatris spicata</i>	X	X	X	X				
1	<i>Lilium michiganense</i>		X	X	X				
2 to 3	<i>Lithospermum canescens</i>		X		X				
1	<i>Lobelia siphilitica</i>	X							
2 to 3	<i>Lobelia spicata</i>		X		X				
3	<i>Lonicera x bella</i> *		X	X	X				
2	<i>Ludwigia palustris</i>	X		X					
1	<i>Ludwigia polycarpa</i>	X		X					
1	<i>Luzula multiflora</i>				X				
1	<i>Lychnis alba</i> *				X				
3	<i>Lycopus americanus</i>	X		X					
2	<i>Lycopus uniflorus</i>	X		X					
3	<i>Lysimachia quadriflora</i>	X		X	X				
1	<i>Lysimachia thrysiflora</i>	X		X					?
2	<i>Lythrum alatum</i>		X	X	X				
2 to 4	<i>Lythrum salicaria</i> *	X	X	X	X				
1	<i>Malus ioensis</i>		X		X				
2	<i>Medicago lupulina</i> *		X		X				
2 to 3	<i>Melilotus alba</i> *		X		X				
2	<i>Mentha arvensis</i> var. <i>villosa</i>	X		X					
1 to 2	<i>Mimulus ringens</i>	X		X					
3	<i>Monarda fistulosa</i>		X		X				
2	<i>Muhlenbergia frondosa</i>			X					
2	<i>Myriophyllum heterophyllum</i>	X							
2	<i>Oenothera biennis</i>				X				
?	<i>Oenothera perennis</i>		X						
2	<i>Onoclea sensibilis</i>	X		X	X				
2	<i>Oxalis stricta</i>		X		X				
2 to 3	<i>Oxypolis rigidior</i>	X		X					
2	<i>Panicum capillare</i>		X		X				
1	<i>Panicum virgatum</i>		X						
3	<i>Parthenium integrifolium</i>		X		X				
2	<i>Parthenocissus quinquefolius</i>				X				

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
1 to 2	<i>Pedicularis canadensis</i>		X		X				
1	<i>Pedicularis lanceolata</i>	X							
1	<i>Penstemon calycosa</i>				X				?
2	<i>Penstemon digitalis</i>	X	X		X				
2	<i>Penthorum sedoides</i>	X		X					
4	<i>Phalaris arundinacea</i>	X		X					
1	<i>Phleum pratense*</i>		X		X				
3	<i>Phlox glaberrima</i>	X		X					
3	<i>Phlox pilosa</i>		X		X				
1 to 2	<i>Phragmites australis</i>	X		X					
2	<i>Physalis pubescens</i>		X		X				
1 to 2	<i>Plantago rugellii</i>	X	X	X	X				
4	<i>Poa compressa*</i>		X		X				
3	<i>Poa pratensis*</i>		X		X				
1	<i>Podophyllum peltatum</i>				X				
2	<i>Polygala verticillata</i>				X				
3	<i>Polygonum amphibium</i>	X		X					
2	<i>Polygonum hydropiperoides</i>			X					
2	<i>Polygonum punctatum</i>	X							
2	<i>Populus deltoides</i>	X		X					
2	<i>Populus tremuloides</i>		X		X				
2	<i>Potamogeton foliosus</i>	X							
1	<i>Potentilla arguta</i>		X		X				
1	<i>Potentilla norvegica*</i>	X							
2	<i>Potentilla recta*</i>		X		X				
2	<i>Potentilla simplex</i>		X		X				
1	<i>Prenanthes cf. racemosa</i>		X		X				
1 to 2	<i>Proserpinaca palustris</i>	X		X					?
2	<i>Prunella vulgaris</i> var. <i>elongata</i>		X		X				
1	<i>Prunus americanus</i>		X		X				
2	<i>Prunus serotina</i>		X		X				
2	<i>Prunus virginiana</i>		X		X				
1 to 2	<i>Pycnanthemum pilosum</i>	X		X					
2 to 3	<i>Pycnanthemum virginiana</i>	X	X	X	X				
1	<i>Quercus macrocarpa</i>		X						
2	<i>Quercus palustris</i>		X		X				
1	<i>Quercus rubra</i>				X				
2	<i>Ranunculus flabellaris</i>	X							
2	<i>Ranunculus longirostre</i>	X		X					
2	<i>Ranunculus sceleratus</i>			X					
2	<i>Ratibida pinnata</i>		X		X				
4	<i>Rhamnus cathartica*</i>		X	X	X				
2	<i>Rhamnus frangula*</i>	X		X					
2	<i>Rhus copallina</i>		X						
2	<i>Rhus glabra</i>		X		X				
2	<i>Ribes americana</i>	X		X					
1 to 2	<i>Rorippa palustris</i> var. <i>fernaldiana</i>			X					
1	<i>Rosa blanda</i>	X		X					
2	<i>Rosa carolina</i>		X		X				

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
2	<i>Rosa multiflora</i> *		X		X				
1 to 2	<i>Rosa setigera</i>				X				
2	<i>Rubus flagellaris</i>		X		X				
2	<i>Rubus occidentalis</i>				X				
2	<i>Rubus strigosus</i>	X		X					
2 to 3	<i>Rudbeckia hirta</i>		X		X				
1	<i>Rumex crispus</i> *	X		X					
2	<i>Sagittaria latifolia</i>	X		X					
2	<i>Salix alba</i> *	X		X					
2	<i>Salix discolor</i>	X		X					
3 to 4	<i>Salix exigua</i>	X		X					
2 to 3	<i>Salix petiolaris</i>	X		X					
2	<i>Salix fragilis</i> *			X					
2	<i>Salix x rubens</i> *			X					
2	<i>Sanicula canadensis</i>			X	X				
2	<i>Schizachyrium scoparium</i>		X		X				
2	<i>Scirpus acutus</i>	X		X					
2	<i>Scirpus atrovirens</i>	X							
2	<i>Scirpus cyperinus</i>	X		X	X				
2	<i>Scirpus fluviatilis</i>	X		X					
2	<i>Scirpus pendulus</i>		X		X				
2	<i>Scirpus tabernaemontanii</i>	X		X					
2	<i>Scutellaria galericulata</i>			X					
2	<i>Scutellaria lateriflora</i>	X		X					
2	<i>Scutellaria leonardii</i>				X				
4	<i>Senecio pauperculus</i>		X		X				
2	<i>Silphium integrifolium</i>		X		X				
2 to 3	<i>Silphium terebinthinaceum</i>		X		X				
2 to 3	<i>Sisyrinchium albidum</i>		X		X				
2	<i>Sium suave</i>	X		X					
2	<i>Smilacina stellata</i>	X	X	X	X				
1	<i>Smilax lasioneuron</i>				X			?	
2	<i>Solanum dulcamera</i> *			X					
2 to 4	<i>Solidago canadensis</i>	X	X	X	X				
2	<i>Solidago gigantea</i>	X	X	X	X				
3	<i>Solidago juncea</i>		X		X				
3	<i>Solidago nemoralis</i>		X		X				
1 to 2	<i>Solidago riddellii</i>	X		X	X				
4	<i>Solidago rigida</i>		X		X				
1 to 2	<i>Sonchus oleracea</i> *				X				
2 to 3	<i>Sorghastrum nutans</i>		X		X				
2	<i>Sparganium eurycarpum</i>			X					
2 to 3	<i>Spartina pectinata</i>	X	X	X	X				
2	<i>Sphenopholis obtusata</i>				X				
2	<i>Spiraea alba</i>	X	X	X					
2	<i>Spiranthes cernua</i>		X		X				
2	<i>Sporobolus heterolepis</i>		X		X				
2	<i>Stachys palustris</i> var. <i>homotricha</i>	X		X					
2	<i>Stachys tenuifolia</i> var. <i>hispida</i>		X	X	X				

Cover Class	Latin Species Name	1995-1996 Surveys		2006 Surveys		Quarter Units			
		Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	Marsh-Pond/ Sedge Meadow	Prairie/ Old Field	1	2	3	4
1	<i>Stellaria meadia*</i>		X						
1	<i>Taraxicum officinale*</i>		X		X	∴			
1	<i>Thalictrum dasycarpum</i>	X	X	X	X				∴
2	<i>Thalictrum revolutum</i>			X	X		∴	∴	∴
1	<i>Thelypteris palustris</i>			X					∴
2 to 3	<i>Tradescantia ohiensis</i>	X		X	X	∴	∴		∴
2	<i>Trifolium hybridum*</i>				X	∴	∴		
3	<i>Trifolium pratense*</i>		X		X	∴	∴		
1	<i>Trillium recurvatum</i>				X		?		?
1 to 2	<i>Triosteum aurantiacum</i>				X				∴
1	<i>Triosteum perfoliatum</i>				X				∴
3	<i>Typha angustifolia</i>	X		X		∴	∴	∴	∴
3 to 4	<i>Typha latifolia</i>	X		X			∴	∴	∴
1	<i>Ulmus americana</i>	X	X	X	X		∴		
2	<i>Urtica dioica</i>	X							
2	<i>Utricularia gibba</i>	X							
2	<i>Utricularia vulgaris</i>	X							
1	<i>Valeriana officinalis*</i>				X		∴		
3	<i>Verbena hastata</i>	X		X		∴	∴	∴	∴
2	<i>Vernonia fasciculata</i>	X		X					∴
1	<i>Veronica scutellata</i>	X	X	X			∴		
2	<i>Veronicastrum virginicum</i>	X	X		X				∴
1	<i>Viburnum lantana*</i>				X		∴		
3	<i>Viburnum lentago</i>		X	X	X	∴	∴	∴	∴
2	<i>Viburnum opulus*</i>	X			X	∴	∴		∴
1	<i>Viburnum prunifolium</i>				X				∴
2	<i>Viburnum recognitum*</i>				X		∴	∴	
2	<i>Vicia americana</i>	X		X				∴	∴
2	<i>Viola affinis</i>	X							
2	<i>Viola pedatifida</i>		X		X		∴		∴
3	<i>Viola sororia/pratincola</i>	X		X	X	∴	∴	∴	∴
2	<i>Vitis riparia</i>		X	X	X	∴	∴	∴	∴
2	<i>Zizea aptera</i>		X		X			∴	∴
2 to 3	<i>Zizea aurea</i>	X	X		X		∴	∴	∴
	Total Number of Taxa/Habitat	135	146	141	194	112	180	147	166
	Total Taxa in Study Area for each survey period	256		289					
	Total species combining surveys			323					

APPENDIX 3. Floristic Quality Assessment of the North Chicago Wetland Mitigation Site with combined results from 1995-96 and 2006 surveys.

FLORISTIC QUALITY DATA	Native	276	85.4%	Adventive	47	14.6%
276 NATIVE SPECIES	Tree	17	5.3%	Tree	4	1.2%
323 Total Species	Shrub	20	6.2%	Shrub	7	2.2%
4.4 NATIVE MEAN C	W-Vine	2	0.6%	W-Vine	1	0.3%
3.8 W/Adventives	H-Vine	1	0.3%	H-Vine	0	0.0%
73.1 NATIVE FQI	P-Forb	160	49.5%	P-Forb	16	5.0%
67.6 W/Adventives	B-Forb	5	1.5%	B-Forb	7	2.2%
-0.6 NATIVE MEAN W	A-Forb	17	5.3%	A-Forb	5	1.5%
-0.3 W/Adventives	P-Grass	24	7.4%	P-Grass	6	1.9%
AVG: Faculative (+)	A-Grass	1	0.3%	A-Grass	1	0.3%
	P-Sedge	25	7.7%	P-Sedge	0	0.0%
	A-Sedge	0	0.0%	A-Sedge	0	0.0%
	Fern	4	1.2%			

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
1	<i>Acer negundo</i>	-2	FACW-	Nt Tree	BOXELDER
0	<i>ACHILLEA MILLEFOLIUM</i>	3	FACU	Ad P-Forb	COMMON MILFOIL
3	<i>Agrimonia gryposepala</i>	2	FACU+	Nt P-Forb	TALL AGRIMONY
5	<i>Agrimonia parviflora</i>	-1	FAC+	Nt P-Forb	SWAMP AGRIMONY
0	<i>Agrostis alba</i>	-3	FACW	Nt P-Grass	RED TOP
8	<i>Agrostis alba v. palustris</i>	-3	FACW	Nt P-Grass	CREEPING BENT GRASS
2	<i>Alisma plantago-aquatica v. parviflorum</i>	-5	OBL	Nt P-Forb	COMMON WATER PLANTAIN
0	<i>ALLIARIA PETIOLATA</i>	0	FAC	Ad B-Forb	GARLIC MUSTARD
2	<i>Allium canadense</i>	3	FACU	Nt P-Forb	WILD GARLIC
7	<i>Allium cernuum</i>	5	UPL	Nt P-Forb	NODDING WILD ONION
0	<i>ALNUS GLUTINOSA</i>	-2	FACW-	Ad Tree	BLACK ALDER
0	<i>Ambrosia artemisiifolia</i>	3	FACU	Nt A-Forb	COMMON RAGWEED
0	<i>Ambrosia trifida</i>	-1	FAC+	Nt A-Forb	GIANT RAGWEED
5	<i>Andropogon gerardii</i>	1	FAC-	Nt P-Grass	BIG BLUESTEM
8	<i>Anemone cylindrica</i>	5	UPL	Nt P-Forb	CANDLE ANEMONE
4	<i>Anemone virginiana</i>	5	UPL	Nt P-Forb	TALL ANEMONE
4	<i>Antennaria neglecta</i>	5	UPL	Nt P-Forb	CAT'S FOOT
2	<i>Apocynum cannabinum</i>	0	FAC	Nt P-Forb	DOGBANE
2	<i>Apocynum sibiricum</i>	-1	FAC+	Nt P-Forb	INDIAN HEMP
0	<i>ARCTIUM MINUS</i>	5	UPL	Ad B-Forb	COMMON BURDOCK
4	<i>Asclepias incarnata</i>	-5	OBL	Nt P-Forb	SWAMP MILKWEED
7	<i>Asclepias purpurascens</i>	3	FACU	Nt P-Forb	PURPLE MILKWEED
7	<i>Asclepias sullivantii</i>	5	UPL	Nt P-Forb	PRAIRIE MILKWEED
0	<i>Asclepias syriaca</i>	5	UPL	Nt P-Forb	COMMON MILKWEED
5	<i>Asclepias tuberosa v. interior</i>	5	UPL	Nt P-Forb	BUTTERFLYWEED
1	<i>Asclepias verticillata</i>	5	UPL	Nt P-Forb	HORSETAIL MILKWEED
7	<i>Aster azureus</i>	5	UPL	Nt P-Forb	SKY-BLUE ASTER
3	<i>Aster drummondii</i>	3	FACU	Nt P-Forb	DRUMMOND'S ASTER
4	<i>Aster ericoides</i>	4	FACU-	Nt P-Forb	HEATH ASTER
4	<i>Aster novae-angliae</i>	-3	FACW	Nt P-Forb	NEW ENGLAND ASTER
0	<i>Aster pilosus</i>	4	FACU-	Nt P-Forb	HAIRY ASTER
4	<i>Aster praealtus</i>	-5	OBL	Nt P-Forb	WILLOW ASTER
7	<i>Aster puniceus</i>	-5	OBL	Nt P-Forb	BRISTLY ASTER
3	<i>Aster simplex</i>	-5	OBL	Nt P-Forb	PANICLED ASTER
6	<i>Baptisia lactea</i>	3	FACU	Nt P-Forb	WHITE WILD INDIGO
9	<i>Baptisia leucophaea</i>	5	UPL	Nt P-Forb	CREAM WILD INDIGO
0	<i>BARBAREA VULGARIS</i>	0	FAC	Ad B-Forb	WINTER CRESS

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
2	<i>Bidens cernua</i>	-5	OBL	Nt A-Forb	NODDING BUR MARIGOLD
2	<i>Bidens connata</i>	-5	OBL	Nt A-Forb	PURPLESTEMMED TICKSEED
1	<i>Bidens frondosa</i>	-3	FACW	Nt A-Forb	COMMON BEGGAR'S TICKS
3	<i>Boehmeria cylindrica</i>	-5	OBL	Nt P-Forb	FALSE NETTLE
0	<i>Bromus kalmii</i>	0	FAC	Nt P-Grass	PRAIRIE BROME
0	<i>Cacalia plantaginea</i>	0	FAC	Nt P-Forb	PRAIRIE INDIAN PLANTAIN
3	<i>Calamagrostis canadensis</i>	-5	OBL	Nt P-Grass	BLUE JOINT GRASS
7	<i>Caltha palustris</i>	-5	OBL	Nt P-Forb	COWSLIP
1	<i>Calystegia sepium</i>	0	FAC	Nt P-Forb	AMERICAN BINDWEED
3	<i>Carex annectens v. xanthocarpa</i>	-3	FACW	Nt P-Sedge	SMALL YELLOW FOX SEDGE
6	<i>Carex atherodes</i>	-5	OBL	Nt P-Sedge	HAIRY-LEAVED LAKE SEDGE
9	<i>Carex buxbaumii</i>	-5	OBL	Nt P-Sedge	DARK-SCALED SEDGE
6	<i>Carex comosa</i>	-5	OBL	Nt P-Sedge	BRISTLY SEDGE
3	<i>Carex cristatella</i>	-4	FACW+	Nt P-Sedge	CRESTED OVAL SEDGE
2	<i>Carex granularis v. haleana</i>	-4	FACW+	Nt P-Sedge	PALE SEDGE
7	<i>Carex haydenii</i>	-5	OBL	Nt P-Sedge	LONG-SCALED TUSSOCK SEDGE
5	<i>Carex hirsutella</i>	4	FACU-	Nt P-Sedge	HAIRY GREEN SEDGE
6	<i>Carex lacustris</i>	-5	OBL	Nt P-Sedge	COMMON LAKE SEDGE
4	<i>Carex lanuginosa</i>	-5	OBL	Nt P-Sedge	WOOLY SEDGE
0	<i>Carex lasiocarpa</i>	-5	OBL	Nt P-Sedge	NARROW-LEAVED WOOLLY SEDGE
2	<i>Carex molesta</i>	0	FAC	Nt P-Sedge	FIELD OVAL SEDGE
5	<i>Carex sartwellii</i>	-5	OBL	Nt P-Sedge	RUNNING MARSH SEDGE
2	<i>Carex stipata</i>	-5	OBL	Nt P-Sedge	COMMON FOX SEDGE
5	<i>Carex stricta</i>	-5	OBL	Nt P-Sedge	COMMON TUSSOCK SEDGE
5	<i>Carex tenera</i>	-1	FAC+	Nt P-Sedge	NARROW-LEAVED OVAL SEDGE
5	<i>Carex tetanica</i>	-3	FACW	Nt P-Sedge	COMMON STIFF SEDGE
3	<i>Carex vulpinoidea</i>	-5	OBL	Nt P-Sedge	BROWN FOX SEDGE
8	<i>Castilleja coccinea</i>	0	FAC	Nt A-Forb	INDIAN PAINTBRUSH
0	CENTAURIUM PULCHELLUM	4	FACU-	Ad A-Forb	SHOWY CENTAURY
3	<i>Ceratophyllum demersum</i>	-5	OBL	Nt P-Forb	COONTAIL
0	CICHORIUM INTYBUS	5	UPL	Ad P-Forb	CHICKORY
4	<i>Cicuta maculata</i>	-5	OBL	Nt B-Forb	WATER HEMLOCK
5	<i>Cinna arundinacea</i>	-3	FACW	Nt P-Grass	COMMON WOOD REED
2	<i>Circaea lutetiana v. canadensis</i>	3	FACU	Nt P-Forb	ENCHANTER'S NIGHTSHADE
0	CIRSIUM ARVENSE	3	FACU	Ad P-Forb	FIELD THISTLE
3	<i>Cirsium discolor</i>	5	UPL	Nt B-Forb	PASTURE THISTLE
0	CIRSIUM VULGARE	4	FACU-	Ad B-Forb	BULL THISTLE
6	<i>Comandra umbellata</i>	3	FACU	Nt P-Forb	BASTARD TOAD-FLAX
6	<i>Coreopsis palmata</i>	5	UPL	Nt P-Forb	PRAIRIE COREOPSIS
4	<i>Cornus obliqua</i>	-5	OBL	Nt Shrub	PALE DOGWOOD
2	<i>Cornus racemosa</i>	-2	FACW-	Nt Shrub	GRAY DOGWOOD
4	<i>Cornus stolonifera</i>	-3	FACW	Nt Shrub	RED OSIER DOGWOOD
4	<i>Corylus americana</i>	0	FAC	Nt Shrub	AMERICAN FILBERT
2	<i>Crataegus crus-galli</i>	0	FAC	Nt Tree	COCK-SPUR HAWTHORN
5	<i>Crataegus flabellata</i>	5	UPL	Nt Tree	LARGE-SEEDED HAWTHORN
2	<i>Crataegus mollis</i>	-2	FACW-	Nt Tree	DOWNY HAWTHORN
5	<i>Crataegus succulenta</i>	5	UPL	Nt Tree	FLESHY HAWTHORN
0	DACTYLIS GLOMERATA	3	FACU	Ad P-Grass	ORCHARD GRASS
8	<i>Dalea purpurea</i>	5	UPL	Nt P-Forb	PURPLE PRAIRIE CLOVER

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
3	<i>Danthonia spicata</i>	5	UPL	Nt P-Grass	POVERTY OAT GRASS
0	DAUCUS CAROTA	4	FACU-	Ad B-Forb	QUEEN ANNE'S LACE
5	<i>Desmodium canadense</i>	1	FAC-	Nt P-Forb	SHOWY TICK TREFOIL
0	DIPSACUS LACINIATUS	5	UPL	Ad B-Forb	CUT-LEAVED TEASEL
6	<i>Dodecatheon meadia</i>	3	FACU	Nt P-Forb	SHOOTING STAR
7	<i>Echinacea pallida</i>	5	UPL	Nt P-Forb	PALE PURPLE CONEFLOWER
0	ECHINOCHLOA CRUSGALLI	-3	FACW	Ad A-Grass	BARNYARD GRASS
0	ELAEAGNUS ANGUSTIFOLIA	4	FACU-	Ad Shrub	RUSSIAN OLIVE
3	<i>Eleocharis erythropoda</i>	-5	OBL	Nt P-Sedge	RED-ROOTED SPIKE RUSH
8	Elymus trachycaulus	3	FACU	Nt P-Grass	BEARDED WHEAT GRASS
3	<i>Epilobium coloratum</i>	-5	OBL	Nt P-Forb	CINNAMON WILLOW HERB
9	<i>Epilobium leptophyllum</i>	-5	OBL	Nt P-Forb	FEN WILLOW HERB
0	<i>Equisetum arvense</i>	0	FAC	Nt Fern	COMMON HORSETAIL
2	<i>Equisetum X ferrissii</i>	-3	FACW	Nt Fern	JOLIET HORSETAIL
2	<i>Erechtites hieracifolia</i>	3	FACU	Nt A-Forb	FIREWEED
1	<i>Erigeron annuus</i>	1	FAC-	Nt B-Forb	ANNUAL FLEABANE
3	<i>Erigeron philadelphicus</i>	-3	FACW	Nt P-Forb	MARSH FLEABANE
2	<i>Erigeron strigosus</i>	1	FAC-	Nt P-Forb	DAISY FLEABANE
7	<i>Eryngium yuccifolium</i>	-1	FAC+	Nt P-Forb	RATTLESNAKE MASTER
2	<i>Eupatorium altissimum</i>	3	FACU	Nt P-Forb	TALL BONESET
5	<i>Eupatorium maculatum</i>	-5	OBL	Nt P-Forb	SPOTTED JOE PYE WEED
4	<i>Eupatorium perfoliatum</i>	-4	FACW+	Nt P-Forb	COMMON BONESET
3	<i>Euphorbia corollata</i>	5	UPL	Nt P-Forb	FLOWERING SPURGE
3	<i>Euthamia graminifolia</i>	-2	FACW-	Nt P-Forb	GRASS-LEAVED GOLDENROD
0	FESTUCA PRATENSIS	4	FACU-	Ad P-Grass	MEADOW FESCUE
2	<i>Fragaria virginiana</i>	1	FAC-	Nt P-Forb	WILD STRAWBERRY
5	<i>Fraxinus pennsylvanica</i>	-3	FACW	Nt Tree	RED ASH
2	<i>Fraxinus pennsylvanica v. subintegerrima</i>	-3	FACW	Nt Tree	GREEN ASH
5	<i>Galium obtusum</i>	-4	FACW+	Nt P-Forb	WILD MADDER
6	<i>Galium tinctorium</i>	-5	OBL	Nt P-Forb	STIFF BEDSTRAW
4	<i>Galium triflorum</i>	2	FACU+	Nt P-Forb	SWEET-SCENTED BEDSTRAW
9	<i>Gentiana alba</i>	3	FACU	Nt P-Forb	PALE GENTIAN
7	<i>Gentiana andrewsii</i>	-3	FACW	Nt P-Forb	CLOSED GENTIAN
7	<i>Gentianella quinquefolia v. occidentalis</i>	0	FAC	Nt A-Forb	STIFF GENTIAN
4	<i>Geranium maculatum</i>	3	FACU	Nt P-Forb	WILD GERANIUM
6	<i>Geum aleppicum</i>	-1	FAC+	Nt P-Forb	YELLOW AVENS
2	<i>Geum laciniatum</i>	-3	FACW	Nt P-Forb	ROUGH AVENS
0	GLECHOMA HEDERACEA	3	FACU	Ad P-Forb	GROUND IVY
6	<i>Glyceria septentrionalis</i>	-5	OBL	Nt P-Grass	FLOATING MANNA GRASS
4	<i>Glyceria striata</i>	-5	OBL	Nt P-Grass	FOWL MANNA GRASS
3	<i>Helenium autumnale</i>	-4	FACW+	Nt P-Forb	SNEEZEWEED
2	<i>Helianthus grosseserratus</i>	-2	FACW-	Nt P-Forb	SAWTOOTH SUNFLOWER
6	<i>Helianthus rigidus</i>	5	UPL	Nt P-Forb	PRAIRIE SUNFLOWER
3	<i>Helianthus strumosus</i>	5	UPL	Nt P-Forb	PALE-LEAVED SUNFLOWER
7	<i>Heuchera richardsonii v. grayana</i>	1	FAC-	Nt P-Forb	PRAIRIE ALUMROOT
0	HIERACIUM AURANTIACUM	5	UPL	Ad P-Forb	DEVIL'S PAINT BRUSH
0	HIERACIUM CAESPITOSUM	5	UPL	Ad P-Forb	FIELD HAWKWEED
5	<i>Hieracium scabrum</i>	5	UPL	Nt P-Forb	ROUGH HAWKWEED
7	<i>Hierochloa odorata</i>	-3	FACW	Nt P-Grass	SWEET GRASS

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
0	HYPERICUM PERFORATUM	5	UPL	Ad P-Forb	COMMON ST. JOHN'S WORT
6	Hypoxis hirsuta	0	FAC	Nt P-Forb	YELLOW STAR GRASS
2	Impatiens capensis	-3	FACW	Nt A-Forb	SPOTTED TOUCH-ME-NOT
2	Ipomoea pandurata	3	FACU	Nt P-Forb	WILD SWEET POTATO
5	Iris shrevei	-5	OBL	Nt P-Forb	SOUTHERN BLUE FLAG
4	Juncus dudleyi	0	FAC	Nt P-Forb	DUDLEY'S RUSH
6	Juncus nodosus	-5	OBL	Nt P-Forb	JOINT RUSH
0	Juncus tenuis	0	FAC	Nt P-Forb	PATH RUSH
3	Juncus torreyi	-3	FACW	Nt P-Forb	TORREY'S RUSH
1	Juniperus virginiana	3	FACU	Nt Tree	EASTERN RED CEDAR
7	Koeleria macrantha	5	UPL	Nt P-Grass	JUNE GRASS
5	Krigia biflora	3	FACU	Nt P-Forb	FALSE DANDELION
7	Lathyrus palustris	-5	OBL	Nt P-Forb	MARSH VETCHLING
6	Lathyrus palustris v. myrtifolius	-5	OBL	Nt P-Forb	MARSH VETCHLING
3	Leersia oryzoides	-5	OBL	Nt P-Grass	RICE CUT GRASS
8	Lemna trisulca	-5	OBL	Nt A-Forb	FORKED DUCKWEED
4	Lespedeza capitata	3	FACU	Nt P-Forb	ROUND-HEADED BUSH CLOVER
0	LEUCANTHEMUM VULGARE	5	UPL	Ad P-Forb	OX-EYE DAISY
7	Liatris aspera	5	UPL	Nt P-Forb	ROUGH BLAZING STAR
6	Liatris pycnostachya	1	FAC-	Nt P-Forb	PRAIRIE BLAZINE STAR
7	Liatris spicata	0	FAC	Nt P-Forb	MARSH BLAZING STAR
6	Lilium michiganense	-1	FAC+	Nt P-Forb	MICHIGAN LILY
6	Lithospermum canescens	5	UPL	Nt P-Forb	HOARY PUCCOON
4	Lobelia siphilitica	-4	FACW+	Nt P-Forb	GREAT BLUE LOBELIA
4	Lobelia spicata	0	FAC	Nt P-Forb	PALE SPIKED LOBELIA
0	LONICERA X BELLA	3	FACU	Ad Shrub	SHOWY FLY HONEYSUCKLE
4	Ludwigia palustris v. americana	-5	OBL	Nt P-Forb	MARSH PURSLANE
5	Ludwigia polycarpa	-5	OBL	Nt P-Forb	FALSE LOOSESTRIFE
5	Luzula multiflora	3	FACU	Nt P-Forb	COMMON WOOD RUSH
0	LYCHNIS ALBA	5	UPL	Ad A-Forb	WHITE CAMPION
3	Lycopus americanus	-5	OBL	Nt P-Forb	COMMON WATER HOREHOUND
7	Lycopus uniflorus	-5	OBL	Nt P-Forb	NOTHERN BUGLE WEED
8	Lysimachia quadriflora	-5	OBL	Nt P-Forb	NARROW-LEAVED LOOSESTRIFE
7	Lysimachia thyriflora	-5	OBL	Nt P-Forb	TUFTED LOOSESTRIFE
5	Lythrum alatum	-5	OBL	Nt P-Forb	WINGED LOOSESTRIFE
0	LYTHRUM SALICARIA	-5	OBL	Ad P-Forb	PURPLE LOOSESTRIFE
3	Malus ioensis	5	UPL	Nt Tree	IOWA CRAB
0	MEDICAGO LUPULINA	1	FAC-	Ad A-Forb	BLACK MEDICK
0	MELILOTUS ALBA	3	FACU	Ad B-Forb	WHITE SWEET CLOVER
4	Mentha arvensis v. villosa	-3	FACW	Nt P-Forb	WILD MINT
5	Mimulus ringens	-5	OBL	Nt P-Forb	MONKEY FLOWER
4	Monarda fistulosa	3	FACU	Nt P-Forb	WILD BERGAMOT
3	Muhlenbergia frondosa	-3	FACW	Nt P-Grass	COMMON SATIN GRASS
0	Myriophyllum heterophyllum	-5	OBL	Nt P-Forb	VARIOUS-LEAVED WATER MILFOIL
1	Oenothera biennis	3	FACU	Nt B-Forb	COMMON EVENING PRIMROSE
8	Oenothera perennis	0	FAC	Nt P-Forb	SMALL SUNDROPS
5	Onoclea sensibilis	-3	FACW	Nt Fern	SENSITIVE FERN
0	Oxalis stricta	3	FACU	Nt P-Forb	TALL WOOD SORREL
7	Oxypolis rigidior	-5	OBL	Nt P-Forb	COWBANE

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
0	<i>Panicum capillare</i>	0	FAC	Nt A-Grass	OLD WITCH GRASS
2	<i>Panicum implicatum</i>	0	FAC	Nt P-Grass	OLD FIELD PANIC GRASS
7	<i>Panicum leibergii</i>	2	FACU+	Nt P-Grass	PRAIRIE PANIC GRASS
5	<i>Panicum villosissimum</i>	5	UPL	Nt P-Grass	WHITE-HAIRED PANIC GRASS
4	<i>Panicum virgatum</i>	-1	FAC+	Nt P-Grass	PRAIRIE SWITCH GRASS
8	<i>Parthenium integrifolium</i>	5	UPL	Nt P-Forb	WILD QUININE
2	<i>Parthenocissus quinquefolia</i>	1	FAC-	Nt W-Vine	VIRGINIA CREEPER
7	<i>Pedicularis canadensis</i>	2	FACU+	Nt P-Forb	WOOD BETONY
9	<i>Pedicularis lanceolata</i>	-4	FACW+	Nt P-Forb	FEN BETONY
3	<i>Penstemon calycosus</i>	3	FACU	Nt P-Forb	SMOOTH BEARD TONGUE
4	<i>Penstemon digitalis</i>	1	FAC-	Nt P-Forb	FOXGLOVE BEARD TONGUE
2	<i>Penthorum sedoides</i>	-5	OBL	Nt P-Forb	DITCH STONECROP
0	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-Grass	REED CANARY GRASS
0	PHLEUM PRATENSE	3	FACU	Ad P-Grass	TIMOTHY
6	<i>Phlox glaberrima</i> sp. interior	-3	FACW	Nt P-Forb	SMOOTH PHLOX
7	<i>Phlox pilosa</i>	1	FAC-	Nt P-Forb	SAND PRAIRIE PHLOX
1	<i>Phragmites australis</i>	-4	FACW+	Nt P-Grass	COMMON REED
3	<i>Physalis pubescens</i>	5	UPL	Nt A-Forb	HAIRY GROUND CHERRY
0	<i>Plantago rugelii</i>	0	FAC	Nt A-Forb	RED-STALKED PLANTAIN
0	POA COMPRESSA	2	FACU+	Ad P-Grass	CANADIAN BLUE GRASS
0	POA PRATENSIS	1	FAC-	Ad P-Grass	KENTUCKY BLUE GRASS
4	<i>Podophyllum peltatum</i>	3	FACU	Nt P-Forb	MAY APPLE
5	<i>Polygala verticillata</i> v. <i>isocycla</i>	5	UPL	Nt A-Forb	WHORLED MILKWORT
3	<i>Polygonum amphibium</i>	-5	OBL	Nt P-Forb	WATER KNOTWEED
4	<i>Polygonum hydropiperoides</i>	-5	OBL	Nt P-Forb	MILD WATER PEPPER
3	<i>Polygonum punctatum</i>	-5	OBL	Nt A-Forb	SMARTWEED
2	<i>Populus deltoides</i>	-1	FAC+	Nt Tree	EASTERN COTTONWOOD
3	<i>Populus tremuloides</i>	0	FAC	Nt Tree	QUAKING ASPEN
5	<i>Potamogeton foliosus</i>	-5	OBL	Nt P-Forb	LEAFY PONDWEED
0	<i>Potentilla arguta</i>	4	FACU-	Nt P-Forb	PRAIRIE CINQUEFOIL
0	<i>Potentilla norvegica</i>	0	FAC	Nt A-Forb	ROUGH CINQUEFOIL
0	POTENTILLA RECTA	5	UPL	Ad P-Forb	SULFUR CINQUEFOIL
3	<i>Potentilla simplex</i>	4	FACU-	Nt P-Forb	COMMON CINQUEFOIL
8	<i>Prenanthes racemosa</i>	-3	FACW	Nt P-Forb	GLAUCOUS WHITE LETTUCE
5	<i>Proserpinaca palustris</i>	-5	OBL	Nt P-Forb	MERMAID WEED
1	<i>Prunella vulgaris</i> v. <i>elongata</i>	0	FAC	Nt P-Forb	SELF-HEAL
3	<i>Prunus americana</i>	5	UPL	Nt Tree	AMERICAN PLUM
1	<i>Prunus serotina</i>	3	FACU	Nt Tree	WILD BLACK CHERRY
3	<i>Prunus virginiana</i>	1	FAC-	Nt Shrub	COMMON CHOKE CHERRY
6	<i>Pycnanthemum pilosum</i>	5	UPL	Nt P-Forb	HAIRY MOUNTAIN MINT
5	<i>Pycnanthemum virginianum</i>	-4	FACW+	Nt P-Forb	COMMON MOUNTAIN MINT
5	<i>Quercus macrocarpa</i>	1	FAC-	Nt Tree	BURR OAK
4	<i>Quercus palustris</i>	-3	FACW	Nt Tree	PIN OAK
5	<i>Quercus rubra</i>	3	FACU	Nt Tree	NORTHERN RED OAK
6	<i>Ranunculus flabellaris</i>	-5	OBL	Nt P-Forb	YELLOW WATER BUTTERCUP
6	<i>Ranunculus longirostris</i>	-5	OBL	Nt P-Forb	WHITE WATER CROWFOOT
3	<i>Ranunculus sceleratus</i>	-5	OBL	Nt A-Forb	CURSED CROWFOOT
4	<i>Ratibida pinnata</i>	5	UPL	Nt P-Forb	YELLOW CONEFLOWER
0	RHAMNUS CATHARTICA	3	FACU	Ad Shrub	COMMON BUCKTHORN

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
0	RHAMNUS FRANGULA	-1	FAC+	Ad Shrub	GLOSSY BUCKTHORN
3	Rhus copallina	5	UPL	Nt Shrub	DWARF SUMAC
1	Rhus glabra	5	UPL	Nt Shrub	SMOOTH SUMAC
5	Ribes americanum	-3	FACW	Nt Shrub	WILD BLACK CURRENT
4	Rorippa palustris v. fernaldiana	-5	OBL	Nt A-Forb	MARSH YELLOW CRESS
4	Rosa blanda	3	FACU	Nt Shrub	EARLY WILD ROSE
4	Rosa carolina	4	FACU-	Nt Shrub	PASTURE ROSE
0	ROSA MULTIFLORA	3	FACU	Ad Shrub	JAPANESE ROSE
5	Rosa setigera	2	FACU+	Nt Shrub	ILLINOIS ROSE
2	Rubus flagellaris	4	FACU-	Nt Shrub	COMMON DEWBERRY
2	Rubus occidentalis	3	FACU	Nt Shrub	BLACK RASPBERRY
6	Rubus strigosus	-2	FACW-	Nt P-Forb	RED RASPBERRY
2	Rudbeckia hirta	3	FACU	Nt P-Forb	BLACK-EYED SUSAN
0	RUMEX CRISPUS	-1	FAC+	Ad P-Forb	CURLY DOCK
4	Sagittaria latifolia	-5	OBL	Nt P-Forb	COMMON ARROWHEAD
0	SALIX ALBA	-3	FACW	Ad Tree	WHITE WILLOW
4	Salix discolor	-3	FACW	Nt Shrub	PUSSY WILLOW
1	Salix exigua	-5	OBL	Nt Shrub	SANDBAR WILLOW
0	SALIX FRAGILIS	-1	FAC+	Ad Tree	CRACK WILLOW
6	Salix petiolaris	-5	OBL	Nt Shrub	MEADOW WILLOW
0	SALIX X RUBENS	-4	FACW+	Ad Tree	HYBRID CRACK WILLOW
4	Sanicula canadensis	2	FACU+	Nt B-Forb	CANADIAN BLACK SNAKEROOT
5	Schizachyrium scoparium	4	FACU-	Nt P-Grass	LITTLE BLUESTEM
6	Scirpus acutus	-5	OBL	Nt P-Sedge	HEARD-STEMMED BULRUSH
4	Scirpus atrovirens	-5	OBL	Nt P-Sedge	DARK GREEN RUSH
5	Scirpus cyperinus	-5	OBL	Nt P-Sedge	WOOL GRASS
3	Scirpus fluviatilis	-5	OBL	Nt P-Sedge	RIVER BULRUSH
3	Scirpus pendulus	-5	OBL	Nt P-Sedge	RED BULRUSH
4	Scirpus tabernaemontanii	-5	OBL	Nt P-Sedge	GREAT BULRUSH
6	Scutellaria galericulata	-5	OBL	Nt P-Forb	MARSH SKULLCAP
4	Scutellaria lateriflora	-5	OBL	Nt P-Forb	MAD-DOG SKULLCAP
5	Scutellaria leonardii	3	FACU	Nt P-Forb	SMALL SKULLCAP
3	Senecio pauperculus	-1	FAC+	Nt P-Forb	BALSAM RAGWORT
5	Silphium integrifolium	5	UPL	Nt P-Forb	ROSIN WEED
4	Silphium terebinthinaceum	1	FAC-	Nt P-Forb	PRAIRIE DOCK
4	Sisyrinchium albidum	3	FACU	Nt P-Forb	COMMON BLUE-EYED GRASS
5	Sium suave	-5	OBL	Nt P-Forb	WATER PARSNIP
5	Smilacina stellata	1	FAC-	Nt P-Forb	STARRY FALSE SOLOMON SEAL
4	Smilax lasioneuron	5	UPL	Nt H-Vine	COMMON CARRION FLOWER
0	SOLANUM DULCAMARA	0	FAC	Ad W-Vine	BITTERSWEET NIGHTSHADE
1	Solidago canadensis	3	FACU	Nt P-Forb	CANADA GOLDENROD
3	Solidago gigantea	-3	FACW	Nt P-Forb	LATE GOLDENROD
4	Solidago juncea	5	UPL	Nt P-Forb	EARLY GOLDENROD
3	Solidago nemoralis	5	UPL	Nt P-Forb	OLD FIELD GOLDENROD
7	Solidago riddellii	-5	OBL	Nt P-Forb	RIDDELL'S GOLDENROD
4	Solidago rigida	4	FACU-	Nt P-Forb	RIGID GOLDENROD
0	SONCHUS OLERACEUS	3	FACU	Ad A-Forb	COMMON SOW THISTLE
4	Sorghastrum nutans	2	FACU+	Nt P-Grass	INDIAN GRASS
5	Sparganium eurycarpum	-5	OBL	Nt P-Forb	COMMON BUR REED

C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
4	<i>Spartina pectinata</i>	-4	FACW+	Nt P-Grass	PRAIRIE CORD GRASS
5	<i>Sphenopholis obtusata</i>	0	FAC	Nt P-Grass	PRAIRIE WEDGE GRASS
6	<i>Spiraea alba</i>	-4	FACW+	Nt Shrub	MEADOWSWEET
4	<i>Spiranthes cernua</i>	-2	FACW-	Nt P-Forb	NODDING LADIES' TRESSES
9	<i>Sporobolus heterolepis</i>	4	FACU-	Nt P-Grass	NORTHERN DROP SEED
5	<i>Stachys palustris</i>	-5	OBL	Nt P-Forb	WOUNDWORT
5	<i>Stachys tenuifolia v. hispida</i>	-5	OBL	Nt P-Forb	MARSH HEDGE NETTLE
0	STELLARIA MEDIA	3	FACU	Ad A-Forb	COMMON CHICKWEED
0	TARAXACUM OFFICINALE	3	FACU	Ad P-Forb	COMMON DANDELION
5	<i>Thalictrum dasycarpum</i>	-2	FACW-	Nt P-Forb	PURPLE MEADOW RUE
5	<i>Thalictrum revolutum</i>	0	FAC	Nt P-Forb	WAXY MEADOW RUE
7	<i>Thelypteris palustris v. pubescens</i>	-4	FACW+	Nt Fern	MARSH SHIELD FERN
3	<i>Tradescantia ohiensis</i>	2	FACU+	Nt P-Forb	COMMON SPIDERWORT
0	TRIFOLIUM HYBRIDUM	1	FAC-	Ad P-Forb	ALSIKE CLOVER
0	TRIFOLIUM PRATENSE	2	FACU+	Ad P-Forb	RED CLOVER
5	<i>Trillium recurvatum</i>	4	FACU-	Nt P-Forb	RED TRILLIUM
5	<i>Triosteum aurantiacum</i>	5	UPL	Nt P-Forb	EARLY HORSE GENTIAN
5	<i>Triosteum perfoliatum</i>	5	UPL	Nt P-Forb	LATE HORSE GENTIAN
0	TYPHA ANGUSTIFOLIA	-5	OBL	Ad P-Forb	NARROW-LEAVED CATTAIL
1	<i>Typha latifolia</i>	-5	OBL	Nt P-Forb	BROAD-LEAVED CATTAIL
5	<i>Ulmus americana</i>	-2	FACW-	Nt Tree	AMERICAN ELM
2	<i>Urtica dioica</i>	-1	FAC+	Nt P-Forb	TALL NETTLE
7	<i>Utricularia gibba</i>	-5	OBL	Nt P-Forb	HUMPED BLADDERWORT
6	<i>Utricularia vulgaris</i>	-5	OBL	Nt P-Forb	COMMOM BLADDERWORT
0	VALERIANA OFFICINALIS	-4	FACW+	Ad P-Forb	GARDEN HELIOTROPE
3	<i>Verbena hastata</i>	-4	FACW+	Nt P-Forb	BLUE VERVAIN
5	<i>Vernonia fasciculata</i>	-3	FACW	Nt P-Forb	COMMON IRONWEED
9	Veronica scutellata	-5	OBL	Nt P-Forb	MARSH SPEEDWELL
6	<i>Veronicastrum virginicum</i>	0	FAC	Nt P-Forb	CULVER'S ROOT
0	VIBURNUM LANTANA	5	UPL	Ad Shrub	WAYFARING TREE
4	<i>Viburnum lentago</i>	-1	FAC+	Nt Shrub	NANNYBERRY
0	VIBURNUM OPULUS	0	FAC	Ad Shrub	EUROPEAN HIGH-BUSH CRANBERRY
4	<i>Viburnum prunifolium</i>	3	FACU	Nt Shrub	BLACK HAW
6	<i>Viburnum recognitum</i>	-2	FACW-	Nt Shrub	SMOOTH ARROWWOOD
6	<i>Vicia americana</i>	5	UPL	Nt P-Forb	AMERICAN VETCH
2	<i>Viola affinis</i>	0	FAC	Nt P-Forb	WOODLAND BLUE VIOLET
9	<i>Viola pedatifida</i>	4	FACU-	Nt P-Forb	PRAIRIE VIOLET
3	<i>Viola sororia</i>	1	FAC-	Nt P-Forb	WOOLLY BLUE VIOLET
2	<i>Vitis riparia</i>	-2	FACW-	Nt W-Vine	RIVERBANK GRAPE
9	<i>Zizia aptera</i>	3	FACU	Nt P-Forb	HEART-LEAVED MEADOW PARSNIP
6	<i>Zizia aurea</i>	-1	FAC+	Nt P-Forb	GOLDEN ALEXANDERS

The Floristic Quality Index is derived from the formula:

r/n (vN), where:

r = sum of the coefficients of conservatism, n = number of recorded taxa, N = number of native taxa, CC = Coefficient of Conservatism, CW = Coefficient of Wetness, Ad = Adventive, Nt = Native, $Physiog$ = Physiognomy.