

# **Meadow Systems Planning: Analysis of Restoration Strategies at the Don Valley Brick Works Park**

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## **Foreword**

My Master of Environmental Studies (MES), Plan of Study (POS) guided my learning over the course of the program, where I took several courses based on my Area of Concentration (Urban Ecosystem and Habitat Creation Planning) and three Components: Ecology, Canadian and Ontario Biodiversity Policy and Ecosystem Planning. As a result, I have learned about the principles of environmental policy, and natural heritage planning, and what's more I have built upon my ecology background, garnering an understanding of urban ecology. My Major Research Project (MRP) is the culminating work of my MES, bridging the Components and Learning Objectives of my POS. It took an urban ecosystem, the Don Valley Brick Works Meadow, and considered management strategies which could maximize meadow diversity based on ecology and environmental planning principles. An understanding of the ecology of

meadows is necessary to correctly manage them and maximize biodiversity. As well, policy tools can strengthen these efforts and planning tools are required to implement and secure such goals. My MRP specifically used Learning Objective 1.3, 2.1, 2.2, and 3.2 in providing the bedrock for my research. Learning Objective 1.1, 1.2 and 3.3 was partially or fully fulfilled by completing my MRP, through research. Consequently this MRP contributes to the requirements of my MES and POS Learning Objectives.

## ***Introduction***

This Major Research Project will assess management alternatives for ecological restoration in the DVBW Meadow in Toronto, with response to the following questions: How can the Don Valley Brick Works Meadow management be improved in order to create a diverse meadow habitat? Does the infrequent mowing of the site, currently practiced, enhance its biodiversity? Would prescribed burns and/or grazing be more effective options? How can prescribed burns be implemented in this urban setting? Using an Ecological Land Classification (ELC) assessment of the meadow and evaluating options for prairie restoration including prescribed burning, prescribed grazing, and seeding, I will show ecological criteria suggest that a combination of these three management options will be the most successful in prairie restoration at the DVBW. Understanding the feasibility of implementing prescribed burns- the most contentious of meadow management options- was achieved through interviews. Two urban, southern Ontario sites, High Park and the Ojibway Prairie Complex have been conducting burns for over a decade; their experiences offer guidelines to implementing prescribed burns in an urban setting. This Major Research Project is a response to the goals of the City of Toronto, to improve the biodiversity of the DVBW Meadow and thus enhance the health and integrity of the DVBW Park ecosystem.

## ***About the Don Valley Brick Works***

### **Location**

The Don Valley Brick Works (DVBW) is a unique site within the City of Toronto, Ontario, Canada and a celebrated urban park. It is situated at the southern end of the Don River, which originates in the Oak Ridges Moraine and flows to Lake Ontario (See

Figure 1) (TRCA, 2014). The Park opened in 1997 (DCL, 2008) and is immediately surrounded by the residential community Rosedale to the West; Moore Park Ravine to the North; an old rail line to the East; and two major transit routes the Don Valley Parkway and Bayview Avenue to the East and South respectively (Figure 2). There are two distinctive features at the DVBW, the re-developed industrial pad (4.9 ha) and the restored park (11.5 ha) (Dogan & Associates, 2008). The industrial pad is maintained by Evergreen, an environmental living non-profit organization, leased from the Toronto Region Conservation Authority (TRCA). The northern and larger portion of the site is the DVBW Park, managed by the City of Toronto (Post, 2014).



Figure 1- DVBW (Shown here as “Evergreen Brick Works”) within the Greater Toronto Area (Canadian Geographic, 2014)

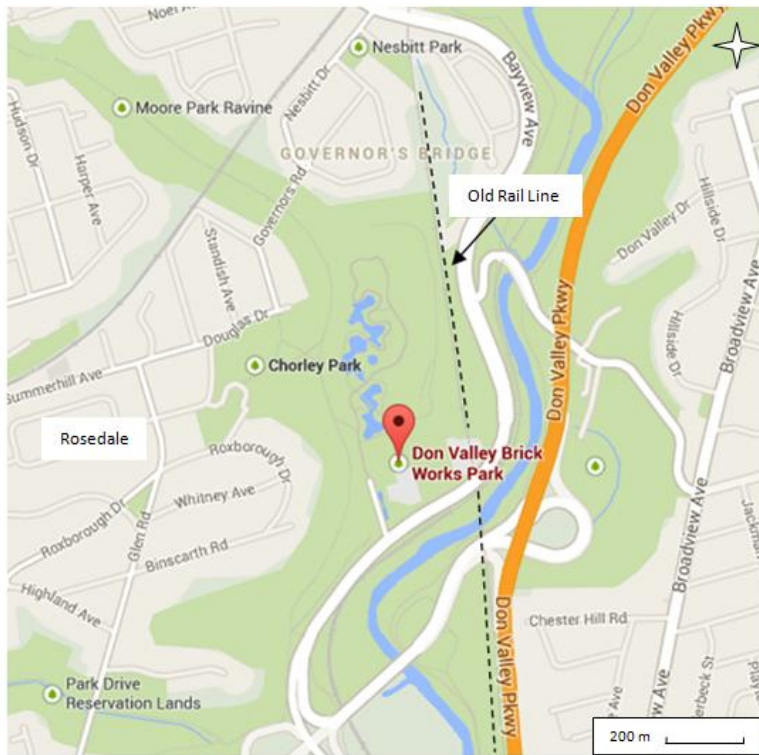


Figure 2- DVBW Park Surrounding Area (Google Maps, 2014)

## Social Importance

The DVBW Park is bordered by steep slopes and a cliff, rising up to 35m, a remnant of the quarry it once was (Côté, 2013). The effect is one of a more intimate space that feels tucked in and somewhat sheltered from the elements. It has four distinctive ecosystems: ponds, wetlands, forest and meadow, and a series of walking trails. The focus of this project is on the DVBW Meadow (0.6 ha) (DCL, 2008) as its restoration<sup>1</sup> success is currently in question. Currently the Park is managed to control invasive species and perform plantings as necessary. These activities are carried out by City of Toronto Natural Environment Crews, Natural Environment and Community Programs staff and volunteer groups like the Community Stewardship Program (Post,

<sup>1</sup> The use of the word 'restoration' in this report means to return an ecosystem to a natural state, which includes natural disturbances; a diverse array of flora and fauna; and re-established ecological integrity



2014). The Park has a diversity of uses including public trails for recreation; workshops run by the City; a destination for school trips; and an area to appreciate the natural environment. Furthermore, the area acts as an important migratory or colonization corridor for flora and fauna. The DVBW has a complex history and consequently involves many stakeholders (Appendix I). As a consequence the space and its management can be convoluted (Post, 2014). Yet this provides the DVBW with many helping hands and access to resources, such as the Weston Foundation, which donated 1 million dollars to aid in the Park's original restoration in the late 1990s (Côté, 2013).

### **About the Report**

This report will begin by describing meadows and prairies, including a brief description of this habitats' decline. The Background section will review the recent history of the DVBW, including its original restoration from a brick works and also the current management regime. From there the current ecological challenges at the DVBW Meadow are reviewed, as they are barriers to the site's full restoration. The Objectives section describes past and present goals for the DVBW Park and Meadow. Following this section the report outlines its research Methods and Results of an Ecological Land Classification assessment of the DVBW Meadow. Furthermore, the legal implications, following the discovery of species at risk will be reviewed. The Management Options section reviews current literature and available practitioner knowledge on prairie restoration practices: mowing, prescribed burns, prescribed grazers and seeding. In the Recommendation section the author will propose a management scheme for the DVBW Meadow based on the options described

previously. The feasibility of prescribed burns will be considered in the Feasibility section, using examples from High Park and the Ojibway Prairie Complex.

## ***Meadows and Prairies***

### **Prairie Definition**

Prairies are exceptionally biologically diverse ecosystems (Robertson, 2008) in southern Ontario (Rodger, 1998). The forbs found there offer floral displays for the entirety of the growing season, which makes them attractive to both pollinators (TRCA, n.d., USDA, n.d. and Packard and Mutel, 1997) and people. Within this paper the terms meadow and prairie will be synonymous, and academic sources focused on prairies will be applied to meadows. "Prairie" is the French word for "meadow" (Rodger, 1998), and French explorers supplied this name when they saw similarities between the old world meadows and those found in North America (Packard and Mutel, 1997). Prairies and meadows can be defined as containing a mix of herbaceous plants; grasses, sedges and forbs, and with less than 10 percent tree cover (Rodger, 1998 and Lee et al., 1998). *The Tallgrass Restoration Handbook* defines a prairie as a natural ecosystem maintained by fire (Packard and Mutel, 1997). Evidence supports an image of prairies which is not a static species assemblage, but in an ever transitional state, with relation to disturbance (Howe, 1994). The Ontario Ministry of Natural Resources' Ecological Land Classification makes some distinction between a prairie and a meadow. Meadows were created by and are maintained by anthropogenic and cultural activity (Lee et al., 1998). Consequently the DVBW Meadow is accurately named, as it contains grasses, sedges and forbs, but was not created by natural processes and is maintained with anthropogenic activity. Prairies can vary by the proportion of different herbaceous

plants: mixed-grass prairies occur naturally in Alberta and Saskatchewan, whereas tallgrass prairies are more common in southern Ontario. Furthermore Ontario prairies tend to have a higher percentage of forbs than tallgrass prairies in the United States (Rodger, 1998). At the DVBW a wildflower meadow was planted (HWNDLOW Architects, 2001), indicating the dominance of forb species it is intended to hold.

### **Importance of Prairie Ecosystems**

Prairies are one of the most threatened ecosystems in Canada. In Ontario, around 1% percent of European pre-settlement distribution still remains, in isolated areas (City of Toronto, n.d.). What's more, cultural meadows are largely deemed to be less valuable than forests and wetlands (DCL, 2008) and are often not the goal for conservation or restoration work. This habitat loss has meant that many prairie species are threatened, and listed as species at risk (Rodger, 1998 and Bowman, 2011). Yet, tallgrass prairies existed and developed for thousands of years before European settlement. The prairies of the central Canadian provinces were vast, whereas the tallgrass prairies in southern Ontario were at the limits of their range. Consequently this ecosystem is unique within Ontario, and holds genetic diversity of prairie species which is unique in North America (Packard and Mutel, 1997).

### ***History of the DVBW***

DVBW Park is intended to provide natural habitat for native species, with the purpose of providing recreation and inspiring Torontonians with positive experience in a natural environment (Blue Sky Design, 2011). Some regard it as an industrial heritage site which is a model of ecological restoration (The Planning Partnership, 2010). The DVBW

Park has an interesting history, briefly outlined below, which influences its physical features today.

The DVBW site was first put on a map by the Taylor family in 1889, (Côté, 2013) when it was bought and maintained as a brick works, extracting clay and shale to a maximum depth of 220 ft (See Figure 3) (Foster, 2005). The site was put up for sale in 1984 (Côté, 2013) and bought by developers, Torvalley, who had plans to build high density luxury condos. After Torvalley filled the quarry, due to local protest, the site was expropriated by the Toronto Region Conservation Authority (TRCA) in 1989 (Côté, 2013), in order to protect the unique ecological, geological and historical features of the site (Dougan & Associates, 2008). The North Slope, a feature created by the historic brick making activities, “represents one of the few accessible exposures of the York Till in North America and the only accessible exposure of the Toronto Interglacial beds that directly overlie the shales of the Georgian Bay Formation” (HWNDLOW Architects, 2001, pg. i). As a result of this unique slope, the DVBW has been designated as an Area of Natural Scientific Interest (ANSI) since 1983, and within Ontario is considered a Provincial Heritage Site (Côté, 2013).

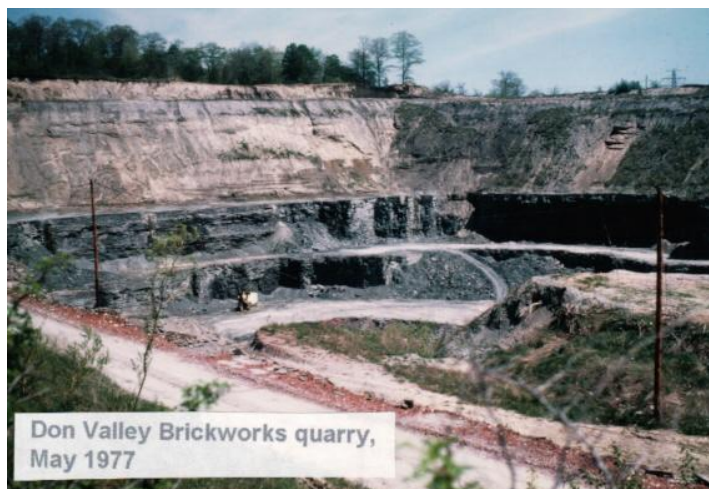


Figure 3- DVBW Quarry North Slope, 1977 (LRW, n.d.)

## **Brownfield Status**

At the time when the TRCA bought the DVBW it was considered a brownfield, which is a site that is contaminated or suspected to have contamination (NRTEE, 2003). A former Master of Environmental Studies student, Anna Côté (2013) investigated the known knowledge regarding the contamination at the Don Valley Brick Works. According to her findings, brick-making is considered a relatively clean industrial process, especially in the quarry section, where the DVBW Park is situated. Furthermore, the Ministry of the Environment required testing be performed on site, but focused on the industrial pad, not quarry. Although measures were taken to ensure existing contaminants did not pose a risk, details of such work are absent. Consequently what Côté's work makes clear is that there are real reasons to believe that contaminants persist at the DVBW Park, from the previous brick-making, fill for the quarry, or even the adjacent old rail line. Therefore, although some of Côté's interviewees believe that the DVBWs brownfield status is unwarranted because it is relatively clean, it certainly is not an unspoiled environment, definitively void of toxic hazards to flora and fauna. Testing should be updated, as it influences current restoration work, and also the health of visitors and wildlife.

## **Original Restoration**

Restoration work has been ongoing for the meadow and a review will provide guidance for future endeavors. By the mid-nineties restoration work was being planned by landscape architects (Côté, 2013) and the initial phase of restoration was in 1997 (HWNDLOW Architects, 2001). As restoration work did not begin until about a decade following the brick works closure, this meant that the site had begun to naturally

regenerate. It was decided that some areas, such as the western slope, would be protected not restored. This area included a stand of mature oak, maple and beech trees, rare to urban areas but representative of Toronto's natural heritage. On the other hand, the eastern slope was lacking much vegetation and presented erosion concerns, so Carolinian and hardwood species were planted (HSWL, 1990). Furthermore, much work took place regarding the hydrology of the site. Mud Creek, a tributary of the Don River, was day-lighted and redirected to flow from Moore Park Ravine to the western slope of the DVBW Park. Moreover a series of ponds and wetland habitat was established, to enhance the water quality (LRW, n.d.); protect the Northern Slope from erosion (DCL, 2008) and diversify the ecosystems on site. Lastly the DVBW Master Plan called for a wildflower meadow, to be just above the grade of the ponds, providing a view of the iconic North Slope (HWNDLOW Architects, 2001). Figure 4, an aerial image, shows the Park as it exists today with this restoration work completed.

### **Restoration Challenges**

Problems were encountered in the early stages of restoration. Despite a layer of top-soil added before plantings, it was evident that the soil was in a poor state, including its physical condition of being compacted. Furthermore, there were logistical concerns regarding maintenance and watering. These factors led to many failed plantings in the meadow and wetland (Côté, 2013 and HWNDLOW Architects, 2001). With time and natural regeneration, vegetation did take hold and presently many consider the restoration a success (Côté, 2013). This appears true considering the forested and wetland areas, but there are ongoing concerns regarding both the level of traffic within the DVBW and the state of the meadow (Post, 2014). There is a

projected increase in visitor levels, due to the presence of the recently built Evergreen facility and development in the city, however these levels were never intended to be accommodated by the DVBW Park. There are many negative impacts this will have on the Park including the creation of unofficial trails which will destroy habitat and disturb flora and fauna<sup>2</sup> (Blue Sky Design, 2011).



Figure 4- DVBW Park Post-Restoration (Dougan & Associates, 2008)

<sup>2</sup> By those who prioritize the ecological integrity of the DVBW Park, the creation of the Evergreen facility may one day be deemed poor planning

## **Current Management Scheme**

Presently the park is maintained by several groups. Invasive plants are monitored by volunteers and City of Toronto staff, and the City of Toronto Natural Environment Crew becomes involved when larger equipment or herbicides are needed. The Natural Environment and Community Programs Staff organize plantings of trees, shrubs and herbaceous species if necessary, and volunteers often carry out the plantings. The Community Stewardship Program, a volunteer based group, monitors the meadow throughout the growing season for invasive species and woody species encroachment and performs removals whenever possible (Post, 2014). Since its creation the meadow has been seeded and planted to augment the existing flora, but with only limited success (Côté, 2013 and HWNDLOW Architects, 2001). As of 2001 (DCL, 2008) the meadow has been mowed every 2-3 years, alternating between the east and west sides, and the cut grass litter is left where it falls (Post, 2014).

## **Existing Ecological Challenges**

There are three major ecological concerns at the DVBW Park meadow, which are described below: woody/invasive encroachment, poor flora diversity, and poor soil quality. These challenges need to be addressed in order to improve the biodiversity of the meadow and will be acknowledged throughout this report.

Presently, the most pressing concern at the DVBW Park meadow is the encroachment of woody species, particularly poplars. This was the primary reason why mowing was implemented (Post, 2014) as well as to slow the establishment of invasive flora and assist the native species (DCL, 2008). However, woody species are established adjacent to the meadow, and they have seeded the meadow over time, making their



encroachment more challenging. Invasive species are present at the DVBW Park, and have been a primary issue in the past. Dillon Consulting Limited evaluated the meadow in 2008, and found that non-native, invasive flora dominated, as 60% of total species present. However, presently, with ongoing work, this is not considered a significant threat to the biodiversity of the DVBW Meadow as invasive species are no longer as prevalent (Post, 2014).

The second challenge is the lack of flora diversity. The more northern portion of the meadow is quite moist and a community other than a wildflower meadow may be more successful. A sedge meadow, for example, may be more appropriate, with plantings of species more tolerant of wetter soils such as blue joint grass and prairie cord grass (Packard and Mutel, 1997). Overall the biodiversity of the site is considered low (Post, 2014). Seeding and planting of a diverse mix of prairie flora has been attempted on multiple occasions, and some rare native species are present. However, many native plants such as black-eyed susan and upland white aster have failed to establish. This is likely due to competition with invasive species and poor soil quality (DCL, 2008). The biodiversity of the site will likely only be improved with continued restoration, which includes the successful seeding of native species.

According to Packard and Mutel (1997) prairie soils are unique and distinctive due to their deep topsoil layer, 20-28 inches deep (50-71 cm). The author's soil tests found a very shallow topsoil layer, 3cm deep, and other indicators of poor soil quality, such as trash throughout the soil profile. The DVBW Park is composed of infill soil, and has limited soil development. The Meadow's soil requires restoration, especially because healthy soils are critical to prairie ecosystems. Due to the harsh conditions above ground, and frequent disturbances, the majority of prairie plants live underground and

prairies are considered a root-driven ecosystem (Packard and Mutel, 1997). The restoration of the DVBW Meadow needs to start from the soil up, as healthy biodiverse meadows are grounded on healthy organically rich soil (Packard and Mutel, 1997). Of course this is not to suggest that organic matter be added to the meadow, which may boost invasive or woody species. But investigation of other missing healthy soil components - such as mycorrhizal fungi and beneficial bacteria - may indicate what is thwarting the success of this meadow. Most importantly management schemes need to consider the health of the soil in order to improve the ecological diversity and health of the meadow.

## ***Objectives for the DVBW***

Past objectives have brought the DVBW from a brownfield quarry to City of Toronto Natural Heritage. The DVBW Meadow is an anthropogenic creation, resulting from two objectives, out of five, from the 1989 DVBW Master Plan. These objectives called to maintain the view and prominence of the North Slope and to provide a variety of habitats for native flora and fauna (HWNDLOW Architects, 2001), which has resulted in the creation of the meadow. This second objective subsequently called for the restoration of the DVBW Park, considering its brownfield status at purchase by the TRCA. In this manner the DVBW fulfilled various goals of Canada's National Brownfield Redevelopment Strategy (NRTEE, 2003) and focused growth to already built-up areas as directed in the Growth Plan (OMI, 2006). Moreover the rehabilitation was a ground-breaking example of environmentally significant brownfield restoration, recognized by the Aggregate Producers' Association of Ontario with a Bronze Plaque Award (Côté, 2013).

## **Present Objectives**

The DVBW Park uses an adaptive management strategy which maintains that the management regime is to be re-evaluated every six years. In 2008, Dillon Consulting Limited reviewed the management options- excluding prescribed grazers- which could take place at the DVBW Meadow and evaluated the current use of alternating mowing. They concluded that implementing prescribed burns should be considered and additional seeding/planting would be necessary to reduce the number of woody and invasive species and enhance the native flora. They found that mowing was not benefitting the meadow significantly (DCL, 2008). While recognizing the original goals of the DVBW Park, to maintain the meadow and view of the North Slope, the primary objective of *this* report is to enhance the biodiversity of the DVBW Meadow by evaluating the existing management strategies available for meadow systems.

## **Methods**

This section will describe how and where information was gathered for this report. This MRP was completed by performing several site visits; conducting an ecosystem analysis; researching meadow restoration schemes and interviewing four people (Cheryl Post, Beth McEwen, Jennifer Gibb and Karen Cedar) regarding their knowledge on meadow management.

### **Site Visits**

The author visited the DVBW site and Park on five occasions for varying lengths of time at different times of year (2013-2014), in order to view all seasons and changing park users. The surrounding area was also visited to become familiar with the Parks' neighbours and more frequent visitors.

## **City of Toronto Contact and Published Sources**

Sources on the history of the DVBW include reports for the City of Toronto such as the *Management Plan for the DVBW* (2001) written by HWNDLOW Architects, and other reports by DCL (2008), Dougan & Associates (2008) and Côté (2013). Moreover an interview with Cheryl Post, City of Toronto, Natural Environment Specialist, was conducted through email regarding current management of the DVBW Park, March 2014.

## **Legal Context for the present report**

The legal implications of the results in this report were determined by the *Species at Risk Act* (2013), the *Endangered Species Act* (2007), and Toronto's Official Plan (2010).

## **Sources on Prairie Restoration**

*The Tallgrass Restoration Handbook: for Prairies, Savannas and Woodlands* (Packard and Mutel, 1997) was the central source for practitioner based knowledge on general prairie restoration options. Research focused on the impacts of mowing to prairie flora was gathered from Wilson and Clark (2001), Nuckols et al. (2011), and Copeland et al. (2002).

## **Prescribed Burning in Prairie Management**

Research regarding the use of prescribed burns in prairie management used many sources, some key authors include Howe (1994), DiTomaso et al. (2006), Copeland et al. (2002) and the City of Toronto (n.d. and 2002). Guedo and Lamb (2013) highlight the impacts of prescribed burns to encroaching trembling aspen.

## **Grazers in Prairie Management**

Considering the use of grazers, Howe (1994), Collins (1987), Henrichs (1997) and Hickman et al. (2004) were important sources.

## **Public Perception of Prescribed Burns**

Studies by McCaffrey (n.d.) and Miller et al. (2002) were significant in evaluating the role of public attitudes towards prescribed burns in urban areas.

## **Evaluation of Similar Sites**

Evaluating the feasibility of prescribed burns at the DVBW Meadow was largely based on two other urban, southern Ontario sites which have been conducting prescribed burns for flora restoration purposes. Beth McEwen (City of Toronto, Urban Forest Renewal Manager) and Jennifer Gibb (City of Toronto, Natural Resource Specialist) were interviewed regarding the initiation and current use of prescribed burns at High Park. Karen Cedar (Education and Outreach Coordinator for the Ojibway Nature Centre) was interviewed regarding the use and history of prescribed burns at the Ojibway Prairie Complex. Both Beth McEwen and Karen Cedar's interviews were through telecommunication, May 2014 and lasted under half an hour. Jennifer Gibb was communicated with through several emails, March 2014. All interview subjects were informed of the details of this research report, and all consented to be identified.

## **Ecological Land Classification of the Meadow**

The author performed an Ecological Land Classification (ELC) assessment of the meadow in order to gather baseline data of the ecosystem. This information provided guidance for research, especially considering the current health and diversity of the ecosystem. Furthermore, this field work led to the discovery of a few species at risk, the

presence of which could lead to greater protection for the DVBW Park through policy. Ecological Land Classification is a widely used system for classifying ecological units, considering bedrock, climate, physiography, and vegetation (Government of Ontario, 2007 A). To begin, the author viewed an aerial map of the site (Figure 4) and chose three sites to gather a soil sample using an auger and performed field tests on the soil at each horizon. The vegetation was assessed as the author walked throughout the site, whenever a new species was encountered it was identified as close to the specie level as possible, and if this could not be performed in the field a sample or photograph was taken to identify later.

## **Results**

### **ELC Assessment of DVBW Meadow**

The DVBW Meadow was determined to be a Dry-Moist Old Field Meadow, under the ELC system (see Appendix II for complete reports). The soil below the meadow contains coarse fragments and is severely compacted, which prevented sampling below a depth over 45cm in two of the three samples. The effective soil texture is a very fine sand clay loam (vfSCL), not characteristic of the site pre-settlement, but a function of the quarry's fill. The very North end of the site is known to have a higher water table (Post, 2014). The DVBW Meadow was found to have 24 flora species present within it (see full list in Appendix III) and is bordered by other woody species, including large toothed aspen and manitoba maple. Common species found throughout the meadow include aster (new england and bushy), goldenrod (showy and tall), several species of grass (e.g. switchgrass) and chicory. Of the 24 species found eight are invasive, but only three – white clover, canadian thistle and crown vetch – are a real concern for park

management (Post, 2014). A few species found are of significance: common cinquefoil is a TRCA ranked Species of Conservation Concern (DCL, 2008) and showy goldenrod is listed as 'endangered' provincially and nationally (OMNR, 2014 B). While conducting the ELC assessment the author saw a monarch butterfly, red-tailed hawk, and a plethora of unidentified insects, dragonflies, moths, bees and flies.

## **Previous Ecological Assessments**

This ELC assessment is likely an incomplete assessment of the quality of the vegetation at the DVBW. Half the site had been recently mowed, as a part of the management scheme and as a consequence much of the vegetation onsite was not identifiable. In November 2008, Dillon Consulting Limited produced a document titled *Don Valley Brickworks Meadow Botanical Assessment, Toronto, Ontario* for the City of Toronto. In this they conducted an ELC assessment and Floristic Quality Assessment. They classified the site as a Dry-Moist Old Field Meadow which is consistent with the author's ELC assessment and identified 80 flora species, during the summer and fall of 2008 (Appendix IV). What's more, of the species present they calculated a mean Coefficient of Conservation<sup>3</sup> of 1.45; a Floristic Quality Assessment<sup>4</sup> (FQA) of 13; and 60% of these species were non-native species. Invasive species found by Dillon Consulting Limited (2008) but not by the author include birds-foot trefoil, cow vetch, purple loosestrife and dog-strangling vine. These species may still exist on site and likely are still a threat to the health of the DVBW Meadow. However, they also discovered species of

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<sup>3</sup> The Natural Heritage Information Centre provides Coefficients of Conservation (0-10) to indicate the probability that a species will be present in a remnant habitat. Eg. Manitoba maple can be found almost anywhere and has a C of 0. Species often only found on high quality habitat are given a C of 10 (DCL, 2008)

<sup>4</sup> The Floristic Quality Assessment presents the mean Coefficient of Conservation and species richness into a qualitative measurement, which can be used in monitoring. A FQA of 13 is low, but only gains significance in relation to other future assessments (DCL, 2008 and Packard and Mutel, 1997)

conservation concern as well. Side-oats gama and gray-headed coneflower are both ranked by the Natural Heritage Information Centre, designated as Imperiled in Ontario and Imperiled/Vulnerable in Ontario respectively. The TRCA has also ranked 7 flora Species of Conservation Concern found within the study site: big bluestem, canada wild rye, little bluestem, azure aster, virginia mountain mint, common cinquefoil and ninebark. According to Dillon Consulting Limited (2008) these species were introduced as part of the current restoration schemes. Although these assessments indicated that much restoration work remains to be done at the DVBW Meadow, when compared to the Natural Heritage Impact Study of 2007, it appears that some improvement has occurred. The Natural Heritage Impact Study performed in 2007 found that the ground cover was composed of non-native grasses and other weedy species (Dougan & Associates, 2008).

## **Legal Implications**

As a result of these findings and the location of the DVBW Park there are several legal considerations which need be recognize and could provide a basis for stronger conservation protection of the Park. The *Species at Risk Act* (2013) provides protection from harm or harassment for individuals of listed species. Furthermore, emergency orders can be given to protect a listed species facing imminent threats to survival or recovery. The monarch butterfly that was identified by the author at the DVBW Meadow is entitled to this protection as it is listed as a Species of Special Concern under the *Species at Risk Act* (2013). Species that are listed as threatened or endangered, however, receive even greater protection, having their critical habitat also safeguarded through regulation (Government of Canada, 2013 A). There are two



species that are known to exist in the DVBW Park which have this status. The author identified showy goldenrod in the meadow, which is listed as Endangered in the *Species at Risk Act* (2013) and the *Ontario Endangered Species Act* (2007). Additionally, the barn swallow was identified by the TRCA in 2009 at the DVBW Park, and recorded as successfully nesting on site (TRCA, 2009). The barn swallow is listed as Threatened under the *Ontario Endangered Species Act* (2007). Provincially the barn swallow has had its General Habitat Description published and protected, as its nesting sites are likely to be interfered with by human activity. The *Endangered Species Act*, 2007, describes the actions which must be followed after someone has received a permit to disturb a barn swallow nest, which includes mitigation and the creation of new nest sites and habitat. In this way the *Species at Risk Act* (2013) and *Endangered Species Act* (2007) protects the DVBW Park through these threatened species.

## **Planning Policies**

The Provincial Policy Statement (2014) directs local government planning and values, with authority from the *Planning Act*, 2011. It includes strong protective language regarding natural heritage systems and biodiversity. As a result, the City of Toronto also has protective policy for the DVBW Park, as a piece of the City of Toronto's Natural Heritage System (Dougan & Associates, 2008), set out in the Official Plan (2010). The Natural Heritage Policies there support biodiversity and restoration in Toronto (City of Toronto, 2010, No. 1 b). Furthermore, Official Plan Natural Heritage Policy No. 13 outlines a four pronged criteria for Environmentally Sensitive Areas (ESAs) which includes habitat for threatened species, and rare landforms. The DVBW Park is considered an ESA due to its unique landform (Mainguy et al., 2012). Development is largely limited

within or adjacent to such an area and, when it is permitted, an Environmental Assessment must first be performed (City of Toronto, 2010 and Dougan & Associates, 2008). Furthermore, the City of Toronto Ravine Protection By-law provides a minor protective layer over the DVBW Park, as the entire site is within a ravine protection area. This means that a permit is required for any work which may alter the grade of the land or may injure a tree. Lastly, the property was designated under the Ontario Heritage Act in 2002 (Dougan & Associates, 2008), providing more protection against any development. The DVBW Park clearly has many layers of protection for species, landforms and its natural heritage, which is critical to realizing long term restoration objectives.

## ***Restoration Management Options***

When considering the restoration and management of prairies, many options are available: mowing, seeding, prescribed burns, and prescribed grazing. These options aim to reintroduce historic species diversity and disturbances which prairie species are adapted to. Each management option listed above will be reviewed here, in regards to promoting maximum prairie flora diversity. The consideration of one option does not exclude the implementation of another. Furthermore, the following sections do not review past errors in management, except to suggest options best able to achieve the goal of maximum biodiversity.

Prairie restoration knowledge is largely based on practitioner based experiments, with relatively little hard science (Packard and Mutel, 1997). As a result the management options considered below are based on academic sources as well as practitioner knowledge and trials. Particularly the *Tallgrass Prairie Restoration Handbook*

is a very useful resource for prairie restoration and is written by practitioners for practitioners (Packard and Mutel, 1997).

## **No Management**

This management option is not feasible, as the climax community for the entire DVBW Park is a riverine wetland and floodplain, not a meadow. Objectives of the original DVBW 1989 master plan and current funding parameters (Post, 2014) require that the meadow exist within the park, in order to diversify habitats and view the iconic North Slope (HWNDLOW Architects, 2001). What's more even naturally occurring prairies undergoing restorations must be managed in order to control and implement the use of prescribed burns and grazers (Howe, 1993). Consequently the DVBW Meadow must be managed.

## **Mowing**

The use of mowing- a mechanical action which cuts a portion of above ground vegetation- in prairie restoration and management has been shown to be detrimental to prairie species, although in some trials remains a reasonable option when prescribed burns are not feasible. At the DVBW Meadow, mowing has been conducted every 2-3 years, alternating between east and west sides since 2001 (DCL, 2008 and Post, 2014). The principle objective is to prevent the encroachment of woody species (Post, 2014). In this way it is replicating some of the effects of fire and grazing, eliminating above ground vegetation. Yet the mowed litter is left on the ground at the DVBW Meadow, whereas it would have been completely cleared with a burn or consumed by grazers. This mowing activity was not conducted as a trial and the site is not isolated, - therefore no direct conclusions can be presupposed- yet since that time the biodiversity of the

flora has not improved, and the encroachment of woody species is still an ongoing concern (Post, 2014). Therefore it does not appear that mowing, as a primary management option, is significantly benefitting the flora biodiversity of the DVBW Meadow.

Mowing can be particularly harmful to flora when litter is left on site after being cut, because it can inhibit the early growth of prairie plants, as light cannot easily warm the ground surface (Copeland et al., 2002). Moreover, prairie species have not evolved with mowing and it can result in the loss of some species, which are sensitive to thick layers of litter and the microclimatic and physical changes that result (Packard and Mutel, 1997). In fact Nuckols and his colleagues (2011) performed a study on a wet prairie in Oregon to compare prairie species responses to prescribed burns versus mowing. They found that while both demonstrated some short term positive effects, burns benefitted more species. That said, in some areas fires are not permitted or are challenging to implement and in these cases mowing can be used to maintain a prairie, but the remaining litter must be raked away, allowing the soil to warm, one of the functions of a burn (Packard and Mutel, 1997).

#### *Positive Results of Mowings*

In some cases, it has been found that mowing can have beneficial effects for forb species over time, with mowing as frequent as once per week for the first two years of treatment (Williams et al., 2007). Wilson and Clark (2001) found similar results, with varied timing and height, mowing reduced invasive species and increased the presence of native species. Specifically they found that a mow height of 15cm, twice a year during late spring/early summer promoted native species the most. They also

discovered that the removal of litter allowed for greater seedling establishment, but was mostly invasive at the study site (Wilson and Clark, 2001). These mowing intervals are much shorter than what is currently practiced at the DVBW Meadow. Prescribed mowing can be detrimental to some species but is useful when burns are not a feasible option (Packard and Mutel, 1997). Therefore, if mowing should continue at the DVBW Meadow, the use of a shorter mowing interval and removal of litter may be more effective at increasing flora diversity.

### **Prescribed Burns**

Prescribed burns are deliberately set fires which are intended to achieve an environmental management objective. Designed to imitate historic fires, prescribed burns are low burning, (City of Toronto, n.d.), but vary in speed and temperature dependant on the objective (DiTomaso et al., 2006). Lightning fires naturally started fires and maintained prairies before human settlement (City of Toronto, 2002). Native Americans historically set fires in the fall (Packard and Mutel, 1997) in order to clear land for agriculture and hunting (City of Toronto, 2002). Presently, prescribed burns are a widespread management tool for prairies, savannahs and woodlands (Copeland et al., 2002).

### *Benefits of fire*

The use of prescribed burns in prairie management is not a point of debate amongst prairie restorationists (Packard and Mutel, 1997). Numerous studies have demonstrated the beneficial effects of fire to prairie flora (Packard and Mutel, 1997, Howe, 1994 and Copeland et al., 2002) and several will be reviewed here.

Fire enhances the vigor of prairie species, with the year of the burn likely to be followed by healthier prairie plants, and greater seed production. This is caused in part by the removal of the litter layer, which allows the soil to warm faster in the spring, lengthening the growing season by up to four weeks (Packard and Mutel, 1997). Prescribed burns can also increase prairie flora's photosynthetic rate during the growing season (Copeland et al., 2002). Fire does not kill prairie species as they have evolved with buds just below the soil surface, which are not damaged, and have extensive root systems (Packard and Mutel, 1997).

Considering prairie soils, fire has both positive and negative effects. The majority of nitrogen in prairie systems is within the plants themselves, especially grasses (Packard and Mutel, 1997). Burning the prairie will release nitrogen, and creates a nitrogen limited system (Johnson and Matchett, 2001). However, this can be regained with legumes and also free-living nitrogen fixing bacteria which live in the root zone of prairie systems (Packard and Mutel, 1997). Additionally, prescribed burns have been shown to be components of healthy prairie soil management by improving the mycorrhizal fungi community in soils as microbial activity in the soil can be stimulated with fire (Packard and Mutel, 1997), below 100 degrees Celsius (DiTomaso et al., 2006). Lastly some nutrients are available for prairie flora from ash, within a short time frame (Packard and Mutel, 1997).

#### *Prescribed Burns and Invasive/Woody Species*

One of the challenges at the DVBW Meadow is the presence of invasive and woody species, the following section will discuss the ability of prescribed burns to reduce the presence of these two groups. Implementation of prescribed burns often

eliminates most invasive flora and specifically has been shown to reduce the competitiveness of Canada and Kentucky bluegrass, dandelion, and red and white clover (Packard and Mutel, 1997). Depending on the timing of the burn, the effective growing season of invasive species can be reduced, and fire also increases the competitive edge of prairie species by increasing water stress (Packard and Mutel, 1997). DiTomaso and his colleagues (2006) reviewed current literature on the use of prescribed burns to control invasive species. They found that burns had been used as a tool to control "invasive late-season annual broadleaf and grass species, particularly yellow starthistle, medusahead, barb goatgrass, and several bromes" (DiTomaso et al., 2006, pg. 535). What's more DiTomaso et al. (2006) provides successful examples of the use of prescribed burns in the reduction of garlic mustard, smooth brome and Canada thistle populations, the latter two are present at the DVBW Meadow.

Fire also works to control woody species encroachment, thus maintaining the prairie. Pines and cedars are often killed by fire, whereas several deciduous species are capable of resprouting (Packard and Mutel, 1997). Furthermore, fire stimulates prairie plants, which can grow to have a thick and vigorous sod layer, reducing the establishment of woody seedlings. However, in situations where encroaching woody species are resprouting post-burn, results are not as positive. Quinlan and her colleagues (2003) investigated the effects of prescribed burns on encroaching willows in a sedge-grass meadow in the Northwest Territories. After comparing the following treatments over six years: no burn, burn once, and burn three times, they concluded that burning only had minimal effects on reducing willow vigor and survival remained high at 76%. Guedo and Lamb (2013) investigated the effects of prescribed burns to encroaching trembling aspen, with varying frequency and season of burn, in a

Saskatchewan grassland. They found that none of their treatments had any effect on the trembling aspen and suggest that this “may be due to important missing interactions between fire and grazing” (Guedo and Lamb, 2013, pg. 50).

### *Prescribed Burn Frequency*

The frequency and timing of a prescribed burn can have significant effects on the flora species in the prairie. *The Tallgrass Restoration Handbook* provides some general guidelines for burn frequency. Burning should take place once there is enough leaf litter to fuel a burn, on a mesic<sup>5</sup> site, this can take one to three years. However for new restorations; those invaded by woody/invasive species; or degraded sites, annual burning is the norm until the prairie has improved (Packard and Mutel, 1997). It is important to monitor the effects of annual burns as it favours grasses over forbs and can promote an artificial dominance structure (Packard and Mutel, 1997 and Howe, 1994).

### *Prescribed Burn Season*

The timing of prescribed burns- which season to burn- is currently debated (Packard and Mutel, 1997). Varying the timing of burns influences the competitive abilities of prairie flora, as the degree of damage to flora varies dependant on the timing of their developmental stages (Copeland et al., 2002). Most current prairie managers burn in the so call 'dormant season', such as the spring and fall. The justification for this, according to Packard and Mutel (1997), is that in the spring and fall invasive C3 plants are active and native C4 plants are dormant, so a burn will be a detriment to the invasive species and enhance the growth of the natives. However, this assumption does not hold true for many North American prairies, for example in the

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<sup>5</sup> Well balanced soil, neither wet nor dry (Packard and Mutel, 1997)



northern parts of the great plains, native C3 grasses dominate, and regular spring or fall burns would not be beneficial (Packard and Mutel, 1997). Furthermore, with such practices early flowering forbs may annually lose all their vegetative investment (stems, leaves, flowers, seeds etc.), and are left unable to take advantage of the improved growing conditions following the burn. What's more their competition- warm season species- are able to have a successful growing season and produce seeds (Copeland et al., 2002). Consequently by burning at the same time each year certain species are favoured, creating an artificial dominance structure and putting the survival of other species at risk. For example, regular spring burning favours tall grasses over forbs, both late-flowering and early-flowering species (Packard and Mutel, 1997).

According to Copeland et al. (2002) and Howe (1994) dormant season burns are often set for anthropogenic reasons such as convenience; aesthetics; a predilection for grasses; to mimic Native American practices; or to recreate pre-settlement prairies. Howe (1994) states that prairie restoration practices currently use fire itself as a treatment rather than fire season. Doing this places the long term biodiversity of the prairie ecosystem at risk. Fire season is known to influence forb and grass reproductive activity, seedling recruitment and cover (Howe, 1994). Therefore, it is important to understand the native prairie flora developmental cycles and burn at various times of year, in order to not damage the same species with every burn, and promote greater species diversity (Packard and Mutel, 1997).

#### *Summer and Late Winter Prescribed Burns*

Summer and late winter burns are often not considered a real option by prescribed burn managers, but should be implemented. Before human settlement of

North America – including native Americans- fires were ignited by lightning, which would have occurred in the summer and rarely in the dormant season (Howe, 1994). Copeland and her colleagues (2002, pg. 315) demonstrated through their study that “practices that suppress dominants increase diversity through competitive release of subdominants”. They found that summer burns resulted in a twofold increase in the frequency and richness of subdominant species. They monitored dominant warm season grasses and found that while their competitive intensity was reduced by summer burns, there were no lasting negative effects on these species (Copeland et al., 2002). Moreover, some evidence suggests controlled burns set at these times can have significantly negative impacts on woody invading flora.

At the University of Wisconsin, Madison Arboretum, quaking aspen was encroaching onto the prairie. Following a summer burn, the prairie flora resprouted, yet the aspen did not resprout later that season or even the next (Packard and Mutel, 1997). Prairie species have been shown to have adapted with shortened life cycles when burned in the summer. A study by Roger Anderson in Illinois, showed that following a summer burn, 84% of the ground was covered with vegetation by the end of the growing season (Packard and Mutel, 1997). Summer burns do shorten the growing season of cool-season natives such as porcupine grass, june grass and canada wild rye (Packard and Mutel, 1997), however this is not likely to be detrimental in the long term, by alternating the prescribed burn season.

#### *Prescribed Burns and Fauna*

Prescribed burns are not intended to threaten fauna communities and most populations are able to leave a burning area with low mortality (Packard and Mutel,

1997). However there is concern from entomologists that prescribed burns are not compatible with insect and small invertebrate conservation. For this reason entire sites should not be burned at one time. Many ecologists “recommend leaving half to two-thirds of large remnant prairies unburned each year so the insects can reinvade the burned portion” (Packard and Mutel, 1997, pg 226). Panzer (2002) studied the effects of prescribed burns to several insect taxa and found that post-burn influences varied, but 40% of the species investigated had a negative response. However, within a year 68% of negatively affected species had recovered. While other studies have varying conclusions (Pryke and Samways, 2012 and Vogel et al., 2007)) and some find that burning can eliminate rare insect populations (Swengel and Swengel, 2001), prescribed burns<sup>6</sup> are considered an overall positive influence on insect diversity and populations. The benefits of burning to plant communities need to be balanced with those of insect communities (Packard and Mutel, 1997). This is especially true due to the symbiotic relationship flowering plants and insects have, where both groups rely on the other for survival and successful reproduction.

### **Prescribed Grazing**

Prescribed grazing is the deliberate placement and movement of a low density herd of grazing animals, which is used to achieve an environmentally based objective. The period of time which saw the North American prairies evolve, the past 30 million years, included over 20 large ungulate genera, many of which grazed on the existing flora. There were a variety of horses, rhinos, camels, mastodons, mammoths, antelope, deer and bison, with historic densities averaging 20-30 ungulates/km<sup>2</sup>. During the last ice age, many of these genera went extinct, with only bison, antelope and deer families

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<sup>6</sup> Where a site is broken into units and burned at different times

surviving (Howe, 1994). Roaming herds of bison were dominant in the period following the last ice age (Henrichs, 1997 and Kohl et al., 2013). Presently literature focused on grazing in regards to prairie management focuses on bison, cattle, horses, sheep and goats. Consequently, when considering grazers as a component of meadow management, only these animals will be considered.

### *Prescribed Grazing and Biodiversity*

A review of literature regarding prescribed grazing influence to prairie flora biodiversity largely shows a positive correlation. This review includes incidents of overgrazing, which can be environmentally harmful and reduce biodiversity (Howe, 1994 and Willms et al., 1990). Overgrazing is likely to occur when a land owner is using their prairie as a food source for their herds and animal densities are high, not when prairie management implements prescribed grazing, and additional animals and longer grazing times can be costly.

Collins (1987) conducted an experiment with four treatments to a tallgrass prairie in El Reno, Oklahoma, using cattle: ungrazed/unburned, ungrazed/burned, grazed/unburned and grazed/burned. The conclusion was that the greatest disturbance, the burned/grazed treatment, increased species richness. Collins (1987) writes that fire and grazing disturbances target different species groups, which allows less dominant groups such as forbs to compete with more dominant grasses. Vinton et al. (1993) conducted a similar study at the Konza Prairie Research Natural Area, Kansas, where a fire regime of 2, 4 and 20 year intervals was implemented and bison were free to graze across the 469 ha area. They found that bison selected dominant grasses over forbs, increasing species diversity (Henrichs, 1997). The balancing effect of grazers on

dominant species, thereby increasing species diversity was also documented by Edwards (1976) and Collins and Smith (2006). What's more Edwards (1976) found that bison were able to prevent the woody encroachment of ponderosa pines, maintaining the prairie, whereas cattle did not prevent this (Henrichs, 1997).

Karen Hickman and her colleagues (2004) performed a study to investigate the impacts of cattle grazing on tallgrass prairie plant community composition and diversity, in Eastern Kansas. Over 6 years they used 3 grazing densities, both season long (May-October) and late season, and compared the community compositions to an ungrazed control site. They found that the native plant species diversity, species richness and growth form diversity all increased when grazed compared to ungrazed, with the best result at the highest stocking density. However, Gillen and his colleagues (1991) found through a similar study that the prairie plant community was not significantly influenced by grazing schedule and stocking rate. All the above studies incorporated fire into their treatments, however when fire is not used in conjunction with grazing treatments, findings vary.

Rebollo and his colleagues (2013) investigated the impacts of herbivores to grassland plant diversity in Northeastern Colorado. They found no significant impact to biodiversity despite using a variety of herbivores. Interestingly they investigated the impact of small folivores (rabbits) and other granivore rodents to grassland flora and found they had a disproportionately large influence on the plant community. Willms and his colleagues (1990) investigated the impact of heavy stocking rates of cattle on prairie community composition. They determined that in the long-term higher stocking rates – minimum of 1.65 animal unit months/ha for 6 months- would be detrimental to prairie flora species. This study can be used to understand what should be considered

overgrazing. The discrepancy seen between these two studies and those mentioned earlier may be due to the absence of fire.

### *Benefits of Grazers*

Grazing animal manures are a widely excepted beneficial soil additive (Seymour, 2008 and Zhu et al., 2012), adding organic matter, microfauna, Phosphorous, Potassium, Calcium, Magnesium (Edmeades, 2003), Nitrogen, Sulfur, Copper, Manganese, Zinc, Boron and Iron (Government of Saskatchewan, 2013). These nutrients are important to plant health and necessary for plant growth (Barak, 1999). The DVBW Meadow has poor soil quality and limited success of native plantings may be due to a lack of nutrients or organic matter in the soil, therefore grazers can indirectly aid flora biodiversity. Furthermore, as prescribed burns are also being considered in this management plan, it is important to recognize that fire can have negative effects on soil health, largely because of the Nitrogen lost in combustion. Grazing on the other hand increases Nitrogen cycling and availability, through urine and manure (Johnson and Matchett, 2001), which is particularly important as Nitrogen is a macronutrient for plants (Barak, 1999).

Grazers disturb the soil, bison being the most extreme case, as they create disturbances by wallowing, trampling, defecating, urinating and rubbing. These disturbed areas allow for the establishment of native pioneer species, and in this way increases species diversity (Packard and Mutel, 1997). For example Cosyns et al. (2006) found that dicotylous species primarily grow in these disturbed sites, and are also less dominant overall. Thus this disturbance may be important to their sustained presence in a prairie ecosystem.

Grazers have been shown to be effective control agents for weeds and invasive species (Popay and Field, 1996), and by focusing their herbivory on these species can reduce the competitive edge that invasive plants often have. Furthermore, the use of grazers to control unwanted flora can eliminate the need for herbicides, which can be detrimental to adjacent flora and fauna, especially insects. Grazing animals vary in their forage preferences, the table below outlines their documented preferences.

Consequently the use of all grazing animals is ideal, in order to diversify the targeted invasive flora (Popay and Field, 1996). However, this may not always be possible, and managers may need to choose a grazer.

The choice of grazer, for restoration purposes, will be dependent on the size of the site, the physical effect of each grazer and the forage species they favour. Bison require at least 100 acres to roam (Henrichs, 1997) and will likely not be suitable for urban areas. Larger animals like cattle, bison and horses cause increased soil compaction (Svedarsky et al., 2002) and also disturbed pockets of bare soil (Popay and Field, 1996 and Packard and Mutel, 1997). These factors can increase species diversity (Packard and Mutel, 1997), but at a site like the DVBW Meadow, with existing compacted soil, this may not be an ideal choice. In the United States there are a growing number of sheep and goat rental companies, and government agencies, municipalities and private land owners which purchase their targeted grazing services. Goats and sheep have a wider vegetation herbivory tolerance (Melancon, 2014) and goats can be trained to target invasive species (Hart, 2000). The trend is growing and a farm near Guelph, Ontario (All Sorts Acres) recently launched a sheep rental business to manage grass, weeds and invasive species (Guelph Mercury, 2012). Utilizing these

smaller grazers, with a broad diet may be an option for woody and invasive species management at the DVBW Meadow.

Table 1: Grazers and Invasive Flora

Grazer	Targeted weed/invasive flora	Avoided weed/invasive flora
Sheep	Leafy spurge, gorse seedlings, blackberry, hare/wall barley, larkspur, <i>Juncus</i> spp., tansy ragwort, canadian/bull thistle (Popay and Field, 1996), spotted knapweed (Chapman and Reid, 2004), kudzu, wild parsnip, garlic mustard, spotted knapweed, white/yellow clover, tansy, reed canary grass (WDNR, 2012)	Bracken (Popay and Field, 1996)
Goat	Multiflora rose, wild grape, bittersweet, Japanese barberry (Kleppel et al., 2010), locust, sumac, willow, mulberry, autumn olive, chicory, red/white clover, ragweed, lambs quarter, crown vetch, oak, walnut, sericea lespedeza, burdock, queen anne's lace, garlic mustard (USDA, 2013), leafy spurge, serrated tussock, galvanized burr, white horehound, <i>Juncus</i> spp., spiny brush weeds (blackberry), sweet brier, matagouri, thistles, poison ivy, poison oak, poison sumac, hare/wall barley (Popay and Field, 1996), kudzu, tansy, spotted knapweed, reed canary grass, knotweed, common buckthorn, honeysuckle, russian olive (WDNR, 2012)	Clover (Popay and Field, 1996), grasses (USDA, 2013)
Cattle	Blackberry, bracken, yellow star thistle (Popay and Field, 1996), knotweed, kudzu, wild parsnip (WDNR, 2012), grasses (Svedarsky et al., 2002)	Buttercups, Gorse (Popay and Field, 1996), milkweed (Svedarsky et al., 2002)
Horses	Blackberry (Popay and Field, 1996)	
Bison	Grasses (Svedarsky et al., 2002)	Forbs (Svedarsky et al., 2002)

Where prescribed burns may not be feasible due to a site's size, public concerns or legal consideration, grazers can present an alternative. Furthermore, in areas which currently practice prescribed burns with limited success, the incorporation of grazers may improve results.



## Seeding

The real question about restoring prairies, according to *The Tallgrass Restoration Handbook* (Packard and Mutel, 1997), is whether it needs to be seeded or not.

Nevertheless, where sites are seriously degraded seeding is important to successful restoration. The DVBW Meadow currently has low flora diversity (Post, 2014) which makes it a good candidate for additional seeding. Reseeding is needed in heavily degraded areas where the native seed bank is lacking or absent and can take several years (Packard and Mutel, 1997).

Meadows are composed of part grasses, sedges and forbs, consequently it is often recommended that planting should be equal parts by weight grass/sedge seed and forb seed. Less grass seed will result in a showier display of wildflowers (forbs), which would be good for the DVBW Meadow as it is a site trafficked by the public. Wildflowers can enhance the beauty and interest in prairies, which can augment messages about this endangered habitat (Packard and Mutel, 1997). There is a bias towards late-flowering C4 grasses and forbs in prairie restoration. Furthermore, much restoration is focused on grasses, and the 'tallgrass prairie' is classified by a few dominant grasses (Howe, 1994). Furthermore, until the mid 1980s native prairie restoration plantings included few forbs if any, because they were not commercially available (Williams et al., 2007). This may be due to the preference of grasses by livestock (Howe, 1994), but in fact grasses make up a small proportion of prairie diversity, with grasses, sedges and rushes only comprising one quarter of species diversity (Packard and Mutel, 1997). Perennial forbs make up between 52-82% of prairie diversity (Howe, 1994 and Packard and Mutel, 1997). Restoration for forbs at the DVBW Meadow could actually result in a much more diverse prairie.

## Adapted Seeding

Adapted seeding can target the challenges at the DVBW Meadow. A plant list in Appendix V, from *The Tallgrass Restoration Handbook* should be referenced and includes those species adapted for wet sites (CW -2 to -5). This is particularly important for the northern half of the DVBW Meadow, as the site has a high water table and poses a challenge to standard, mesic prairie plantings (Post, 2014). In order to address poor soil quality, more legumes can be planted to add nitrogen to the soil (Packard and Mutel, 1997). *The Tallgrass Restoration Handbook* recommends avoiding species with a low Coefficient of Conservation<sup>7</sup>, such as tall goldenrod and briars, which can take over after burns and out-compete more conservative<sup>8</sup> species (Packard and Mutel, 1997). Similarly, aggressive tall grasses should not be planted in high numbers relative to forbs, but will likely have more success than short grasses. Forbs are not aggressive, so strong invasive species management may be necessary for a wildflower meadow (Packard and Mutel, 1997).

Seeding presents an opportunity to encourage particular insect species to inhabit the site. For example, monarch butterflies- a listed Species at Risk- can be targeted by seeding or transplanting its obligate host plant, common milkweed (*Asclepias syriaca*). Moreover a great diversity of plant species can be planned for, which include active and blooming forbs throughout the growing season (Packard and Mutel, 1997), thus providing high quality habitat for insects. Packard and Mutel (1997) identify two flora groups that require greater attention than restorationists often provide.

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<sup>7</sup> The Natural Heritage Information Centre provides Coefficients of Conservation (0-10) to indicate the probability that a species will be present in a remnant habitat. Eg. Manitoba Maple can be found almost anywhere and has a C of 0. Species often only found on high quality habitat are given a C of 10 (DCL, 2008)

<sup>8</sup> Conservative refers to a species with a high Coefficient of Conservation

Sedges and prairie/bird's foot violets are important food sources for skippers and fritillaries respectively. Seeding with a diverse and appropriate seed mix is critical to increasing the biodiversity of the DVBW meadow. However success seeding may be difficult, considering the failed seeding in the past, without recognizing the challenges facing the site, especially the poor soil quality.

### ***Recommendation: Combining Prescribed Burns, Grazing and Seeding***

According to Henry Howe (1994) the conditions which existed throughout the development and evolution of prairies, a period of 30 million years, would logically produce the greatest biodiversity today. This includes a combination of management options, which has been found to be superior to just one (Packard and Mutel, 1997) Therefore, based on academic findings outlined in the Restoration Management Options section, it is recommended that variable season prescribed burns, small ungulate grazing, and seeding take place in the DVBW Meadow. Variable season prescribed burns includes burning throughout the growing season, including summer, as to not provide tall grasses- which are naturally more aggressive- a competitive advantage. Prescribed burns should initially take place annually, but alternate sections of the meadow. Small ungulate grazing (goats/sheep) should target invasive and woody species. Seeding mixes should accurately represent the species diversity of prairies, which has a high proportion of forbs, with more wet tolerant species in the north end of the meadow.

Howe (1994) writes that currently much prairie management is based on pre-settlement communities, already shaped by anthropogenic influences, such as depleted ungulate populations. Prairie management should not work to re-create a

specific community structure, but a diverse range of species and disturbances which have been shown to be present during the evolutionary history of the prairie ecosystem in North America. Furthermore prescribed burn timing is currently ruled by anthropogenic preferences for dormant season burns, not historic patterns, which in fact may threaten flora and fauna diversity. Grazer exclusion is also a common practice. Yet this also threatens prairie species, favouring grasses which are often targeted by grazers, and therefore have a competitive edge when they are absent (Howe, 1994). However, this report is not intended to evaluate current or historical prairie management methods, but to suggest the best management scheme aimed at maximizing flora diversity at the DVBW Meadow.

## **Monitoring**

An additional recommendation is to perform regular Floristic Quality Assessments<sup>9</sup> (FQA) and ELC assessments, to measure community changes, in order to prevent establishment of invasive species and direct restoration. The baseline data provided by the ELC assessment in this report and the *Don Valley Brickworks Meadow Botanical Assessment* by Dillon Consulting Limited (2008) should be built upon. Insect communities should be monitored to evaluate the impacts of prescribed burns. This can be done through monitoring butterflies. They are a good representative group because a large percentage of Midwestern butterflies require remnant flora species to survive, meaning if there is a good array of butterflies, there are conservative plants and likely other conservative insect species. Furthermore, butterflies are an easy group to monitor because they are a relatively small insect group, who are conspicuous, easy to identify

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<sup>9</sup> The Floristic Quality Assessment presents the mean Coefficient of Conservation and species richness into a qualitative measurement, which can be used in monitoring. A FQA of 13 is low, but only gains significance in relation to other future assessments (DCL, 2008 and Packard and Mutel, 1997)

and many good field guides are available (Packard and Mutel, 1997). All these factors encourage non-professionals to assist in their monitoring and welfare, which can be a significant positive force to any restoration effort.

## ***Feasibility of Prescribed Burns***

Many people and properties are adjacent to the DVBW Park, and consequently any management considerations will need to consider the impact to the surrounding area. Prescribed burns are undoubtedly the most potentially contentious management option. Such burns are likely to be visible from across the city, due to rising smoke, and therefore have an influence to communities on a much larger scale than mowing, seeding and prescribed grazers. Furthermore, smoke is not a common sight in cities, and can be alarming as well as distressing. For these reasons the feasibility of prescribed burns will be considered in this section.

If burns were to be implemented in the DVBW Meadow it would not be the first time a prescribed burn was set in an urban area in Ontario. High Park, situated in the south west end of Toronto has been conducting prescribed burns since 2001 (McEwen, 2014). The Ojibway Prairie Complex, in the City of Windsor has implemented prescribed burns for over 30 years (Cedar, 2014). In order to evaluate the feasibility of prescribed burns at the DVBW Meadow, it would be beneficial to understand how these Parks were able to implement prescribed burns.

### **High Park**

Beth McEwen, City of Toronto Urban Forest Renewal Manager was involved in the implementation of prescribed burns at High Park. An Interview with her reveals that implementing burns was not a simple process. Concern was raised when the black oak

savannah species in High Park were in decline and not sufficiently regenerating. As a result, a study was conducted in 1992 to determine the cause and potential solutions. It was recommended that prescribed burns be implemented to reinvigorate the flora community. Following this, the decision to have prescribed burns went to City of Toronto Council. There was much debate regarding the burns, and according to McEwen it was an educational moment for councillors, some of which believed that the burns were an “ecological genocide” (McEwen, 2014). This misinformation was reflective of the general public's lack of knowledge regarding prescribed burns (Gibb, 2014). The confusion within city council regarding the burns meant that burns were not to be implemented in 1996 as planned, but instead a small scale, demonstration burn was conducted in 1997. Additionally a public education project was initiated which included a demonstration garden to display the ecosystem which they aimed to reinvigorate, black oak savannah (McEwen, 2014). The education project focused on wild blue lupine, a once common flower in the High Park savannah, but in decline (Gibb, 2014). The pilot burn was evaluated with evident, positive results. The public was involved in the demonstration garden and invited to watch the pilot burn. As well, the evaluation of the burn involved public participation and in this way some public education of the importance of burns was achieved. In fact this public engagement was significant to the establishment of the High Park Citizens' Advisory Committee, which City Council called to be created in 1995. What's more, several public meetings and administrative meetings were conducted to increase prescribed burns understanding and logistical considerations (McEwen, 2014).

With City Council approval large scale burns commenced in 2001, and up until recently every burn required Council approval. Presently, Toronto City staff oversee the

burn, but administrative meetings are still required to keep police services, fire services, Provincial staff and other parties informed about prescribed burn protocol. Throughout the burn history there have been some minor public concerns such as smoke rising from High Park and landing across the City to homes that were not sufficiently warned about the burn. However, McEwen believes that over time there is increasing awareness about the ecological need for fire and the implications to those who respond to public concerns (McEwen, 2014). This is likely due to ongoing public education which is currently practiced.

An interview with Jennifer Gibb, Natural Resource Specialist with the City of Toronto, revealed the current prescribed burn efforts. Presently High Park, Lambton Park and South Humber Park all receive some burn treatment, as they all include some oak savannah habitat. The prescribed burns have aided in bringing back a number of species, yet remains most successful when in concert with other management strategies. Burns are conducted annually but in differing areas of each park, a total of 10-15 ha. Each unit- from as small as 1 ha- undergoes a different burn frequency (every 1-5 years) dependant on the site objectives, but with the overall objective of reversing previous non-burn management. Although, since the program has been implemented for over 10 years, the burn frequency is currently being re-evaluated and will likely be reduced to every 8-10 years, in order to mimic more natural cycles (Gibb, 2014).

The pre-burn process is lengthy, but involves a burn boss who is hired to manage the burn itself, and write a Burn Plan, and the local fire department which governs the burn. A Communication Plan is also written addressing how the local community will be informed, and reviewed with the local councillor to ensure that all interested groups are included. Media outlets are contacted and community notices are posted to get the

word out to the public. Additionally, homes that are in close proximity receive mailbox flyers in order to ensure they are informed. City staff, such as Jennifer Gibb, are involved in site preparation and follow up of the burn (Gibb, 2014).

The follow up is also an opportunity to engage the community. High Park has an established neighbourhood group, High Park Citizens' Advisory Committee, which informs High Park management. This is one way that the community can be informed about restoration activity and provide feedback regarding prescribed burning (Gibb, 2014). The Committee also has a Volunteer Stewardship Program which recruits community members (City of Toronto, 2002) to aid in plantings of native species (Gibb, 2014); invasive species weeding; and seed collection (City of Toronto, 2002). Furthermore, City staff provide some tours in High Park, for various groups in regards to the prescribed burn treatment and other restoration work (Gibb, 2014). In Lambton Park and South Humber Park, there are fewer organized groups, so the local councillor is relied upon to inform necessary parties (Gibb, 2014). It is evident that initially the most significant hurdle at High Park was gaining public support (Gibb, 2014) and to this day remains an important component of prescribed burns in the High Park area.

### **Ojibway Prairie Complex**

The Ojibway Prairie Complex is situated in the south west end of the City of Windsor and is a collection of five adjoining natural areas. Windsor's Parks and Recreation Department manages three: Tallgrass Prairie Heritage Park, Black Oak Heritage Park and Ojibway Park, through the Ojibway Nature Centre. The Ministry of Natural Resources (MNR) owns the Prairie Provincial Nature Reserve. The last piece, the Spring Garden Natural Area, is collectively managed. The first parcel of land in this



complex was purchased in 1957 by the City of Windsor, and in 1973 by the MNR (Ojibway Nature Centre, 2008). These areas were purchased to protect and preserve the unique prairie habitat present, yet shortly after the MNR purchased the land it was evident that the prairie was being encroached by shrubs and woody species. As a result the MNR began implementing burns within the Prairie Provincial Nature Reserve in 1978 (Cedar, 2014 and Ojibway Nature Centre, 2008) and on the other protected areas in 1990. In the late 1990s the City of Windsor began to hire private companies to conduct their burns (Cedar, 2014).

Public education regarding prescribed burns began years before the burns were implemented and continues to this day. The Ojibway Nature Centre conducts daily programs which include the use of prescribed burns in prairie management. Burns occur annually, but circulate between various parcels. The pre-burn process includes public engagement such as media outreach and door to door contact. It appears that the public has been successfully educated with only a singular complaint arising, regarding smoke from a resident who had been informed of the burn. Considering the success of the burns, results are mixed. The savannah community appears to have responded very well, but some prairie areas are still in need of restoration. This is especially true for parcels that were once agricultural areas, and consequently these areas are seeded as well as burned (Cedar, 2014). These examples demonstrate the precedent for prescribed burns in urban areas within southern Ontario.

## **Lessons**

There are lessons to be learned from these examples and others which can inform the feasibility of prescribed burns and other management options at the DVBW

Meadow. Sarah McCaffrey (n.d.) investigated what influenced public approval to prescribed burns. She performed a literature review of studies in the United States which studied public support for prescribed burns and found that 80-90% of respondents considered it an appropriate management tool. McCaffrey shared two lessons for those who wish to introduce prescribed burns to their community: "1) increase familiarity with the practice; and 2) work to build trust between officials from the implementing agency and the public" (n.d., pg. 192). A study conducted by Miller et al. (2002) for the Chicago Wilderness Burn Communications Team investigated the attitudes of residents to prescribed burns conducted in the greater Chicago region. Most (73%) of residents were supportive of prescribed burning in some or all situations. Interestingly they discovered that those who supported burns often perceived themselves to understand the ecological benefits of burns; and were more likely to have attended a burn or other management practices (Miller et al., 2002). It is evident from this study and the experiences gathered from High Park and the Ojibway Complex that public education and engagement is critical to gaining public support for burns, and other restoration management practices.

The DVBW Meadow has only existed since the late 1990s and is not a remnant meadow<sup>10</sup>, the question remains whether public support could still be gathered for

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<sup>10</sup> The DVBW Park, under natural forces would have been a riverine wetland and floodplain community with deciduous woodland on the uplands (HWNDLOW Architects, 2001). The brick work activity scarred the landscape, but exposed a rarely seen rock formation, which has become valuable for public education and study. As a result an open, wildflower meadow landscape was deemed to be created to view this North Slope. This has implications for local flora and fauna, and biophysical conditions. This meadow does not act as a corridor or habitat for more habitat-sensitive native flora and fauna which would have once existed there, which raises questions about the purposes of the meadow from a regional perspective. What's more due to the small size and isolation of the meadow, it may be unlikely that prairie fauna ever become established. By creating a habitat for anthropogenic reasons, the future of this meadow is unknown and at odds with the surrounding, more naturalized, park. However should prairie flora become established it may represent a rare collection of prairie species.

prescribed burns, despite this. The DVBW Park has many uses for neighbouring community members and organizations (see Appendix I for DVBW Stakeholders). The primary three reasons members of the public visit the Park are: dog walking, walking trails and the natural environment (The Planning Partnership, 2010). The DVBW Park is also important to much environmental programming by stakeholders, including tours, volunteering and education (Post, 2014). Although much of these park uses are for anthropogenic purposes, having a strong community, with invested stakeholders can be an asset for long term restoration goals. What's more the DVBW Park has volunteer groups that currently maintain the environmental integrity of the space, and many stakeholders value the natural heritage found there. This is important when implementing any restoration work, including prescribed burns, as seen at High Park and the Ojibway Prairie Complex.

### ***Conclusion: A good example of urban restoration***

The DVBW Park facilitates many functions for the people of Toronto. It primarily caters to those who walk the trails, often with their dog(s) and passively enjoy the natural environment (Post, 2014 and The Planning Partnership, 2010). The Park is also used to run workshops, tours and events by the City of Toronto, schools, Outward Bound, Evergreen and others. In this way the Park acts as valuable green space for Torontonians. The DVBW Park is also notable natural heritage space for local flora and fauna who may use the site for their survival. Furthermore, the Park acts as a much needed corridor for migrating or colonizing species, a component of the connection between the Oak Ridges Moraine and Lake Ontario, a densely populated region. The DVBW Park acts to benefit native flora and fauna and the people of Toronto, but this

also places both groups at odds. The increased number of people in the Park weakens the integrity of the space as habitat and can contribute to the presence of invasive species. The Park would likely benefit by conspicuously designating where each group has priority.

The original goals for the Park are also conflicted. The objectives of the 1989 Master Plan called for a wildflower meadow to be created within the park, to view the iconic North Slope. However, the intent was to create a natural environment park which was low maintenance, thus allowing natural succession. This was not possible as the natural climax community for the entire site is a riverine wetland and flood plain community, with deciduous woodland on the upper slopes, and uplands, not a wildflower meadow. The site has clay soils, and considering its hydrology is not dry enough for a natural prairie or savannah community to exist without maintenance (HWNDLOW Architects, 2001). Consequently, regular upkeep is required in order to achieve the 1989 DVBW Master Plan goals, and a park based on natural succession cannot be achieved without neglecting these goals.

Yet while the site is in many ways conflicted it also can be viewed as an example of good planning. The brick work that polluted and literally gutted the area contributed to much of our cultural heritage buildings in Toronto (LRW, n.d.). Furthermore, when the site passed ownership and plans were created to build a condo in this floodplain, the TRCA - with the encouragement of local residents – seized the site. This is an example of re-developing brownfields with environmental goals, where often they are for economic reasons. In this way the site is unique and pioneering the use of these types of spaces (Côté, 2013). Moreover, considering a city like Toronto is relentlessly becoming denser, and residential development is accelerating, the re-development of

brownfield sites may represent one of the few remaining ways greenspace and natural heritage can be created in Toronto. What's more the Park embraces its industrial and created landscape history (Post, 2014). The DVBW is an example of what should occur with our brownfields, restoration and transformation in to a historically conscious and naturally significant area.

## **Appendix**

### **Appendix I- DVBW Stakeholders**

- Neighbouring residents and resident associations
- Local Councillors
- The Garfield Weston Foundation
- City of Toronto divisions (Parks, Culture, Forestry etc.)
- Toronto Region Conservation Authority
- Evergreen
- Evergreen building tenants including schools that operate out of the building
- Outward Bound (lease space from Evergreen and utilize the park)
- Southern Ontario Orchid Society
- Volunteer groups (Community Stewardship Program and DVBW Ambassador Program)
- Other (groups that utilize the Brick Works on a regular basis, general users, birders, hikers, Toronto Field Naturalists etc.)

## Appendix II- DVBW Meadow ELC Results

<b>ELC</b> COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: DVBW Park-Meadow		POLYGON:	
	SURVEYOR(S): Jennifer Smith		DATE: Oct 17, 2013	TIME: 11 start 3 finish
	UTMZ:	UTMZ:	UTMN:	

### POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input checked="" type="checkbox"/> TERRESTRIAL <input type="checkbox"/> WETLAND <input type="checkbox"/> AQUATIC	<input type="checkbox"/> ORGANIC <input checked="" type="checkbox"/> MINERAL SOIL <input type="checkbox"/> PARENT MIN. <input type="checkbox"/> ACIDIC BEDRK. <input type="checkbox"/> BASIC BEDRK. <input type="checkbox"/> CARB. BEDRK.	<input type="checkbox"/> LACUSTRINE <input type="checkbox"/> RIVERINE <input type="checkbox"/> BOTTOMLAND <input type="checkbox"/> TERRACE <input checked="" type="checkbox"/> VALLEY SLOPE <input type="checkbox"/> TABLELAND <input type="checkbox"/> ROLL, UPLAND <input type="checkbox"/> CLIFF <input type="checkbox"/> TALUS <input type="checkbox"/> CREVICE / CAVE <input type="checkbox"/> ALVAR <input type="checkbox"/> ROCKLAND <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> SAND DUNE <input type="checkbox"/> BLUFF	<input type="checkbox"/> NATURAL <input checked="" type="checkbox"/> CULTURAL	<input type="checkbox"/> PLANKTON <input type="checkbox"/> SUBMERGED <input type="checkbox"/> FLOATING-LVD. <input checked="" type="checkbox"/> GRAMINOID <input checked="" type="checkbox"/> FORB <input type="checkbox"/> LICHEN <input type="checkbox"/> BRYOPHYTE <input type="checkbox"/> DECIDUOUS <input type="checkbox"/> CONIFEROUS <input type="checkbox"/> MIXED	<input type="checkbox"/> LAKE <input type="checkbox"/> POND <input type="checkbox"/> RIVER <input type="checkbox"/> STREAM <input type="checkbox"/> MARSH <input type="checkbox"/> SWAMP <input type="checkbox"/> FEN <input type="checkbox"/> BOG <input type="checkbox"/> BARREN <input checked="" type="checkbox"/> MEADOW <input type="checkbox"/> PRAIRIE <input type="checkbox"/> THICKET <input type="checkbox"/> SAVANNAH <input type="checkbox"/> WOODLAND <input type="checkbox"/> FOREST <input type="checkbox"/> PLANTATION
<b>SITE</b> <input type="checkbox"/> OPEN WATER <input type="checkbox"/> SHALLOW WATER <input checked="" type="checkbox"/> SURFICIAL DEP. <input type="checkbox"/> BEDROCK	Infill		<b>COVER</b> <input checked="" type="checkbox"/> OPEN <input type="checkbox"/> SHRUB <input type="checkbox"/> TREED		

### STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY			
2 SUB-CANOPY			
3 UNDERSTOREY			Solidago sp. > New England Aster = P. coarctatus sp. > Chicory
4 GRD. LAYER			P. coarctatus sp. > Common Plantain = Dandelion = Clover = Thistle

HT CODES: 1 = >25 m 2 = 10<HT≤25 m 3 = 2<HT≤10 m 4 = 1<HT≤2 m 5 = 0.5<HT≤1 m 6 = 0.2<HT≤0.5 m 7 = HT<0.2 m

CVR CODES 0 = NONE 1 = 0% < CVR ≤ 10% 2 = 10 < CVR ≤ 25% 3 = 25 < CVR ≤ 60% 4 = CVR > 60%

STAND COMPOSITION:	BA:
Solidago sp. > Aster sp. = P. coarctatus sp. > Chicory	

SIZE CLASS ANALYSIS:	< 10	10 - 24	25 - 50	> 50
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STANDING SNAGS:	< 10	10 - 24	25 - 50	> 50
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DEADFALL / LOGS:	< 10	10 - 24	25 - 50	> 50
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ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:	PIONEER	<input checked="" type="checkbox"/> YOUNG	MID-AGE	MATURE	OLD GROWTH
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### SOIL ANALYSIS:

TEXTURE: fSCL	DEPTH TO MOTTLES / GLEY: g = 999	G = 999
MOISTURE: 2 Fresh	DEPTH OF ORGANICS: 3	(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK: 999	(cm)

### COMMUNITY CLASSIFICATION: OLD NEW ELC CODE

COMMUNITY CLASS:	Cultural	Meadow	
COMMUNITY SERIES:	Cultural Meadow	Mixed Meadow	
ECOSITE:	Mineral Cultural Meadow	Fresh-Moist Mixed Meadow	→ MEMM4
VEGETATION TYPE:	Dry-Moist Old Field Meadow		OLD: CUM1-1
INCLUSION			
COMPLEX			

### Notes:

This is an infill site, so two soils are not characteristic of the area, & have little profile development & contain trash.

LAYERS: 1 = CANOPY 2 = SUB-CANOPY 3 = UNDERSTOREY 4 = GROUND (GRD.) LAYER  
ABUNDANCE CODES: R = RARE O = OCCASIONAL A = ABUNDANT D = DOMINANT

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<b>ELC</b>  SOILS ONTARIO		SITE: DVBW PARK - meadow									
		POLYGON:									
		DATE: Oct 17									
		SURVEYOR(S): Jennifer Smith									
Slope											
UTM											
P/A	PP	Dr	Position	Aspect	%	Type	Class	Z	EASTING	NORTHING	
1	A	3	3	W					79.3653°W	43.6847°N	
2	A	4	3	W							
3	A	4	3	W							
4											
5											

SOIL	1	2	3	4	5
TEXTURE & HORIZON	3L CL 20 fSL 44 Too rocky	3L CL 56 fSCL >120	3L CL 17 SCL 40 too rocky		
A TEXTURE	L	L	L		
COURSE FRAGMENTS	0	0	0		
B TEXTURE	CL <sup>10</sup>	CL <sup>5</sup>	CL <sup>5</sup>		
COURSE FRAGMENTS	0	0	0		
C TEXTURE	fSL <sup>10</sup>	fSCL <sup>4</sup>	fSCL <sup>4</sup>		
COURSE FRAGMENTS	5%	1%	1%		
EFFECTIVE TEXTURE	fSL	fSCL	fSCL		
SURFACE STONINESS	0	0	0		
SURFACE ROCKINESS	0	0	0		
DEPTH TO / OF					
MOTTLES	999	999	999		
GLEYS	999	999	999		
BEDROCK	999	999	999		
WATER TABLE	999	999	999		
CARBONATES	999	999	999		
DEPTH OF ORGANICS	3	3	3		
PORE SIZE DISC #1					
PORE SIZE DISC #2					
MOISTURE REGIME	2 Fresh	2 Fresh	2 Fresh		
SOIL SURVEY MAP	Meadow 1.1664 deg 55.15 - sand soil/mud gravel & organic				
LEGEND CLASS					

### Appendix III- DVBW Meadow Species List (Summer 2014)

Total of 24 (\* City's concern), (-invasive, 31% of total)

- Common Milkweed, *Asclepias syriaca*
- Smooth Brome, *Bromus inermis*-
- White Bear Sedge, *Carex albursina*
- Chicory, *Cichorium intybus*
- Canadian Thistle, *Cirsium arvense*-\*
- Queen Anne's Lace, *Daucus carota*-
- Autumn Olive, *Elaeagnus umbellata*-
- Sweet Clover, *Melilotus* sp.-
- Switchgrass, *Panicum virgatum*
- Common Plantain, *Plantago major*
- Grasses, *Poaceae* sp.
- Common Cinquefoil, *Potentilla simplex* (TRCA species of Conservation Concern)
- Multiflora Rose, *Rosa multiflora*
- Black Raspberry, *Rubus occidentalis* Crown Vetch, *Securigera varia*-\*
- Cup Plant, *Silphium perfoliatum*
- Tall Goldenrod, *Solidago canadensis* var. *scabra*
- Showy Goldenrod, *Solidago speciosa* (Specie of Special Concern)
- Heath Aster, *Symphyotrichum ericoides*
- Bushy Aster, *Symphyotrichum dumosum*
- New England Aster, *Symphyotrichum novae-angliae*
- Dandelion, *Taraxacum officinale*
- Red Clover, *Trifolium pretense*-
- White Clover, *Trifolium repens*-\*
- Blue Vervain, *Verbena hastata*

Adjacent species

- Manitoba Maple, *Acer negundo*-
- Willow sp.
- Aspen sp.
- Sumac sp.

# Appendix IV- DVBW Meadow Species List by Dillon Consulting Limited (2008)

Family	Scientific Name	Common Names
<b>ANGIOSPERMS - MONOCOTYLEDONS</b>		
CYPERACEAE	<i>Carex spicata</i>	Spiked Sedge
JUNCACEAE	<i>Juncus tenuis</i>	Path Rush
POACEAE	<i>Agrostis gigantea</i>	Redtop Grass
	<i>Andropogon gerardii</i> *	Big Bluestem Grass
	<i>Bouteloua curtipendula</i> *	Side-oats Grama
	<i>Bromus inermis ssp. inermis</i>	Smooth Brome
	<i>Bromus japonicus</i>	Japanese Chess
	<i>Dactylis glomerata</i>	Orchard Grass
	<i>Elymus canadensis</i> *	Canada Wild Rye
	<i>Elymus repens</i>	Quack Grass
	<i>Hordeum jubatum ssp. jubatum</i>	Squirrel-tail Grass
	<i>Panicum capillare</i>	Witch Panic Grass
	<i>Phalaris arundinacea</i>	Reed Canary Grass
	<i>Phleum pratense</i>	Timothy
	<i>Phragmites australis</i>	Common Reed
	<i>Poa compressa</i>	Canada Blue Grass
	<i>Schizachyrium scoparium</i> *	Little Bluestem
	<i>Setaria viridis</i>	Green Foxtail
<b>ANGIOSPERMS – DICOTYLEDONS</b>		
ACERACEAE	<i>Acer negundo</i>	Manitoba Maple
ANACARDIACEAE	<i>Rhus aromatica</i> *	Fragrant Sumac
	<i>Rhus typhina</i>	Staghorn Sumac
APIACEAE	<i>Daucus carota</i>	Wild Carrot
ASCLEPIADACEAE	<i>Asclepias syriaca</i>	Common Milkweed
	<i>Cynanchum rossicum</i>	Dog-strangling Vine
ASTERACEAE	<i>Achillea millefolium ssp. millefolium</i>	Common Yarrow
	<i>Ambrosia artemisiifolia</i>	Common Ragweed

Family	Scientific Name	Common Names
	<i>Arctium minus ssp. minus</i>	Common Burdock
	<i>Aster ericoides var. ericoides</i>	Heath Aster
	<i>Aster lanceolatus ssp. lanceolatus</i>	Panicked Aster
	<i>Aster lateriflorus var. lateriflorus</i>	One-sided Aster
	<i>Aster novae-angliae</i>	New England Aster
	<i>Aster oolentangiensis*</i>	Azure Aster
	<i>Chrysanthemum leucanthemum</i>	Ox-eye Daisy
	<i>Cichorium intybus</i>	Chicory
	<i>Cirsium arvense</i>	Canada Thistle
	<i>Cirsium vulgare</i>	Bull Thistle
	<i>Erigeron annuus</i>	Daisy Fleabane
	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod
	<i>Lactuca serriola</i>	Prickly Lettuce
	<i>Ratibida pinnata*</i>	Gray-headed Coneflower
	<i>Solidago altissima var. altissima</i>	Tall Goldenrod
	<i>Solidago juncea</i>	Early Goldenrod
	<i>Solidago nemoralis ssp. nemoralis</i>	Gray Goldenrod
	<i>Tanacetum vulgare</i>	Tansy
	<i>Taraxacum officinale</i>	Common Dandelion
	<i>Tragopogon pratensis ssp. pratensis</i>	Meadow Goat's-beard
BORAGINACEAE	<i>Echium vulgare</i>	Viper's Bugloss
CAPRIFOLIACEAE	<i>Lonicera tatarica</i>	Tartarian Honeysuckle
CLUSIACEAE	<i>Hypericum perforatum</i>	Common St. John's-

Family	Scientific Name	Common Names
		wort
CONVOLVULACEAE	<i>Convolvulus arvensis</i>	Field Bindweed
CORNACEAE	<i>Cornus stolonifera</i>	Red-osier Dogwood
DIPSACACEAE	<i>Dipsacus fullonum</i> ssp. <i>sylvestris</i>	Common Teasel
FABACEAE	<i>Coronilla varia</i>	Trailing Crown-vetch
	<i>Lotus corniculatis</i>	Birds-foot Trefoil
	<i>Medicago lupulina</i>	Black Medick
	<i>Medicago sativa</i> ssp. <i>sativa</i>	Alfalfa
	<i>Melilotus alba</i>	White Sweet-clover
	<i>Trifolium pratense</i>	Red Clover
	<i>Trifolium repens</i>	White Clover
	<i>Vicia cracca</i>	Cow Vetch
LAMIACEAE	<i>Monarda fistulosa</i>	Wild Bergamot
	<i>Pycnanthemum virginianum</i> *	Virginia Mountain Mint
LYTHRACEAE	<i>Lythrum salicaria</i>	Purple Loosestrife
OLEACEAE	<i>Fraxinus pennsylvanica</i>	Red Ash
PLANTAGINACEAE	<i>Plantago lanceolata</i>	Ribgrass
	<i>Plantago major</i>	Common Plantain
POLYGONACEAE	<i>Rumex crispus</i>	Curly Dock
ROSACEAE	<i>Physocarpus opulifolius</i> *	Ninebark
		Rough-fruited Cinquefoil
	<i>Potentilla recta</i>	Cinquefoil
	<i>Potentilla simplex</i>	Common Cinquefoil
	<i>Prunus serotina</i>	Black Cherry
	<i>Rosa multiflora</i>	Multiflora Rose
SALICACEAE	<i>Rubus allegheniensis</i>	Common Blackberry
	<i>Populus tremuloides</i>	Trembling Aspen
	<i>Salix alba</i>	White Willow
	<i>Salix exigua</i>	Sandbar Willow
SCROPHULARIACEAE	<i>Linaria vulgaris</i>	Butter-and-eggs
	<i>Verbascum thapsus</i>	Common Mullein

Family	Scientific Name	Common Names
ULMACEAE	<i>Ulmus pumila</i>	Siberian Elm
VITACEAE	<i>Vitis riparia</i>	Riverbank Grape

## Appendix V- Vascular Plants of Midwestern Prairies (total of 988), Their Distribution and Status

The *Tallgrass Restoration Handbook* compiles this list from state floras, natural area reports, site flora summaries, ecological sampling data and consultation with biologists. Plants are arranged alphabetically by genus name, and each includes the scientific name, common name, physiognomy (Physiog), wetness rating (CW), and coefficient of conservatism where available (Packard and Mutel, 1997).

Note: The species of interest (total of 529) for this report are those listed under ON (Ontario), numbers in this column indicate the coefficient of conservatism of each specie, additional letters indicates species of special concern according to the Ontario Ministry of Natural Resources: E (Endangered), T (Threatened), R (Rare) and X (Extirpated within the Province), the use of a starburst (⌘) indicates that the specie is considered introduced to the Province.

Distribution of Wetness Ratings among Tallgrass Prairie Vascular Flora				Summary of Physiognomic Classes of Tallgrass Prairie Vascular Flora		
	Wetness Rating (CW)	Number of Taxa	% of flora	Physiognomy	Number of Taxa	% of flora
Upland	5	445	44.9	Annual Forb	141	14.2
Facultative Upland –	4	45	4.5	Biennial Forb	31	3.1
Facultative Upland	3	74	7.5	Perennial Forb	514	52.0
Facultative Upland +	2	14	1.4	Annual Grass	14	1.4
Facultative –	1	37	3.7	Perennial Grass	94	9.5
Facultative	0	67	6.8	Annual Sedge	5	0.5
Facultative +	–1	32	3.2	Perennial Sedge	105	10.6
Facultative Wetland –	–2	19	1.9	Herbaceous Vine	4	0.4
Facultative Wetland	–3	80	8.1	Woody Vine	3	0.3
Facultative Wetland +	–4	37	3.7	Shrub	46	4.7
Obligate Wetland	–5	138	14.0	Tree	16	1.6
				Cryptogam	15	1.5



SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Acalypha gracilens</i>	slender mercury	5	A-Forb	*	4	*				3				*	*			*
<i>Acalypha gracilens monococca</i>	one-seeded mercury	5	A-Forb	*	4		S	*		3					*			
<i>Acalypha virginica</i>	Virginia mercury	3	A-Forb	*	2	*	*	*	*	2			*	0	*		*	*
<i>Acalypha virginica rhomboidea</i>	rhombic copperleaf	3	A-Forb	*	0	*	*	*	0	0	*	*	*	0	*	0		*
<i>Achillea millefolium</i>	woolly yarrow	3	P-Forb	*	0	*	*	*	*	0	*	*	*	*	*	0	*	*
<i>Aconis calamus</i> <sup>1</sup>	sweet flag	-5	P-Forb	*	4	*	*	*	6	4	*	T	*	6	*	8	*	*
<i>Agalinis aspera</i>	rough false foxglove	5	A-Forb	*	10		*	*		10	*	*	*		*		*	*
<sup>†</sup> <i>Agalinis auriculata</i>	eared false foxglove	5	A-Forb	*	9 <sup>T</sup>	E	S	*	10 <sup>X</sup>	10 <sup>U</sup>	*			8 <sup>E</sup>	*			X
<i>Agalinis fasciculata</i>	fascicled agalinis	5	A-Forb	*	6	W		*		7					*			
<i>Agalinis heterophylla</i>	prairie false foxglove	0	A-Forb	*				*		10 <sup>E</sup>					*			
<sup>†</sup> <i>Agalinis purpurea</i>	purple false foxglove	-3	A-Forb	*	6	*	*	*	7	10 <sup>W</sup>	*		*	8 <sup>E</sup>		10	*	*
<i>Agalinis skinneriana</i>	pale false foxglove	5	A-Forb	*	10 <sup>T</sup>	E	E	*	10 <sup>T</sup>	7 <sup>W</sup>				10 <sup>E</sup>	*	10		E
<sup>†</sup> <i>Agalinis tenuifolia</i>	slender false foxglove	-3	A-Forb	*	5	*	*	*	5	4	*	*	*	5	*	7	*	*
<i>Agalinis viridis</i>	green false foxglove	5	A-Forb	*						10 <sup>E</sup>								
<i>Agoseris glauca</i>	pale mountain-dandelion	3	P-Forb					*	10 <sup>T</sup>		*	*	*				*	
<i>Agrimonia parviflora</i>	swamp agrimony	-1	P-Forb	*	5	*	*	*	4	6			*	6	*	4	*	S
<i>Agrostis Elliottiana</i>	awned bent grass	5	A-Grass	*	5	*		*		3	*			X	*			
<i>Agrostis hyemalis</i>	tickle grass	1	P-Grass	*	1	*	*	*	4	3	*		*	2	*	4	*	*
<i>Agrostis perennans</i>	upland bent	1	P-Grass	*	2	*	*	*	5	3		*		4	*	5	*	*
<i>Aletris farinosa</i>	colic root	0	P-Forb	*	9	*			10		*			8	*	10 <sup>T</sup>	*	
<i>Allium canadense</i>	wild garlic	3	P-Forb	*	2	*	*	*	4	1		T		3	*	8	*	*
<i>Allium canadense mobilese</i>	glade onion	5	P-Forb	*	3		S	*		1	*				*			
<i>Allium cernuum</i>	nodding wild onion	5	P-Forb	*	7	*	T		5	8	*		*	5		9	*	*
<i>Allium stellatum</i>	prairie onion	5	P-Forb	*	10	*	*	*	10	6	*	*	*		*		*	*
<i>Allium textile</i>	textile onion	5	P-Forb				*	*			*	*	*				*	
<i>Ambrosia bidentata</i>	southern ragweed	4	A-Forb	*	0	*	S	*		0	*			*	*			
<sup>†</sup> <i>Ambrosia coronopifolia</i>	western ragweed	5	P-Forb	*	2	*	*	*	*	2	*	*	*	*	*	*	*	*
<i>Amorpha canescens</i>	lead plant	5	Shrub	*	8	*	*	*	8	8	*	*	*		*	10	*	*
<i>Amorpha fruticosa</i>	indigo bush	-4	Shrub	*	6	*	*	*	*	5	*	*	*	2	*	5	*	*
<i>Amorpha nana</i>	dwarf wild indigo	5	Shrub				T	*			*	*	*		*		*	
<i>Amphicaryx dracunculoides</i>	broom snakeroot	5	A-Forb	*	*	*	*	*		3			*	*	*			
<i>Amphicarpa bracteata</i>	hog peanut	0	A-Forb	*	5	*	*	*	5	4	*	*	*	5	*	4	*	*
<i>Anagallis minima</i>	chaffweed	4	A-Forb	*	5	*		*		5		*	*	*	*			
<i>Andropogon gerardii</i>	big bluestem	1	P-Grass	*	5	*	*	*	5	5	*	*	*	6	*	7	*	*
<i>Andropogon gyrans</i>	Elliott's broom sedge	5	P-Grass	*	3	*				3			*					
<i>Andropogon hallii</i>	sand bluestem	5	P-Grass	*	*	*	S	*			*	*	*		*		*	
<i>Andropogon ternarius</i>	splitbeard bluestem	3	P-Grass	*	8 <sup>E</sup>	W		*		5					*			
<i>Andropogon virginicus</i>	broom sedge	1	P-Grass	*	1	*	S	*	4	2				3	*	5		
<i>Androsace occidentalis</i>	rock jasmine	4	A-Forb	*	4	T	*	*	6 <sup>T</sup>	3	*	*	*	10 <sup>T</sup>	*	6	*	*
<i>Anemone canadensis</i>	meadow anemone	-3	P-Forb	*	4	*	*	*	4	6	*	*	*	5	*	3	*	*
<i>Anemone caroliniana</i>	Carolina anemone	5	P-Forb	*	7	X	*	*		6	*		*		*		*	E
<i>Anemone cylindrica</i>	thimbleweed	5	P-Forb	*	8	*	*	*	6	10 <sup>W</sup>	*	*	*	9 <sup>T</sup>		7	*	*
<i>Anemone multifida</i>	windflower	5	P-Forb						10		E	*	*			10	*	E
<i>Anemone quinquefolia</i>	wood anemone	0	P-Forb	*	8	*	*		5	10 <sup>U</sup>	*	*	*	5		7	*	*
<i>Anemone virginiana</i>	tall anemone	5	P-Forb	*	4	*	*	*	3	4	*	*	*	3	*	4	*	*
<i>Angelica atropurpurea</i>	great angelica	-5	P-Forb		6	*	*		6		*			6		6		*
<i>Angelica venenosa</i>	wood angelica	5	P-Forb	*	8	*			8 <sup>S</sup>	7	*			8		10		

contin

<sup>1</sup>See Swink and Wilhelm (1994), p. 80.

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Antennaria microphylla</i> <sup>2</sup>	pink pussy toes	5	P-Forb						10 <sup>T</sup>		*	*	*				*	
<i>Antennaria neglecta</i> <sup>3</sup>	field cat's foot	5	P-Forb	*	4	*	*	*	2	4	*	*	*	2	*	2	*	*
<i>Antennaria parvifolia</i>	plains pussy toes	5	P-Forb								*	*	*		*		*	
<i>Antennaria plantaginifolia</i>	pussy toes	5	P-Forb	*	4	*	*	*	3	5	*	*	*	1	*	2	*	*
<i>Apios americana</i>	ground nut	-3	H-Vine	*	4	*	*	*	3	6	*	T	*	4	*	6	*	*
<i>Apocynum androsaemifolium</i>	spreading dogbane	5	P-Forb	*	6	*	*		3	5	*	*	*	6	*	3	*	*
<i>Apocynum cannabinum</i>	prairie dogbane	0	P-Forb	*	3	*	*	*	3	3	*	*	*	3	*	3	*	*
<i>Apocynum sibiricum</i> <sup>4</sup>	Indian hemp	-1	P-Forb		2	*	*	*	*	2	*	*	*	8 <sup>E</sup>	*	?	*	*
<i>Apocynum × floribundum</i>	intermediate dogbane	5	P-Forb	*	6	*	*	*		4	*	*	*	3			*	*
<i>Arabis drummondii</i>	Drummond's rock cress	3	B-Forb		10	E	*		6		*	*	*	9 <sup>E</sup>		9	*	*
<i>Arabis glabra</i>	tower mustard	5	B-Forb		6	T	*		3	8 <sup>E</sup>	*	*	*	3		4	*	*
<i>Arabis lyrata</i>	sand cress	4	B-Forb		7	*	*		7	8	*			6 <sup>P</sup>		7	*	*
<i>Argentina anserina</i>	silverweed	-4	P-Forb		6	T	T		5		*	*	*	10 <sup>P</sup>		5	*	*
<i>Aristida basiramea</i>	fork-tipped three-awn grass	5	A-Grass		6	⊖	*	*	3	4	*		*		*	10	*	*
<i>Aristida dichotoma</i>	poverty grass	3	A-Grass	*	2	*	*	*	5 <sup>X</sup>	3	*		*	2	*	10	*	S
<i>Aristida longespicca</i>	slimspike three-awn	4	A-Grass	*	2	*	*	*	6 <sup>T</sup>	2			*	10	*	8	*	*
<i>Aristida oligantha</i>	plains three-awn grass	5	A-Grass	*	0	*	*	*	⊖	1	*		*	0	*	⊖	*	*
<i>Aristida purpurascens</i>	arrow feather	5	P-Grass	*	5	*		*	8	5				8 <sup>P</sup>	*	10	*	*
<i>Aristida purpurea</i>	purple three-awn	5	P-Grass	*			*	*			*	*	*		*		*	*
<i>Aristida tuberculosa</i>	beach three-awn grass	5	A-Grass		9	*	*		9		*						*	*
<i>†Arnoglossum atriplicifolium</i>	pale Indian plantain	5	P-Forb	*	5	*	*	*	10	4	*		*	7	*		*	*
<i>†Arnoglossum plantaginicum</i>	prairie Indian plantain	0	P-Forb	*	10	*	*	*	10 <sup>T</sup>	8	T		*	P	*	10 <sup>R</sup>	*	T
<i>†Artemisia campestris caudata</i>	beach wormwood	5	B-Forb		5	*	*	*	5	5	*	*	*	10 <sup>T</sup>	*	8	*	*
<i>Artemisia dracunculus</i>	false tarragon	5	P-Forb		9 <sup>E</sup>		*	*		10 <sup>X</sup>	*	*	*		*		*	S
<i>Artemisia frigida</i>	prairie sagebrush	5	Shrub		⊖		S	*		⊖	*	*	*				*	S
<i>Artemisia ludoviciana</i>	white sage	5	P-Forb	*	2	⊖	*	*	8 <sup>T</sup>	3	*	*	*	*	*	⊖	*	*
<i>Artemisia serotina</i>	saw-toothed sagebrush	5	P-Forb		10		*				*						*	*
<i>Asclepias amplexicaulis</i>	sand milkweed	5	P-Forb	*	8	*	*	*	10	9	S		*	7 <sup>T</sup>	*		*	*
<i>Asclepias engelmanniana</i>	Engelmann's milkweed	5	P-Forb				E	*					*		*			*
<i>Asclepias hirtella</i>	tall green milkweed	5	P-Forb	*	6	*	*	*	10 <sup>T</sup>	4	T			8	*	10	*	*
<i>Asclepias incarnata</i>	swamp milkweed	-5	P-Forb	*	4	*	*	*	6	5	*	*	*	5	*	6	*	*
<i>Asclepias lanuginosa</i>	woolly milkweed	5	P-Forb		10 <sup>E</sup>		T	*			*	*	*				*	T
<i>Asclepias meadii</i> <sup>4</sup>	Mead's milkweed	5	P-Forb		10 <sup>E</sup>	X	E	*		10 <sup>E</sup>	*						*	X
<i>Asclepias ovalifolia</i>	oval milkweed	5	P-Forb		10 <sup>E</sup>		*		10 <sup>E</sup>		*						*	*
<i>Asclepias purpurascens</i>	purple milkweed	3	P-Forb	*	7	*	*	*	10	6				8	*	10	E	*
<i>Asclepias speciosa</i>	showy milkweed	0	P-Forb		⊖		T	*	⊖		*	*	*		*		*	⊖
<i>Asclepias stenophylla</i>	glade milkweed	5	P-Forb	*	10 <sup>T</sup>		E	*		9	E		*		*		*	*
<i>Asclepias sullivantii</i>	prairie milkweed	5	P-Forb	*	8	*	*	*	9 <sup>T</sup>	9	T	E	*	9	*	8	*	T
<i>Asclepias syriaca</i>	common milkweed	5	P-Forb	*	0	*	*	*	1	0	*	*	*	0	*	0	*	*
<i>Asclepias tuberosa</i>	butterfly weed	5	P-Forb	*	5	*	*	*	5	5	*		*	6	*	8	*	*
<i>Asclepias verticillata</i>	whorled milkweed	5	P-Forb	*	1	*	*	*	1	2	*	*	*	6	*	6	*	*
<i>Asclepias viridiflora</i>	short green milkweed	5	P-Forb	*	9	*	*	*	8	9	*	*	*	9 <sup>T</sup>	*	10	*	*
<i>Asclepias viridis</i>	green-flowered milkweed	5	P-Forb	*	6	E		*		6			*	P	*		*	*
<i>Aster dumosus</i>	bushy aster	-1	P-Forb	*	9	*	E		9	9				10 <sup>T</sup>		10	*	*
<i>Aster eriooides</i>	heath aster	4	P-Forb	*	4	*	*	*	3	4	*	*	*	3	*	4	*	*
<i>Aster falcatus</i>	curved aster	1	P-Forb				S	*			*	*	*		*		*	*
<i>Aster fragilis subdumosus</i>	small white aster	-2	P-Forb	*	3	*	*		*	6				2	*		*	*

<sup>2</sup>Including *Antennaria rosea*.

<sup>3</sup>Including *Antennaria neodioica*.

<sup>4</sup>Federally designed as Threatened (USFWS 1994).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

continue



SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Aster laevis</i>	smooth blue aster	5	P-Forb	*	8	*	*	*	5	7	*	*	*	6		7	*	*
† <i>Aster lanceolatus</i>	panicked aster	-5	P-Forb	*	3	*	*	*	2	4	*	*	*	2	*	3	*	*
<i>Aster lateriflorus</i>	side-flowering aster	-2	P-Forb	*	2	*	*	*	2	3	*		*	2	*	3	*	*
<i>Aster novae-angliae</i>	New England aster	-3	P-Forb	*	4	*	*	*	3	4	*	*	*	3	*	2	*	*
<i>Aster oblongifolius</i>	aromatic aster	5	P-Forb	*	7	R	*	*		6	*	*	*	T	*		*	*
† <i>Aster oolentangiensis</i>	azure aster	5	P-Forb	*	8	*	*	*	4	7	*		*	7	*	9	*	*
<i>Aster paludosus hemisphaericus</i>	southern prairie aster	2	P-Forb	*				*		9					*			
<i>Aster paniceus</i>	small-headed aster	5	P-Forb	*	3		*	*		3								
<i>Aster patens</i>	spreading aster	5	P-Forb	*	6	*		*		5				9	*			
<i>Aster pilosus</i>	hairy aster	4	P-Forb	*	0	*	*	*	1	0	*		*	1	*	4	*	*
<i>Aster praealtus</i>	willow aster	-5	P-Forb	*	5	*	*	*	6	6			*	7	*	8		*
<i>Aster puniceus</i>	bristly aster	-5	P-Forb		8	*	*		5	10	*	*	*	6		6	*	*
<i>Aster puniceus firmus</i>	shining aster	-5	P-Forb		5	*	*		4		*	*		*		6		*
<i>Aster sericeus</i>	silky aster	5	P-Forb	*	10	R	*	*	10 <sup>T</sup>	8	*	T	*		*		*	*
<i>Aster turbinellus</i>	prairie aster	5	P-Forb	*	7		S	*		6					*			
<i>Aster umbellatus</i>	flat-top aster	-3	P-Forb	*	8	*	*		5		*			2		6		*
<i>Aster umbellatus pubens</i>	northern flat-top aster	-3	P-Forb				S		*	10 <sup>E</sup>	*	*	*					
<i>Astragalus adsurgens</i>	standing milk vetch	5	P-Forb				S				*	*	*				*	
<i>Astragalus agrestis</i>	field milk vetch	5	P-Forb				*				*	*	*				*	
<i>Astragalus canadensis</i>	Canadian milk vetch	-1	P-Forb	*	7	*	*	*	9 <sup>T</sup>	6	*	*	*	3	*	8	*	*
<i>Astragalus crassicaupus</i>	Indian pea	5	P-Forb	*		*	*	*		10	*	*	*		*		*	E
<i>Astragalus crassicaupus trichocalyx</i>	ground plum	5	P-Forb	*	8 <sup>E</sup>			*		7					*			
<i>Astragalus distortus</i>	bent milk vetch	5	P-Forb	*	8		S	*		6					*			
<i>Astragalus flexuosus</i>	slender milk vetch	5	P-Forb				*				S	*	*				*	
<i>Astragalus lotiflorus</i>	low milk vetch	5	P-Forb					*	*	10 <sup>W</sup>	*	*	*		*		*	
<i>Astragalus missouriensis</i>	Missouri milk vetch	5	P-Forb				S	*			S	*	*		*		*	
<i>Astragalus neglectus</i>	Cooper's milk vetch	4	P-Forb						9 <sup>S</sup>		S	T	*	10 <sup>E</sup>		9	*	E
<i>Astragalus tenesseeensis</i>	Tennessee milk vetch	5	P-Forb		10 <sup>E</sup>	X												
<i>Astranthium integrifolium</i>	western daisy	5	A-Forb	*				*		6					*			
† <i>Baptisia alba macrophylla</i>	white wild indigo	3	P-Forb	*	6	*	*	*	10 <sup>T</sup>	6	*		*	8 <sup>P</sup>	*			*
<i>Baptisia australis</i>	blue wild indigo	5	P-Forb	*		T	S	*		8			*	E	*			
† <i>Baptisia bracteata leucophylla</i>	cream wild indigo	5	P-Forb	*	9	W	*	*	10 <sup>E</sup>	6	S		*	*	*			*
<i>Baptisia tinctoria</i>	yellow wild indigo	5	P-Forb		10	W	S		10		*			8		10		S
<i>Beckmannia syzigachne</i>	American slough grass	-5	A-Grass		10 <sup>E</sup>		*		4 <sup>T</sup>		*	*	*			4	*	*
† <i>Besseyia bullii</i>	kitten tails	5	P-Forb		8 <sup>T</sup>	E	T		10 <sup>T</sup>		E			X				T
<i>Betula pumila</i>	dwarf birch	-5	shrub		10	*	T		8					10 <sup>T</sup>		9		*
<i>Bidens aristosa</i>	swamp marigold	-3	A-Forb	*	1	*	*	*	1	1	*		*	3	*		*	*
<i>Bidens coronata</i>	tall swamp marigold	-5	P-Forb		8	*	*	*	7		*		*	3		9	*	*
<i>Bidens frondosa</i>	common beggar's ticks	-3	A-Forb	*	1	*	*	*	1	2	*	*	*	2	*	3	*	*
<i>Blephilia ciliata</i>	Ohio horse mint	5	P-Forb	*	6	*	T	*	7	5				4		10		*
† <i>Boltonia asteroides</i>	false aster	-3	P-Forb	*	5	*	*	*	5 <sup>S</sup>	5	*	*	*	8	*		*	*
<i>Boltonia diffusa</i>	doll's daisy	-3	P-Forb	*	4					7					*			
<i>Bothriochloa saccaroides</i>	silver beard grass	5	P-Grass	*				*		2			*		*			
<i>Botrychium campestre</i>	prairie moonwort	5	Crptgm				S		10 <sup>T</sup>		T	E	*				*	S
<i>Botrychium minganense</i>	Mingan moonwort	-3	Crptgm				*		7		*	E				8		S
<i>Botrychium simplex</i>	dwarf grape fern	0	Crptgm		4 <sup>E</sup>	E	T		5		*	*		10		7	*	X
<i>Bouteloua curtipendula</i>	side-oats grama	5	P-Grass	*	7	*	*	*	10 <sup>T</sup>	7	*	*	*	7	*	10	*	*
<i>Bouteloua gracilis</i>	blue grama	5	P-Grass		5		*	*		8 <sup>X</sup>	*	*	*		*		*	*

continue.

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Bouteloua hirsuta</i>	hairy grama	5	P-Grass	E	9	*	*	*	10 <sup>R</sup>	*	*	*	*	*	*	*	*	*
<i>Brachyactis ciliata angusta</i>	rayless aster	0	P-Forb	*	*	*	*	*	10 <sup>X</sup>	*	*	*	*	*	*	*	*	*
† <i>Brickellia eupatorioides</i>	false boneset	5	P-Forb	*	6	*	*	*	10 <sup>S</sup>	5	*	*	*	8	*	*	*	*
<i>Bromus ciliatus</i>	fringed brome	-3	P-Grass		10	*	*	*	6	*	*	*	7			6	*	*
<i>Bromus kalmii</i>	prairie brome	0	P-Grass		10	*	*	*	8	*	T		8			8	*	*
<i>Bromus latiglumis</i>	ear-leaved brome	-2	P-Grass		7	*	*	*	6	10 <sup>S</sup>	*	*	*	7		7	*	*
<i>Budloe dactyloides</i>	buffalo grass	4	P-Grass	*	*		S	*	5 <sup>R</sup>	S	*	*					*	*
<i>Buchnera americana</i>	blue hearts	1	P-Forb	*	10	E		*	10 <sup>X</sup>	10				8 <sup>T</sup>	*	10 <sup>T</sup>		
<i>Bulbostylis capillaris</i>	hair sedge	2	A-Sedge	*	4	*	*	*	4	4	*		*	3	*	5		*
<i>Calamagrostis canadensis</i>	blue joint grass	-5	P-Grass		3	*	*	*	3	6	*	*	*	4		4	*	*
<i>Calamagrostis stricta inexpansa</i>	bog reed grass	-4	P-Grass		5	*	*	*	10 <sup>T</sup>	8	*	*	*	10 <sup>P</sup>		8	*	S
<i>Calamintha arkansana</i>	low calaminth	-3	P-Forb	*	8	*		*	10	7	*			8 <sup>T</sup>	*	10		S
<i>Calamovilfa longifolia</i>	sand reed	5	P-Grass		8	*	*	*	10	10 <sup>X</sup>	*	*	*			10	*	T
<i>Callirhoe alcaeoides</i>	pink poppy mallow	5	P-Forb	*	5		T	*	5				*		*		*	
<i>Callirhoe bushii</i>	Bush's poppy mallow	5	P-Forb	*			S	*	10						*			
<i>Callirhoe digitata</i>	fringed poppy mallow	5	P-Forb	*	*			*	6						*			
<i>Callirhoe involucrata</i>	purple poppy mallow	5	P-Forb	*	*	*	*	*	5	*		*			*	*		
<i>Callirhoe triangulata</i>	clustered poppy mallow	5	P-Forb		9	X	E		10 <sup>X</sup>									S
† <i>Calopogon tuberosus</i>	grass pink	-5	P-Forb	*	10 <sup>E</sup>	*	S	*	9	10	*			10 <sup>P</sup>	*	9		*
<i>Caltha palustris</i>	marsh marigold	-5	P-Forb		7	*	*		6	10 <sup>E</sup>	*	*	*	5		5	*	*
<i>Calylophus semilatus</i>	toothed evening primrose	5	P-Forb	*	10	*	*	*	*	4	*	*	*	*	*	*	*	S
<i>Calystegia sepium</i>	hedge bindweed	0	H-Vine	*	1	*	*	*	2	1	*	*	*	1	*	2	*	*
† <i>Calystegia spithamea</i>	low bindweed	5	P-Forb		10	*	S		8	9	*			6		7		*
<i>Canassia angusta</i>	prairie hyacinth	5	P-Forb	*	10 <sup>E</sup>	E		*	10						*			
<i>Canassia scilloides</i>	wild hyacinth	-1	P-Forb	*	7	*	*	*	9 <sup>T</sup>	6				5	*	10 <sup>R</sup>		E
<i>Campanula aparinoides</i>	marsh bellflower	-5	P-Forb		7	*	*		7	10 <sup>E</sup>	*	T	*	7		7	*	*
<i>Campanula rotundifolia</i>	harebell	1	P-Forb		8	*	*		6	10 <sup>E</sup>	*	*	*	8 <sup>T</sup>		7	*	*
<i>Cardamine bulbosa</i>	bulbous cress	-5	P-Forb	*	5	*	*	*	4	6	*	*	*	4	*	8	*	*
<i>Carex aggregata</i>	glomerate sedge	5	P-Sedge		4	*	S	*	1	5			*	2	*	5	*	
<i>Carex alata</i> *	winged oval sedge	-5	P-Sedge		10 <sup>E</sup>	*			10	10 <sup>W</sup>				8 <sup>P</sup>		10		
<i>Carex alopecuroides</i>	brown-headed fox sedge	-4	P-Sedge		4	E	*	*	3		*	*				6	*	*
<i>Carex annectens</i>	yellow-fruited sedge	-3	P-Sedge	*	3	*	*	*	1	4	S		*	6	*	9	*	*
<i>Carex aquatilis</i>	water sedge	-5	P-Sedge		8	*	*	*	7	10 <sup>E</sup>	*	*	*	9		7	*	*
<i>Carex arkansana</i>	Arkansas sedge	-5	P-Sedge	*	10 <sup>E</sup>			*	10 <sup>R</sup>						*			
<i>Carex austriaca</i>	southern sand sedge	5	P-Sedge	*				*	6						*			
<i>Carex bebbii</i>	Bebb's oval sedge	-5	P-Sedge		8	T	*		4		*	*	*	7 <sup>T</sup>		3	*	*
<i>Carex bicknellii</i>	prairie sedge	1	P-Sedge	*	8	*	*	*	10	8	*	*	*	T	*	10	*	*
<i>Carex bicknellii opaca</i>	southern prairie sedge	1	P-Sedge	E					9 <sup>S</sup>						*			
<i>Carex brevior</i>	short-beaked sedge	0	P-Sedge	*	4	*	*	*	3	4	*	*	*	4	*	7	*	*
<i>Carex bushii</i>	Bush's sedge	-3	P-Sedge	*	3	E	S	*	3				*		*			
<i>Carex buxbaumii</i>	brown bog sedge	-5	P-Sedge	*	10	*	*	*	10	10 <sup>R</sup>	*	T	*	10	*	10		*
<i>Carex caroliniana</i>	Carolina sedge	0	P-Sedge	*	7	*		*	7					6	*			
<i>Carex comosa</i>	bristly sedge	-5	P-Sedge	*	5	*	*	*	5	10 <sup>R</sup>	*		*	2		5	*	*
<i>Carex conjuncta</i>	soft fox sedge	-3	P-Sedge	*	5	*	*	*	5	T			*	5			*	*
<i>Carex conoidea</i>	field sedge	-5	P-Sedge		10	E	S		9	10 <sup>E</sup>	*			8 <sup>T</sup>		9		*
<i>Carex crauvei</i>	Crawe's sedge	-5	P-Sedge	*	9 <sup>T</sup>	T	S	*	10	10	*	*	*	8 <sup>P</sup>	*	10	*	S
<i>Carex crinita</i>	fringed sedge	-5	P-Sedge	*	7	*	S		4	6	*		*	2		6	*	*
<i>Carex cristatella</i>	crested sedge	-4	P-Sedge		3	*	*	*	3	4	*	*	*	3		3	*	*
<i>Carex crux-cervi</i>	raven's foot sedge	-5	P-Sedge	*	6	*	*	*	10 <sup>T</sup>	5	E		*	10 <sup>E</sup>	*	10		E

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†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Carex davisi</i>	Davis's sedge	-1	P-Sedge		3	*	*	*	8 <sup>S</sup>	4	T	*	*	6	*	10	*	*
<i>Carex douglasii</i>	Douglas's sedge	0	P-Sedge				S			*	*	*	*				*	*
<i>Carex elaeagnifolia</i>	slender-leaved sedge	5	P-Sedge				*	*		*	*	*	*				*	*
<i>Carex emoryi</i>	Emory's sedge	-5	P-Sedge	*	6	*	*	*	7	6	*	*	*	6	*	8	*	*
<i>Carex festucacea</i>	fescue sedge	0	P-Sedge	*	6	*	*	*	8 <sup>S</sup>	6	*	*	*	6		9	*	*
<i>Carex filifolia</i>	thread-leaved sedge	5	P-Sedge					*		*	*	*	*				*	*
<i>Carex fissa</i>	hardpan sedge	-1	P-Sedge	*				*		9					*			*
<i>Carex frankii</i>	Frank's sedge	-5	P-Sedge	*	4	*	*	*	4 <sup>S</sup>	5			*	5	*	7		*
<i>Carex granularis</i>	meadow sedge	-4	P-Sedge	*	3	*	*	*	2	4	*	*	*	3	*	3	*	*
<i>Carex gravida</i>	heavy sedge	5	P-Sedge	*	4	E	*	*	10 <sup>S</sup>	5	*	*	*	T	*	10	*	*
<i>Carex hallii</i>	Hall's sedge	0	P-Sedge								T	*	*				*	*
<i>Carex haydenii</i>	cloud sedge	-5	P-Sedge		8	*	*	*	8 <sup>S</sup>	10	*	T	*	10 <sup>X</sup>		9	*	*
<i>Carex hyalinolepis</i>	shoreline sedge	-5	P-Sedge	*	4	*	*	*	4 <sup>S</sup>	5	*		*	8	*	4		*
<i>Carex inops heliophila</i> <sup>5</sup>	yellow sedge	5	P-Sedge		7 <sup>E</sup>	*	*	*	*	7	*	*	*		*	10	*	*
<i>Carex interior</i>	interior sedge	-5	P-Sedge	*	10	*	*	*	3	10	*	*	*	8		6	*	*
<i>Carex lacustris</i>	lake bank sedge	-5	P-Sedge		6	*	*	*	6	10 <sup>E</sup>	*	*	*	5		5	*	*
<i>Carex laeviconica</i>	smooth cone sedge	-5	P-Sedge		10	*	*	*		9	*	*	*				*	*
<i>Carex leavenworthii</i>	Leavenworth's sedge	5	P-Sedge	*	2	*	*	*	*	3			*	6	*	8	*	*
<i>Carex leptalea</i>	bristle-stalked sedge	-5	P-Sedge	*	10	W	S		5	10	*	T		5	*	8	*	*
<i>Carex lupulina</i>	hop sedge	-5	P-Sedge	*	5	*	*	*	4	6	*		*	3	*	6	*	*
<i>Carex lurida</i>	sallow sedge	-5	P-Sedge	*	7	*	S		3	6	*			3	*	6	*	*
<i>Carex meadii</i>	Mead's sedge	0	P-Sedge	*	8	*	*	*	8	8	*	*	*	7	*	9	*	*
<i>Carex mesochorea</i>	oval-headed sedge	3	P-Sedge		*	*	*	*	*	5			*	E		8		*
<i>Carex microdonta</i>	little tooth sedge	0	P-Sedge	*				*		10 <sup>S</sup>					*			*
<i>Carex molesta</i>	troublesome sedge	0	P-Sedge	*	2	*	*	*	2	4	*	*	*	4		5	*	*
<i>Carex muhlenbergii</i>	sand sedge	5	P-Sedge	*	5	*	*	*	7	5	*		*	6	*	7	*	*
<i>Carex normalis</i>	larger straw sedge	-3	P-Sedge	*	4	*	*	*	5	4	*		*	4	*	6	*	*
<i>Carex oklahomensis</i>	Oklahoma sedge	0	P-Sedge	*				*		8 <sup>R</sup>					*			*
<i>Carex pellita</i> <sup>6</sup>	woolly sedge	-5	P-Sedge	*	4	*	*	*	2	5	*	*	*	6 <sup>P</sup>	*	4	*	*
<i>Carex pennsylvanica</i>	Pennsylvania sedge	5	P-Sedge	*	5	*	*	*	4	6	*	*		3		5	*	*
<i>Carex praegracilis</i>	expressway sedge	-3	P-Sedge		*	*	*	*	*	*	*	*	*		*		*	*
<i>Carex prairea</i>	fen panicked sedge	-5	P-Sedge		10	*	*		10		*	*	*	9		7	*	*
<i>Carex projecta</i>	necklace sedge	-4	P-Sedge	*	4	*	*		3	5	*			8 <sup>T</sup>		5	*	*
<i>Carex richardsonii</i>	prairie hummock sedge	5	P-Sedge		10	E	S		9 <sup>S</sup>		*	T		10 <sup>X</sup>		9	*	S
<i>Carex sartwellii</i>	running marsh sedge	-5	P-Sedge		5	*	*	*	5	10 <sup>B</sup>	*	*	*	9 <sup>P</sup>		9	*	*
<i>Carex saximontana</i>	Rocky Mountain sedge	5	P-Sedge				S				*	*	*				*	*
<i>Carex scoparia</i>	pointed broom sedge	-3	P-Sedge	*	5	*	*	*	4	4	*	*	*	4		5	*	*
<i>Carex shortiana</i>	Short's sedge	-4	P-Sedge	*	4	*	*	*		4				5	*	9	*	*
<i>Carex sicata</i> <sup>7</sup>	running savanna sedge	-1	P-Sedge		7	*	S		5		*	T	*	9		8	*	*
<i>Carex sparganioides</i>	bur-reed sedge	0	P-Sedge	*	4	*	*	*	5	6	*		*	3	*	5	*	*
<i>Carex squarrosa</i>	squarrose sedge	-5	P-Sedge	*	5	*	*	*	9 <sup>S</sup>	6	*		*	5	*	8		*
<i>Carex stipata</i>	sawbeak sedge	-5	P-Sedge	*	2	*	*	*	1	4	*	*	*	2	*	3	*	*
<i>Carex straminea</i>	straw sedge	-5	P-Forb			T			10 <sup>S</sup>	10 <sup>S</sup>				9 <sup>T</sup>	*			S
<i>Carex suberecta</i>	prairie straw sedge	-5	P-Sedge	*	7	*	*		8	10	*			9 <sup>P</sup>		10		S
<i>Carex tenera</i>	slender sedge	-1	P-Sedge	*	5	*	S		4	5	*	*	*	6	*	4	*	*
<i>Carex tetanica</i>	rigid sedge	-3	P-Sedge	*	8	*	*	*	9	10 <sup>S</sup>	*	*	*	8		8		*

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<sup>5</sup>See Swink and Wilhelm (1994), p. 212.

<sup>6</sup>= *Carex lanuginosa*; see Swink and Wilhelm (1994), p. 212.

<sup>7</sup>= *Carex foenea* of many midwestern authors (misapplied).

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Carex tonsa</i>	deep green sedge	5	P-Sedge		10 <sup>E</sup>	*	S		4	10 <sup>E</sup>	*							
<i>Carex tribuloides</i>	blunt broom sedge	-4	P-Sedge	*	3	*	*	*	3	3	*			4	*	5		*
<i>Carex typhina</i>	cat-tail sedge	-5	P-Sedge	*	6	*	*		9 <sup>T</sup>	7	*			6		9		*
<i>Carex umbellata</i>	umbel-like sedge	5	P-Sedge	*	6	*	S	*	5	6	*			9		7		*
<i>Carex utriculata</i>	beaked sedge	-5	P-Sedge		9 <sup>T</sup>	*	*		5		*	*		7 <sup>P</sup>		7	*	*
<i>Carex vesicaria</i>	inflated sedge	-5	P-Sedge		10	*	*		7	9 <sup>S</sup>	*			7		7	*	*
<i>Carex vulpinoidea</i>	fox sedge	-5	P-Sedge	*	2	*	*	*	1	4	*	*	*	3	*	3	*	*
<i>Castilleja coccinea</i>	Indian paintbrush	0	A-Forb	*	10	*	*	*	8	5	*			8	*	9		*
<i>Castilleja sessiliflora</i>	downy yellow painted cup	5	P-Forb		10 <sup>E</sup>		*	*		10 <sup>W</sup>	*	*	*		*		*	*
<i>Ceanothus americanus</i>	New Jersey tea	5	Shrub	*	7	*	*	*	8	7	*			6	*	7		*
† <i>Ceanothus herbaceus</i>	inland New Jersey tea	5	Shrub	*	10 <sup>E</sup>	X	*	*	9	8	*			10 <sup>E</sup>	*	9	*	*
<i>Cephalanthus occidentalis</i>	buttonbush	-5	Shrub	*	4	*	*	*	7	3	S			7	*	7		*
<i>Cerastium arvense</i>	prairie chickweed	4	P-Forb	*	4	*	*		6	4	*	*	*	2		8	*	*
<i>Chaerophyllum tainturieri</i>	southern chervil	5	A-Forb	*	1	*		*	3					*	*			
<i>Chaetopappa asteroides</i>	least daisy	5	A-Forb	*				*		10 <sup>S</sup>					*			
† <i>Chamaecrista fasciculata</i>	partridge pea	4	A-Forb	*	1	*	*	*	2	1	*			3	*	9	*	*
<i>Chamaecrista nictitans</i>	wild sensitive plant	4	A-Forb	*	2	W		*	3	2				*	*		*	*
<i>Chamaesyce geyeri</i>	Geyer's spurge	5	A-Forb		10	*	*	*	10 <sup>E</sup>	*	*	*			*		*	*
<i>Chamaesyce missurica</i>	Missouri spurge	5	A-Forb	*			S	*	8	T	*	*			*		*	*
<i>Chamaesyce serpyllifolia</i>	thyme-leaved spurge	5	A-Forb			*	*	*			*	*	*		*	*	*	*
<i>Chelone glabra</i>	turtlehead	-5	P-Forb	*	7	*	*		7	7	*			8		7		*
<i>Chloris verticillata</i>	windmill grass	5	P-Grass	*		*	*	*		1				*	*		*	*
<i>Chrysopsis pilosa</i>	soft golden aster	5	A-Forb	*				*	3						*			
<i>Cicuta maculata</i>	water hemlock	-5	B-Forb	*	4	*	*	*	4	5	*	*	*	3	*	6	*	*
<i>Cirsium altissimum</i>	tall thistle	5	P-Forb	*	3	*	*	*	5	4	*	*	*	5	*	6	*	*
<i>Cirsium carolinianum</i>	Carolina thistle	5	B-Forb	*	9	R				8				E	*			*
<i>Cirsium discolor</i>	field thistle	5	P-Forb	*	2	*	*		4	3	*			6		9		*
<i>Cirsium flodmanii</i>	Flodman's thistle	5	P-Forb			*	*	*			*	*	*				*	S
<i>Cirsium hillii</i>	prairie thistle	5	P-Forb		9 <sup>T</sup>	E	S		8 <sup>S</sup>		S			8 <sup>E</sup>		10		T
<i>Cirsium muticum</i>	swamp thistle	-5	B-Forb	T	9	*	S		6	9	*	T		8		8		*
<i>Cirsium undulatum</i>	wavy-leaved thistle	1	P-Forb			*	S	*		5	*	*	*		*		*	*
<i>Cladium mariscoides</i>	twig rush	-5	P-Sedge		10	*			10		S			10 <sup>P</sup>		9		*
<i>Claytonia virginica</i>	spring beauty	3	P-Forb	*	3	*	*	*	4	3	*			3	*	5		*
<i>Clematis fremontii</i>	Fremont's leather flower	5	P-Forb					*		10 <sup>W</sup>				*				
<i>Clematis pitcheri</i>	Pitcher's leather flower	3	W-Vine	*	5	R	*	*	6		*			*	*			
<i>Cleome semilata</i>	Rocky Mountain bee plant	4	A-Forb			*	*	*	2		*	*	*		*		*	*
<i>Coelorachis cylindrica</i>	joint grass	5	P-Grass	*				*	*	10 <sup>E</sup>					*			
<i>Collomia linearis</i>	slender gilia	3	A-Forb			*	*	*			*	*	*		*		*	*
† <i>Comandra umbellata</i>	false toadflax	3	P-Forb	*	6	*	*	*	5	6	*	*	*	7	*	6	*	*
<i>Commelina erecta</i>	narrow-leaved day flower	5	P-Forb	*	5	*	T	*	9 <sup>X</sup>	4	*			*	*		*	*
<i>Comptonia peregrina</i>	sweet fern	5	Shrub		9 <sup>E</sup>	W			6		*			8 <sup>T</sup>			*	*
<i>Coryza canadensis</i>	horseweed	1	A-Forb	*	0	*	*	*	0	0	*	*	*	0	*	0	*	*
<i>Coryza ramosissima</i>	dwarf fleabane	5	A-Forb	*	1	*	*	*		1	*	*	*	7 <sup>E</sup>	*		*	*
<i>Cooperia drummondii</i>	rain lily	5	P-Forb	*				*							*			
<i>Coreopsis grandiflora</i>	large-flowered coreopsis	5	P-Forb	*		*	*	*		6					*	*	*	*
<i>Coreopsis lanceolata</i>	sand coreopsis	3	P-Forb	*	5	*	*	*	8	7	*			*	*	5		*
<i>Coreopsis palmata</i>	prairie coreopsis	5	P-Forb	*	6	*	*	*	10 <sup>T</sup>	6	*			*	*		*	*
<i>Coreopsis tripteris</i>	tall coreopsis	0	P-Forb	*	6	*	*	*	7	6				7	*	9		*

contin

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Cornus amomum obliqua</i>	pale dogwood	-5	Shrub	*	4	*	*	*	2	5	*		*	2	*	5	*	*
<i>Cornus drummondii</i>	rough-leaved dogwood	0	Shrub	*	2	*	*	*	6	1			*	4	*	4	*	*
<i>Cornus racemosa</i>	gray dogwood	-2	Shrub	*	1	*	*		1	3	*	*	*	2	*	2	*	*
<i>Cornus sericea</i>	red-osier dogwood	-3	Shrub		3	*	*		2		*	*	*	4		2	*	*
<i>Corydalis aurea</i>	golden corydalis	5	A-Forb		5 <sup>E</sup>		T	*	5	3	*	*	*	*	*	8	*	*
<i>Corydalis crystallina</i>	mealy corydalis	5	B-Forb	*				*		7					*			
<i>Corydalis curvisiliqua grandibracteata</i>	large-bracted corydalis	5	A-Forb		10 <sup>T</sup>		E	*							*			
<i>Corydalis micrantha</i>	small-flowered corydalis	5	B-Forb	*	2	*	*	*		4	*		*		*		*	*
<i>Crotalaria sagittalis</i>	rattlebox	5	A-Forb	*	3	*	*	*	⊗	4	*		*	*	*		*	*
<i>Croton capitatus</i>	hogwort	5	A-Forb	*	0	*	*	*		0			*	*	*	⊗	*	
<i>Croton glandulosus septentrionalis</i>	sand croton	5	A-Forb	*	1	*	*	*	⊗	1			*	E	*			*
<i>Croton monanthogynus</i>	prairie tea	5	A-Forb	*	2	*	S	*	⊗	2			*	*	*			⊗
<i>Croton willdenowii</i>	rushfoil	5	A-Forb	*	5	E	S	*		6				*	*			
<i>Cunila origanoides</i>	dittany	5	P-Forb	*	5	*	*	*		5				*	*			
<i>Cuphea viscosissima</i>	waxweed	3	A-Forb	*	4	*	S	*		4			*	6	*			
<i>Cuscuta cuspidata</i>	cusp dodder	-4	A-Forb	*	5	X	*	*		6	*	*	*		*		*	*
<i>Cuscuta glomerata</i>	rope dodder	0	A-Forb	*	6	*	*	*	10 <sup>S</sup>	5	*	T	*	T	*		*	*
<i>Cuscuta gronovii</i>	common dodder	-3	A-Forb	*	2	*	*	*	3	4	*	*	*	3	*	4	*	*
<i>Cuscuta pentagona</i> <sup>8</sup>	prairie dodder	5	A-Forb	*	9	*	*	*	10	5	*	*	*	5 <sup>X</sup>	*	2	*	
<i>Cuscuta polygonorum</i>	knotweed dodder	5	A-Forb	*	6	*	*	*	9 <sup>S</sup>	5	*	*	*	7	*	7		*
<i>Cyperus echinatus</i>	hedgehog club rush	0	P-Sedge	*	2	*	*	*		3				*	*			
<i>Cyperus esculentus</i>	chufa	-3	P-Sedge	*	0	*	*	*	1	1	*	*	*	2	*	1	*	*
<i>Cyperus grayioides</i>	Gray's sedge	5	P-Sedge	*	8 <sup>T</sup>					10 <sup>E</sup>								
<i>Cyperus lancastrensis</i>	many-flowered flatsedge	1	P-Sedge	*	7					7				E	*			
<i>Cyperus lupulinus</i>	slender flatsedge	4	P-Sedge	*	5	*	*	*	2	4	*		*	3	*	7	*	*
<i>Cyperus pseudovegetus</i>	green flatsedge	-3	P-Sedge	*	5	R		*		5					*			
<i>Cyperus schweinitzii</i>	rough sand sedge	5	P-Sedge	*	5	*	*	*	5	6	*	*	*	9 <sup>P</sup>	*	9	*	*
<i>Cyperus strigosus</i>	straw-colored flatsedge	-3	P-Sedge	*	0	*	*	*	3	1	*		*	2	*	5	*	*
<i>Cypripedium candidum</i>	white lady's slipper	-5	P-Forb		10 <sup>E</sup>	R	S		10 <sup>T</sup>	10 <sup>E</sup>	S	T	*	10 <sup>T</sup>		10 <sup>E</sup>	*	T
<i>Cypripedium parviflorum</i>	small yellow lady's slipper	-1	P-Forb	*	10 <sup>E</sup>	R	*	*	7	8	*	T	*	10 <sup>E</sup>		7	*	S
<i>Cypripedium pubescens</i>	large yellow lady's slipper	-1	P-Forb	*	8	W	*	*	5	8	*	T	*	8 <sup>P</sup>	*	5	*	*
<i>Cypripedium reginae</i>	showy lady's slipper	-4	P-Forb	E	10 <sup>E</sup>	W	T		9	10 <sup>W</sup>	*	T		10 <sup>T</sup>		7		S
<sup>†</sup> <i>Dalea candida</i>	white prairie clover	5	P-Forb	*	10	*	*	*		8	*	*	*		*		*	*
<i>Dalea candida oligophylla</i>	western prairie clover	5	P-Forb					*			*	*	*		*		*	
<i>Dalea emeandra</i>	nine-anthered prairie clover	5	P-Forb		⊗		*	*		10 <sup>W</sup>		T	*		*		*	
<i>Dalea foliosa</i> <sup>9</sup>	leafy prairie clover	5	P-Forb		10 <sup>E</sup>													
<i>Dalea leporina</i>	foxtail dalea	5	A-Forb	⊗	⊗	*	*	*	⊗	4	*	*	*	⊗		*		*
<i>Dalea multiflora</i>	round-headed prairie clover	5	P-Forb					*		10 <sup>X</sup>			*		*			
<sup>†</sup> <i>Dalea purpurea</i>	purple prairie clover	5	P-Forb	*	9	*	*	*	10 <sup>X</sup>	8	*	*	*	X	*	10	*	*
<i>Dalea villosa</i>	silky prairie clover	5	P-Forb	E			E	*			*	*	*		*		*	S
<i>Danthonia spicata</i>	poverty oat grass	5	P-Grass	*	3	*	*	*	4	3	*	*		3	*	5	*	*
<i>Daucus pusillus</i>	small wild carrot	5	B-Forb	*	⊗			*		4					*			
<i>Delphinium carolinianum</i>	Carolina larkspur	5	P-Forb	*	10		S	*		7					*			
<i>Delphinium carolinianum</i> ssp. <i>virescens</i>	prairie larkspur	5	P-Forb	*	10		*	*		6	*	*	*		*		*	*
<i>Deschampsia cespitosa</i>	tufted hair grass	-5	P-Grass		8	R			9		*	*		10 <sup>P</sup>		9	*	S
<i>Descurainia incana</i>	hoary tansy mustard	5	B-Forb								*	*					*	

<sup>8</sup>See Swink and Wilhelm (1994), pp. 281 and 283.

<sup>9</sup>Federally designated as Endangered (USFWS 1994).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

continues

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Descurainia pinnata brachycarpa</i> <sup>10</sup>	tansy mustard	5	A-Forb	*	7	*	*	*	3	*	*	*	7 <sup>T</sup>	*		4	*	*
<i>Desmanthus illinoensis</i>	Illinois bundleflower	1	P-Forb	*	4	*	*	*	3	S	T		9				*	
<i>Desmodium canadense</i>	showy tick trefoil	1	P-Forb	*	5	*	*	*	3	4	*	*	*	5	*	5	*	*
<i>Desmodium ciliare</i>	hairy tick trefoil	5	P-Forb	*	7	*		*	10	5				6	*	10		
<i>Desmodium illinoense</i>	Illinois tick trefoil	5	P-Forb	*	5	*	*	*	6	4	*		*	10 <sup>E</sup>	*	10 <sup>X</sup>	*	*
<i>Desmodium marilandicum</i>	small-leaved tick trefoil	5	P-Forb	*	6	*		*	7	5				*	*	10		*
<i>Desmodium obtusum</i>	stiff tick trefoil	5	P-Forb	*	5	*		*	9	5				*	*			
<i>Desmodium paniculatum</i> <sup>11*</sup>	tall tick clover	5	P-Forb	*	2	*	*	*	4	3			*	4	*	6		*
<i>Desmodium sessilifolium</i>	sessile-leaved tick trefoil	5	P-Forb	*	6	*	S	*	8	5				8 <sup>E</sup>	*	10		
<i>Digitaria cognata</i>	fall witch grass	5	P-Grass	*	4	*	*	*	3	3	*		*	4	*	6		*
<i>Digitaria filiformis</i>	slender crab grass	5	A-Grass	*	6	*	S	*	10 <sup>X</sup>	4				X	*			
<i>Diodia teres</i>	buttonweed	3	A-Forb	*	2	*	S	*	2					*	*			*
<i>Diospyros virginiana</i>	persimmon	0	Tree	*	2	*	*	*	3					3	*			
<i>Distichlis spicata</i>	inland salt grass	5	P-Grass	*	*		*	*	10	*	*	*	*	*			*	
<i>Dodecatheon meadia</i>	shooting star	4	P-Forb	*	6	*	*	*	10 <sup>T</sup>	5	S		*	10	*			*
<i>Draba brachycarpa</i>	short-fruited whitlow grass	5	A-Forb	*	2	*		*	0				*	E	*			
<i>Draba reptans</i>	common whitlow grass	5	A-Forb	*	3	*	*	*	8 <sup>T</sup>	2	*	*	*	7 <sup>E</sup>	*		*	*
<i>Dracopis amplexicaulis</i>	coneflower	4	A-Forb	*	*			*	3 <sup>S</sup>		*			*				
<i>Drosera intermedia</i>	narrow-leaved sundew	-5	P-Forb		10 <sup>T</sup>	R			8	*	*			10 <sup>E</sup>		9		*
<i>Echinacea angustifolia</i>	narrow-leaved coneflower	5	P-Forb				*	*	10 <sup>S</sup>	*	*	*	*	*			*	
<i>Echinacea pallida</i>	pale purple coneflower	5	P-Forb	*	7	*	*	*	7				*	*	*	9		T
<i>Echinacea paradoxa</i>	yellow glade coneflower	5	P-Forb	T					9									
<i>Echinacea purpurea</i>	purple coneflower	5	P-Forb	*	6	*	S	*	10	5				8	*	10		*
<i>Eleocharis compressa</i>	flat-stemmed spike rush	-5	P-Sedge	*	7	*	*	*	9 <sup>T</sup>	6	*	*	*	9 <sup>T</sup>	*	8	*	T
<i>Eleocharis erythropoda</i>	red-rooted spike rush	-5	P-Sedge	*	3	*	*	*	4	5	*	*	*	4	*	4	*	*
<i>Eleocharis palustris</i> <sup>12</sup>	pale spike rush	-5	P-Sedge	*	8	*	*	*	*	*	*	*	*	4	*	*	*	*
<i>Eleocharis smallii</i>	Small's spike rush	-5	P-Sedge	*	5	*	*	*	5	5	*	*	*	4	*	6	*	*
<i>Eleocharis tenuis verucosa</i>	slender spike rush	-3	P-Sedge	*	6	*	*	*	5				*	*	*		*	
<i>Eleocharis wolfii</i>	Wolf's spike rush	-5	P-Sedge	*	10	T	S	*	10 <sup>E</sup>	E	T	*	E					X
<i>Elymus canadensis</i>	Canada wild rye	1	P-Grass	*	4	*	*	*	7	5	*	*	*	3	*	8	*	*
<i>Elymus glaucus</i>	blue wild rye	3	P-Grass	*					8 <sup>S</sup>	10		T					*	
<i>Elymus internuptus</i>	wild rye	5	P-Grass	*			S		10	*	*						*	*
<sup>†</sup> <i>Elymus trachycaudus</i>	slender wheat grass	0	P-Grass		8	*	*	*	8	*	*	*	*	8 <sup>T</sup>		7	*	*
<i>Elymus trachycaudus subsecundus</i>	bearded wheat grass	5	P-Grass		8 <sup>E</sup>	*	*	*	8	*	*	*	*				*	*
<i>Elymus villosus</i>	silky wild rye	3	P-Grass	*	4	*	*	*	5	4	*	*	*	4	*	7	*	*
<i>Elymus virginicus</i>	Virginia wild rye	-2	P-Grass	*	4	*	*	*	4	4	*	*	*	3	*	5	*	*
<i>Epilobium coloratum</i>	cinnamon willow herb	-5	P-Forb	*	3	*	*	*	3	6	*	T	*	2	*	3	*	*
<i>Epilobium leptophyllum</i>	fen willow herb	-5	P-Forb		9	*	*	*	6	10 <sup>E</sup>	*	*	*	7		7	*	*
<i>Equisetum arvense</i>	horsetail	0	Crptgm	*	0	*	*	*	0	0	*	*	*	0	*	0	*	*
<i>Equisetum hyemale</i>	scouring rush	-2	Crptgm	*	2	*	*	*	2	3	*	*	*	2	*	2	*	*
<i>Equisetum laevigatum</i>	smooth scouring rush	-3	Crptgm	*	4	*	*	*	2	4	*	*	*	8	*	7	*	*
<i>Equisetum sylvaticum</i>	wood horsetail	-3	Crptgm		10 <sup>E</sup>		T		5	*	T		7 <sup>P</sup>		7	*	*	
<i>Equisetum</i> × <i>ferrissii</i>	intermediate scouring rush	0	Crptgm	*	2	*	*	*	3	*	*	*	*	4	*		*	*
<i>Erigeron spectabilis</i>	purple love grass	5	P-Grass	*	3	*	*	*	3	3	*	T	*	2	*	6	*	*
<i>Erigeron trichodes</i>	sand love grass	5	P-Grass		5	*	*	*	4	*		*	*		*		*	*
<i>Erechtites hieracifolia</i>	fireweed	3	A-Forb	*	2	*	*	*	2	2	*		*	3	*	2	*	*
<i>Erigeron annuus</i>	annual fleabane	1	A-Forb	*	1	*	*	*	1	1	*	T	*	1	*	0	*	*

<sup>10</sup> Several recently discovered populations in Ohio appear to be introductions.

continue

<sup>11</sup> Included here *sensu lato*, conceptually encompassing material variously referred to as *D. dilenii*, *D. glabellum*, and *D. perplexum*.

<sup>12</sup> See Gleason and Cronquist (1991).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Erigeron glabellus</i>	smooth fleabane	5	B-Forb								*	*	*				*	*
<i>Erigeron philadelphicus</i>	marsh fleabane	-3	B-Forb	*	3	*	*	*	2	3	*	*	*	2	*	1	*	*
<i>Erigeron strigosus</i>	daisy fleabane	1	A-Forb	*	2	*	*	*	4	3	*	*	*	1	*	0	*	*
<i>Erigeron tenuis</i>	slender rough fleabane	5	P-Forb	*				*		4					*			
<i>Eriophorum angustifolium</i>	narrow-leaved cotton grass	-5	P-Sedge		10	R	S		10		*	*	*				*	*
<i>Eriophorum virginicum</i>	rusty cotton grass	-5	P-Sedge		10 <sup>E</sup>	*	S		10		*			10		10		*
<i>Eriophorum viridicaratum</i>	tall cotton grass	-5	P-Sedge		10 <sup>E</sup>	R			8		*	*		10 <sup>P</sup>		9		*
<i>Eryngium leavenworthii</i>	Leavenworth eryngo	5	A-Forb	*				*							*			
<i>Eryngium prostratum</i>	creeping coyote thistle	-5	P-Forb	*	5 <sup>E</sup>			*		6					*			
<i>Eryngium yuccifolium</i>	rattlesnake master	-1	P-Forb	*	8	*	*	*	10 <sup>T</sup>	8	S			10 <sup>P</sup>	*			*
<i>Erysimum capitatum</i> <sup>13</sup>	western wallflower	5	P-Forb	*	7	*	*	*	*	7	*	*	*	E	*		*	
<i>Erysimum inconspicuum</i>	small wormseed mustard	5	P-Forb		*	*	*	*	*	*	*	*	*	*		*	*	*
<i>Erythronium mesochoreum</i>	prairie dog-tooth violet	5	P-Forb	*	9 <sup>E</sup>	*	*	*		6			*		*			
<i>Eupatorium altissimum</i>	tall boneset	3	P-Forb	*	1	*	*	*	0	3	*		*	3	*	3	*	*
<i>Eupatorium maculatum</i>	spotted Joe-Pye weed	-5	P-Forb	*	5	*	*	*	4	10 <sup>E</sup>	*	*	*	6	*	3	*	*
<i>Eupatorium perfoliatum</i>	common boneset	-4	P-Forb	*	4	*	*	*	4	5	*	T	*	3	*	2	*	*
<i>Eupatorium serotinum</i>	late boneset	-1	P-Forb	*	1	*	*	*	0	1	*		*	3	*	*	*	*
<i>Euphorbia corollata</i>	flowering spurge	5	P-Forb	*	3	*	*	*	4	3	*		*	4	*	7	*	*
<i>Euphorbia dentata</i>	toothed spurge	5	A-Forb	*	0	*	*	*	*	0	*		*	*	*	*	*	*
<i>Euphorbia marginata</i>	snow-on-the-mountain	3	A-Forb	*	*	*	*	*	*	3	*	*	*	*	*	*	*	*
<i>Euphorbia spathulata</i>	prairie spurge	5	A-Forb	*	10 <sup>E</sup>	*	*	*		5	*	*	*		*		*	*
<sup>†</sup> <i>Euthamia graminifolia</i>	grass-leaved goldenrod	-2	P-Forb	*	3	*	*	*	3	3	*	*	*	2	*	2	*	*
<i>Euthamia gymnospermoides</i>	Great Plains goldenrod	-1	P-Forb	*	5	*	*	*	8	3	*		*	T	*		*	*
<i>Euthamia leptocepala</i>	western bushy goldenrod	3	P-Forb	*						8					*			
<i>Evolvulus nuttallianus</i>	Ozark morning glory	5	P-Forb	T	*			*		7		*	*		*		*	
<i>Festuca paradoxa</i>	cluster fescue	0	P-Grass	*	6	E	*	*		6	*		*		*			S
<i>Filipendula nuba</i>	queen of the prairie	-5	P-Forb		10 <sup>T</sup>	W	T		10 <sup>T</sup>	10 <sup>E</sup>	*			8		*	*	
<i>Fimbristylis autumnalis</i>	autumn sedge	-4	A-Sedge	*	6	*	S	*	6	5	*		*	4	*	9	*	*
<i>Fimbristylis dichotoma</i>	tall fimbry	-5	A-Sedge	*				*		5					*			
<i>Fimbristylis puberula</i>	glade fimbry	3	P-Sedge	*	9	E		*	10 <sup>X</sup>	5	*		*		*	10		E
<i>Fragaria virginiana</i>	wild strawberry	1	P-Forb	*	2	*	*	*	2	2	*		*	2	*	2	*	*
<i>Froelichia floridana</i>	large cottonweed	5	A-Forb	*	5	*	*	*		4	*		*	E	*		*	*
<i>Froelichia gracilis</i>	small cottonweed	5	A-Forb	*	*	*	*	*	*	3			*	*	*	*	*	*
<i>Fuirena simplex</i>	umbrella grass	-5	P-Sedge	*			S	*		7			*		*			
<i>Gaillardia aristata</i>	northern blanket flower	5	P-Forb		*						*	*					*	
<i>Galium boreale</i>	northern bedstraw	0	P-Forb		7	*	*		3	10 <sup>R</sup>	*	*	*	8		7	*	*
<i>Galium concinnum</i>	shining bedstraw	3	P-Forb	*	4	*	*	*	5	4	*		*	4	*	9	*	*
<i>Galium obtusum</i>	wild madder	-4	P-Forb	*	5	*	*	*	5	5	*		*	5	*	6	*	*
<i>Galium pilosum</i>	hairy bedstraw	5	P-Forb	*	7	*		*	6	6				4	*	9	*	*
<i>Galium tinctorium</i>	stiff bedstraw	-5	P-Forb	*	6	*	*		5	6	*			6		5	*	*
<i>Galium virgatum</i>	dwarf bedstraw	5	A-Forb	*	10 <sup>E</sup>			*		5					*			
<i>Gamochaeta purpurea</i>	early cudweed	3	A-Forb	*	2	*	S	*	0	3				3	*	10		*
<i>Gaura biennis</i>	biennial gaura	4	B-Forb		2	*	*		2		S			2		4	*	*
<i>Gaura coccinea</i>	scarlet gaura	5	P-Forb			*	*	*	4 <sup>S</sup>	*	*	*	*		*		*	*
<sup>‡</sup> <i>Gaura longiflora</i>	large-flowered gaura	5	B-Forb	*	5	*	*	*	1				*	*	*	*	*	*
<i>Gaura parviflora</i>	small-flowered gaura	5	B-Forb	*	*	*	*	*	2			*	*		*		*	*
<sup>†</sup> <i>Gentiana alba</i>	yellowish gentian	3	P-Forb	*	9	R	*	*	10 <sup>E</sup>	8	*			10 <sup>T</sup>	*	10		T
<i>Gentiana andrewsii</i>	closed gentian	-3	P-Forb		8	*	*	*	5	10 <sup>E</sup>	*	*	*	6		6	*	*

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<sup>13</sup> Sensus Rollins (1993).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Gentiana puberulenta</i>	downy gentian	3	P-Forb	*	9	T	*	*	10 <sup>E</sup>	9	*	*	*	10 <sup>E</sup>	*	10	*	*
<i>Gentiana saponaria</i>	soapwort gentian	-2	P-Forb	*	9	*	*	*	10 <sup>X</sup>					10 <sup>E</sup>	*			
† <i>Gentianella quinquefolia</i>	stiff gentian	0	A-Forb	*	7	*	*	*	9 <sup>T</sup>	10	*			9		9	*	*
† <i>Gentianopsis crinita</i>	fringed gentian	-4	A-Forb		10	*	*	*	8		*	T		8 <sup>P</sup>		8	*	*
<i>Gentianopsis procera</i>	small fringed gentian	-5	A-Forb		10	*	S	*	8		*	*	*	8 <sup>P</sup>		8		S
<i>Geranium carolinianum</i>	Carolina cranesbill	5	A-Forb	*	2	*	*	*	4	0	*	*	*	4	*	7	*	*
<i>Geum triflorum</i>	prairie smoke	5	P-Forb		10	*	*	*	10 <sup>T</sup>		*	*					*	*
<i>Glandularia bipinnatifida</i>	Dakota verbena	5	P-Forb	*		*	*	*					*		*		*	
<i>Glandularia canadensis</i>	rose vervain	5	P-Forb	*	7	*	*	*	*	5			*	*	*			
<i>Glyceria striata</i>	fowl manna grass	-5	P-Grass	*	4	*	*	*	4	4	*	*	*	2	*	3	*	*
<i>Glycyrrhiza lepidota</i>	wild licorice	4	P-Forb		*	*	*	*	3		*	*	*		*		*	S
<i>Gnaphalium obtusifolium</i>	old-field balsam	5	B-Forb	*	2	*	*	*	2	2	*		*	2	*	4	*	*
<i>Grindelia lanceolata</i>	spiny-toothed gumweed	5	P-Forb	*				*	3					*	*			
<i>Grindelia squarrosa</i>	gum plant	3	B-Forb	*	*	*	*	*	1	*	*	*	*	*	*		*	*
<i>Hedeoma hispida</i>	rough pennyroyal	5	A-Forb	*	2	*	*	*	3	3	*	*	*	8 <sup>T</sup>	*	7	*	*
<i>Hedyotis nigricans</i>	narrow-leaved bluets	5	P-Forb	*	8	R	*	*	5				*	8 <sup>P</sup>	*			
<i>Helenium autumnale</i>	sneezeweed	-4	P-Forb	*	3	*	*	*	3	5	*	*	*	4	*	7	*	*
<i>Helenium flexuosum</i>	purple-headed sneezeweed	-1	P-Forb	*	4	*	*	*	3	*	*			*	*	*	*	*
<i>Helianthemum bicknellii</i>	rockrose	5	P-Forb	*	7	*	*	*	10	6	*	E	*	9 <sup>T</sup>		9	*	*
<i>Helianthemum canadense</i>	common rockrose	5	P-Forb		7	*	*	*	8	10 <sup>S</sup>	*			9 <sup>T</sup>		9	*	*
<i>Helianthus angustifolius</i>	swamp sunflower	-2	P-Forb	*	10 <sup>T</sup>	*	*	*		7 <sup>E</sup>					*		*	
<i>Helianthus annuus</i>	common sunflower	1	A-Forb	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*
<i>Helianthus decapetalus</i>	pale sunflower	5	P-Forb		5	*	*	*	5	4				4	*	4	*	*
<i>Helianthus divaricatus</i>	woodland sunflower	5	P-Forb	*	5	*	*	*	5	6				5	*	7	*	*
<i>Helianthus giganteus</i>	tall sunflower	-3	P-Forb		9 <sup>E</sup>	*	*	*	5		*	*	*	6		6	*	*
<i>Helianthus grosseserratus</i>	sawtooth sunflower	-2	P-Forb	*	2	*	*	*	2	4	*	T	*	4	*	*	*	*
<i>Helianthus hirsutus</i>	oblong sunflower	5	P-Forb	*	5	*	*	*	10 <sup>S</sup>	4	*	*	*	5	*	*	*	*
<i>Helianthus maximiliani</i>	Maximilian sunflower	5	P-Forb	*	*	*	*	*	5		*	*	*	*	*	*	*	*
<i>Helianthus mollis</i>	downy sunflower	5	P-Forb	*	7	*	*	*	9 <sup>T</sup>	6			*	8 <sup>T</sup>	*	*	*	*
<i>Helianthus nuttallii</i>	Nuttall's sunflower	-3	P-Forb								*	*	*				*	
<i>Helianthus occidentalis</i>	western sunflower	4	P-Forb	*	7	*	*	*	8	5	*			7 <sup>P</sup>			*	*
† <i>Helianthus pauciflorus</i>	showy sunflower	5	P-Forb	*	6	*	*	*	5	5	*	*	*	4	*	8	*	*
<i>Helianthus petiolaris</i>	plains sunflower	5	A-Forb	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Helianthus salicifolius</i>	willow-leaved sunflower	5	P-Forb					*	8					*				
<i>Helianthus strumosus</i>	pale-leaved sunflower	5	P-Forb	*	4	*	*	*	4	4	*	*	*	5	*	7	*	*
<i>Helianthus tuberosus</i>	Jerusalem artichoke	0	P-Forb	*	3	*	*	*	6	3	*	*	*	3	*	*	*	*
<i>Helictotrichon hookeri</i>	spike oats	5	P-Grass								*	*						
<i>Helioopsis helianthoides</i>	false sunflower	5	P-Forb	*	5	*	*	*	5	5	*	*	*	5	*	3	*	*
<i>Heliotropium terrellum</i>	glade heliotrope	5	A-Forb	*	10 <sup>E</sup>	T	*	*	6						*			
† <i>Hieracium maximum</i>	cow parsnip	-3	P-Forb		6	*	*	*	3	6	*	*	*	4		3	*	*
<i>Heterotheca villosa</i>	golden aster	5	P-Forb	*	5	*	*	*		1	*	*	*	*	*		*	*
<i>Heuchera americana</i>	alum root	4	P-Forb	*	7	*	*	*	8	7			*	6	*	9	*	*
<i>Heuchera richardsonii</i>	prairie alum root	1	P-Forb		7	*	*	*	8	5	*	*	*		*		*	*
<i>Hexaletris spicata</i>	crested coral root	5	P-Forb	*	10 <sup>E</sup>	R	*	*		8				E	*			
<i>Hieracium canadense</i>	canada hawkweed	5	P-Forb		5	*	*	*	3		*	*	*	10		7	*	*
<i>Hieracium gronovii</i>	hairy hawkweed	5	P-Forb	*	5	*	*	*	5	4				6	*	9	*	*
<i>Hieracium longipilum</i>	long-bearded hawkweed	5	P-Forb	*	6	*	*	*	6	5	*	*	*	7 <sup>E</sup>	*	10	*	*
<i>Hieracium scabrum</i>	rough hawkweed	5	P-Forb	*	5	*	*	*	3	6	*			5	*	7	*	*

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

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SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Hieracium umbellatum</i>	narrow-leaved hawkweed	5	P-Forb				*		7			*	*			*	*	*
<i>Hierochloa odorata</i>	sweet grass	-3	P-Grass		7	*	*		9		*	*		8		5	*	*
<i>Houstonia caerulea</i>	bluets	0	A-Forb	*	7	*				6				4		10		S
<i>Houstonia longifolia</i>	long-leaved bluets	5	P-Forb	*	7	*		*	6	5	*	*		7	*	8		*
<i>Houstonia pusilla</i>	least bluets	4	A-Forb	*	3		*	*	3				*		*		*	
<i>Hymenopappus scabiosaeus</i>	old plainsman	5	B-Forb	*	9	*		*	7				*		*			
<i>Hypericum drummondii</i>	nits and lice	3	A-Forb	*	6	*	S	*	4					6	*			
<i>Hypericum gentianoides</i>	orange grass	3	A-Forb	*	6	*	E		6 <sup>S</sup>	5	*			4	*	10		*
<i>Hypericum kalmianum</i>	Kalm's St. John's wort	-2	Shrub		10 <sup>E</sup>	W			10					10 <sup>T</sup>		9		*
<i>Hypericum majus</i>	sand St. John's wort	-3	A-Forb		7	*	*	*	4	10 <sup>E</sup>	*	*	*	7 <sup>P</sup>		5	*	*
<i>Hypericum mutilum</i>	weak St. John's wort	-3	P-Forb	*	5	*	*	*	5	4				5	*	6		*
<i>Hypericum punctatum</i>	spotted St. John's wort	-1	P-Forb	*	3	*	*	*	4	3	*		*	3	*	5		*
<i>Hypericum sphaerocarpum</i>	round-fruited St. John's wort	3	P-Forb	*	5	*	*	*	8 <sup>T</sup>	5			*	7	*	6		T
<i>Hypoxis hirsuta</i>	yellow star grass	0	P-Forb	*	6	*	*	*	10	4	*	*	*	7	*	10	*	*
<i>Ionactis linariifolius</i>	flax-leaved aster	5	P-Forb	*	10	*	T	*		10				*	*			*
<i>Ipomoea lacunosa</i>	small morning glory	-3	A-Forb	*	1	*	S	*		1				*	*			
<i>Ipomoea pandurata</i>	wild sweet potato	3	P-Forb	*	2	*	*	*	6 <sup>T</sup>	2			*	3	*	9		
<i>Iris virginica shrevei</i>	blue flag iris	-5	P-Forb	*	5	*	*	*	5	6	*		*	6	*	5		*
<i>Isoetes butleri</i>	Butler's quillwort	-5	Crptgm	*	10 <sup>E</sup>			*		8					*			
<i>Iva annua</i>	marsh elder	0	A-Forb	*	0	*	S	*		0		*	*	*	*		*	
<i>Juncus acuminatus</i>	sharp-fruited rush	-5	P-Forb	*	4	*	*	*	8	4	*			3	*	6		*
<i>Juncus alpinoarticulatus fuscescens</i>	Richardson's rush	-5	P-Forb		8 <sup>E</sup>	*	S		5	10 <sup>X</sup>	*	*	*	10 <sup>T</sup>		5	*	*
<i>Juncus balticus</i>	lake shore rush	-5	P-Forb	*	4	R	*	*	4	10 <sup>E</sup>	*	*	*	9 <sup>P</sup>	*	5	*	*
<i>Juncus biflorus</i>	two-flowered rush	-3	P-Forb	*	5	*			8 <sup>S</sup>	5				4		10		
<i>Juncus brachycarpus</i>	short-fruited rush	-3	P-Forb	*	5	*		*	9 <sup>T</sup>	7	*			5	*	10		
<i>Juncus brachycephalus</i>	short-headed rush	-5	P-Forb		9	*			7		*	E		6		7		*
<i>Juncus brachyphyllus</i>	small-headed rush	4	P-Forb	*				*		8			*		*			
<i>Juncus dudleyi</i>	Dudley's rush	0	P-Forb	*	4	*	*	*	1	6	*	*	*	*	*	1	*	*
<i>Juncus effusus</i>	common rush	-5	P-Forb	*	4	*	S	*	3	5	*		*	1	*	4		*
<i>Juncus Greenei</i>	Greene's rush	0	P-Forb		7	*	S		10		*			7 <sup>E</sup>		9		*
<i>Juncus interior</i>	inland rush	-1	P-Forb	*	3	*	*	*		4	*	*	*	T	*		*	*
<i>Juncus longistylis</i>	large-flowered rush	-3	P-Forb								*	*	*				*	
<i>Juncus marginatus</i>	grass-leaved rush	-3	P-Forb	*	5	*	S	*	8	5	T		*	6	*	9	*	*
<i>Juncus nodatus</i>	stout rush	-5	P-Forb	*	6	*		*		6				*	*			
<i>Juncus nodosus</i>	joint rush	-5	P-Forb		6	*	*		5	10 <sup>E</sup>	*	*	*	4		5	*	*
<i>Juncus scirpoides</i>	round-leaved rush	-4	P-Forb	*	10	T		*	9 <sup>T</sup>	9			*	*	*		*	
<i>Juncus secundus</i>	secund rush	1	P-Forb	*	6	E				4				7 <sup>T</sup>	*	9		
<i>Juncus tenuis</i>	path rush	2	P-Forb	*	0	*	*	*	1	0	*		*	1	*	0	*	*
<i>Juncus Torreyi</i>	Torrey's rush	-3	P-Forb	*	3	*	*	*	4	6	*	*	*	3	*	3	*	*
<i>Juncus validus</i>	round-headed rush	-3	P-Forb	*				*		10 <sup>X</sup>					*			
<i>Juncus vaseyi</i>	Vasey's rush	-3	P-Forb		10 <sup>E</sup>		S		10 <sup>T</sup>		*	T				9		S
<i>Juniperus virginiana</i>	red cedar	3	Tree	*	1	*	*	*	3	2	*	*	*	3	*	4	*	*
<i>Koeleria macrantha</i>	june grass	5	P-Grass	*	7	*	*	*	9	6	*	*	*	10 <sup>E</sup>	*	10	*	*
<i>Krigia biflora</i>	false dandelion	3	P-Forb	*	7	*	*	*	5	5	*			7	*	10		*
<i>Krigia caespitosa</i>	opposite-leaved dwarf dandelion	5	A-Forb	*	1	T		*		2			*		*			
<i>Krigia dandelion</i>	potato dandelion	3	P-Forb	*	6	*	*	*		5				E	*			
<i>Krigia occidentalis</i>	western dwarf dandelion	5	A-Forb	*				*		7					*			
<i>Krigia virginica</i>	dwarf dandelion	5	A-Forb	*	4	*	E		4	3				9 <sup>T</sup>			*	

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†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Lactuca canadensis</i>	wild lettuce	2	B-Forb	*	1	*	*	*	2	2	*	*	*	2	*	3	*	*
<i>Lactuca ludoviciana</i>	western wild lettuce	5	B-Forb		10 <sup>E</sup>	X	*	*		10 <sup>X</sup>	*	*	*		*		*	*
<i>Lactuca tatarica</i> <sup>14</sup>	western blue lettuce	5	P-Forb			*	*	*	10 <sup>T</sup>	10 <sup>E</sup>	*	*	*		*		*	*
<i>Lathyrus ochroleucus</i>	pale vetchling	5	P-Forb		10 <sup>T</sup>	X	*		8		*	*	*	9 <sup>T</sup>		8	*	*
<i>Lathyrus palustris</i>	marsh vetchling	-3	P-Forb		6	*	*		7	10	*	*	*	7		6	*	*
<i>Lathyrus venosus</i>	veiny pea	0	P-Forb	*	9	T	*		8	8	*	*		8 <sup>E</sup>	*	8	*	*
<i>Leavenworthia uniflora</i>	Michaux's leavenworthia	4	A-Forb	*		E				7				T				
<i>Lechea intermedia</i>	savanna pinweed	5	P-Forb		10 <sup>E</sup>		T		6		*		*	7 <sup>T</sup>		7	*	
<i>Lechea mucronata</i>	hairy pinweed	5	P-Forb	*	7	*	T	*	5	5			*	7 <sup>T</sup>	*	9		*
<i>Lechea stricta</i>	bushy pinweed	5	P-Forb		8	X	*		10 <sup>S</sup>		*	E	*	*				*
<i>Lechea tenuifolia</i>	slender-leaved pinweed	5	P-Forb	*	6	*	*	*		4	*		*	8 <sup>E</sup>	*			*
<i>Leersia oryzoides</i>	rice cut grass	-5	P-Grass	*	3	*	*	*	3	4	*	*	*	1	*	3	*	*
<i>Lepidium virginicum</i>	common peppergrass	4	A-Forb	*	0	*	*	*	0	0	*	*	*	1	*	0	*	*
<i>Lespedeza capitata</i>	round-headed bush clover	3	P-Forb	*	4	*	*	*	5	6	*		*	6	*	7	*	*
<i>Lespedeza leptostachya</i> <sup>4</sup>	prairie bush clover	5	P-Forb		10 <sup>E</sup>		T				E							E
<i>Lespedeza repens</i>	creeping bush clover	5	P-Forb	*	6	*	S	*		4				7	*			*
<i>Lespedeza stuevei</i>	Stueve's bush clover	5	P-Forb	*	7	*		*		4					*			
<i>Lespedeza violacea</i>	violet bush clover	5	P-Forb	*	5	*	*	*	5	4			*	4	*	10		S
<i>Lespedeza virginica</i>	slender bush clover	5	P-Forb	*	5	*	*	*	7	5				2	*	10		T
<i>Lesquerella gracilis nuttallii</i>	slender bladderpod	5	A-Forb					*					*		*			
<i>Lesquerella ludoviciana</i>	silvery bladderpod	5	P-Forb		10 <sup>E</sup>		S	*			E	*	*				*	T
<i>Leucospora multifida</i>	obe-wan-conobea	-4	A-Forb	*	3	*	E	*	8	4			*	8	*	8		
<i>Liatris aspera</i>	rough blazing star	5	P-Forb	*	7	*	*	*	4	6	*	*	*	6	*	10	*	*
<i>Liatris cylindracea</i>	cylindrical blazing star	5	P-Forb	*	8	*	*		5	7	*			8 <sup>T</sup>		10	*	*
<i>Liatris ligulistylis</i>	blazing star	5	P-Forb	*	9	*	*			9 <sup>S</sup>	*	*	*				*	*
<i>Liatris mucronata</i>	narrow-leaved gayfeather	5	P-Forb	*				*		10			*		*			
<i>Liatris punctata</i>	dotted blazing star	5	P-Forb	*			*	*	10 <sup>X</sup>	10 <sup>W</sup>	*	*	*		*		*	E
<i>Liatris pycnostachya</i>	prairie blazing star	1	P-Forb	*	6	T	*	*		6	*	*	*	*	*		*	*
<i>Liatris spicata</i>	marsh blazing star	0	P-Forb	*	7	*			8	10 <sup>X</sup>				8		9 <sup>R</sup>		S
<i>Liatris squarrosa</i>	scaly blazing star	5	P-Forb	*	7	W	*	*		5			*	8 <sup>P</sup>	*		*	
<i>Lilium michiganense</i>	Michigan lily	-1	P-Forb	*	6	*	*	*	5	7	*		*	7	*	7	*	*
<i>Lilium philadelphicum</i>	prairie lily	1	P-Forb		10	*	*		10		*	*	*	8 <sup>T</sup>		8	*	*
<i>Linum medium texanum</i>	small yellow flax	3	P-Forb	*	7	*	S	*	7	5				6	*	10	*	*
<i>Linum rigidum</i>	stiff-stemmed flax	5	A-Forb				*	*			*	*	*		*		*	*
<i>Linum sulcatum</i>	grooved yellow flax	5	A-Forb	*	8	R	*	*	8 <sup>S</sup>	5	*	*	*	8 <sup>P</sup>	*	8	*	*
<i>Liparis loeselii</i>	green twayblade	-4	P-Forb	T	8	W	*	*	5	10	*	*	*	9		5	*	*
<i>Lithospermum canescens</i>	hoary puccoon	5	P-Forb	*	6	*	*	*	10	6	*	*	*	7	*	10	*	*
<i>Lithospermum carolinense</i>	puccoon	5	P-Forb	*	7	*	*	*	10	6	*		*	9 <sup>T</sup>	*	8	*	*
<i>Lithospermum incisum</i>	fringed puccoon	5	P-Forb	*	8	E	*	*	10 <sup>X</sup>	7	*	*	*		*	10	*	*
<i>Lobelia cardinalis</i>	cardinal flower	-5	P-Forb	*	6	*	*	*	7	6	*		*	7	*	7	*	*
<i>Lobelia kalmii</i>	bog lobelia	-5	P-Forb		10	*	S		10		*	*		9		9	*	*
<i>Lobelia siphilitica</i>	great blue lobelia	-4	P-Forb	*	4	*	*	*	4	4	*	*	*	4	*	6	*	*
<i>Lobelia spicata</i>	pale spiked lobelia	0	P-Forb	*	5	*	*	*	4	5	*	*	*	6	*	8	*	*
<i>Lomatium foeniculaceum</i>	hairy parsley	5	P-Forb				E	*		9		*	*		*		*	*
<i>Lomatium orientale</i>	biscuit root	5	P-Forb				T	*			*	*	*		*		*	*
<i>Lotus unifolius</i>	Clements' prairie trefoil	5	A-Forb	*			*	*		7	*	*	*		*		*	*
<i>Ludwigia alternifolia</i>	seedbox	-5	P-Forb	*	5	*	*	*	8 <sup>T</sup>	4			*	5	*	10	*	*

<sup>4</sup> Federally designated as Threatened (USFWS 1994).

<sup>14</sup> Including subspecies *oblongifolia* and *pukhella*.

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

continues

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Ludwigia palustris</i>	water purslane	-5	P-Forb	*	4	*	*	*	4	5	*		*	4	*	5	*	
<i>Ludwigia polycarpa</i>	false loosestrife	-5	P-Forb	*	5	*	*	*	6	6	*		*	7		8	*	
<i>Lupinus perennis occidentalis</i> *	wild lupine	5	P-Forb		8	*	T		7		*			10 <sup>P</sup>		10	*	
<i>Luzula multiflora</i> <sup>15</sup>	wood rush	3	P-Forb	*	5	*	*	*	5	4	*		*	5 <sup>T</sup>	*	6	*	*
<i>Lycopus americanus</i>	common water horehound	-5	P-Forb	*	3	*	*	*	2	4	*	*	*	3	*	4	*	*
<i>Lycopus asper</i>	rough water horehound	-5	P-Forb		1	*	*	*	10		*	*	*				*	*
<i>Lycopus uniflorus</i>	northern bugle weed	-5	P-Forb		7	*	*	*	2	5	*	*	*	3	*	5	*	*
<i>Lygodesmia juncea</i>	skeleton plant	5	P-Forb	*		*	*	*		10 <sup>W</sup>	*	*	*		*		*	
<i>Lysimachia ciliata</i>	fringed loosestrife	-3	P-Forb	*	4	*	*	*	4	5	*	*	*	4	*	4	*	*
<i>Lysimachia hybrida</i>	hybrid loosestrife	-5	P-Forb	*	7	*	*	*	10 <sup>S</sup>	6	*	*	*				*	*
<i>Lysimachia lanceolata</i>	lance-leaved loosestrife	0	P-Forb	*	6	*	*		9	4				8	*		*	
<i>Lysimachia quadriflora</i>	narrow-leaved loosestrife	-5	P-Forb	*	8	*	*		10	8	*	*		8		10	*	
<i>Lysimachia terrestris</i>	swamp candles	-5	P-Forb		8	*	*		6		*			6		6	*	*
<i>Lysimachia thyrsoiflora</i>	tufted loosestrife	-5	P-Forb		7	*	*	*	6	10 <sup>E</sup>	*	*	*	6		7	*	*
<i>Lythrum alatum</i>	winged loosestrife	-5	P-Forb	*	5	*	*	*	9	6	*	*	*	7	*	5	*	*
<i>Machaeranthera pinnatifida</i>	cutleaf ironplant	5	P-Forb	*			*	*			S	*	*		*		*	
† <i>Maianthemum stellatum</i>	starry false Solomon's seal	1	P-Forb	*	5	*	*	*	5	7	*	*	*	5	*	6	*	*
<i>Malus ioensis</i>	Iowa crab	5	Tree	*	3	*	*	*	4	3	*		*		*		*	*
<i>Malvastrum hispidum</i>	false mallow	5	A-Forb	*	5 <sup>E</sup>		S	*		5 <sup>W</sup>			*		*			
<i>Manfreda virginica</i>	American aloe	5	P-Forb	*	8	W				7			T		*			
<i>Marshallia caespitosa</i>	Barbara's buttons	5	P-Forb	*				*		9 <sup>S</sup>					*			
<i>Melanthium virginicum</i>	bunch flower	-4	P-Forb	*	10 <sup>T</sup>	E	*	*		7	*		10 <sup>T</sup>	*				
<i>Melica nitens</i>	tall melic grass	5	P-Grass	*	7	t	*	*		6	T		*	E	*			S
† <i>Mentha canadensis</i>	wild mint	-5	P-Forb		4	*	*	*	3	5	*	*	*	2		3	*	*

<i>Mentzelia oligosperma</i>	stickleaf	5	P-Forb	*	10			*		6			*		*		*	
† <i>Mimosa quadrivalvis nuttallii</i>	sensitive briar	5	H-Vine	*	7		S	*	*	6			*		*		*	
<i>Mimulus ringens</i>	monkey flower	-5	P-Forb	*	5	*	*	*	5	5	*	*	*	5	*	6	*	*
<i>Minuartia michauxii</i>	stiff sandwort	5	P-Forb	*	10	R	S	*	10	9	*		*	10 <sup>P</sup>	*	8	*	*
<i>Minuartia patula</i>	slender sandwort	5	A-Forb	*	8 <sup>T</sup>	*		*		7	*			E	*			
<i>Mirabilis albida</i>	pale umbrellawort	5	P-Forb	*	*		*	*	*	5	*	*	*	*	*			
<i>Mirabilis hirsuta</i>	hairy umbrellawort	5	P-Forb	*	5 <sup>E</sup>	*	*	*	*	3	*	*	*			*	*	*
<i>Mirabilis linearis</i>	narrow-leaved umbrellawort	5	P-Forb	*	*	*	*	*	*	8	*	*	*		*		*	*
<i>Mirabilis nyctaginea</i>	wild four o'clock	5	P-Forb	*	*	*	*	*	*	0	*	*	*	*	*	*	*	*
<i>Monarda citriodora</i>	lemon mint	5	A-Forb	*	*			*		8					*			
<i>Monarda fistulosa</i>	wild bergamot	3	P-Forb	*	4	*	*	*	2	4	*	*	*	5	*	6	*	*
<i>Monarda punctata</i>	spotted bee balm	5	P-Forb	*	5	*	*	*	4	9	*			7 <sup>E</sup>	*	9	*	*
<i>Muhlenbergia asperifolia</i>	scratch grass	-3	P-Grass	*	*	*	S	*	*	*	*	*	*	*	*	*	*	*
<i>Muhlenbergia cuspidata</i>	prairie satin grass	5	P-Grass	*	10	E	*	*	10 <sup>X</sup>	10	*	*	*	E	*		*	*
<i>Muhlenbergia frondosa</i>	common satin grass	-3	P-Grass	*	3	*	*	*	3	3	*	*	*	3	*	5	*	*
<i>Muhlenbergia glabrifloris</i>	smooth satin grass	5	P-Grass	*	7	*	*			7								
<i>Muhlenbergia glomerata</i>	marsh wild timothy	-4	P-Grass		10	*	*		10		*	*	*	9		7	*	*
<i>Muhlenbergia mexicana</i>	leafy satin grass	-3	P-Grass	*	4	*	*	*	3	5	*	*	*	5	*	1	*	*
<i>Muhlenbergia racemosa</i>	upland wild timothy	-3	P-Grass		0	*	*	*	*	4	*	*	*		*		*	*
<i>Muhlenbergia richardsonis</i>	mat muhly grass	-1	P-Grass						10 <sup>T</sup>		*	*	*				*	*
<i>Nassella viridula</i>	green needlegrass	5	P-Grass	*	*		*	*			*	*	*				*	*
<i>Nemastylis geminiflora</i>	celestial lily	5	P-Forb					*		10 <sup>W</sup>					*			
<i>Nemastylis nuttallii</i>	Nuttall's prairie iris	5	P-Forb	*						9 <sup>S</sup>					*			
† <i>Nothocalais cuspidata</i>	prairie dandelion	5	P-Forb	*	10 <sup>E</sup>		*	*		10 <sup>R</sup>	*	*	*		*		*	S

<sup>15</sup> Including *Luzula bulbosa*.

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

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SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Nothoscordum bivalve</i>	false garlic	5	P-Forb	*	5	R		*	4					T	*			
<sup>†</sup> <i>Nuttallanthus canadensis</i>	blue toadflax	5	A-Forb	4	*	*	*	8	3	*				8 <sup>E</sup>	*	4	*	*
<i>Nuttallanthus texanus</i>	southern blue toadflax	5	A-Forb	*	4			*	3	*	*	*			*		*	
<i>Oenothera biennis</i> <sup>16</sup>	common evening primrose	3	B-Forb	*	1	*	*	*	2	0	*	*	*	2	*	0	*	*
<i>Oenothera delandii</i>	sand evening primrose	5	B-Forb	*	5	*	*		7		*					9	*	*
<i>Oenothera fruticosa</i> s.l.	northern sundrops	5	P-Forb		9	*			7	10 <sup>S</sup>				5	*	⊗		
<i>Oenothera laciniosa</i>	ragged evening primrose	3	A-Forb	*	2	*	*	*	3	1	*	T	*	3	*	⊗	*	⊗
<i>Oenothera linifolia</i>	thread-leaved sundrops	5	A-Forb	*	8			*	4						*			
<i>Oenothera macrocarpa</i>	Missouri primrose	5	P-Forb	*	10			*	7				*		*			
<i>Oenothera nuttallii</i>	white evening primrose	5	P-Forb		⊗			*	⊗		*	*	*				*	⊗
<i>Oenothera perennis</i>	small sundrops	0	P-Forb	T	8 <sup>E</sup>	T	T		5	10 <sup>E</sup>	*			4		6	*	*
<i>Oenothera pilosella</i>	prairie sundrops	1	P-Forb	*	6	*	*		⊗	6				4		8		⊗
<i>Oenothera rhombipetala</i>	western sand evening primrose	5	B-Forb	*	⊗	*	*	*	⊗	3	S	T	*		*		*	*
<i>Oenothera speciosa</i>	showy evening primrose	5	P-Forb	*	⊗	⊗	S	*	2				*	⊗	*			
<i>Oenothera triloba</i>	stemless evening primrose	5	A-Forb	*	⊗	X		*	9 <sup>W</sup>					X	*			
<i>Onoclea sensibilis</i>	sensitive fern	-3	Crptgm	*	5	*	*	*	2	6	*	T	*	3	*	4	*	*
<i>Onosmodium molle hispidissimum</i>	marbleseed	5	P-Forb	*	5	E	*	*	4	*	*	*	*	8 <sup>P</sup>	*	8		S
<i>Onosmodium molle occidentale</i>	false gromwell	5	P-Forb	*	8		*	*	4	*	*	*			*		*	
<i>Onosmodium molle subsetosum</i>	Ozark false gromwell	5	P-Forb	*					6						*			
<i>OphioGLOSSUM engelmannii</i>	glade adder's tongue	4	Crptgm	*	9	R		*	6					E	*			
<i>Opuntia fragilis</i>	little prickly pear	5	Shrub		10 <sup>E</sup>		T	*	10 <sup>E</sup>		*	*	*		*		*	T
<i>Opuntia humifusa</i>	prickly pear	5	Shrub	*	5	*	*	*	7	4				9 <sup>P</sup>	*	10 <sup>E</sup>	*	*
<i>Opuntia macrothiza</i>	plains prickly pear	5	Shrub	*	8		E	*	10 <sup>R</sup>	S		*			*		*	*
<i>Orbexilum onobrychis</i>	French grass	5	P-Forb	*	6	*	E		7					9		10		
<i>Orbexilum pedunculatum</i>	Sampson's snakeroot	5	P-Forb	*	6	*		*	0	7				8 <sup>P</sup>	*			
<i>Orobanche fasciculata</i>	clustered broom rape	5	P-Forb		10 <sup>E</sup>	E	E	*	10 <sup>T</sup>		S	*	*		*	10	*	T
<i>Orobanche ludoviciana</i>	Louisiana broom rape	5	P-Forb		10 <sup>E</sup>	T	S	*	10 <sup>E</sup>	S	*	*	X	*		*	S	
<i>Orobanche uniflora</i>	one-flowered broom rape	5	P-Forb	*	8	*	*	*	8	7	S	T	*	7	*	8	*	S
<i>Orthocarpus luteus</i>	owl clover	5	A-Forb								*	*	*				*	
<i>Oxalis dillenii</i>	yellow wood sorrel	5	P-Forb	*	0	*	*	*	0	0	*	*	*	0	*	0	*	*
<i>Oxalis violacea</i>	violet wood sorrel	5	P-Forb	*	5	*	*	*	10 <sup>T</sup>	5	*	*	*	6	*		*	*
<i>Oxypholis rigidior</i>	cowbane	-5	P-Forb	*	7	*	*		6	7	*			8	*	9	*	*
<i>Oxytropis lambertii</i>	loco weed	4	P-Forb				*	*	10 <sup>W</sup>	*	*	*			*		*	
<i>Panicum anceps</i>	beaked panic grass	-3	P-Grass	*	3	*		*	2					*	*			
<i>Panicum bicknellii</i> *	Bicknell's panic grass	5	P-Grass	*		E			8					8 <sup>T</sup>				
<i>Panicum boreale</i> *	northern panic grass	0	P-Grass		10 <sup>E</sup>	R	E		7		*			8 <sup>T</sup>		7	*	*
<i>Panicum clandestinum</i> *	deer tongue grass	-3	P-Grass	*	4	*	*	*	3	4				3	*	8		*
<i>Panicum depauperatum</i> *	starved panic grass	5	P-Grass	*	5	*	*	*	4	4	*			9	*	6		*
<i>Panicum flexile</i>	wiry panic grass	-4	A-Grass	*	7	*	*	*	8	4		*		*	*	8	*	*
<sup>†</sup> <i>Panicum lamuginosum implicatum</i> <sup>17</sup> *	slender-stemmed panic grass	3	P-Grass	*	1	*	*	*	3	2	*	*	*	2	*	2	*	*
<i>Panicum lamuginosum lindheimeri</i> *	smooth woolly panic grass	-1	P-Grass	*	4	*	*	*	8	3			*	*	*	8		*
<i>Panicum leibergii</i> *	prairie panic grass	2	P-Grass		7	T	*	*	10 <sup>T</sup>	9 <sup>S</sup>	*	*	*	E		10	*	*
<i>Panicum linearifolium</i> *	slender-leaved panic grass	5	P-Grass	*	7	*	T	*	4	5	*			4	*	6		*
<i>Panicum oligoanthos</i> s.l.*	Scribner's panic grass	3	P-Grass	*	3	*	*	*	5	3	*	*	*	7	*	7	*	*
<i>Panicum perlongum</i> *	long-stalked panic grass	5	P-Grass	*	9	*	*	*	10	7	*	*	*	E	*	10	*	*
<i>Panicum polyanthos</i> *	small-fruited panic grass	5	P-Grass	*	6	*		*	10	7				*	*			
<i>Panicum praecoxius</i> *	early-branching panic grass	5	P-Grass		7	*	*	*	8	5	*	T	*	*	*	9	*	*
<i>Panicum rigidulum</i>	Munro grass	-3	P-Grass	*	5	*		*	7	3				4	*	9		*

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<sup>16</sup> Including *O. stringosa* and *O. villosa*.

<sup>17</sup> Including variety *fasciculatum*.

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Panicum scoparium</i> *	velvety panic grass	-3	P-Grass	*	9	E		*		8					*			
<i>Panicum sphaerocarpon</i> *	round-fruited panic grass	3	P-Grass	*	7	*		*	5	5				4	*	8		
<i>Panicum virgatum</i>	switch grass	-1	P-Grass	*	4	*	*	*	4	4	*	*	*	4	*	6	*	*
<i>Panicum wilcoxianum</i> *	Wilcox's panic grass	5	P-Grass		10	*	*	*			*	*	*		*		*	S
<i>Parnassia glauca</i>	grass of Parnassus	-5	P-Forb		10	*	*		8		*	*		10		8	*	
<i>Paronychia canadensis</i>	tall forked chickweed	5	A-Forb	*	5	*	*	*	8	4	S		*	4	*	10	*	
<i>Paronychia fastigiata</i>	low forked chickweed	5	A-Forb	*	5	*	*	*	8 <sup>S</sup>	5	S			7	*	10	*	
<i>Parthenium integrifolium</i>	wild quinine	5	P-Forb	*	7	*	*	*		6	E			*				T
<i>Parthenium integrifolium hispidum</i>	hairy feverfew	5	P-Forb	*				*		9					*			
<sup>†</sup> <i>Pascopyron smithii</i>	western wheat grass	2	P-Grass	*	∅	∅	*	*	∅	0	*	*	*	∅	*		*	∅
<i>Paspalum floridanum</i>	Florida bead grass	-3	P-Grass	*	7			*		5				∅	*			
<i>Paspalum laeve</i>	smooth lens grass	5	P-Grass	*	2	*		*		2				*	*			
<i>Paspalum pubiflorum</i>	hairy-flowered bead grass	-3	P-Grass	*	3	*		*		4				*	*			
<sup>†</sup> <i>Paspalum setaceum</i>	hairy lens grass	5	P-Grass	*	3	*	*	*	4	3	*		*	3	*	8	*	
<i>Pedicularis canadensis</i>	lousewort	2	P-Forb	*	7	*	*	*	10	5	*	*	*	6	*	7	*	*
<i>Pedicularis lanceolata</i>	swamp lousewort	-4	P-Forb	*	9	*	*	*	8	9	*	*	*	8		9	*	*
<i>Pedimelum angophyllum</i>	silvery scurfy pea	5	P-Forb		∅		*	*		9 <sup>W</sup>	*	*	*		*		*	S
<i>Pedimelum esculentum</i>	prairie turnip	5	P-Forb	*			*	*		10	*	*	*		*		*	S
<i>Penstemon albidus</i>	white beard tongue	5	P-Forb				S	*			*	*	*		*		*	
<i>Penstemon cobaea</i>	showy beard tongue	5	P-Forb	*	∅		S	*		10			*		*			
<i>Penstemon digitalis</i>	foxglove beard tongue	1	P-Forb	*	4	*	*	*	2	4	∅		*	3	*	6	*	
<i>Penstemon gracilis</i>	slender beard tongue	5	P-Forb		∅	∅	T		10 <sup>E</sup>		*	*	*				*	*
<i>Penstemon grandiflorus</i>	large-flowered beard tongue	5	P-Forb		8 <sup>E</sup>	*	*	*		10 <sup>E</sup>	*	*	*		*		*	*
<i>Penstemon hirsutus</i>	hairy beard tongue	5	P-Forb		8	*			5					6		7		S
<i>Penstemon pallidus</i>	pale beard tongue	5	P-Forb	*	6	*	*	*	5	4	∅			7 <sup>T</sup>				S
<i>Penstemon tubaeformis</i> *	funnelform beard tongue	5	P-Forb	*	5	X	S	*		5			*	X	*		*	
<i>Pentstemonoides floribunda</i>	shrubby cinquefoil	-3	Shrub		10	*	T		10		*	*		10		9	*	*
<i>Phacelia glioides</i>	small-flowered phacelia	5	A-Forb	*	10			*		3					*			
<i>Phacelia hirsuta</i>	hairy phacelia	5	A-Forb	*				*		4					*			
<i>Phalaris caroliniana</i>	May grass	5	A-Grass	*				*		∅				∅	*			
<i>Phlox bifida</i>	sand phlox	5	P-Forb	*	7	*	S	*	10 <sup>T</sup>	8								S
<i>Phlox glaberrima</i>	marsh phlox	-3	P-Forb	*	6	*				8				P			*	E
<i>Phlox maculata</i>	sweet William phlox	-5	P-Forb		10	*	*		10 <sup>T</sup>	10 <sup>RL</sup>	*			7		∅		
<i>Phlox pilosa</i>	sand prairie phlox	1	P-Forb	*	7	*	*	*	7	6				7	*	9	*	
<i>Phlox pilosa fulgida</i>	prairie phlox	-1	P-Forb	*	7	*	*	*	7	6	*	E	*		*		*	*
<i>Phlox pilosa sangamonensis</i>	Sangamon phlox	1	P-Forb		10 <sup>E</sup>													
<i>Phyla lanceolata</i>	fog fruit	-5	P-Forb	*	1	*	*	*	6	3	*		*	6	*	8	*	*
<i>Physalis heterophylla</i>	clammy ground cherry	5	P-Forb	*	2	*	*	*	3	3	*	*	*	3	*	3	*	*
<i>Physalis longifolia</i>	ground cherry	5	P-Forb	*	∅	*	*	*	1	2	*	*	*	2	*		*	*
<i>Physalis pumila</i>	prairie ground cherry	5	P-Forb	*	5		*	*		6			*	*	*		*	
<i>Physalis virginiana</i>	lance-leaved ground cherry	5	P-Forb	*	3	*	*	*	3	3	*	*	*	*	*	8	*	*
<i>Physostegia angustifolia</i>	false dragonhead	0	P-Forb	*	7			*		6					*			
<i>Physostegia virginiana</i> <sup>18</sup>	obedient plant	-3	P-Forb	*	6	*	*	*	8	5	*	*	*	6	*	8	*	*
<i>Plantago aristata</i>	bracted plantain	5	A-Forb	*	1	*	*	*	∅	1	*		*	∅	*	∅	*	*
<i>Plantago eriopoda</i>	alkali plantain	0	P-Forb								*	*	*				*	
<i>Plantago patagonica</i>	Patagonia plantain	5	A-Forb	*	∅	∅	*	*		∅	*	*	*	E	*	∅	*	*
<i>Plantago pusilla</i>	slender plantain	3	A-Forb	*	3	*		*		1					*		*	*
<i>Plantago virginica</i>	dwarf plantain	4	A-Forb	*	1	*	*	*	∅	1	*			0	*	∅	*	*

<sup>18</sup> Much of the prairie material is referable to subspecies *praemorsa* (=variety *arenaria*).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

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SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Platanthera ciliaris</i>	orange fringed orchid	-3	P-Forb	*	10 <sup>E</sup>	E			10 <sup>T</sup>	10 <sup>E</sup>				10 <sup>T</sup>	*	10		
<i>Platanthera clavellata</i>	club-spur orchid	-5	P-Forb	*	10 <sup>E</sup>	R	S		6	10 <sup>E</sup>	S			8 <sup>P</sup>	*	8		*
<i>Platanthera flava</i>	southern rein orchid	-3	P-Forb	*	10 <sup>E</sup>	E				10 <sup>S</sup>					*			
<i>Platanthera flava herbiola</i>	northern rein orchid	-3	P-Forb		10 <sup>E</sup>	W	E	*	10	10 <sup>S</sup>	E			6 <sup>P</sup>		8		T
<i>Platanthera lacera</i>	ragged fringed orchid	-3	P-Forb	*	9	W	S	*	6	10	*			6	*	6		*
<i>Platanthera leucophaea</i> <sup>4</sup>	eastern prairie fringed orchid	-4	P-Forb		10 <sup>E</sup>	X	E		10 <sup>E</sup>	10 <sup>X</sup>				10 <sup>T</sup>	*	10 <sup>R</sup>		E
<i>Platanthera praedara</i> <sup>4</sup>	western prairie fringed orchid	0	P-Forb				T	*		10 <sup>E</sup>	E	E	T		*		*	
<i>Platanthera psycodes</i>	purple fringed orchid	-3	P-Forb		10 <sup>E</sup>	R	T		7		*			9 <sup>E</sup>		8		*
<i>Poa arida</i>	plains blue grass	3	P-Grass				S	*			*	*	*		*		*	
<i>Poa interior</i>	inland bluegrass	5	P-Grass							10 <sup>E</sup>	*	*	*				*	
<i>Poa palustris</i>	marsh blue grass	-4	P-Grass		7	*	*		3		*	*	*	5		5	*	*
<i>Pogonia ophioglossoides</i>	snake-mouth orchid	-5	P-Forb	T	10	W	*		10	10 <sup>E</sup>	*	*		10 <sup>T</sup>	*	10		*
<i>Polanisia dodecandra trachysperma</i>	large clammy weed	5	A-Forb	*	0	*	*	*		4	*	*	*		*		*	*
<i>Polanisia jamesii</i>	James' clammyweed	5	A-Forb		10 <sup>E</sup>		E	*			E		*		*	*	*	*
<i>Polygala incarnata</i>	pink milkwort	4	A-Forb	*	10 <sup>E</sup>	E	T	*	10 <sup>X</sup>	8				T	*	10		E
<i>Polygala polygama</i>	bitter milkwort	4	B-Forb	*	7	*	*		9		*			10 <sup>T</sup>		9		*
<i>Polygala sanguinea</i>	field milkwort	3	A-Forb	*	5	*	*	*	4	5	*		*	4	*	9	*	*
<i>Polygala senega</i>	Seneca snakeroot	3	P-Forb	*	7	*	*	*	8	6	*	*	*	7		7	*	*
<i>Polygala verticillata</i>	whorled milkwort	5	A-Forb	*	5	*	*	*	5	4	*	*	*	4	*	7	*	*
<sup>†</sup> <i>Polygonatum biflorum commutatum</i>	smooth Solomon's seal	3	P-Forb	*	4	*	*	*	4	4	*	*	*	5	*	8	*	*
<i>Polygonella articulata</i>	jointweed	5	A-Forb		9	R	*		8		*					8		*
<i>Polygonum Carey</i>	Carey's heartsease	-4	A-Forb		10 <sup>E</sup>	T			10 <sup>T</sup>		E			10 <sup>X</sup>		10		*
<i>Polygonum hydropiperoides</i>	mild water pepper	-5	P-Forb	*	4	*	*	*	5	4	*	T	*	5	*	4	*	*
<i>Polygonum punctatum</i>	dotted smartweed	-5	A-Forb	*	3	*	*	*	5	3	*	T	*	6	*	4	*	*
<i>Polygonum ramosissimum</i>	bushy knotweed	1	A-Forb	*	3	*	*	*	7	5	*	*	*	*	*	8	*	*
<i>Polygonum tenue</i>	slender knotweed	5	A-Forb	*	5	*	*	*	7	6	*	*	*	5	*	10	*	*
<i>Polytaenia nuttallii</i>	prairie parsley	5	P-Forb	*	8	E	*	*	10 <sup>X</sup>	8	E		*		*			T
<i>Populus tremuloides</i>	quaking aspen	0	Tree		3	*	*		1	10 <sup>R</sup>	*	*	*	2			*	*
<i>Potentilla arguta</i>	prairie cinquefoil	4	P-Forb	T	10	*	*	*	8	10	*	*	*	8 <sup>E</sup>	*	7	*	*
<i>Potentilla hippiana</i>	woolly cinquefoil	5	P-Forb								*	*	*				*	
<i>Potentilla norvegica</i>	rough cinquefoil	0	A-Forb	*	0	*	*	*	0	0	*	*	*	1	*	0	*	*
<i>Potentilla pennsylvanica</i>	gray cinquefoil	5	P-Forb		10		T		10 <sup>T</sup>		*	*	*				*	
<i>Potentilla rivalis millegrana</i>	brook cinquefoil	-5	P-Forb		10 <sup>E</sup>	*	*	*		4	*	*	*		*		*	
<i>Potentilla simplex</i>	common cinquefoil	4	P-Forb	*	3	*	*	*	2	3	*			1	*	3	*	*
<i>Prenanthes alba</i>	white lettuce	3	P-Forb	*	5	*	*	*	5	9	*	*		5		6	*	*
<i>Prenanthes aspera</i>	rough white lettuce	5	P-Forb	*	8	R	*	*		8	*		*	10 <sup>E</sup>	*		*	E
<i>Prenanthes racemosa</i>	glaucous white lettuce	-3	P-Forb		8	*	*	*	8	10 <sup>X</sup>	*	*	*	8 <sup>P</sup>		10	*	*
<i>Prionopsis ciliata</i>	goldenweed	5	A-Forb	*				*		2 <sup>S</sup>			*		*			
<i>Prunella vulgaris lanceolata</i>	self-heal	0	P-Forb	*	1	*	*	*	*	1	*	*	*	0	*	5	*	*
<i>Prunus americana</i>	wild plum	5	Tree	*	3	*	*	*	4	4	*	*	*	5	*	6	*	*
<i>Prunus angustifolia</i>	Chickasaw plum	5	Shrub	*	3	*	*	*	4		*	*	*	*	*			
<i>Prunus mexicana</i>	Mexican plum	5	Tree	*	7	*	*	*	3		*	*	*	X	*		*	
<i>Prunus munsoniana</i>	wild goose plum	5	Tree	*	6		*	*	3		*	*	*	*	*		*	
<i>Prunus pumila</i>	sand cherry	5	Shrub	T	8	*	S		8		*			10		9	*	*
<i>Prunus pumila besseyi</i>	dwarf sand cherry	5	Shrub				S	*			*	*	*			10	*	*
<i>Prunus virginiana</i>	choke cherry	1	Shrub	*	3	*	*	*	2	3	*	*	*	2	*	2	*	*
<i>Psoraleidium lanceolatum</i>	lemon scurfy pea	5	P-Forb				S	*				*	*		*		*	

<sup>4</sup> Federally designated as Threatened (USFWS 1994).

\*Indicates nomenclature differs from Kartesz.

<sup>†</sup>Precedes scientific name cross-referenced in appendix C.

continue

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<sup>†</sup> <i>Psoraleidium tenuiflorum</i>	scurfy pea	5	P-Forb		9	X	*	*		8	S	T	*	*		*		
<i>Ptelea trifoliata</i>	hop tree	2	Shrub	*	4	*	*	*	4	5	⊗		*	6	*	9 <sup>R</sup>	*	
<i>Ptilimnium nuttallii</i>	Nuttall's mock bishop's weed	-4	A-Forb	*	7 <sup>E</sup>			*		4					*			
<i>Pulsatilla patens</i>	pasque flower	5	P-Forb		10		*				*	*	*				*	*
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	0	P-Forb	*	4	*	*	*	6	3	*		*	3	*	8	*	
<i>Pycnanthemum verticillatum pilosum</i>	hairy mountain mint	5	P-Forb	*	6	*	*	*	10 <sup>S</sup>	5			*	9 <sup>E</sup>	*	10		
<i>Pycnanthemum virginianum</i>	common mountain mint	-4	P-Forb	*	5	*	*	*	5	6	*	T	*	3	*	8	*	*
<i>Quercus imbricaria</i>	shingle oak	1	Tree	*	2	*	*	*	5	3				5				
<i>Quercus macrocarpa</i>	bur oak	1	Tree	*	5	*	*	*	5	5	*	*	*	6	*	5	*	*
<i>Quercus marilandica</i>	blackjack oak	5	Tree	*	7	*	*	*		4			*	P	*			
<i>Quercus prinoides</i>	dwarf chestnut oak	4	Tree	*		E	*	*	7	5			*		*			*
<i>Quercus stellata</i>	post oak	4	Tree	*	5	*	*	*		4				*	*			
<i>Ranunculus fascicularis</i>	early buttercup	3	P-Forb	*	5	*	*	*	10	5	*		*	8 <sup>P</sup>	*	9		*
<i>Ranunculus laxicaulis</i>	water plantain spearwort	-5	A-Forb	*	6	E		*		7					*			
<i>Ranunculus thomboideus</i>	prairie buttercup	5	P-Forb		10 <sup>T</sup>		*		9 <sup>T</sup>		*	*	*			10	*	*
<i>Ratibida columnifera</i>	long-headed coneflower	5	P-Forb	*	⊗	⊗	*	*	⊗	3	*	*	*	⊗	*	⊗	*	⊗
<i>Ratibida pinnata</i>	grey-headed coneflower	5	P-Forb	*	4	*	*	*	4	5	*		*	7	*	9	*	*
<i>Rhamnus lanceolata</i>	lance-leaved buckthorn	-5	Shrub	*	7	W	*	*		5			*	6	*		*	S
<i>Rhexia mariana</i>	Maryland meadow beauty	-5	P-Forb	*	10	E			10 <sup>T</sup>	8					*			
<i>Rhexia mariana interior</i>	meadow beauty	-5	P-Forb	*		W		*		9					*			
<i>Rhexia virginica</i>	Virginia meadow beauty	-5	P-Forb	*	10	*	T		9 <sup>S</sup>	6				8 <sup>P</sup>	*	10		S
<i>Rhus aromatica</i>	fragrant sumac	5	Shrub	*	4	*	*	*	7	3	⊗	*	*	4	*	8	*	S
<i>Rhus copallina</i>	winged sumac	5	Shrub	*	2	*	S	*	3	2			*	6	*	7	*	*
<i>Rhus glabra</i>	smooth sumac	5	Shrub	*	1	*	*	*	2	1	*	*	*	2	*	7	*	*
<i>Rhynchosia latifolia</i>	prairie snoutbean	5	P-Forb	*						9					*			
<i>Rhynchospora capitellata</i>	clustered beak rush	-5	P-Sedge	*	10	*			6	7				9	*	10		*
<i>Rhynchospora globularis</i>	grass beak rush	-3	P-Sedge	*	10 <sup>E</sup>	E		*	10 <sup>X</sup>	7				E	*			
<i>Rhynchospora harveyi</i>	Harvey's beak rush	0	P-Sedge	*				*		10 <sup>E</sup>					*			
<i>Rhynchospora macrostachya</i>	horned rush	-5	P-Sedge	*		R		*	9 <sup>S</sup>	9					*			
<i>Rosa arkansana</i>	sunshine rose	5	Shrub	*	5	*	*	*	4	5	*	*	*	X	*	5	*	*
<i>Rosa blanda</i>	early wild rose	3	Shrub	*	4	*	*	*	3	6 <sup>S</sup>	*	*	*	8 <sup>T</sup>	*	3	*	*
<i>Rosa carolina</i>	pasture rose	4	Shrub	*	4	*	*	*	4	4				5	*	6		*
<i>Rosa foliosa</i>	white prairie rose	5	Shrub	*				*							*			
<i>Rosa setigera</i>	prairie rose	2	Shrub	*	5	*	*	*	5 <sup>S</sup>	4			*	6	*	5 <sup>R</sup>		*
<i>Rosa woodsii</i>	western wild rose	3	Shrub			*	*	*			*	*	*		*		*	*
<i>Rubus allegheniensis</i>	common blackberry	2	Shrub	*	2	*	*	*	1	4	*		*	1	*	2		*
<i>Rubus flagellaris</i>	common dewberry	4	Shrub	*	2	*	*	*	1	2	*		*	2	*	4		*
<i>Rubus pensilvanicus</i>	Yankee blackberry	1	Shrub	*	2	*		*	2	2	*		*	2	*	6		*
<i>Rudbeckia fulgida s.l.</i>	orange coneflower	-5	P-Forb	*	6	*			9 <sup>S</sup>	7				7	⊗			*
<i>Rudbeckia hirta</i>	black-eyed Susan	3	P-Forb	*	2	*	*	*	1	1	*	*	*	3	*	0	*	*
<i>Rudbeckia missouriensis</i>	Missouri black-eyed Susan	4	P-Forb	*	10 <sup>E</sup>					6					*			*
<i>Rudbeckia subtomentosa</i>	sweet black-eyed Susan	-3	P-Forb	*	5	*	*	*		5			*		*			*
<i>Rudbeckia triloba</i>	brown-eyed Susan	1	B-Forb	*	3	*	*	*	5	4	S		*	6	*	⊗		E
<i>Ruellia humilis</i>	hairy ruellia	4	P-Forb	*	3	*	*	*	10 <sup>T</sup>	3	E		*	*	*			
<i>Rumex hastatulus</i>	sour dock	3	A-Forb	*	4 <sup>E</sup>	*		*		3					*			
<i>Rumex orbiculatus</i>	great water dock	-5	P-Forb		7	*	*		9	10	*	*	*	3		6	*	*
<i>Sabatia angularis</i>	rose gentian	-1	B-Forb	*	3	*		*	9 <sup>T</sup>	4				5	*	9		
<i>Sabatia campestris</i>	prairie rose gentian	3	B-Forb	*	8 <sup>E</sup>		S	*		4					*			

continue

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† Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Salix discolor</i>	pussy willow	-3	Shrub		4	*	*		1	10 <sup>E</sup>	*	*		3		3	*	*
<i>Salix eriocephala</i>	diamond willow	-3	Tree	*	5	*	*	*	2	5	*	*	*	1		4	*	*
<i>Salix exigua</i>	sandbar willow	-5	Shrub	*	1	*	*	*	1	3	*		*	1	*	3	*	*
<i>Salix humilis</i>	prairie willow	3	Shrub	*	5	*	*	*	4	6	*	*	*	4	*	7	*	*
<i>Salix petiolaris</i>	stalked willow	-5	Shrub		6	*	*		1	9 <sup>E</sup>	*	*	*	8 <sup>T</sup>		3	*	*
<i>Salvia azurea</i>	blue sage	5	P-Forb	*	9	*	*	*	*	4			*	*	*			
<i>Salvia reflexa</i>	Rocky Mountain sage	5	A-Forb	*	*	*	*	*	*	3	*	*	*	*	*	*	*	*
<i>Sanguisorba annua</i>	prairie burnet	5	A-Forb	*			*	*							*			
<i>Sanguisorba canadensis</i>	American burnet	-4	P-Forb		10 <sup>E</sup>	E			10 <sup>T</sup>					8				
<i>Sanicula canadensis</i>	Canadian black snakeroot	2	B-Forb	*	4	*	*	*	8	3	S		*	4	*	7	*	*
<i>Sanicula marilandica</i>	black snakeroot	3	P-Forb		6	*	*		4		*	*	*	5	*	5	*	*
<i>Sassafras albidum</i>	sassafras	3	Tree	*	2	*	S	*	5	2				4	*	6		*
<i>Saxifraga pensylvanica</i>	swamp saxifrage	-3	P-Forb		10	*	*		10		*			6				*
<i>Saxifraga texana</i>	Texas saxifrage	0	P-Forb	*				*		9				*				
<i>Schedonardus paniculatus</i>	tumble grass	5	P-Grass	*	5	*	S	*		4	S	*	*		*		*	
† <i>Schizachyrium scoparium</i>	little bluestem	4	P-Grass	*	5	*	*	*	5	5	*	*	*	6	*	7	*	*
<i>Scirpus acutus</i>	hard-stemmed bulrush	-5	P-Sedge	*	6	*	*	*	5	7	*	*	*	5	*	6	*	*
<i>Scirpus atrovirens</i>	dark green rush	-5	P-Sedge	*	4	*	*	*	3	4	*	*	*	2	*	3	*	*
<i>Scirpus cyperinus</i>	wool grass	-5	P-Sedge	*	5	*	*		5	7	*			1	*	4	*	*
<i>Scirpus hallii</i>	Hall's bulrush	-5	A-Sedge		10 <sup>E</sup>	E	S	*	10 <sup>E</sup>	10			*		*		*	S
<i>Scirpus koilolepis</i>	keeled bulrush	-4	A-Sedge	*	8			*		9				*				
<i>Scirpus pendulus</i>	red bulrush	-5	P-Sedge	*	3	*	*	*	3	5			*	6	*	7	*	*
<i>Scirpus tabernaemontani</i>	great bulrush	-5	P-Sedge	*	4	*	*	*	4	5	*	*	*	6	*	5	*	*
<i>Scleria ciliata</i>	hairy nut rush	0	P-Sedge	*				*		10 <sup>S</sup>					*			
<i>Scleria pauciflora</i>	few-flowered nut rush	3	P-Sedge	*	10	W		*	10 <sup>E</sup>	8				10 <sup>T</sup>	*	10		
<i>Scleria triglomerata</i>	tall nut rush	0	P-Sedge	*	9	*	*	*	10 <sup>S</sup>	7	*			8 <sup>P</sup>	*	10		S
<i>Scrophularia lanceolata</i>	early figwort	2	P-Forb		5	*	*	*	5	10 <sup>X</sup>	*	*	*	5	*	7	*	*
<i>Scutellaria parvula</i>	small skullcap	3	P-Forb	*	6	X	*	*	9 <sup>T</sup>	4	*			*	*	9		E
<i>Scutellaria parvula australis</i>	southern small skullcap	3	P-Forb	*	6	R		*		5				*			*	
<i>Scutellaria parvula leonardii</i>	Leonard's small skullcap	3	P-Forb	*	5	*	*	*	*	4	*	*	*	*	*	8	*	*
<i>Selaginella seligeyana</i>	hidden spikemoss	-4	Crptgm	*	10	*	*		5	8				9 <sup>T</sup>	*	7	*	*
<i>Selaginella rupestris</i>	sand club moss	5	Crptgm	*	8	T	S	*	8	9	*	T	*	10 <sup>E</sup>	*	8	*	*
<i>Selenia aurea</i>	golden selenia	5	A-Forb	*				*		6				*				
<i>Senecio aureus</i>	golden ragwort	-3	P-Forb	*	5	*	*		5	5	*			5	*	7	*	*
<i>Senecio congestus</i>	swamp ragwort	-4	A-Forb				*		10 <sup>X</sup>		*	*					*	S
<i>Senecio integerrimus</i>	western groundsel	0	P-Forb				*	*			*	*	*				*	
<i>Senecio pauperculus</i>	balsam ragwort	-1	P-Forb		4	*	*		3	6	*	*		9 <sup>T</sup>		7	*	*
<i>Senecio plattensis</i>	prairie ragwort	4	P-Forb	*	6	*	*	*	5	6	*	*	*	5	*	8	*	*
<i>Senecio pseudonanus semicordatus</i>	streambank butterweed	-3	P-Forb				S	*		10	*	*	*				*	*
† <i>Senna marilandica</i>	Maryland senna	-3	P-Forb	*	4	*	*	*		4			*	4	*			S
<i>Setaria parviflora</i>	perennial foxtail	0	P-Grass	*	6	E	S	*		6				*	*			
<i>Silene regia</i>	royal catchfly	5	P-Forb	T	9 <sup>E</sup>	T		*		10 <sup>W</sup>				P	*			
<i>Silene stellata</i>	starry campion	5	P-Forb	*	6	*	*	*	10 <sup>T</sup>	5	*		*	6	*		*	*
<i>Silphium integrifolium laeve</i>	western rosinweed	5	P-Forb	*	*			*					*	*	*			
<i>Silphium integrifolium</i>	rosinweed	5	P-Forb	*	5	*	*	*	10 <sup>T</sup>	4			*		*	*	*	*
<i>Silphium laciniatum</i>	compass plant	4	P-Forb	*	5	*	*	*	9 <sup>T</sup>	6	*		*	9 <sup>E</sup>	*	3	*	*
<i>Silphium perfoliatum</i>	cup plant	-2	P-Forb	*	4	*	*	*	10 <sup>T</sup>	3	*	*	*	6	*	9	*	*

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

continue.



SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Silphium laciniatum</i>	prairie dock	1	P-Forb	*	5	*	S		6	5				9		10		*
<i>Silphium trifoliatum</i>	whorled rosinweed	5	P-Forb		10 <sup>E</sup>	*								8				
<i>Sisyrinchium albidum</i>	common blue-eyed grass	3	P-Forb	*	4	*			7	6				6		9		*
<i>Sisyrinchium angustifolium</i>	pointed blue-eyed grass	-2	P-Forb	*	5	*	*	*	4	5				4	*	6		*
<i>Sisyrinchium atlanticum</i>	eastern blue-eyed grass	-3	P-Forb	*	10 <sup>E</sup>	*			9 <sup>T</sup>	10 <sup>R</sup>				10 <sup>E</sup>				
<i>Sisyrinchium campestre</i>	prairie blue-eyed grass	5	P-Forb	*	6		*	*		4	*		*		*		*	*
<i>Sisyrinchium montanum</i>	mountain blue-eyed grass	-1	P-Forb		9 <sup>E</sup>	E		*	4		*	*	*	10 <sup>E</sup>			*	*
<i>Sisyrinchium mucronatum</i>	slender blue-eyed grass	-2	P-Forb		9	*			10		*	*		10 <sup>E</sup>		10		
<i>Sium suave</i>	water parsnip	-5	P-Forb	*	5	*	*	*	5	6	*	*	*	5		4	*	*
<i>Solidago canadensis glaucanescens</i>	Canada goldenrod	3	P-Forb		1	*	*		2	5	*	*	*	1	*	1	*	*
<i>Solidago canadensis scabra</i>	tall goldenrod	3	P-Forb	*	1	*	*	*	1	1	*	*	*	*	*	1	*	*
<i>Solidago gigantea</i>	late goldenrod	-3	P-Forb	*	3	*	*	*	3	4	*	*	*	2	*	4	*	*
<i>Solidago juncea</i>	early goldenrod	5	P-Forb	*	4	*			3	5	*			2		3		*
<i>Solidago missouriensis</i>	Missouri goldenrod	5	P-Forb	*	4	*	*	*		4	*	*	*		*		*	*
<i>Solidago mollis</i>	soft goldenrod	5	P-Forb					*			S	*	*		*		*	
<i>Solidago nemoralis</i>	old-field goldenrod	5	P-Forb	*	3	*	*	*	2	2	*	*	*	3	*	2	*	*
<i>Solidago ohioensis</i>	Ohio goldenrod	-5	P-Forb		10	*			8					10 <sup>P</sup>		10		*
<i>Solidago petiolaris</i>	downy goldenrod	5	P-Forb	*	8			*		6			*		*			
<i>†Solidago ptarmicoides</i>	stiff aster	5	P-Forb	*	9	R	*		6	9	*	*		10 <sup>X</sup>		9	*	*
<i>Solidago radula</i>	rough goldenrod	5	P-Forb	*	7			*		6					*			
<i>Solidago riddellii</i>	Riddell's goldenrod	-5	P-Forb	S	7	*			6	10	*	E		8		10		*
<i>Solidago rigida</i>	stiff goldenrod	4	P-Forb	*	4	*	*	*	5	6	*	*	*	7	*	9	*	*
<i>Solidago rugosa</i>	rough-leaved goldenrod	-1	P-Forb	*	8	*			3	5				3		4		
<i>Solidago speciosa</i>	showy goldenrod	5	P-Forb	*	7	*	*	*	7	7	*	*	*	5	*	10	*	*
<i>Sorghastrum nutans</i>	Indian grass	2	P-Grass	*	4	*	*	*	6	5	*	*	*	6	*	8	*	*
<i>Spartina pectinata</i>	prairie cord grass	-4	P-Grass	*	4	*	*	*	5	5	*	*	*	7	*	7	*	*
<i>Spermolepis divaricata</i>	forked scaleseed	3	A-Forb	*				*							*			
<i>Spermolepis echinata</i>	bristly-fruited spermolepis	5	A-Forb	*						3					*			
<i>Spermolepis inermis</i>	scaleseed	5	A-Forb	*	4			*		4			*		*			
<i>Sphaeralcea coccinea</i>	red false mallow	5	P-Forb				*	*			*	*	*		*		*	
<i>Sphenopholis intermedia</i>	slender wedge grass	0	P-Grass	*	5	*	*	*	4	6	*	*	*	5	*	6	*	*
<i>Sphenopholis obtusata</i>	prairie wedge grass	0	P-Grass	*	5	*	*	*	8	5	*	*	*	7 <sup>T</sup>	*	10	*	*
<i>Spiraea alba</i>	meadowsweet	-4	Shrub		6	*	*		4	9 <sup>E</sup>	*	*		3 <sup>X</sup>		3	*	*
<i>Spiraea tomentosa</i>	steeple bush	-5	Shrub	*	8	*			5	10 <sup>X</sup>	*			4		5		*
<i>Spiranthes cernua</i>	nodding ladies' tresses	-2	P-Forb	*	4	*	*	*	4	4	*	T	*	5	*	5	*	*
<i>Spiranthes lacera gracilis</i>	slender ladies' tresses	-1	P-Forb	*	8	*	T	*	8	6 <sup>W</sup>	*		*	5	*	7		*
<i>Spiranthes magnicamporum</i>	dune ladies' tresses	-3	P-Forb	*	6	E	S	*	9	7	*	*	*	9 <sup>P</sup>	*	8	*	*
<i>Spiranthes tuberosa</i>	little ladies' tresses	5	P-Forb	*	9	W		*	10	7				6	*			
<i>Spiranthes vernalis</i>	spring ladies' tresses	0	P-Forb	*	7 <sup>E</sup>	R	T	*		8			*	8	*		*	
<i>Sporobolus clandestinus</i>	rough rush grass	5	P-Grass	*	6	*	S	*		5					*			*
<i>Sporobolus compositus</i>	rough dropseed	5	P-Grass	*	3	*	*	*		4	*	*	*	3	*	2	*	*
<i>Sporobolus cryptandrus</i>	sand dropseed	4	P-Grass	*	4	*	*	*	3	5	*	*	*	8 <sup>P</sup>	*	2	*	*
<i>Sporobolus heterolepis</i>	prairie dropseed	4	P-Grass	*	9	*	*	*	10 <sup>T</sup>	7	*	*	*	T	*	10	*	*
<i>Sporobolus neglectus</i>	small rush grass	5	A-Grass	*	1	*	*	*	2	3	*	*	*	3	*	1	*	*
<i>Sporobolus vaginiflorus</i>	sheathed rush grass	5	A-Grass	*	0	*	*	*	2	2	*	*	*	5	*	1	*	*
<i>Stachys palustris</i>	woundwort	-5	P-Forb		5	*	*	*	5	6	*	*	*	6	*		*	*
<i>Stachys tenuifolia</i>	rough hedge nettle	-5	P-Forb	*	5	*	*	*	5	4	*		*	4	*	7		*
<i>Stenosiphon linifolius</i>	false gaura	5	B-Forb	*				*		10 <sup>R</sup>			*		*			

continues

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Stillingia sylvatica</i>	queen's delight	5	P-Forb	*				*							*			
<i>Stipa comata</i>	needle-and-thread	5	P-Grass	⊗	X	S	*	⊗		*	*	*		*	⊗	*	*	*
<i>Stipa spartea</i>	porcupine grass	5	P-Grass		6	*	*	*	10	8	*	*	*	10 <sup>T</sup>	*	10	*	*
<i>Strophostyles helvula</i>	trailing wild bean	-1	A-Forb	*	3	*	*	*	8 <sup>S</sup>	2	*		*	3	*	8	*	*
<i>Strophostyles leiocarpa</i>	small wild bean	5	A-Forb	*	4	T	*	*	2	*	*	*	*	*	*		*	*
<i>Stylisma pickeringii</i>	Patterson's bindweed	5	P-Forb	*	9 <sup>E</sup>		E	*	10						*			
<i>Stylosanthes biflora</i>	pencil flower	5	P-Forb	*	5	*		*	5					*	*			
<i>Symphoricarpos occidentalis</i>	wolfberry	5	Shrub		6	*	*	*	4	10 <sup>E</sup>	*	*	*	*	⊗	*	*	*
<i>Symphoricarpos orbiculatus</i>	coralberry	3	Shrub	*	1	*	*	*	⊗	1	⊗		*	4	*	⊗		*
<i>Taenidia integerrima</i>	yellow pimpernel	5	P-Forb	*	7	*	*	*	8	6	*			6	*	9		*
<i>Talinum calycinum</i>	rockpink fame flower	5	P-Forb	*	10 <sup>E</sup>			*	8				*		*			
<i>Talinum parviflorum</i>	prairie fame flower	5	P-Forb	*	10		T	*	10	*	T	*		*			*	
<i>Talinum nigospemum</i>	sand fame flower	5	P-Forb		9	T	E	*			E	*						S
<i>Tephrosia virginiana</i>	goat's rue	5	P-Forb	*	7	*	*	*	10	5	S			6	*	10		*
<i>Tetranneuris herbacea</i> <sup>4</sup>	lakeside daisy	5	P-Forb		10 <sup>E</sup>									E		10		
<i>Teucrium canadense</i>	germander	-2	P-Forb	*	3	*	*	*	4	2	*	*	*	3	*	6	*	*
<i>Teucrium canadense occidentale</i>	western germander	-3	P-Forb		3	*	*	*	4	5	*	*	*	4	*	6	*	*
<i>Thalictrum dasycarpum</i>	purple meadow rue	-2	P-Forb	*	5	*	*	*	3	4	*	*	*	7	*	8	*	*
<i>Thalictrum revolutum</i>	waxy meadow rue	0	P-Forb	*	5	*	E		9 <sup>T</sup>	5	*			7		9	*	S
<i>Thaspium barbinode</i>	hairy meadow parsnip	5	P-Forb	*	7	*	*	*	10	6	*			4	*	9		E
<i>Thaspium trifoliatum aureum</i>	meadow parsnip	5	P-Forb	*	6	*			8	6			*	3	*	9		S
<i>Thelesperma filifolium</i>	fine-leaved thelesperma	5	B-Forb	*				*	10 <sup>S</sup>				*	*	*		*	
<i>Thelesperma megapotamicum</i>	rayless green thread	5	P-Forb	*	⊗	⊗		*	⊗	⊗			*		*		*	
<i>Thelypteris palustris pubescens</i>	marsh fern	-5	Cryptgm	*	6	*	*	*	2	10	*	T	*	5	*	5	*	*
<i>Thismia americana</i>	thismia	-5	P-Forb		10 <sup>E</sup>													
<i>Tofieldia glutinosa</i>	false asphodel	-5	P-Forb		10 <sup>T</sup>	R			10		S			10		10		T
<i>Toxicodendron radicans</i> <sup>19</sup>	poison ivy	3	W-Vine	*	1	*	*	*	2	1	*	*	*	1	*	0	*	*
<i>Toxicodendron toxicarium</i>	poison oak	5	W-Vine	*	⊗			*	10 <sup>W</sup>						*			
<i>Tradescantia bracteata</i>	long-bracted spiderwort	4	P-Forb	*	7 <sup>E</sup>	⊗	*	*	10 <sup>X</sup>	6	*	*	*	*	*		*	*
<i>Tradescantia occidentalis</i>	prairie spiderwort	5	P-Forb	*			*	*			*	*	*	*	*		*	*
<i>Tradescantia ohimensis</i>	common spiderwort	2	P-Forb	*	3	*	*	*	5	4	S		*	7	*	10		*
<i>Tradescantia tharpai</i>	Tharp's spiderwort	5	P-Forb					*	9						*			
<i>Tradescantia virginiana</i>	Virginia spiderwort	5	P-Forb	*	5	*	S		9 <sup>S</sup>	6				8		⊗		
<i>Tragia betonicifolia</i>	noseburn	5	P-Forb	*				*	4						*			
<i>Tragia ramosa</i>	southern noseburn	5	P-Forb	*				*	7 <sup>S</sup>				*		*			
<i>†Trichostema brachiatum</i>	false pennyroyal	5	A-Forb	*	7	*	*	*	8 <sup>T</sup>	4	*		*	4	*	9	*	*
<i>Tridens flavus</i>	false redtop	5	P-Grass	*	1	*	*	*	3	1			*	3	*	⊗		*
<i>Tridens muticus</i>	slim tridens	5	P-Grass	*				*	10 <sup>R</sup>						*			
<i>Tridens strictus</i>	longspike tridens	3	P-Grass	*	4	*	*	*	5						*			
<i>Trifolium carolinianum</i>	Carolina clover	5	P-Forb	*				*	10 <sup>X</sup>						*			
<i>Trifolium reflexum</i>	buffalo clover	5	A-Forb	*	10 <sup>E</sup>	E	*	*	10 <sup>S</sup>				*	8 <sup>E</sup>	*			
<i>Triglochin maritimum</i>	common bog arrow grass	-5	P-Forb		10	*	T	*	8		*	*	*	9 <sup>T</sup>		8	*	*
<i>Triodanis holzingeri</i>	Holzinger's Venus' looking glass	5	A-Forb	*				*	10				*		*			
<i>Triodanis lamprosperma</i>	shining-seed Venus' looking glass	5	A-Forb	*				*	6						*			
<i>Triodanis leptocarpa</i>	narrow Venus' looking glass	5	A-Forb	*	8		*	*	4	*	*	*		*	*		*	
<i>†Triodanis perfoliata</i>	Venus' looking glass	0	A-Forb	*	2	*	*	*	6	2	*	*	*	3	*	6	*	*

continue.

<sup>4</sup> Federally designated as threatened (USFWS 1994).

<sup>19</sup> Including *Toxicodendron rydbergii*; see Swink and Wilhelm (1994), p. 635.

\* Indicates nomenclature differs from Kartesz.

† Precedes scientific name cross-referenced in appendix C.

SCIENTIFIC NAME	COMMON NAME	CW	PHYSIOG	AR	IL	IN	IA	KS	MI	MO	MN	ND	NE	OH	OK	ON	SD	WI
<i>Triodanis perfoliata biflora</i>	small Venus' looking glass	5	A-Forb	*	4			*		3			*		*			
<i>Triplasis purpurea</i>	sand grass	5	A-Grass	*	6	*	*	*	6 <sup>S</sup>	7	S	*	*	9 <sup>P</sup>	*	8	*	*
<i>Tripsacum dactyloides</i>	gama grass	-1	P-Grass	*	4	W	*	*	5				*		*			
<i>Ulmus americana</i>	American elm	-2	Tree	*	4	*	*	*	1	4	*	*	*	1	*	3	*	*
<i>Ulmus rubra</i>	slippery elm	0	Tree	*	3	*	*	*	2	3	*	*	*	2	*	6	*	*
<i>Valeriana edulis ciliata</i>	common valerian	-5	P-Forb		10	E	S		10 <sup>T</sup>		T			E		10	*	*
<i>Valerianella radiata</i>	beaked corn salad	-1	A-Forb	*	1			*		0			*	*	*			
<i>Verbena bracteata</i>	creeping vervain	3	A-Forb	*	0	*	*	*	5	5	*	*	*	*	*	2	*	*
<i>Verbena hastata</i>	blue vervain	-4	P-Forb	*	3	*	*	*	4	4	*	*	*	4	*	4	*	*
<i>Verbena simplex</i>	narrow-leaved vervain	5	P-Forb	*	4	*	*	*	6	4	S		*	5	*	9	*	*
<i>Verbena stricta</i>	hoary vervain	5	P-Forb	*	2	*	*	*	4	3	*	*	*	5	*	7	*	*
<i>Verbesina helianthoides</i>	wingstem	5	P-Forb	*	5	*		*		4			*	*	*			
<i>Vernonia arkansana</i>	great ironweed	0	P-Forb	*	10			*		6					*			
<i>Vernonia baldwinii</i>	western ironweed	5	P-Forb	*	5	*	*	*		3			*		*		*	
<i>Vernonia fasciculata</i>	common ironweed	-3	P-Forb	*	5	*	*	*		6	*	*	*	7 <sup>P</sup>	*		*	*
<i>Vernonia gigantea</i>	tall ironweed	0	P-Forb	*	4	*	*	*	3	5			*	3	*	7		
<i>Vernonia missurica</i>	Missouri ironweed	-1	P-Forb	*	5	*	*	*	4	4			*	7 <sup>E</sup>	*			
<i>Veronica peregrina</i>	purslane speedwell	5	A-Forb	*	0	*	*	*	0	0	*	*	*	1	*	0	*	*
<i>Veronicastrum virginicum</i>	Culver's root	0	P-Forb	*	6	*	*	*	8	7	*	T	*	9	*	10	*	*
<i>Vicia americana</i>	American vetch	5	H-Vine		7	*	*	*	5	8	*	*	*	5	*	9	*	*
<i>Vicia ludoviciana</i>	deer pea vetch	5	A-Forb	*				*		10					*			
<i>Viola bicolor</i>	Johnny-jump-up	5	A-Forb	*	5	5	*	*		0			*	3	*	8	*	
<i>Viola lanceolata</i>	lance-leaved violet	-5	P-Forb	*	7	*	S	*	8	7	S		*	9 <sup>P</sup>	*	9	*	*
<i>Viola nephrophylla</i>	northern bog violet	-5	P-Forb	*	8	*	*	*	8		*	*	*	10 <sup>E</sup>	*	7	*	*
<i>Viola nuttallii</i>	yellow prairie violet	5	P-Forb					*			S	*	*				*	
<i>Viola pedata</i>	bird's foot violet	5	P-Forb	*	7	*	*	*	9	5	*			9 <sup>T</sup>	*	10 <sup>T</sup>	*	*
<i>Viola pedatifida</i>	prairie violet	4	P-Forb	*	10	T	*	*	10 <sup>T</sup>	10	*	*	*	X	*	10	*	*
<i>Viola primulifolia</i>	primrose violet	-4	P-Forb	*	10 <sup>E</sup>	R								8 <sup>E</sup>				
<i>Viola sagittata</i>	arrow-leaved violet	-2	P-Forb	*	6	*	*	*	8	7	*			6	*	9	*	*
<i>Viola sororia</i>	common blue violet	1	P-Forb	*	3	*	*	*	1	2	*	*	*	2	*	4	*	*
<i>Vulpia octoflora</i>	six-weeks fescue	5	A-Grass	*	2	*	*	*	5	2	*	*	*	5	*	8	*	*
<i>Woodsia obtusa</i>	cliff fern	5	Crptgm	*	6	*	*	*	10 <sup>T</sup>	5	*		*	9	*	10	*	*
<i>Yucca glauca</i>	soapweed	5	Shrub					*		10 <sup>W</sup>		*	*		*		*	
<i>Zanthoxylum americanum</i>	prickly ash	5	Shrub	*	4	*	*	*	3	4	*	*	*	5	*	3	*	*
<i>Zigadenus elegans</i>	plains white camass	1	P-Forb					*		10 <sup>R</sup>	*	*	*				*	*
<i>Zigadenus elegans glaucus</i>	white camass	-5	P-Forb		10 <sup>E</sup>	R	*		10					10 <sup>P</sup>		10	*	*
<i>Zigadenus nuttallii</i>	death camass	5	P-Forb	*				*		10 <sup>E</sup>					*			
<i>Zizia aptera</i>	heart-leaved meadow parsnip	3	P-Forb	*	10	R	*	*	9 <sup>T</sup>	7	*	*	*	*	*	9	*	*
<i>Zizia aurea</i>	golden Alexanders	-1	P-Forb	*	6	*	*	*	6	5	*	*	*	7	*	7	*	*
Total Listed				24	102	136	162	12	121	127	68	64	13	191	11	13	11	91
Total Native				735	800	721	760	763	605	825	661	477	649	657	740	529	541	653

\*Indicates nomenclature differs from Kartesz.

†Precedes scientific name cross-referenced in appendix C



## Works Cited

Barak, Phillip. (1999). "Essential Elements for Plant Growth". University of Wisconsin. Accessed from <http://soils.wisc.edu/facstaff/barak/soilscience326/macronut.htm>

Blue Sky Design. (2011). "Interpretive Master Plan and Guidelines for Visitor Experience at the Don Valley Brick Works". Submitted to the City of Toronto. Print.

Bowman, Laura. (2011). "Grass, Sky, Gone". Environmental Law Centre. Accessed from <http://environmentallawcentre.wordpress.com/2011/04/04/grass-sky-gone/>

Canadian Geographic. (2014). "Watersheds". Canadian Geographic. Accessed from [http://www.canadiangeographic.ca/magazine/jun11/don\\_river\\_watershed.asp](http://www.canadiangeographic.ca/magazine/jun11/don_river_watershed.asp)

Cedar, Karen (Ojibway Nature Centre, Education and Outreach Coordinator). Interview with Jennifer Smith. May, 2014. Tele-Communication.

Chapman, Kim and Chad Reid. (2004). "Sheep and Goats: Ecological Tools for the 21<sup>st</sup> Century". Utah State University. Accessed from <http://extension.usu.edu/files/factsheets/Sheep%20and%20Goats.pdf>

City of Toronto. (n.d.). "Prescribed Burns in Toronto's Savannah Habitats". Urban Forestry. Accessed from [http://www1.toronto.ca/city\\_of\\_toronto/parks\\_forestry\\_\\_recreation/urban\\_forestry/files/pdf/Prescribed\\_Burn.pdf](http://www1.toronto.ca/city_of_toronto/parks_forestry__recreation/urban_forestry/files/pdf/Prescribed_Burn.pdf)

City of Toronto. (2002). "High Park Woodland & Savannah Management Plan". Parks and Recreation. Accessed from [http://www1.toronto.ca/city\\_of\\_toronto/parks\\_forestry\\_\\_recreation/urban\\_forestry/files/pdf/HighParkMgmtPlan.pdf](http://www1.toronto.ca/city_of_toronto/parks_forestry__recreation/urban_forestry/files/pdf/HighParkMgmtPlan.pdf)

City of Toronto. (2010). "Toronto Official Plan". City Planning. Accessed from [http://www1.toronto.ca/static\\_files/CityPlanning/PDF/chapters1\\_5\\_dec2010.pdf](http://www1.toronto.ca/static_files/CityPlanning/PDF/chapters1_5_dec2010.pdf)

Collins, Scott. (1987). "Interaction of Disturbances in Tallgrass Prairie: A Field Experiment". *Ecology*, Vol. 68, No. 5: pp. 1243-1250.

Collins, Scott and Melinda Smith. (2006). "Scale-Dependent Interaction of Fire and Grazing on Community Heterogeneity in Tallgrass Prairie". *Ecology*, Vol. 87, No. 8: pp. 2058- 2067.

Copeland, Tanya, William Sluis and Henry Howe. (2002). "Fire Season and Dominance in an Illinois Tallgrass Prairie Restoration". *Restoration Ecology*, Vol. 10, No. 2: pp. 315- 323.

Cosyns, E., B. Bossuyt, M. Hoffmann, H. Vervaet and L. Lens. (2006). "Seedling establishment after endozoochory in disturbed and undisturbed grasslands". *Basic and Applied Ecology*, Vol. 7: pp. 360- 369.

Côté, Anna. (2013). "From Brown to Green? The Planning and Implementation of the Don Valley Brick Works' Restoration". Final MRP to York University, Faculty of Environmental Studies. Accessed from <http://fes.yorku.ca/files/Anna%20Cote%20-%20FINAL%20MRP.pdf>

Dillon Consulting Limited (DCL). (2008). "Don Valley Brickworks Meadow Botanical Assessment, Toronto, Ontario". Submitted to the City of Toronto.

DiTomaso, Joseph, Matthew Brooks, Edith Allen, Ralph Minnich, Peter Rice and Guy Kyser. (2006). "Control of Invasive Weeds with Prescribed Burning". *Weed Technology*, Vol. 20: pp. 535-548.

Dougan & Associates: Ecological Consulting & Design. (2008). Evergreen Brick Works Natural Heritage Impact Study, Tree Preservation Plan & Ravine Stewardship Plan. Submitted to Evergreen Brick Works.

Edmeades, Douglas. (2003). "The long-term effects of manures and fertilisers on soil productivity and quality: a review". *Nutrient Cycling in Agroecosystems*, Vol. 66: pp. 165- 180.

Edwards, Tom. (1976). "Buffalo and Prairie Ecology". *Midwest Prairie Conference- Proceedings of a symposium on Prairie and Prairie Restoration*. Galesburg IL.

Foster, Jennifer. (2005). "Restoration of the Don Valley Brick Works: Whose Restoration? Whose Space?". *Journal of Urban Design*, Vol. 10, No. 3: pp. 331-351.

Gibb, Jennifer (City of Toronto, Natural Resource Specialist). "MES Research Participation". Message to Jennifer Smith. March, 2014. E-mail Communication.

Gillen, Robert, Ted McCollum, Mark Hodges, Joe Brummer and Kenneth Tate. (1991). "Plant Community Responses to Short Duration Grazing in Tallgrass Prairie". *Journal of Range Management*, Vol. 44, No. 2: pp. 124- 128.

Google Maps. (2014). Search "Don Valley Brick Works Park". Accessed from <https://www.google.ca/maps/place/Don+Valley+Brick+Works+Park/@43.6852087,-79.3676857,16z/data=!3m1!4m2!3m1!1s0x89d4cca547ff0057:0x996807898e1deb7>

Government of Canada. (2013). "Species At Risk Act: A Guide". Species At Risk Public Registry. Accessed from [http://www.sararegistry.gc.ca/archives/Guide\\_e.cfm#20](http://www.sararegistry.gc.ca/archives/Guide_e.cfm#20)

Government of Canada. (2013). *Species at Risk Act*. Accessed from <http://laws-lois.justice.gc.ca/eng/acts/S-15.3/>

Government of Ontario. (2007 A). "Ecological Land Classification Primer". Ontario Ministry of Natural Resources. Accessed from <http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@lueps/documents/document/264777.pdf>

Government of Ontario. (2007). *Endangered Species Act*. Accessed from [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_07e06\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_07e06_e.htm)

Government of Ontario. (2011). *Planning Act*. Accessed from [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_90p13\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90p13_e.htm)

Government of Ontario. (2014). "Provincial Policy Statement, 2014". Ministry of Municipal Affairs and Housing. Accessed from <http://www.mah.gov.on.ca/Page10679.aspx>

Government of Saskatchewan. (2013). "Managing Manure as a Fertilizer". Agriculture. Accessed from <http://www.agriculture.gov.sk.ca/Default.aspx?DN=3a8c4fbe-e1ed-48f3-ae85-9340b45d1a39>

Guedo, Digit and Eric Lamb. (2013). "Prescribed burning has limited long-term effectiveness in controlling Trembling Aspen (*Populus tremuloides*) encroachment into fescue grassland in Prince Albert National Park". *Canadian Field-Naturalist*, Vol. 127, No. 1: pp. 50-56.

Guelph Mercury. (2012). "Move over lawnmowers, sheep are coming to cut your grass in Guelph". Guelph Mercury. Accessed from <http://www.guelphmercury.com/news-story/2780230-move-over-lawnmowers-sheep-are-coming-to-cut-your-grass-in-guelph/>

Hart, Steve. (2000). "Goats for Vegetation Management". Langston University. Accessed from <http://www.luresext.edu/goats/training/vegetation.html>.

Henrichs, Lisa. (1997). "Grazing as a Technique for Prairie Restoration". *Restoration and Reclamation Review: Student On-Line Journal*, Vol. 2, No. 5.

Hickman, Karen, David Hartnett, Robert Cochran and Clenton Owensby. (2004). "Grazing Management Effects on Plant Species Diversity in Tallgrass Prairie". *Journal of Range Management*, Vol. 57, No. 1: pp. 58-65.

Hough Stansbury Woodland Limited (HSWL). (1990). "Don Valley Brick Works Master Plan". Submitted to the City of Toronto. Print.

Hough Woodland Naylor Dance Leinster Oleson Worland Architects (HWNDLOW Architects). (2001). "Management Plan for the Don Valley Brick Works". Beak International. Submitted to the City of Toronto. Print.

Howe, Henry. (1994). "Managing Species Diversity in Tallgrass Prairie: Assumptions and Implications". *Conservation Biology*, Vol. 8, No. 3: pp. 691-704.

Johnson, Loretta, and John Matchett. (2001). "Fire and Grazing Regulate Belowground Processes in Tallgrass Prairie". *Ecology*, Vol. 82, No. 12: pp. 3377- 3389.

Kleppel, Gary, Sophia Caggiano and Anne O'Conner. (2010). "The Use of Goats to Control Multiflora Rose (*Multiflora rose*) in a Pasture in the Hudson River Valley of New York State: A Biological Assessment". Department of Biological Sciences, University of Albany. Submitted to Glynwood Center. Accessed from <http://www.glynwood.org/files/2012/01/Goat-Grant-Final-Report.pdf>

Kohl, Michel, Paul Krausman, Kyran Kunkel and David Williams. (2013). "Bison Versus Cattle: Are They Ecologically Synonymous?". *Rangeland Ecology & Management*, Vol. 66, No. 6: pp. 721-731.

Lee, Harold, Wasyl Bakowsky, John Riley, Jane Bowles, Michael Puddister, Peter Uhlig and Sean McMurray. (1998). "Ecological Land Classification for Southern Ontario: First Approximation and Its Application". Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG- 02. Print.

Lost River Walks (LRW). (n.d.). "Don Valley Brick Works Park". Accessed from <http://www.lostrivers.ca/BrickWorksPark.htm>

Mainguy, Sarah, Daryl Cowell, Sarah Pielt, Leah Lefler, Nancy Falkenberg, Sal Spitale, Richard Czok, Mary Ann Johnson, Karl Konze, Ian Richards, Margy deGruchy, Lynn Wardle, Melinda Thompson-Black, Vladimir Kricsfalussy, Margot Ursic, Ken Ursic, Dan Westerhof, Geri Poisson, Dirk Janas, Andrew Keaveney, Kim Baker, Glenn Coady, Tyler Hoar, and Josh Hevenor. (2012). "Environmentally Significant Areas (ESAs) In the City of Toronto". Submitted to Toronto City Planning. Accessed from [http://www1.toronto.ca/City%20Of%20Toronto/City%20Planning/Zoning%20&%20Environment/Files/pdf/E/esa\\_report\\_volume1\\_sept2012.pdf](http://www1.toronto.ca/City%20Of%20Toronto/City%20Planning/Zoning%20&%20Environment/Files/pdf/E/esa_report_volume1_sept2012.pdf)

McCaffrey, Sarah. (n.d.). "Prescribed Fire: What Influences Public Approval?". *Fire in Eastern Oak Forests: Delivering Science to Land Managers- Proceedings of a Conference*. Accessed from [http://www.nrs.fs.fed.us/pubs/gtr/gtr\\_nrs-p1/mccaffrey\\_p1\\_192.pdf](http://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs-p1/mccaffrey_p1_192.pdf)

McEwen, Beth (City of Toronto, Urban Forest Renewal Manager). Interview with Jennifer Smith. May, 2014. Tele-Communication.

Melancon, Merritt. (2014). "Goats and Sheep Battle Invasive Plants". News editor with the University of Georgia College of Agricultural and Environmental Sciences. Accessed from <http://blog.extension.uga.edu/urbanag/2014/06/goats-and-sheep-battle-invasive-plants/>

Miller, Craig, Linda Campbell and Jessica Yeagle. (2002). "Attitudes of Residents in the Greater Chicago Region Toward Prescribed Burns and Ecological Restoration: A Report to the Chicago Wilderness Burn Communications Team". Human Dimensions Research Programs Report SR-02-02. Accessed from [http://www.inhs.illinois.edu/files/3513/3970/8207/BurnReport\\_Final.pdf](http://www.inhs.illinois.edu/files/3513/3970/8207/BurnReport_Final.pdf)

National Round Table on the Environment and the Economy (NRTEE). (2003). "Cleaning up the Past, Building the Future: A National Brownfield Redevelopment Strategy for Canada". Accessed from <http://nrteetrnee.ca/wp-content/uploads/2011/06/brownfield-redevelopment-strategy-eng.pdf>

Nuckols, Jason, Nathan Rudd, Edward Alverson and Gilbert Voss. (2011). "Comparison of Burning and Mowing Treatments in a Remnant Willamette Valley Wet Prairie, Oregon, 2001-2007". *Northwest Science*, Vol. 85, No. 2: pp. 303-316.

Ojibway Nature Centre. (2008). "History of Ojibway Prairie". City of Windsor. Accessed from <http://ojibway.ca/history.htm>

Ontario Ministry of Infrastructure (OMI). (2006). "Growth Plan for the Greater Golden Horseshoe – Consolidated Edition, 2012". Accessed from <https://www.placestogrow.ca/content/ggh/plan-cons-english-all-web.pdf>

Ontario Ministry of Natural Resources A, (2014). "Barn Swallow". Accessed from [http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR\\_SAR\\_BRN\\_SWLLW\\_EN.html](http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_BRN_SWLLW_EN.html)

Ontario Ministry of Natural Resources B, (2014). "Showy Goldenrod". Accessed from [http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR\\_SAR\\_SHWY\\_GLDNRD\\_EN.html](http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_SHWY_GLDNRD_EN.html)

Packard, Stephen and Cornelia Mutel (Editors). *The Tallgrass Restoration Handbook: For Prairies, Savannas and Woodlands*. Washington, D.C.: Island Press, 1997. Print.

Panzer, Ron. (2002). "Compatibility of Prescribed Burning with the Conservation of Insects in Small, Isolated Prairie Reserves". *Conservation Biology*, Vol. 16, No. 5: pp. 1296- 1307.

Popay, Ian and Roger Field. (1996). "Grazing Animals as Weed Control Agents". *Weed Technology*, Vol. 10, No. 1: pp. 217- 231.

Post, Cheryl (City of Toronto, Natural Environment Specialist). "Update". Message to Jennifer Smith. March, 2014. E-mail Communication.

Pryke, James and Michael Samways. (2012). "Differential resilience of invertebrates to fire". *Austral Ecology*, Vol. 37: pp. 460- 469.

Quinlan, Allyson, Mark Dale and Cormack Gates. (2003). "Effects of Prescribed Burning on Herbaceous and Woody Vegetation in Northern Lowland Meadows". *Restoration Ecology*. Vol. 11, No. 3: pp. 343-350.

Rebollo, Salvador, Daniel Milchunas, Paul Stapp, David Augustine and Justin Derner. (2013). "Disproportionate effects of non-colonial small herbivores on structure and diversity of grassland dominated by large herbivores". *Oikos*, Vol. 122: pp. 1757- 1767.

Robertson, Kenneth. (2008). "Biodiversity of Prairies". Accessed from <http://www.inhs.uiuc.edu/~ken/prairiebiodiversity.html>

Rodger, Lindsay. (1998). "Tallgrass Communities of Southern Ontario: A Recovery Plan". Submitted to the World Wildlife Fund and Ontario Ministry of Natural Resources. Print.

Seymour, John. *The New Self-Sufficient Gardener*. New York, New York: DK Publishing, 2008. Print.

Svedarsky, W., M. Kuchenreuther, G. Cuomo, P. Buesseler, H. Moechnig, and A. Singh. (2012). "A landowner's guide to prairie management in Minnesota". Northwest Research Center, University of Minnesota. Accessed from <http://www3.crk.umn.edu/research/pubs/LandownersGuideSved.pdf>

Swengel, Ann and Scott Swengel. (2001). "Effects of prairie and barrens management on butterfly faunal composition". *Biodiversity and Conservation*, Vol. 10: pp. 1757- 1785.

The Planning Partnership. (2010). "Don Valley Brick Works User Group Study". Submitted to the City of Toronto. Print.

Toronto Region Conservation Authority (TRCA). (n.d.). "Maintaining Your Pollinator Habitat". Accessed from <http://trca.on.ca/dotAsset/151799.pdf>

Toronto Region Conservation Authority (TRCA). (2009). "Don Valley Brick Works November 2009 Fauna Inventory and Assessment". Submitted to the City of Toronto. Print.

Toronto Region Conservation Authority (TRCA). (2014). "Don River Watershed". Accessed from <http://trca.on.ca/the-living-city/watersheds/don-river/>

United States Department of Agriculture (USDA). (n.d.). "Pollinator Conservation Biology Technical Note". Natural Resources Conservation Service. Accessed from [http://plants.usda.gov/pollinators/Habitat\\_Development\\_for\\_Pollinators\\_NJ.pdf](http://plants.usda.gov/pollinators/Habitat_Development_for_Pollinators_NJ.pdf)



United States Department of Agriculture (USDA). (2013). "Brush Management with Goats". Natural Resources Conservation Service. Accessed from [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1117286.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1117286.pdf)

Vinton, Mary Ann, David Hartnett, Elmer Finck and John Briggs. (1993). "Interactive Effects of Fire, Bison (*Bison bison*) Grazing and Plant Community Composition in Tallgrass Prairie". *The American Midland Naturalist*, Vol. 129: pp. 10-18

Vogel, Jennifer, Diane Debinski, Rolf Koford and James Miller. (2007). "Butterfly responses to prairie restoration through fire and grazing". *Biological Conservation*, Vol. 140: pp. 78- 90.

Williams, Dave, Laura Jackson, and Daryl Smith. (2007). "Effects of Frequent Mowing on Survival and Persistence of Forbs Seeded into a Species-Poor Grassland". *Restoration Ecology*, Vol. 15, No. 1: pp. 24-33.

Willms, Walter, Sylver Smoliak, and Johan Dormaar. (1990). "Vegetation Response to Time-Controlled Grazing on Mixed and Fescue Prairie". *Journal of Range Management*, Vol. 43, No. 6: pp. 513-517.

Wilson, Mark and Deborah Clark. (2001). "Controlling invasive *Arrhenatherum elatius* and promoting native prairie grasses through mowing". *Applied Vegetation Science*, Vol. 4: pp. 129-138.

Wisconsin Department of Natural Resources (WDNR). (2012). "Control Methods". Accessed from <http://dnr.wi.gov/topic/Invasives/control.html#biological>

Zhu, Hui, Deli Wang, Ling Wang, Yuguang Bai, Jian Fang and Jun Liu. (2012). "The effects of large herbivore grazing on meadow steppe plant and insect diversity". *Journal of Applied Ecology*, Vol. 49: pp. 1075- 1083.