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A floristic survey of Elk City State Park in Montgomery County, Kansas.

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A FLORISTIC SURVEY OF ELK CITY STATE PARK IN MONTGOMERY COUNTY KANSAS

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DEDICATION

This thesis is dedicated to my friends and family. Without their support this would not have been possible. I extend a special thank you to Stephanie and Nathan for spending hours in the field keeping me company during the heat of summer as we explored the woods and fields looking for plants to add to the specimen collection. As always, I owe a sincere debt of gratitude to Catherine for always supporting me in my efforts to complete my education.

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I would like to take the time to thank the members of my thesis committee for their patience and guidance throughout this process. Their help has been invaluable. I would also like to thank the staff at Elk City State Park for their help with park information. I would like to thank the Montgomery County GIS office for providing me with access to historical aerial photos of the study area as well as GIS information for use in this project.

A FLORISTIC SURVEY OF ELK CITY STATE PARK IN MONTGOMERY COUNTY KANSAS

An Abstract of the Thesis by

Amelia J. Bristow

A floristic survey was conducted in Elk City State Park in Montgomery County, Kansas in order to accomplish three goals; (1) to document the vascular plant species present in Elk City State Park, (2) to assess the floristic quality of the area and (3) to suggest appropriate management strategies for the restoration or reconstruction of the natural areas within the study site.

The floristic survey was conducted over the course of two growing seasons starting in spring of 2011 and continuing through fall of 2012. A total of 259 species were identified representing 191 genera in 68 plant families. Floristic Quality Assessment calculations were made based on the species collected. The mean Coefficient of Conservatism for the study site was 3.02. The adjusted mean Coefficient of Conservatism was 2.46. These calculations indicate that the area within Elk City State Park has experienced a significant amount of disturbance since the arrival of European settlers.

Four species ranked S1 on the Kansas Natural Heritage Inventory were sampled within the study area; *Cissus trifoliata* (sorrel vine), *Pluchea camphorata* (camphorweed), *Krigia biflora* (false dandelion) and *Sesbania herbacea* (bigpod sesbania). These species are either rare or are in danger of extirpation in the state of Kansas.

Management recommendations for the study site include suggestions for the control of noxious weeds. Recommendations have been made for tallgrass prairie restoration in areas of the study site that retain many native species. Options for tallgrass prairie reconstruction are also outlined for implementation in areas of Elk City State Park that do not currently have a significant number of native plant species.

While restoration and reconstruction efforts cannot return the native landscape to pre-European conditions, efforts to increase the floral diversity within the study area will enhance the area for wildlife and will provide park patrons with the opportunity to experience and study a greater number of native species.

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CHAPTER I

INTRODUCTION

Goals of the Study

Elk City State Park is situated in an area of Montgomery County where two physiographic regions occur. As a result, the park contains more than one ecosystem. Overall vascular plant diversity is expected to be higher as a reflection of the unique nature of this convergence zone. Because the physiographic region boundaries are not precise, species from neighboring ecosystems overlap into areas which provide adequate resources for survival (Omernik, 2004). This increased measure of diversity gives the overall appearance of ecosystem health. However, it is important to consider the level of diversity in the context of an ecotone where ecosystems overlap and a high diversity is a reflection of both ecosystems.

A literature review indicated that a floristic survey had not been conducted in this park previously. As Elk City State Park is a protected area, a floristic survey was warranted to accomplish the following goals:

(1) to document the species present in Elk City State Park (establishing a baseline will facilitate future studies and enable comparisons of the floristic quality of the site over time), (2)to assess the Floristic Quality Index of the park, (this will help ascertain the quality of the natural area, comparisons to this value will assist in the long-term monitoring of the area by park employees), (3) to suggest management goals to park employees for the restoration of the natural areas to a closer approximation of the historical vegetative community.

CHAPTER II

LITERATURE REVIEW

Tallgrass Prairie

The prairie biome which once stretched across the central plains from Texas in the south and north into the Canada has been mostly converted for agricultural use (Figure 1). It is estimated that in some areas of its former range, less than 1% remains (Foster *et al*., 2009; Higgins *et al.,* 2001; McIndoe *et al.,* 2008). Kansas retains approximately 18% of the tallgrass prairie that once covered the eastern third of the state (McIndoe *et al*., 2008; Samson & Knopf, 1994; Higgins *et al.,* 2001). The conversion of the tallgrass prairie to agricultural use is the most serious threat to the biodiversity of the region (Cully *et al.,* 2003; Fahrig, 2002; Fahrig, 2003; McGarigal & Cushman, 2002). The vegetative community that replaces the tallgrass prairie supports a different complement of species and has a significant negative impact on the biodiversity of the area (Cully *et al*., 2003; Fahrig, 2002; Higgins *et al*., 2001). This is certainly true of areas that are converted to row crops or are maintained as monocultures of introduced, C_3 grasses. The fragments of tallgrass prairie that remain

Original Extent of the Prairie Types

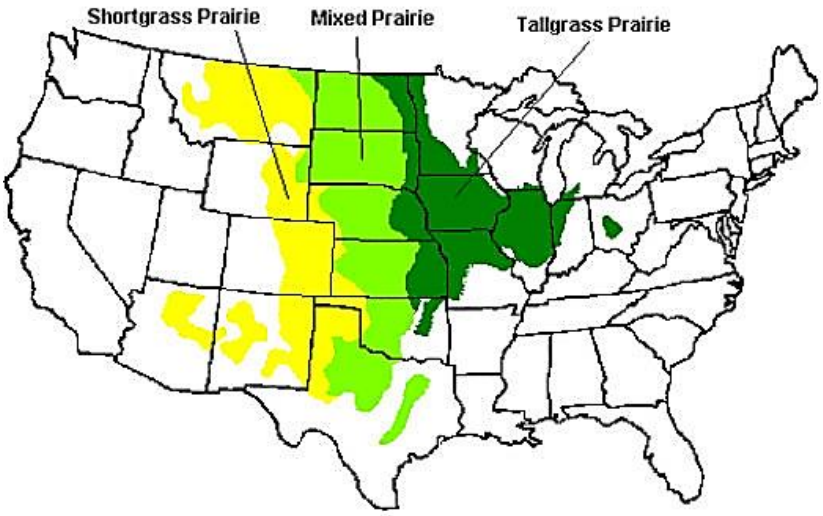


Figure 1. Extent of the prairie region in the United States prior to European settlement

Map Source: U.S. Fish and Wildlife Service Accessed: 3-31-2014
http://www.fws.gov/refuge/waubay/wildlife_and_habitat/native_prairie/article.html

after the widespread destruction of this ecosystem by conversion to agricultural use are frequently isolated from one another. A notable exception to this is the remaining tallgrass prairie situated in the Flint Hills physiographic region of Kansas and Oklahoma (Figure 2.). This largest, contiguous stretch of the tallgrass prairie ecosystem survived for use as rangeland as the rocky, shallow soil is not conducive to converting the landscape to row crops (Cully *et al.,* 2003). This isolation of the remnants affects the successful dispersal of native species seed from patch to patch. The immigration of propagules from neighboring remnants helps to maintain biodiversity within the remnants (Foster *et al*., 2009; Rabinowitz & Rapp, 1980; Smith & Knapp, 2001; Tilman, 1997; Vellend, 2003).

With so many pressures on the native landscape it is imperative to identify and preserve the remaining tallgrass prairie remnants. These remnants provide habitat for threatened and endangered species and they provide a valuable propagule pool that helps to maintain biodiversity. With such a small percentage of the tallgrass prairie remaining, efforts to preserve and restore fragments are beneficial to the overall health of the ecosystem.

The Flint Hills Physiographic Region of Kansas

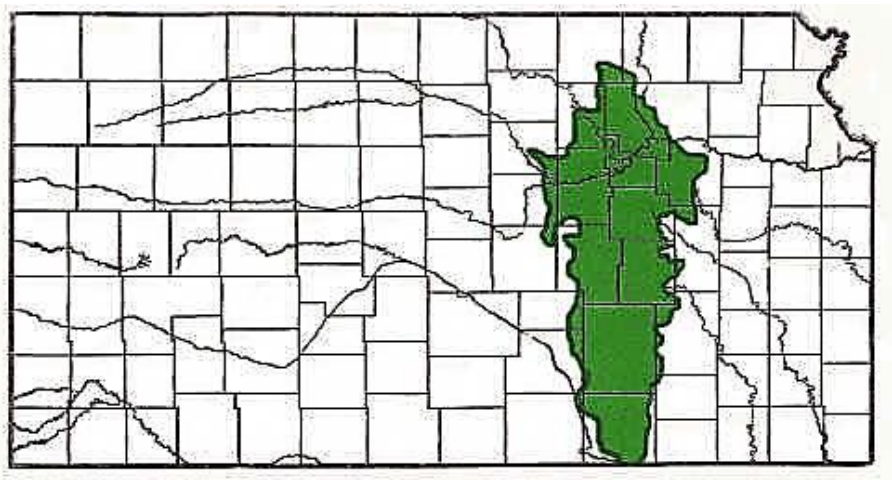


Figure 2: The Flint Hills region of Kansas retains the largest remaining continuous fragment of tallgrass prairie in the state

Source: Great Plains Nature Center; http://www.gpnc.org/meadow.htm accessed 3-31-2014

The Cross Timbers Ecotone

The Cross Timbers is a transitional ecosystem or ecotone that lies between the eastern deciduous forest and the tallgrass prairie (Therrell *et al*., 1998; Engle *et al*., 2006). This ecotone covers portions of eastern Texas in the south; it is the primary forest cover in eastern/central Oklahoma and extends into southeast Kansas following the contours of the eco-region known as the Chautauqua Hills (Figure 3). The Cross Timbers are characterized by patches of deciduous forest characterized by a predominance of oak species interspersed with areas of tallgrass prairie (Bragg, 2012; Stahle *et al.,* 2003). This transitional zone between the eastern deciduous forest to the east and the prairies to the west often reflects characteristics of the surrounding ecosystems (Bragg, 2012; Omernik, 2004; Stahle *et al.,* 2003). Areas within the Cross Timbers form a conglomerate of patches including forest, glades and prairie (Bragg *et al.,* 2012; Engle *et al*., 2006). The dominant genus found in the Cross Timbers forested areas is *Quercus* (oak). *Quercus stellata* (post oak), *Q. marilandica* (blackjack oak) are the characteristic oak species. Other commonly found *Quercus ssp*. include the following: *Q. muehlenbergii* (chinkapin oak), *Q. shumardii* (shumard oak) and *Q. macrocarpa* (bur oak). Other tree species found in the Cross Timbers include: *Cercis canadensis* (redbud), *Celtis occidentalis* (hackberry)*, Carya tomentosa*

(mockernut hickory) and *Ulmus americana* (american elm). Understory species include *Cornus drummondii*, (rough-leaved dogwood),*Bumelia lanuginosa* (woolly buckthorn) *Smilax ssp.* (greenbriar), *Vitis* ssp.(grape), *Symphiocarpus orbiculatus* (buckbrush) and *Rubus* ssp. (blackberry) (Bragg, *et al*., 2012; Therrell *et al*., 1998; Engle *et al*., 2006; Myster, 2009).

Core dating measurements on the trees within the Cross Timbers indicate that some of the older trees have been dated from 200 to over 300 years old in some old growth stands (Bragg *et al*., 2012; Clark & Hallgren, 2003). The trees typically do not reach their growth potential and are frequently described as being stunted. This is due to limited rainfall and low soil nutrients (Clark & Hallgren, 2003; Stahle & Hehr, 1984; Therrell *et al.,* 1998). This stunted growth limits the economic potential of logging within the Cross Timbers and as a result large tracts have been preserved. The Cross timbers still contain thousands of hectares of old growth forest which may not be appreciated as such due to the stature of the trees and the open, scrubby growth pattern (Therrell & Stahle, 1998). The Cross Timbers is a biodiverse region that is becoming increasingly fragmented. In the past, clearing had mainly been confined to areas level enough to support agriculture leaving large tracts intact on sandstone ridges and slopes too steep or rocky to be converted to row crops. The presence of oil reserves, conversion of areas from C_4 to C_3 grasses for ranching and the pressures of urban growth contribute to the continued

destruction of the Cross Timbers (Engle *et al*.,2006; Therrell & Stahle, 1998). Another pressure is the proliferation of *Juniperus virginiana* (eastern red cedar). Fire suppression allows for this species to quickly colonize tracts. The presence of large numbers of *J. virginiana* can change the nutrient cycling patterns within the forest (Bragg *et al*., 2012; Norris *et al*., 2007).

Map of The Ancient Cross Timbers

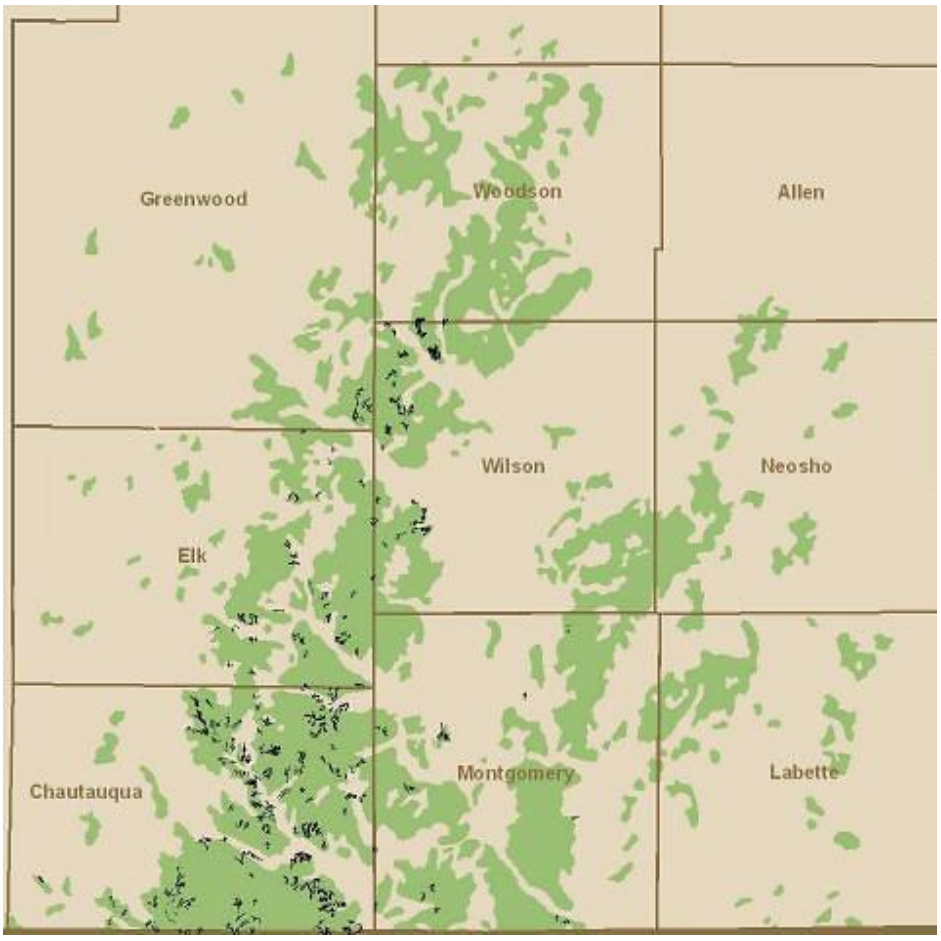


Figure 3:. Extent of the Cross Timbers Ecotone.

Source: University of Arkansas Tree Ring Laboratory
http://www.uark.edu/misc/xtimber/map/ accessed 3-31-2014

The Chautauqua Hills Physiographic Region

The Chautauqua Hills physiographic region occurs to the west of Elk City State Park. The dominant feature of Chautauqua Hills region is the thick layer of sandstone that is the remnant of alluvial deposits formed in an ancient riverbed that occurred here during the Pennsylvanian subperiod (KGS Geologic map of Mont. County). The Cross Timbers ecotone extends into southeast Kansas predominantly within the Chautauqua Hills physiographic region (KGS factsheet C.Hills) (Figure 4). Although there exists this close alignment of the physiographic region and the Cross Timbers ecotone, the Cross Timbers is not restricted to this region. There are many characteristics of the forest cover within Elk City Park that suggest that the Cross Timbers extends beyond the geologic parameters of the Chautauqua Hills and into the park (Figure 5).

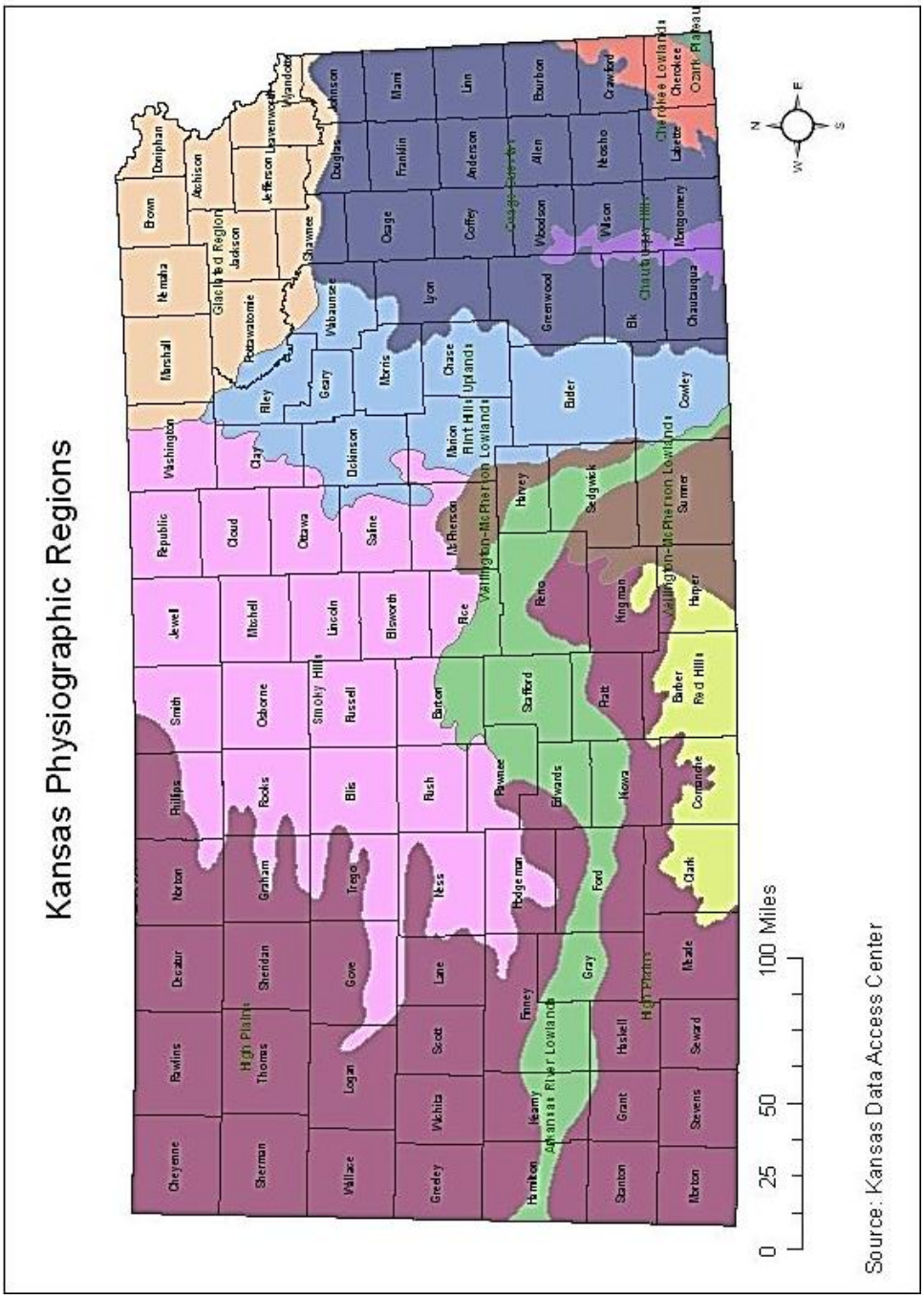
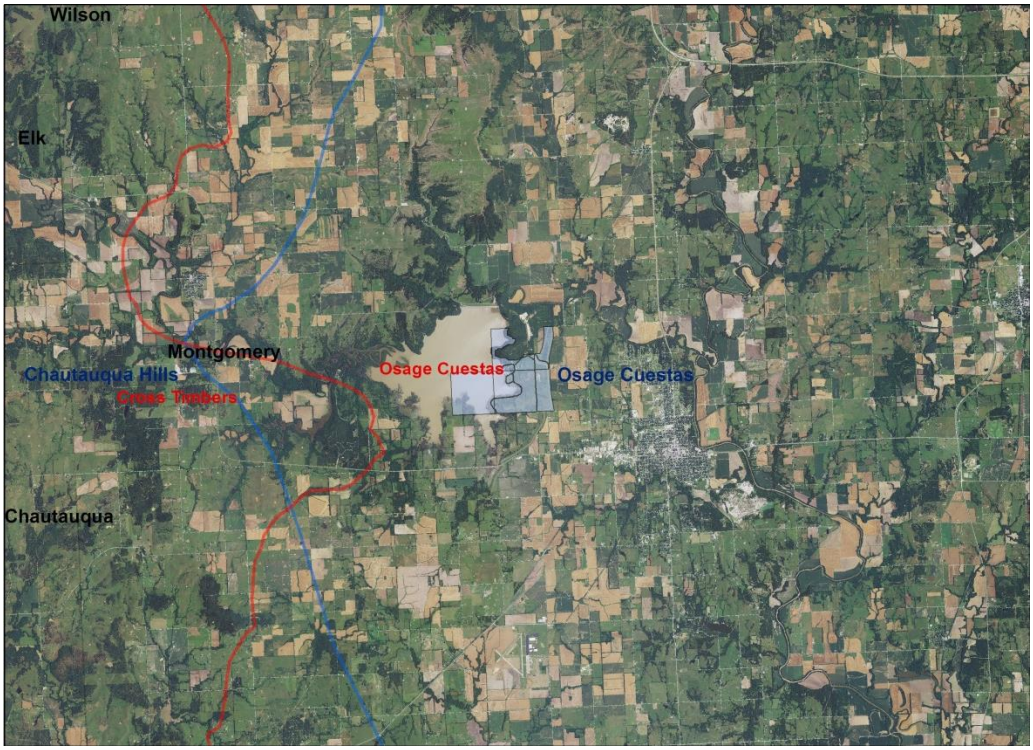


Figure 4. Kansas Physiographic Regions The study site occurs in the Osage cuestas physiographic region. The Chatauqua Hills are to the west of the park

Source: adapted from; Kansas Data Access and Support Center (KDASC) Kansas Biological Survey

Ecoregions and Physiographic Regions



Kansas Ecoregion boundaries in **red**

Kansas Physiographic Region boundaries in **blue**

Park Boundaries shaded light blue

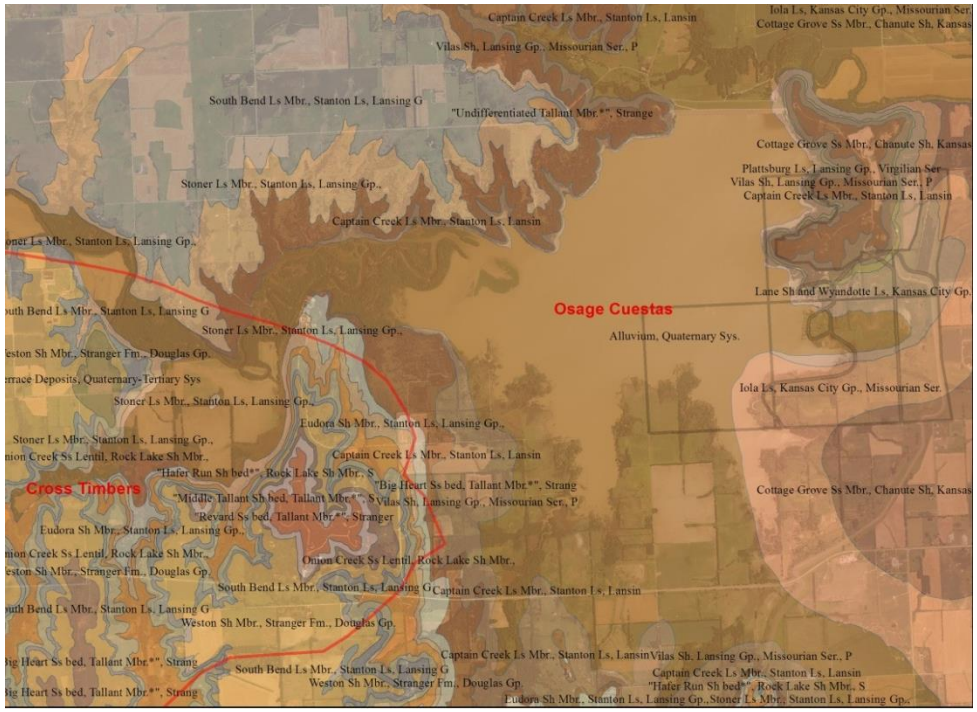
Figure 5: Ecoregion and Physiographic region Boundaries in relation to Elk City State Park Boundaries. This shows the close alignment of the Cross Timbers ecoregion with the Chautauqua Hills physiographic region.

Source: adapted from; Kansas Data Access and Support Center; Kansas Physiographic regions, Kansas Geological Survey, Ecoregions, Kansas Biological Survey Photo Background, Farm Service Agency, Elk City State Park boundaries, Montgomery County GIS Office.

The Osage Cuestas Physiographic Region

The Study site lies within the physiographic region of Kansas known as the Osage Cuestas (Figure 4). The surface geology within the park is consistent with the pattern of alternating layers of limestone and shale found in the Osage Cuestas. These resources continue to be mined in areas outside of the park's boundaries. There is an active quarry on the Tablemound Ridge north of the park entrance (Figure 6). The Tablemound Ridge formation is a series of limestone outcrops that border the northern end of the park and reservoir. The scenic overlook north of the park is situated on this ridge and is under the management of the U.S Army Corps of Engineers. The predominant stratigraphic groups date from the Upper Carboniferous Period also known as the Pennsylvanian sub-period which ended approximately 299 million years ago. The alternating layers of limestone and shale are from the Lansing and Kansas City groups. Alluvial deposits are also present and date from the later Quaternary Period. These riverbed deposits represent the most recent geologic activity within the park (Jewett, O'Connor & Zeller, 1964, KGS, Kansas Geologic Timetable).

Geology of Elk City State Park and Surroundings



2 miles

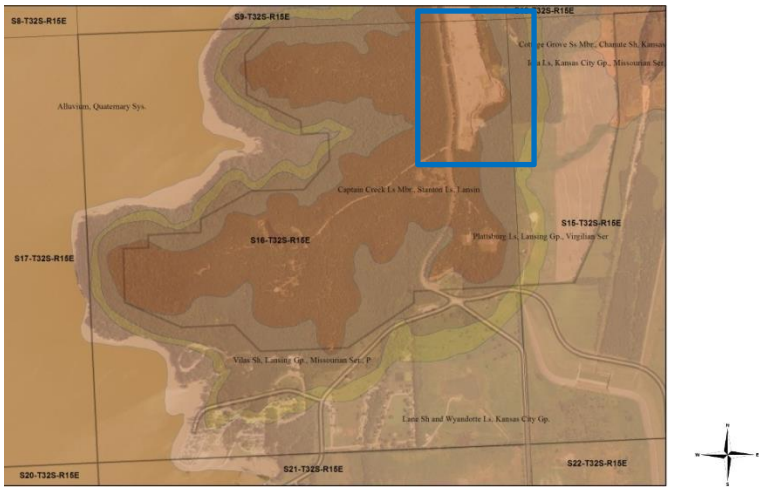


Figure 6: Top; Ecoregions and geology surrounding Elk City State Park
Bottom: Closer view of section 16; active quarry outlined in blue

Source: adapted from; Kansas Data Access Center; Kansas Biological Survey and Kansas Geological Survey. Park outline: courtesy of Montgomery County GIS office

A custom soils report was completed for Elk City State Park in 2010. The report stated that the soils in the park are derived from the underlying shale and limestone and range from well drained to somewhat poorly drained. The soil report stated that the different soil types cannot be mapped with absolute precision where changes occur in close proximity. The map does include information on the dominant soils and minor soil classes.

The predominant soil class is Zaar silty clay, 1 to 3 percent slope which accounts for 24.1% of the acreage within Elk City State Park. The second most abundant soil class is Kenoma silt loam which accounts for 19.6%. Water accounts for the largest percent of acreage with 33% coverage. Aside from the Talihina-Shale outcrop complex which covers 53.30 hectares or 9.1% of the total acreage sampled the smaller map units are comprised of soils described as silt loam or silty clay weathered from shale (USDA-NRCS 2010)

The Effects of Fragmentation and Exotic Species Introduction

Ecosystem fragmentation increases vulnerability to invasion by exotic species. The surrounding matrix and edges of the remnant may hold an available seed pool of introduced and/or noxious species (Cully *et al*., 2003; Higgins *et al*., 2001; Smith &

Knapp, 2001). Woody species that comprise the typical hedgerow encroach on the fragment in the absence of the traditional management techniques of periodic burning and selective grazing (Jog *et al*., 2006). One study indicated that a large available exotic species pool in the surrounding matrix overcame the effect that periodic burning had on the number of exotic species present in the fragment (Smith & Knapp, 2001). Exotic species richness increased with a large available exotic species pool present in the surroundings when compared to similar fragments that were surrounded with a small available exotic species pool (Smith & Knapp, 2001). Species that are present in the matrix surrounding fragmented habitat provide a readily available propagule pool in a disturbed landscape. Higher levels of disturbance allow for the establishment of species from the surroundings. The introduction of C_3 grasses for pastures and common weeds such as *Lamium amplexicaule* (henbit) and *Morus alba* (white mulberry) as well as the aggressive introductions; *Convolvulus arvensis* (field bindweed), *Lespedeza cuneata* (sericea lespedeza), *Lonicera japonica* (japanese honeysuckle) and *Lonicera mackii* (maack honeysuckle) among others have a negative impact on native species. Not only do these introduced species compete with native species for resources, (Higgins *et al*., 2001; Rabinowitz & Rapp, 1980) they have a homogenizing effect on the native landscape (McKinney, 2004). Temporal differences in the growth and reproductive cycles of cool season, C_3 and warm season, C_4 Grasses may favor the establishment of C_3 grasses in the tallgrass prairie. Cool season, C_3 grasses complete their reproductive cycles earlier than the native C_4 grasses. The clumped growth pattern and the later

maturation of the native, C_4 grasses allows C_3 grasses to utilize the available space, nutrients and light before the native species reach their full growth later in the season. This reduced competition for resources early in the growing season favors the establishment of the exotic C_3 grasses (Cully *et al.,* 2003).

Species richness is another variable to consider when assessing the invasiveness of an ecosystem fragment. Species-rich fragments are thought to be more resistant to invasion due to the full utilization of limiting resources. Invasive species are less able to establish a foothold in a species rich community due to competition for space, water and nutrients (Quinn *et al*., 1995; Tilman, 1997). Conversely, species-impoverished sites are more vulnerable to the invasion of exotic species. Disturbed sites offer an opportunity for homogenization of the landscape with the introduction of exotic species (McKinney, 2004). This homogeneity, the replacement of native species with the same introduced species across a wide geographical area is a concern due to the loss of native species as well as the change in community dynamics that occurs. The increasing similarity of sites due to the introduction of exotic species further exacerbates the effects of habitat loss and fragmentation. Pristine ecosystems, when disturbed, begin to resemble adjacent disturbed ecosystems as highly conservative species are replaced by successful generalist and introduced species (Olden, 2006). The extent of some notorious invasive species is well known. *Pueraria lobata* (Kudzu) in the southeast,

Lonicera mackii (maack's honeysuckle) and *Lonicera japonica* (japanese honeysuckle) reach farther into more temperate latitudes. Three invasive species listed as noxious weeds in the state of Kansas occur within the boundaries of Elk City State Park. These are: *Convolvulus arvensis* (field bindweed), *Sorghum halepense* (johnson grass) and *Lespedeza cuneata* (sericea lespedeza). *Lespedeza cuneata* has been reported to occur in most of the Eastern two thirds of Kansas (Figure 7). *Sorghum. halepense* (johnson grass) has been reported in all but eight counties in the state of Kansas. For the remaining eight counties no data is available (Figure 8) (Kansas noxious weed control program, 2011). Whether introduced for erosion control, forage, ornament or by accident, exotic species can have a significant adverse impact on an ecosystem. Adequate control of invasive species is a challenging consideration when planning management and restoration of a natural area.

Reported Distribution of *Lespedeza cuneata* (Sericea lespedeza) in the State of Kansas

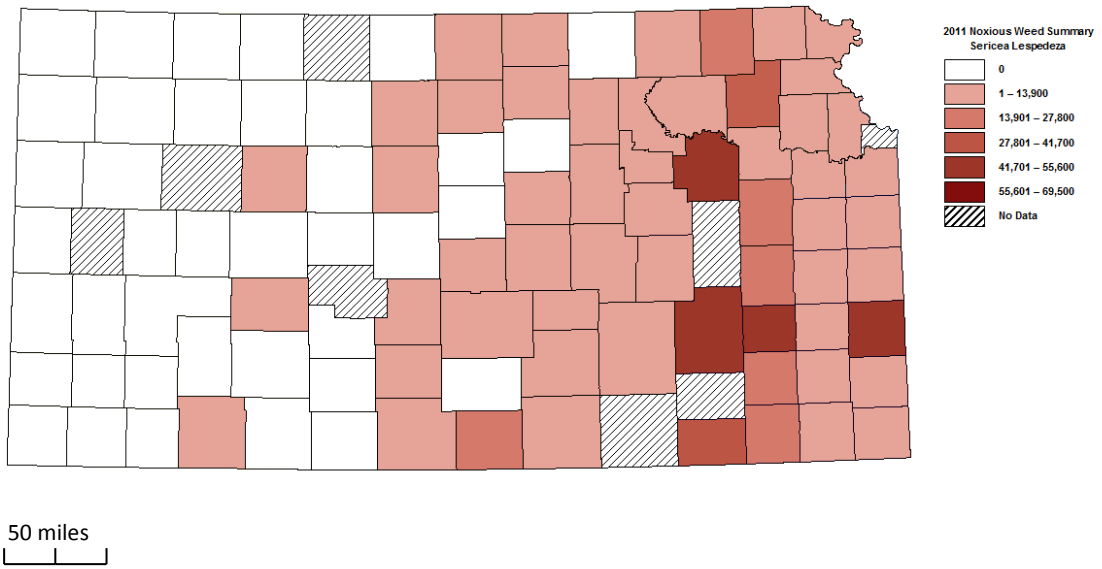


Figure 7: Reported distribution of Sericea lespedeza in the state of Kansas as reported to the Kansas Department of Agriculture Noxious Weed Program.

Source: Kansas Noxious Weed Control Program
http://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/noxious-weed-control-program accessed: 3-31-2014

Reported Distribution of Johnson Grass (*S. halepense*)
in the State of Kansas

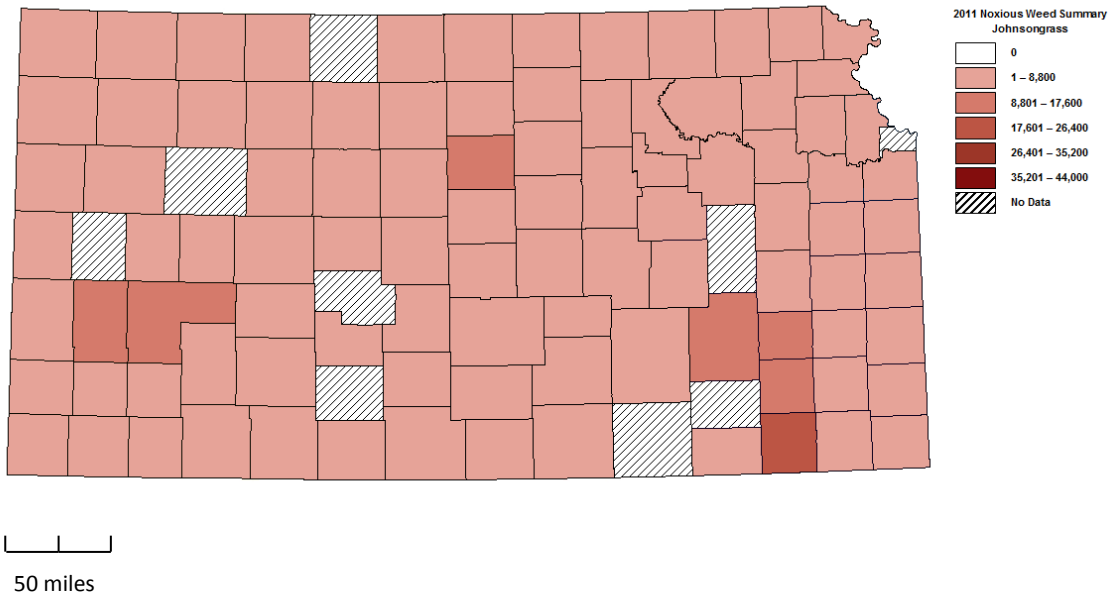


Figure 8: Distribution of Johnson grass in the state of Kansas.

Source: Kansas Noxious Weed Control Program
https://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/noxiousweed-control-program accessed: 3-31-2014

CHAPTER III

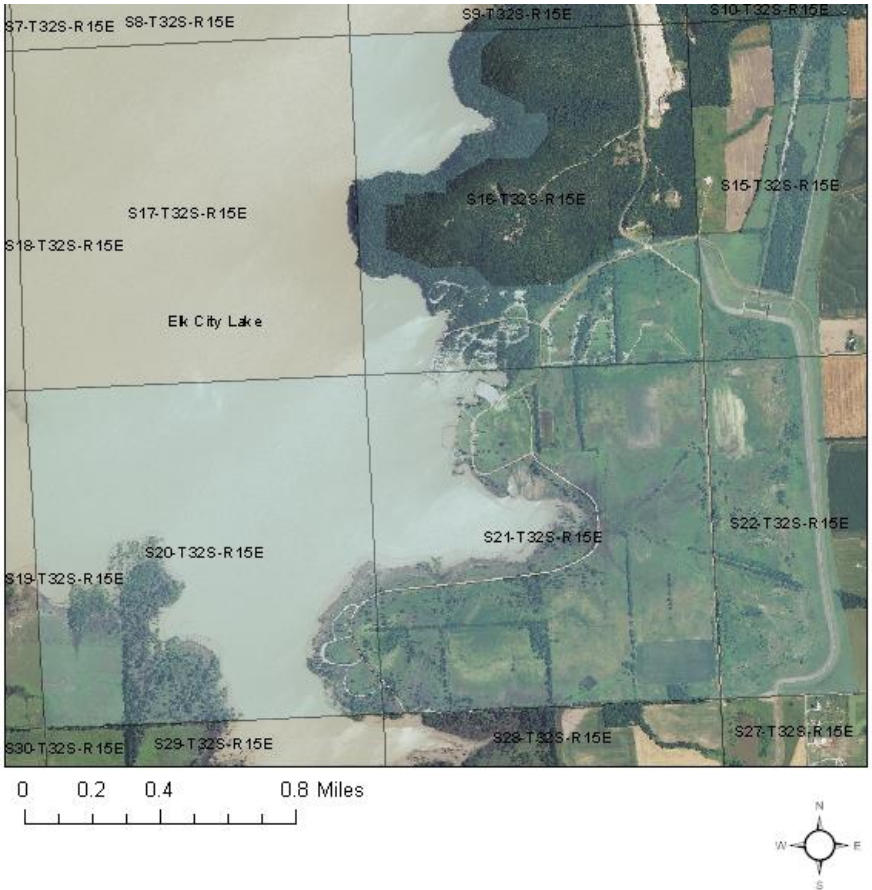
MATERIALS AND METHODS

History and Physical Description of Elk City State Park

Elk City Reservoir was the last of six reservoirs to be built in the Verdigris River Basin. The intent of the project was to control flooding in the drainage basin, to maintain a water supply, and to provide recreation for the surrounding areas (United States Army Corps of Engineers [USACE] Elk City Lake Pertinent Data, 2013). Although congress passed the law to establish these reservoirs in the Verdigris River Basin in 1941, construction on the reservoir projects was delayed until after the end of World War II when funding became more readily available for public service projects. Construction began in 1962 and the project was completed in 1966 (Kansas Water Office, 2011).

Elk City State Park was established when the U.S. Army Corps of Engineers agreed to lease approximately 445 hectares to the Kansas Department of Wildlife and Parks. Currently the park encompasses 343 hectares (Figure 9). In addition, approximately

Boundaries of Elk City State Park



Source: KDASC: Photo background: Farm Services Agency, Public Land Survey System: Kansas Geological Society
Elk City State Park boundary courtesy of the Montgomery County GIS office

Elk City State Park boundaries in blue

Figure 9: Boundaries of Elk City State Park shaded blue showing numbered sections

Elk City Wildlife Area

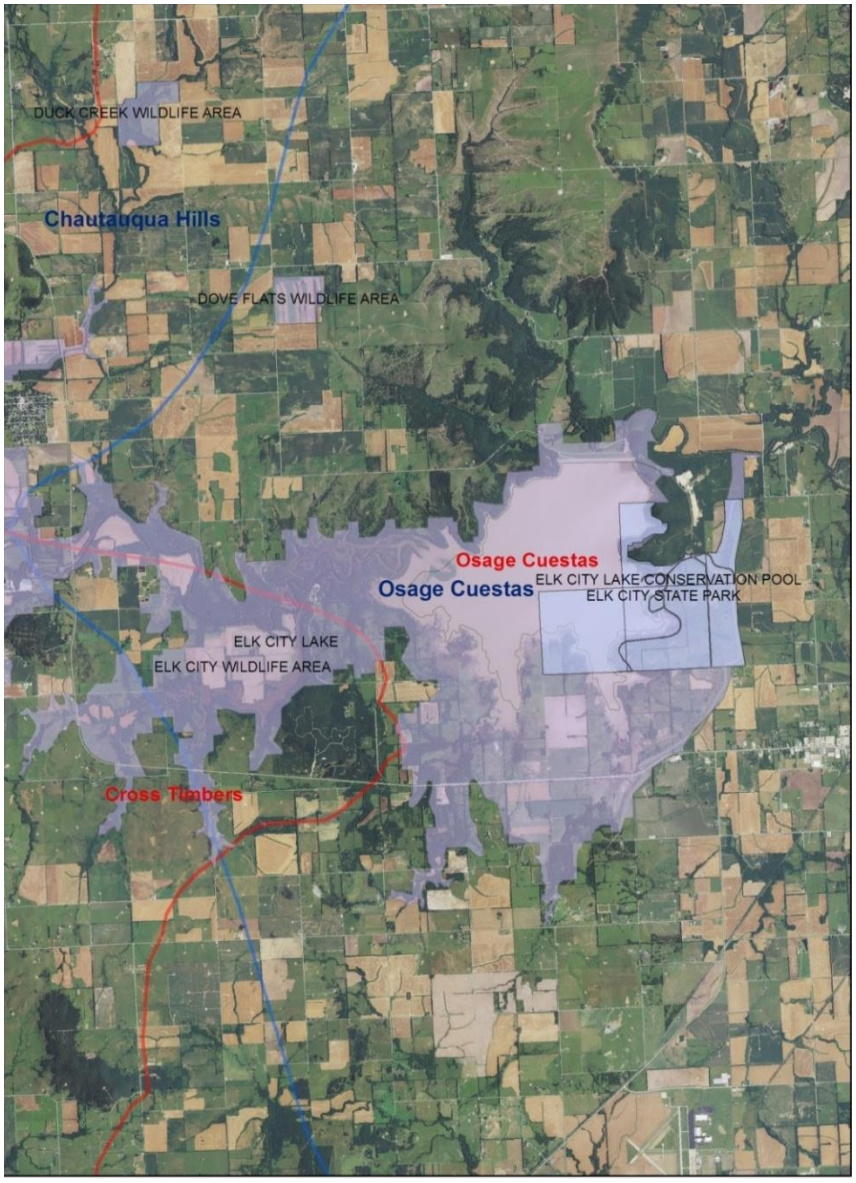


Figure 10: Elk City State Park shaded in blue.

Elk City Wildlife Area shaded in pink

Location of Cross Timbers bordered in red in relation to park. Also visible is the close alignment of the Chautauqua Hills physiographic region in blue with the Cross Timbers ecoregion.

Source: adapted from; KDASC; photo background, FSA, Elk City Wildlife Area, Kansas Department of Wildlife and parks, Physiographic regions, KGS, Ecoregions, KBS, Elk City State Park outline Montgomery County GIS office

4,977 hectares surrounding the park is under the management of the Kansas Department of Wildlife and Parks as Elk City Wildlife Area. Public hunting access is permitted within these areas (Figure 10) (Kansas Department of Wildlife and Parks [KDWP], USACE Elk City Lake, 2014).

Description of the Study Site:

The forest vegetation within the park is representative of two similar types of upland forest cover. The first is the Cross Timbers ecosystem. This ecosystem is characterized by tallgrass prairie interspersed with stands of mixed timber. Common timber species include but are not limited to: *Quercus stellata* (post oak), *Quercus marilandica* (black jack oak), *Quercus muhlenbergii* (chinquapin oak) and *Celtis occidentalis* (hackberry) (Küchler, 1974). The second classification of woodland cover described in this region more recently is Oak-hickory forest (Lauver *et al.,* 1999). This class of vegetation typically includes *Quercus alba*, (white oak) Quercus velutina (black oak), *Carya ovata* (shagbark hickory) and *Ostrya virginiana* (hop hornbeam). These classifications are similar and vegetation samples collected in the study area fall within both categories. Although the underlying limestone and shale geology of the area within the park is more suited to the oak-hickory type forest cover, the collected samples indicate the Cross Timbers ecotone extends into the boundaries of Elk City State Park. It is important to note that the areas where the Cross Timbers and the eastern deciduous forest meet on

the map are not discreet. The forest cover in Elk City State Park shows characteristics of both ecosystems (Omernik, 2004).

Remnants of unglaciated tallgrass prairie also known as southeastern Kansas tallgrass prairie remain in the park (Lauver *et al*., 1999). This area is located in section 21, south of the golf course and the Prairie Meadow Campground. The native grassland does not cover the entire section. Comparison of the current land cover to an aerial map dated from 1954 indicates that at least a portion of the section was converted to row crops or C_3, cool season grass hay meadows at the time of the photograph. This section also contains a length of the old railroad embankment that transected the property prior to the construction of the reservoir (Figure11). Hedgerows are visible on the 1954 aerial photograph and much of these remain further dividing the remnants of native grassland (Figure12).

Other areas of the park include disturbed old-field habitats that contain a mixture of native grasses and forbs as well as shrubs and trees. This vegetation provides food and cover for wildlife but is not representative of the pre-settlement landscape. This habitat borders the southeast end of the lake. The Squaw Creek South Trail winds through this area. Portions of the area are periodically flooded during the spring. The Kansas

Vegitation Classification developed by the Kansas Natural Heritage Inventory and the Kansas Biological Survey classifies the vegetation in this area as wet prairie or *Cephalanthus occidentalis* semi permanently flooded shrub land alliance (Lauver *et al.,* 1999). The classification system was developed in part to facilitate ecological surveys and to assist in making sound conservation decisions (Lauver *et al*., 1999). Other examples of old field habitat contain a mixture of C_3 grasses, C_4 grasses and forbs both native and introduced. This second example of old-field habitat contains fewer shrubs and trees. Portions are mown regularly. The golf course, exercise trail and a few other small areas contain this more intensively managed old-field habitat

Elk City State Park 2012

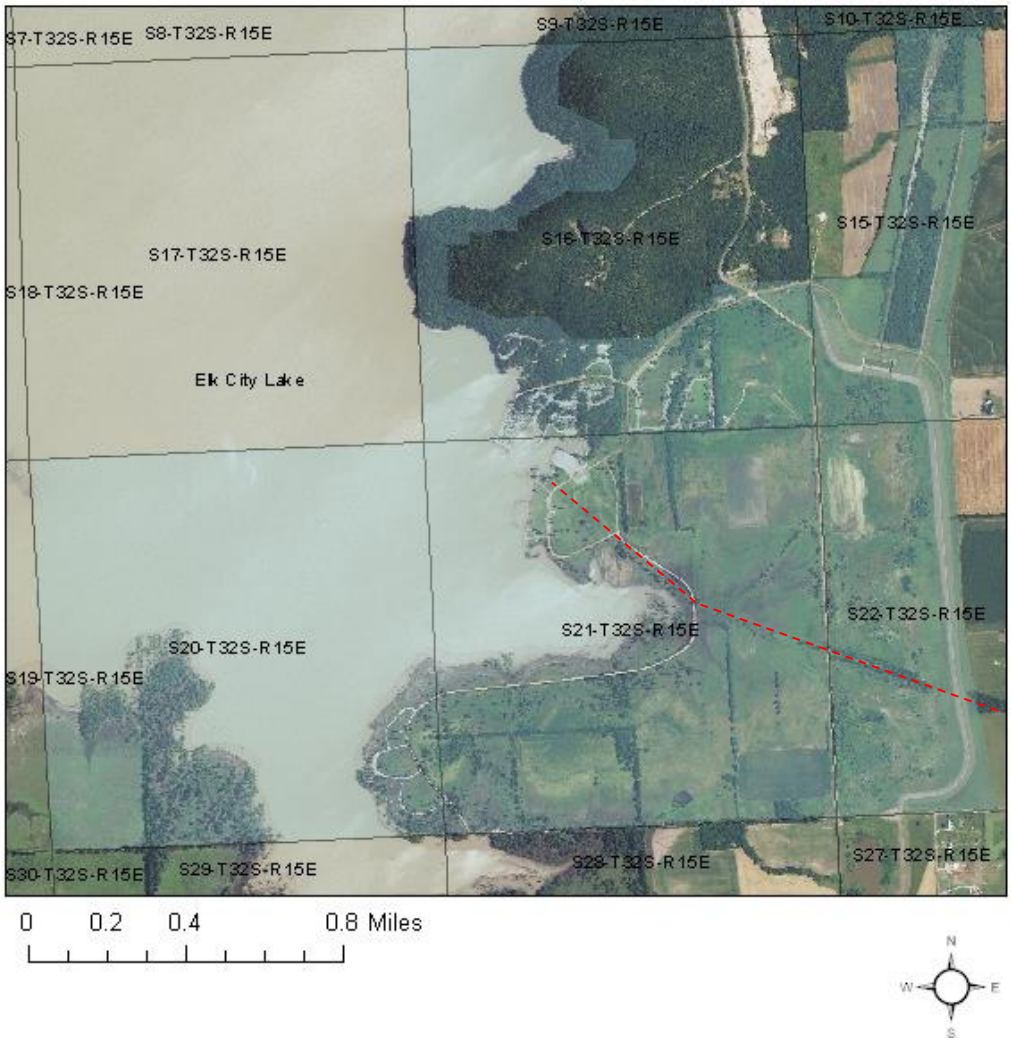
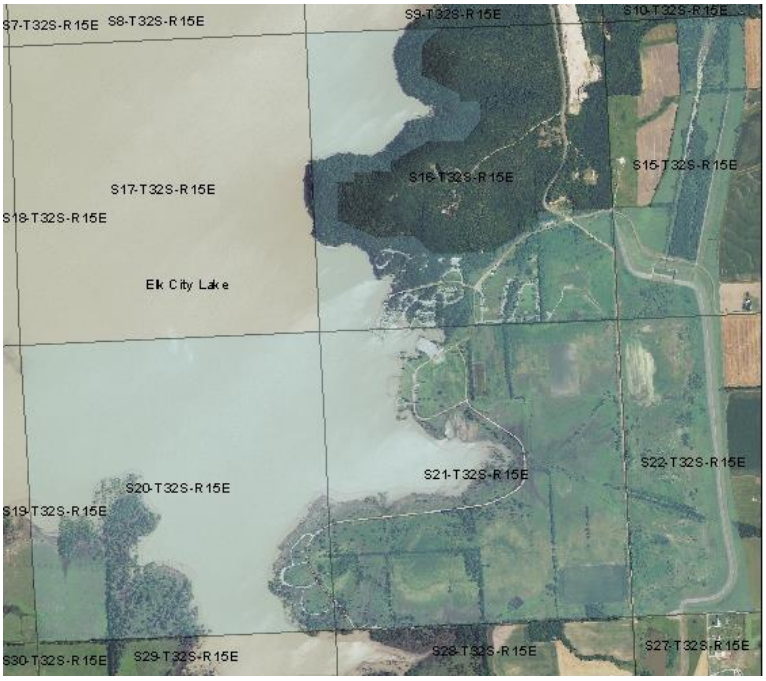


Figure 11: Recent Elk City State Park aerial view showing intact hedgerows. An abandoned railroad embankment is visible starting SE in section 22 and continuing NW through section 21 highlighted in red.

The Squaw Creek trail, visible on this map in section 21 follows the contours of the southeast edge of the lake.
There are disused campgrounds located in the southeast corner of section 20

Sources: Kansas Data Access and Support Center; Farm Services Agency 2012 photo background Kansas Geological society, Public Land Survey System, Kansasgis.org
Elk City State Park boundaries courtesy of Montgomery County GIS Office



Elk City State Park Aerial maps comparing 1954 and 2012.

Park Boundaries shaded blue in 2012 map

1 mile

Figure 12: 2012 Map Comparison to 1954 Aerial Map.
hedgerows and railroad embankment visible in 1954 map remnants of these features remain and are visible in 2012 map.

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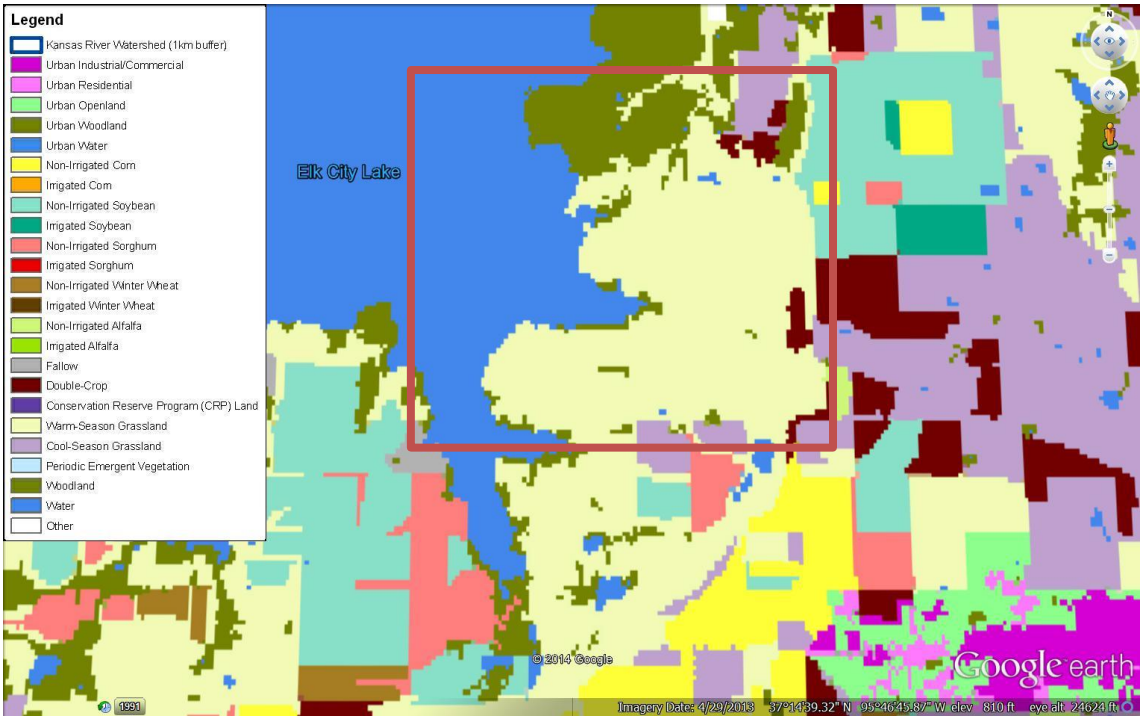
Sources: 2012 map adapted from; Farm Services Agency; Kansas Data Access and Support Center. GIS data and access to historical map provided by Montgomery County GIS office

In considering the fragmented landscape within Elk City State Park several issues are readily apparent. First is the disturbance to the native habitat which has the most detrimental effect on the ecosystem. Species may become extinct locally simply due to disturbance and habitat loss (Cully, Cully & Hiebert, 2003; Van Calster *et al.*, 2008). Second are the remaining habitat fragments; the quality of the remnants, the extent of their isolation and the presence of remaining potential propagule pools in the surrounding area to maintain biodiversity (Bever & Schultz, 2010; Cully *et al.,* 2003; Foster *et al*., 2009; Middleton *et al*., 1980; Tilman, 1997). Third is the introduction of non-native species some of which are highly competitive, invasive species (Cully *at al*., 2003; Smith & Knapp, 2001). Most problematic of these is *Lespedeza cuneata* (sericea lespedeza) which covers large portions of the remaining grasslands in sections 16 and the northern portion of section 21. The vegetative cover in this area has been classified previously by The Kansas Applied Remote Sensing program as warm season grassland on the Kansas land cover patterns map level IV (Figure 13). The applied remote sensing program is a valuable means to assess natural areas. The ability to collect data remotely allows for large areas to be mapped. When used in conjunction with field studies more accurate assessments of natural areas can be compiled and used to refine classifications. Remote sensing has advantages in cases where lack of funding or lack of volunteers to sample natural areas exists.

Kansas Land Cover Pattern Map Level IV



1 Mile

Figure 13: The Kansas Land Cover Pattern Map level IV data compiled through remote sensing data shows most of Elk City State Park covered in warm-season grasses or woodland. Accessed 3-31-2014

Kansas Land Cover Pattern Map Level IV
Source: Kansas Biological Survey Google Earth format

Sampling Timeline and Procedure:

Sampling began in the spring of 2011 and continued through fall of 2011. Sampling resumed in spring of 2012 and continued through fall of 2012. The goal of sampling was to assemble a comprehensive list of vascular plants present in the park. This list serves as a baseline to document species present and as a basis for future comparisons. Specimens were collected, identified and pressed before being added to the Sperry Herbarium at Pittsburg State University. Nomenclature follows that of *The Flora of the Great Plains* (Great Plains Flora Association, 1986). This older text was chosen for its scope and breadth of coverage for the study area. In instances where a second flora was needed to identify a species as in the case of *Taxodium distichum* (bald cypress) and *Liquidambar styraciflua* (sweet gum) *Steyermark's Flora of Missouri* revised edition Vol. 1 and 2 (Yatskievych, Mo. Dept of Conservation, 1999) and *Trees of Missouri* (Kurz, 2003) were used to identify specimens. Some species included in the list were observed but not collected. For example; *Baptisia australis* (blue wild indigo) was locally rare with fewer than 10 plants observed in one location. In an effort to preserve the small population an observational note appears on the plant list. Although abundant, *Toxicodendron radicans* (poison ivy) was omitted from the physical collection. It is included in the list of species with an observation note. Each collection point was

recorded with a GPS unit to facilitate mapping with ARC GIS software. A list of the vascular plants present appears in the appendix. Each species was assigned a coefficient of conservatism value in accordance with the Coefficients of Conservatism for Kansas Vascular Plants (2012) list. This list is made available by The Kansas Natural Heritage Inventory research program (Freeman, 2012). A Floristic Quality Assessment (FQA) was conducted to determin the overall quality of the site. The Floristic Quality Index (FQI) is the numerical calculation based on the assigned coefficients of conservatism for the samples recorded. If there has been little change to the ecosystem since the arrival of European settlers then the Floristic Quality Index (FQI) should be relatively high. Natural areas that have undergone some disturbance will have FQI scores near 45. A score in this range is representative of an area worthy of preservation as it retains much if not all of the native vegetation (Swink and Wilhelm, 1979). Sites deemed of excellent floristic quality may have an FQI score close to 60. A low number would indicate loss of quality of the natural area due to human interference. Such influences include habitat loss, habitat fragmentation or the introduction of non-native species (Higgins *et al*., 2001). The Adjusted Floristic Quality Index (Adjusted FQI) calculates the Floristic Quality Index with the addition of non-native species in the equation to account for the increase in species richness that these species provide (USACE, 2009).

Upon initial observation of the study site it was apparent that there had been extensive fragmentation of the native landscape. Mature hedgerows still exist in areas of the park dividing the former privately owned lands. Remnants of a disused railroad embankment are further evidence of disturbance to the native landscape. The presence of introduced and exotic species throughout the park is another indicator of anthropogenic activity. These observations led to the formulation of the following hypothesis: If there had been substantial change in the area since the time of the arrival of European settlers then there would be little to no high quality native habitat fragments remaining within Elk City State Park. Floristic Quality Assessment scores would reflect these changes as a low FQI and a low mean coefficient of conservatism.

Floristic Quality Assessment

In an effort to objectively assess the quality of remaining habitat of an area, Swink and Wilhelm developed a method to identify high quality natural areas (Swink & Wilhelm, 1979). High quality, in this case, refers to the lack of anthropogenic interference or disturbance of a habitat (Freeman, 2012; McIndoe *et al*., 2008; Medley & Scozzafava, 2009; USACE, 2009). These pristine areas are increasingly rare and for reasons outlined previously, are worthy of preservation.

The development of the Floristic Quality Assessment (FQA) was originally tailored to assess natural areas in the Chicago region (Jog *et al*., 2006; Swink & Wilhelm, 1979; USACE, 2009). FQA has since been applied to many different regions and has proved to be a consistent indicator of the level of disturbance (Jog *et al*., 2006; McIndoe *et al*. 2008; Medley & Scozzafava, 2009; USACE, 2009). FQA has been applied to specific habitats with similar levels of accuracy (Jog *et al*. 2006). FQA has been refined since its inception and is used not only to identify high quality natural areas but it is used as a tool to measure restoration progress, to measure the effectiveness of preservation practices and they provide a basis for comparison between similar sites. FQA has proven to be reliable enough to base policy decisions on the results of these assessments (Freeman, 2012; McIndoe *et al*., 2008; USACE, 2009).

A Coefficient of Conservatism (C of C) is a measure of a plant's tolerance to the level of disturbance in a natural area. Plants that do not tolerate disturbance are described as having a natural affinity or fidelity to pristine, high quality, natural habitats (Freeman 2012; McIndoe *et al*., 2008; Rocchio, 2007; USACE, 2009). These species are assigned a high Coefficient of Conservatism. Conversely, species that are tolerant of human disturbance to the natural habitat and can be found on disturbed ground have a low Coefficient of Conservatism. Introduced species are assigned a zero or null value. Each state or region that utilizes FQA has developed a comprehensive list of the species that

occur within that state or region. A panel of botanists and other experts then assigns a coefficient of conservatism to each species based on knowledge of the species occurrence and field observations (Freeman, 2012; McIndoe *et al.*, 2008; Medley & Scozzafava, 2009; Rocchio, 2007). These efforts to carefully assign coefficients help to eliminate subjectivity in designating an area either high quality or low quality. The list of Coefficients of Conservatism also provides a measure of consistency when assessing natural communities. Two advantages to assessing an area using FQA are (1) eliminating the need to measure abundance or cover density and (2) the ability to eliminate fragment size as a variable in the assessment process (Swink & Wilhelm, 1979; Rocchio, 2007). This assessment tool is particularly suited to the study site due to the fragmented nature of the habitat and the extreme variation in size of comparable parcels of vegetative cover.

Calculating FQA:

Calculating FQA yields three measurements or indices. The first calculation, the mean C value, ($\overline{C}$) indicates the floristic quality of an area. Coefficients of Conservatism are assigned to each species and the sum is then divided by the number of native species.

The mean C value ($\overline{C}$). Where C equals the Coefficient of Conservatism number and N equals the number of native species in the sample.

$$\overline{C} = \sum C \div N$$

This value quantifies the overall habitat quality. An area that has experienced disturbance would tend to have fewer species with high coefficients of conservatism. This loss of highly conservative species is reflected in a lower $\overline{C}$ (Higgins *et al.,* 2001; McIndoe *et al*., 2008; Medley & Scozzafava, 2009; USACE, 2009).

A second formula, the Floristic Quality Index (FQI), has been developed in order to offset the influence of fragment size on the value of $\overline{C}$. Larger fragments tend have a greater number of species (Loring, *et al*., 2005; Rocchio, 2007; Rothrock, 2011; Taft, *et al.,* 1997). This increased species richness may or may not be reflected in the value of $\overline{C}$. A formula that incorporates the measure of species richness helps to differentiate $\overline{C}$ values that occur when assessing fragments of dissimilar size.

$$FQI = \overline{C} \text{ native species } X \sqrt{N\ native\ species}$$

To assess the effects of non-native, introduced species on the FQI, they are incorporated in the formula for analysis. This allows one to address (1) that introduced species contribute to the richness of the study area albeit not in a manner that is considered ecologically sound (McIndoe *et al*., 2008; McKinney, 2004). (2) Non-native,

introduced species lower the quality or level of conservatism of the study site. Since introduced species are always assigned a value of zero this will be reflected in the adjusted FQI value. It is worthwhile to calculate both the FQI and the adjusted FQI of an area (McIndoe *et al.*, 2008; Taft, 1997; USACE, 2009).

The adjusted Floristic Quality Index formula:

$$\text{Adjusted FQI} = \bar{\text{C}} \text{ All Species X } \sqrt{N \quad all\ species}$$

CHAPTER IV

RESULTS

Descriptive Analysis and FQA

The floristic survey conducted within Elk City State Park yielded 259 species of vascular plants. The sample included 191 genera representative of 68 plant families. Of the 259 species, 211 species were native (81.4%). The remaining 48 species were non-native (18.5%). The mean coefficient of conservatism ($\overline{C}$) for the native species sampled was 3.02. The majority of the specimens collected from Elk City State Park have coefficients of conservatism below a rank of five which represents species that will tolerate an intermediate level of disturbance (value 5) to species that are assigned a zero or one. These species, the weediest and least conservative, thrive on disturbed sites. This group includes introduced species and species that are native to the United States but have been introduced to the state of Kansas. These latter classifications carry

a null value. Species with a rank of four and below comprised 76.6% of the collected specimens. Specimens with a coefficient of conservation ranging from (5) to the specimen with highest coefficient of conservation (8) represented just 23.07% of the species sampled.

The Floristic Quality Index for the study area was 43.9 (Table 1). This number indicates a relatively intact site (Swink and Wilhelm, 1979; Higgins *et al*., 2001). When analyzing the study site it is apparent that the moderate FQI may be a reflection of the diverse ecosystems within the park. Because there are areas representative of an oak-hickory type forest, the Cross Timbers ecotone as well as disturbed, successional habitat the FQI value may be a measure of the greater number of species found where transition zones exist rather than an indicator of little disturbance or an intact site.

The Adjusted Floristic Quality Index (Adj FQI) is a measure that includes the introduced species. This has the effect of lowering the mean $\overline{C}$. Since the introduced species carry a null value they decrease the FQI. In this way, the greater biodiversity of the site is recorded in a way that more accurately identifies the level of disturbance. The mean $\overline{C}$ for the adjusted FQI was 2.46 (Table 2). The adjusted FQI for the study site was 39.6. This number is similar to other sites that have experienced a significant level of disturbance (Higgins *et al.,* 2001). In its original inception, the Floristic Quality

Assessment categorized sites with an FQI of 35 or less as unlikely candidates for successful restoration (Swink and Wilhelm, 1979; Higgins *et al.,* 2001).

Floristic Quality Assessment Calculations

Table 1

Floristic Quality Index

Sum of coefficient of conservatism all species	637
Total number of native species	211
Mean C of C (637÷ 211)	3.02
Square root of native species	14.5
FQI (3.02 X 14.5)	43.9

Table 2

Adjusted Floristic Quality Index

Sum of coefficient of conservatism all species	637
Total number of all species	259
Mean C of C all species (637÷259)	2.46
Square root of all species	16.1
Adjusted FQI (2.46 X 16.1)	39.6

Table 3

Percentage of Samples by Coefficient of Conservatism Values

Coefficient of Conservatism	**% of Total**
*	22.4%
0	12.4%
1	8.8%
2	11%
3	11%
4	11%
5	9.6%
6	7.3%
7	5.4%
8	.77%
9	0%
10	0%
Total	99.67%

Analysis of the Three Most Abundant Plant Families

The three taxonomic plant families with the greatest number of representatives are Poaceae with 44 representative species which is 17% of the total species sampled, Asteraceae with 32 representative samples which comprises 12.4% of the total samples taken and Fabaceae with 21 representative samples which is 8% of the total specimens collected (Table 3). Since the study area shows signs of disturbance it is worthwhile to examine the percentages of both the introduced species as well as the species with the lowest coefficient of conservatism values also labeled the weediest species in the three most abundant plant families. In the Poaceae family, 15 of 44 species sampled are introduced species (Table 4). This is 34% of the total number of specimens sampled from this family. An additional eight species fall into the weediest category with a coefficient of conservatism value of zero or one. This is 18% of the total number of specimens from this family (Table 5). In all, 52% of the Poaceae family, are either introduced or suited to the most disturbed habitats. In the Asteraceae family there is only one introduced species. However, 31% of the Asteraceae family sampled falls into the least conservative category. In the Fabaceae family, six species are introduced and only one species falls into the weediest category. This sum represents 33% of the Fabaceae family.

That the Poaceae family is the most frequently sampled family in the grassland areas of the park is not surprising. With a closer examination of the ratio of introduced species and species with the lowest Coefficient of Conservatism (C of C) it becomes clear that these areas have experienced a significant amount of disturbance. The same is true when examining the ratio of introduced and low C of C species in the Asteraceae and Fabaceae family samples. These findings, when combined with the absence of typical indicator species, as well as the lack of highly conservative species present in Elk City State Park clearly indicate significant change has taken place in these natural areas post-European settlement.

Table 4

Three Plant Families with the Greatest Number of Samples

Plant Family	**Number of representatives**	**Percent of Total**
Poaceae	44	17%
Asteraceae	32	12.4%
Fabaceae	21	8%
Total	97	37.4%

Table 5

Percent of Introduced Species in the Three Most Abundant Plant Families

	Poaceae	**Asteraceae**	**Fabaceae**
Number of Representatives	44	32	21
Number of Introduced species	15	1	6
Percent of total family = Introduced Species	34%	0.03%	29%

Table 6

Percent of Weediest Species in the Three Most Abundant Plant Families

	Poaceae	**Asteraceae**	**Fabaceae**
Number of Representatives	44	32	21
Number of Zero C of C value	6	7	1
Number of (1) C of C value	2	3	0
Total: weediest natives (0, 1 value)	8	10	1
Percent of total representatives = Weediest Species	18%	31.2%	.04%

General Floristic Description

Three plants listed as noxious weeds in the state of Kansas occur within Elk City State Park: *Convolvulus arvensis* (field bindweed*), Sorghum halepense* (Johnson grass), and *Lespedeza cuneata* (sericea lespedeza). The last two species are widespread in some areas of the park. *L. cuneata* is particularly abundant on the golf course which is situated in the southeast corner of section 16. In the northeast corner of section 21 the abundant cover of *L. cuneata* makes navigation of the area on foot difficult.

There were few highly conservative species found during the sampling time frame. *Houstonia longifolia* (slender leaf bluet) was the most highly conservative species sampled during the study period. With a coefficient of conservatism of 8, this species tolerates little disturbance. The collection site for this species is noteworthy as it containes a high concentration of native species not found in other areas of the park. This potential propagule pool is situated within the loop of the Green Thumb hiking trail. This small clearing is visible in the 1954 aerial photo. A comparison to recent aerial photos shows there has been some change in the size of the clearing. Trees from the surrounding matrix have not fully colonized this site (Figure 13). Another indicator of little disturbance to this area is the concentration of native species found throughout

two growing seasons. The clearing's small size and its situation on an otherwise wooded slope are hindrances to human disturbance. Lacking size, level ground to build on and deep soil to cultivate the intact flora may simply be a result of the inherent unprofitability of the site.

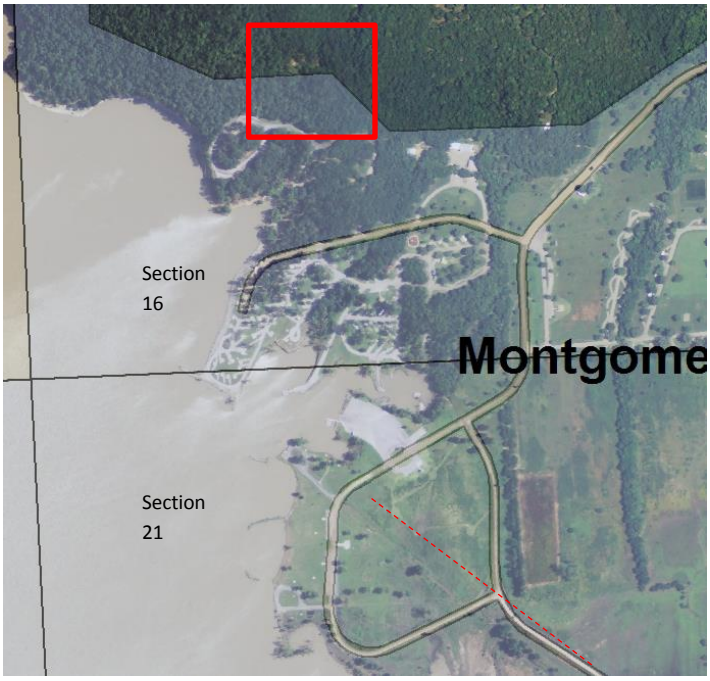
Four species listed as critically imperiled on the Kansas Natural Heritage Inventory were collected from the study site. This includes: *Krigia biflora* (false dandelion), *Pluchea camphorata* (camphorweed), *Sesbania exaltata* syn. *Sesbania herbacea* (bigpod sesbania) and *Cissus incisa* syn. *Cissus trifoliata* (sorrel vine). These species ranked S1 are listed as critically imperiled either due to rarity within the state of Kansas or vulnerability to extirpation from the state. It is important to note that these are not highly conservative species. Only *Cissus incisa*, with a C ofC of 7 and *Krigia biflora*, ranked with a C ofC of 6 indicate that these do tolerate low to intermediate levels of disturbance to the habitat. *Sesbania exaltata* and *Pluchea camphorata* are ranked with coefficients of conservatism of 3 and 4 respectively indicating that these species, although rare in the state of Kansas, will tolerate disturbance to the habitat.

There is convincing evidence of anthropogenic disturbance within the boundaries of Elk City State Park. The density of invasive species cover, the evidence of past disturbance as seen in the aerial photos taken in 1954 as well as the lack of highly conservative species typically found in a tallgrass prairie ecosystem all indicates varying

degrees of habitat degradation. In addition to these factors, there is a noticeable absence of indicator species usually found in the tallgrass prairie. *Andropogon gerardii*, (big bluestem) *Sisyrinchium scoparium* (little bluestem) and *Sorgastrum nutans* (indian grass) were not sampled from the grasslands in the study area. These species do occur in an isolated clearing within the loop of the Green Thumb Trail which lies just outside of the park border (Figure 14).

The presence and abundance of three species of noxious weeds are a particular concern for any conservation efforts conducted within the study area. *Lespedeza cuneata* (sericia lespedeza), *Sorghum halepense* (johnson grass) and *Convolvulus arvensis* (field bindweed) are all present in Elk City State Park These species out-compete the native flora for space and nutrients. Without control efforts there is a risk to the less vigorous native species.

Comparison of Clearing in 1954 and 2012



.5 miles

Figure 14:
The location (in red) of clearing containing a high number of native species. This area lies within the loop of the Green Thumb hiking trail just outside of the park borders.

1954 photo: Montgomery County GIS Office

2012 photo adapted from; Farm Service Agency via KDASC 3-31-2014

Park boundaries courtesy of Montgomery County GIS Office

Chapter V

MANAGEMENT RECOMMENDATIONS

Invasive Species Control

The degradation of the original habitat within ELK City State Park combined with the need to manage the noxious weeds *Lespedeza cuneata* (sericea lespedeza) and *Sorghum halepense* (johnson grass) in Elk City State Park are primary management concerns. Habitat loss and the introduction of noxious weeds are the biggest threats to the biodiversity within the study area (Higgins *et al.,* 2001). Although *Convolvulus arvensis* (field bindweed) and *Lonicera japonica* (japanese honeysuckle) also occur in the study area *L. cuneata and S. halepense* have invaded to a much larger extent.

Abundant weed cover impacts the native species richness in the immediate vicinity and without control measures, the percentage of land covered with *L. cuneata* will increase rapidly to the further detriment of native species. Established stands of *L. cuneata* produce as many as 6000 seeds per plant each year (Wong *et al*., 2012). With the abundant seed production and aggressive growth pattern *L. cuneata* has had a negative impact on the grassland areas within the park. These changes in diversity

happen quickly once *L. cuneata* becomes established. One study reported a significant drop in the number of native species from 27 to eight species in less than seven years (Eddy & Moore, 1998). Controlling *L. cuneata* is a challenge for land managers. Herbicides, burning and grazing have all been utilized but no single control method yields consistent results. Another obstacle to aggressively treating the infestation of *L. cuneata* within Elk City State Park is the location of the weed cover. The golf course has areas with extensive cover of *L. cuneata*. This area is frequented by visitors to the park. Annual or biennial burning coupled with heavy herbicide applications detract from recreational use of the site. The second area with a large stand of *L. cuneata* is less frequented by visitors to the park. Although livestock has been suggested as a means of controlling *L. cuneata t*he fencing requirements necessary to contain goats rule out grazing as a biological means to control dense stands of *L. cuneata.* Other livestock avoid *L. cuneata* due to the high tannin content which makes the forage unpalatable (Rutherford, 2011). The Kansas Noxious Weed Control Program indicates that there are no effective biological controls available. The need to eliminate stands of noxious weeds in order to increase biodiversity and improve the health of the ecosystem must be balanced with the need to attract visitors and revenue to the park.

Marginally successful *L. cuneata* reduction regimens employ several control methods. Burning has little effect on mature *L. cuneata* which will readily re-grow from the robust rootstock after exposure to fire (Wong *et al.,* 2012). A combination of herbicide

applications to mature plants and adopting a burn regimen to control *L. cuneata* in the seedling stage has been more successful than herbicide applications or burning alone (Wong *et al.,* 2012). This study indicated that fire was positively correlated with an increased germination rate in *L. cuneata* seeds. By manipulating the timing of the burns it was found that burning late in the season had the most negative impact on seedling survivorship. Fire late in the season combined with the subsequent flush of germination produced a large number of *L. cuneata* seedlings very late in the growing season. The short growth window gives the tender seedlings little time to accumulate the reserves necessary to survive winter (Wong *et al*., 2012).

Fall burning may be riskier than spring burning due to the annual accumulation of dry material combined with a lack of precipitation late in the season. Fire bans under extremely dry conditions would limit the opportunities to implement this strategy. However, the technique shouldn't be ruled out if conditions allow for safely implementing a controlled burn in an area heavily infested with *L. cuneata*. Frequent mowing has been used with some effectiveness to reduce the vigor of *L. cuneata* but frequent mowing has a negative impact on less vigorous native species. (Wong, *et al*., 2012)

With well established stands of *L. cuneata* present in Elk City State Park complete elimination may be an impossible goal to achieve. Focusing on reducing the population through selective herbicide application to established plants combined with a mowing regimen aimed at reducing seed production and to prevent the establishment of seedlings may be a more practical goal.

Johnson grass (*Sorghum halepense*) is another noxious weed found within the study area. Like *L. cuneata, S. halepense* is an introduced species that has become a noxious weed in many parts of its range. This species produces large amounts of seed and an extensive system of rhizomes. (Riar, *et al.*, 2011). Controlling *S. halepense* requires more than one method. Frequent cultivation, eliminating chances to set seed and herbicide application have proven successful in eradicating stands of *S. halepense* in crop producing fields (Riar, *et al*., 2011). Frequent cultivation is recommended to weaken the rhizomes of *S. halepense.* A 14-day cultivation regimen is recommended to weaken the plant. This method has limitations when applied to restoration settings. The treatment risks eradicating desirable species before noxious weeds are eliminated. A combination of removing top growth and spot application of herbicide may be more suited to areas where *S. halepense* exists in close proximity to native species. Herbicide resistant strains of *S. halepense* have been identified. Herbicide resistance occurs more frequently as herbicide is routinely applied to commercial crops. Alternating herbicides

may prove more effective and may reduce resistance (Riar, *et al*., 2011; Kansas Noxious Weed Control Program, 2014).

Eliminating seed production in these noxious weeds is especially challenging. Both *S. halepense* and *L. cuneata* produce large amounts of seed each growing season. *L. cuneata* produces seed for an extended period during the growing season making control of seed production difficult (Wong, *et al*., 2012). Removal of top growth will prevent seed formation and will reduce root reserves weakening the plant (Riar, *et al*., 2011; *Wong, et al.,* 2012). The difficulty in implementing an aggressive eradication or reduction program is primarily due to a lack of funding for enough park employees to carry out the necessary treatment regimen.

Prairie Restoration and Reconstruction

Despite the challenges imposed by the level of invasive species cover in Elk City State Park, restoring sections of the study area to native species would be beneficial. (1) Along with the characteristic woody species, native grasses and forbs are an integral part of the Cross Timbers ecosystem. As such, restoration or reconstruction would better support the native species that depend on them. (2) Elk City State Park is a protected natural area. Attempts to restore or reconstruct a tallgrass prairie would

allow visitors to the park to enjoy the beauty of this threatened ecosystem. (3) Re-introducing C_4 grasses and forbs would provide a propagule pool which would have the potential to increase biodiversity to the surrounding fragments of grassland (Middleton, *et al*., 2010).

The choice to restore native prairie or to reconstruct native prairie depends on the location within the study area the treatment would be applied. In areas that have an abundance of C_3 grasses and annual weeds, reconstruction may be the better choice (Rowe, 2010; Middleton *et al*., 2010). The most successful reconstructions involve utilizing crop land that has been seeded to *Glycine max* (soybeans). Preparation of the site before the introduction of the crop helps to eliminate the cover of undesirable species. After harvesting the crop a forb-rich grass blend is broadcast over the crop residue. The timing of seed application has an impact on the success of reconstruction. Fall seeding allows the seed to experience the temperature fluctuations necessary to break dormancy (Rowe, 2010). This combination of cultivation to reduce competition and fall application of seed has been a successful method of introducing and establishing a native species pool. There are areas in Elk City State Park that have been used for crop production. In section 21, oil seed sunflowers were grown in 2010. This location is small however that may be advantageous considering budget constraints and the demands on labor that a reconstruction project entails. There is an added benefit as

the site has been cultivated and the introduced species have been greatly reduced by mechanical or chemical means.

Another method to establish prairie species is through restoration. Restoration involves broadcast seeding an area that has vegetative cover. This has some disadvantages to reconstruction methods. Competition with established species reduces the success rate. Burning prior to seeding increases seed-soil contact by reducing the litter on the ground (Wong, *et al.,* 2012). Ideally the burn would be scheduled in fall in order to reduce the number of *L. cuneata* seedlings but the opportunity to safely burn during fall may not occur. Fall seeding is preferred for the stratifying effect that temperature fluctuations have on the seeds (Rowe, 2012). There are areas within Elk City State Park where restoration efforts would be appropriate. The advantage to this method is it requires little disruption to park services while restoration activities take place. Success rates increase with a biannual burn schedule (Middleton, *et al*., 2010)

Efforts to improve the old field habitats through restoration or reconstruction would improve Elk City State Park. Although the reconstructed and restored sites would only be an approximation of the original tallgrass prairie ecosystem, the increase in native species and the resulting biodiversity would be an improvement on the species impoverished areas the park now contains.

LITERATURE CITED

LITERATURE CITED

Bennison, A.P., assisted by Collins, D.R., 1996, Geologic map, Montgomery County, Kansas: Kansas Geological Survey, http://www.kgs.ku.edu/General/Geology/County/klm/montgom.html

Bragg, D, Stahle, D, Cerny, C.(2012) Structural attributes of two old growth cross timbers stands in western Arkansas. American Midland Naturalist. 167 (1) 40-55

Chautauqua Hills Rocks and Minerals Fact Sheet (1999) Kansas Geological Survey Available at: http://www.kgs.ku.edu/Extension/chautauqua/CH_factsheet1.pdf Accessed March 31, 2014

Clark, S. L., Hallgren, S. W. (2003) Dynamics of oak (*Quercus marilandica and Q. stellata*) reproduction in an old-growth cross timbers forest. The Southeastern Naturalist. 2 559-574

Cully, A. C., Cully J. F., Hiebert R. D. (2003). Invasion of exotic plant species in tallgrass prairie fragments. Conservation Biology, 17 (4) 990-998

Eddy,T. A. and Moore, C. M., (1998) Effects of sericea lespedeza (*Lespedeza cuneata* (Dumont) G. Don) invasion on oak savannas in Kansas. Transactions of the Wisconsin academy of Sciences

Elk City Lake Reservoir Information Sheet (2012) Kansas Water Office Available at: http://www.kwo.org/reservoirs/ReservoirFactSheets/Rpt_ElkCity_2011.pdf Accessed March 31, 2014

Elk City State Park Brochure. (2011) Kansas Department of Wildlife and Parks and Tourism Available at: http://www.kdwpt.state.ks.us ElkCitySP@ksoutdoors.com accessed March, 31, 2014

Engle, D. M., Bodine, T. and Stritzke, J. F. (2006) Woody plant community in the crodd timbers over two decades of brush treatments. Rangeland Ecology and Management 59 (2) 153-162

Fahrig, L. (2002) Effect of habitat fragmentation on the extinction threshold: a synthesis. Ecological Applications. 12 (2) 346-353

Fahrig, L. (2003) Effects of habitat fragmentation on biodiversity, Annual Review of Ecology, Evolution and Systematics, 34, 487-515

Foster, B. L., Kindscher, K., Houseman, G.R. & Murphy, C. A. (2009) Effects of hay management and native species sowing on grassland community structure, biomass and restoration. Ecological applications, 19 (7) 1884-1896

Freeman, C. Coefficients of Conservatism for Kansas Vascular Plants (2012) and Selective Life History Attributes. Kansas Natural Heritage Inventory Kansas Biological Survey Website: http://ksnhi.ku.edu/resources/plants/ Accessed March 31, 2014

Haila, Y. (2002). A conceptual genealogy of fragmentation research from island biogeography to landscape ecology. Ecological applications, 12 (2) 321-334

Higgins, J., Larson, G. E., & Higgins, K. F. (2001) Floristic composition of tallgrass prairie remnants managed by different land stewardships in eastern South Dakota. Proceedings of the North American Prairie Conference, 21-31

Jog, S., Kindscher, K., Questad, E., Foster, B. & Loring, H. (2006) Floristic quality as an indicator of native species diversity in managed grasslands. Natural Areas Journal, 26 (2) 149-167

Kansas Department of Wildlife and Parks (2014) Elk City State Park Wildlife Area Available at: http://kdwpt.state.ks.us/KDWPT-Info/Locations/Wildlife-Areas/Region-5/Elk-City Accessed March 31, 2014

Kansas Geologic Timetable (2012) Kansas Geologic Survey Available at: http://www.kgs.ku.edu/Extension/geotopics/timeChart.html. Accessed March 31, 2014.

Kansas Land Cover Pattern Map Level IV (2009) Martinko, E., Egbert, S., Whistler, J. Peterson, D. Kansas Biological Survey University of Kansas, Kansas Applied Remote Sensing Program Available at: http://kars.ku.edu/research/2005-kansas-land-cover-patterns-level-iv/ Accessed March 31, 2014

Kansas Noxious Weeds; Sericea Lespedeza (*Lespedeza cuneata*) Kansas Noxious Weed Control Program; Kansas Department of Agriculture. Available at: https://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/noxious-weed-control-program Accessed March, 31 2014

Kansas Noxious Weeds; Johnsongrass (*Sorghum halepense*) Kansas Noxious Weed Control Program; Kansas Department of Agriculture. Available at: https://agriculture.ks.gov/divisions-programs/plant-protect-weed-control/noxious-weed-control-program Accessed March 31, 2014

Küchler, A. W., (1974) a new vegetation map of Kansas. Ecology 55 (3)586-604

Kurtz, D. (2003) Trees of Missouri, The Conservation Commission of the State of Missouri

Lauver, C. L., Kindscher, K., Faber-Langendoen, D. & Schneider, R. (1999) A classification of the natural vegetation of Kansas. The southwestern Naturalist, 44 (4) 421-443

Loring, H., Kindscher, K. & Delisle, J. (2005). A survey of natural area sites in Cherokee County Kansas. Open-File Report No. 125. Kansas Biological Survey.

McGarigal, K. & Cushman, S. A. (2002). Comparative evaluation of experimental approaches to the study of habitat fragmentation effects. Ecological applications, 12 (2) 335-345

McGregor, Ronald L., Barkley, T. M. 1934-(Theodore Mitchell) Great Plains Flora Association U. S.). *Flora of the Great Plains.* Lawrence, Kansas: University Press of Kansas; 1986

McIndoe, J.M., Rothrock, P. E., Reber, R. T. & Ruch, D.G. (2008) Monitoring tallgrass prairie restoration performance using floristic quality assessment. Proceedings of the Indiana Academy of Science 117 (1) 16-28

McKinney M.L. (2004). Measuring floristic homogenization by non-native plants in North America. Global Ecology and Biogeography, 13, 47-53

Medley, Leah and Scozzafava, M. (2009) Moving towardsa national floristic quality assessment: considerations for the EPA national wetland condition assessment. National Wetlands Newsletter 31 (1) 6-22

Middleton, E. L., Bever J., & Schultz P.A. (2010) The effects of restoration methods on the quality of the restoration and resistance to invasion by exotics. Restoration Ecology, 18, (2) 181-187

Myster, R. (2009) Controls on shomard oak (Quercus shumardii) establishment into the cross timbers ecotone of Oklahoma: implications for restoration. Restoration Ecology, 17 (6) 893-899

Norris, M. D., Blair, J. M. and Johnson L. C., (2007) Altered ecosystem nitrogen dynamics as a consequence of landcover change in tallgrass prairie, American Midland Naturalist 157 (2) 432-445

Omernik, J. M. (2004) Perspectives on the nature and definition of ecological regions. Environmental Management 34 (1) s27-s38

Osage Cuestas Rocks and Minerals Fact Sheet (1999) Kansas Geological Survey Available at: http://www.kgs.ku.edu/Extension/cuestas/OC_factsheet1.pdf Accessed March 31, 2014

Pre-settlement Extent of Prairie Types map, U.S. Fish and Wildlife Service, Waubay National Wildlife Refuge Available at: http://www.fws.gov/refuge/waubay/wildlife_and_habitat/native_prairie/article.html accessed March, 31 2014

Rabinowitz, D. and Rapp, J.K. (1980) Seed rain in a North American tallgrass prairie. Journal of Applied Ecology 17 (3) 793-802

Riar, D. S., Norsworthy, J. K., Johnson, D. B., Scott, R. C., Bagavathiannan, M. (2011) Glyphosate Resistance in a Johnsongrass (Sorghum halepence)Biotype From Arkansas. Weed Science 59 (3) 299-304

Rocchio, J. (2007) Floristic quality assessment indices for Colorado plant communities. Colorado State University Colorado Natural Heritage Program 1-245

Rothrock, P.E., Reber, R. T. & Misurac M. A. (2011) Floristic quality assessment along an old-field chronosequence. Proceedings of the Indiana Academy of Science, 120 (1-2) 12-17

Rowe, H. I. (2010) Tricks of the Trade: Techniques and opinions from 38 experts in tallgrass prairie restoration, Restoration Ecology 18, (52) 253-262

Rutherford, B. (2011) Has sericea got your goat?,Beef Available at: http://search.proquest.com/docview/863359409?accountid=13211 Accessed March 31, 2014

Samson, F. B. Knopf, F. L. and Ostlie, W. R., (2004) Great plains ecosystems: past, present and future. Wildlife Society Bulliten, 32: 6-15

Smith, M. & A. K. Knapp, (2001) Size of the local species pool determines invasibility of a C_4-dominated grassland. Oikos, 92, 55-61

Stahle, D.W., Therrell, M., Clements, K. L., (2003) The ancient cross timbers consortium for research, education and conservation.Tree –Ring Laboratory, Department of Geosciences, University of Arkansas

Swink, F. and G. Wilhelm. (1979) Plants of the Chicago Region 4th ed. Indiana Academy of Science, Indianapolis.

Taft, J. B., Wilhelm, G. S., Ladd, D. M. and Masters, L. A. (1997) Floristic quality assessment for vegetation in Illinois a method for assessing vegetation integrity. Erigenia, 15 3-95

The Flint Hills Region of Kansas. Great Plains Nature Center Available at: http://www.gpnc.org/meadow.html accessed 3-31-2014

Therrell, M. & Stahle, D. (1998) A predictive model to locate ancient forests in the cross timbers of osage county, Oklahoma, Journal of Biogeography, 25, 847-854

Tilman D. (1997) Community invasibility, recruitment limitation, and grassland biodiversity, Ecology, 78 (1) 81-92

U.S. Army Corps of Engineers (2009) Public Works Technical Bulletin 200-2-65 Floristic Quality Assessments Available at: http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb_200_2_65.pdf Accessed: March 31, 2014

U.S Army Corps of Engineers (2014) Elk City Lake recreation information Available at: http://www.swt.usace.army.mil/Locations/TulsaDistrictLakes/Kansas/ElkCityLake/ElkCityLakeRecreation.aspx Accessed: March 31, 1014

Van Calster H., Vandenburghe R., Ruysen M., Verheyen K., Hermy M & Decocq G. (2008). Unexpectedly high 20th century florisic losses in a rural landscape in northern France. Journal of Ecology, 96, 927-936.

Vellend, M. (2003). Habitat loss inhibits recovery of plant diversity as forests regrow, Ecology, 84 (5) 1158-1164

Wilson, S. D., and M. Partel. (2003). Extirpation or coexistence? Management of a persistent introduced grass in a prairie restoration. Restoration Ecology 11, 410-416.

Wong, B, Houseman, S. and Foster, B. (2012). Targeting vulnerable life-stages of sericea lespedeza (Lespedeza cuneata) with prescribed burns. Invasive Plant Science and Management, 5, 487-493

Yatskievych, G., (1999) *Steyermark's Flora of Missouri*, Missouri Botanical Garden and The Conservation Commission of the State of Missouri

APPENDIX

Appendix 1

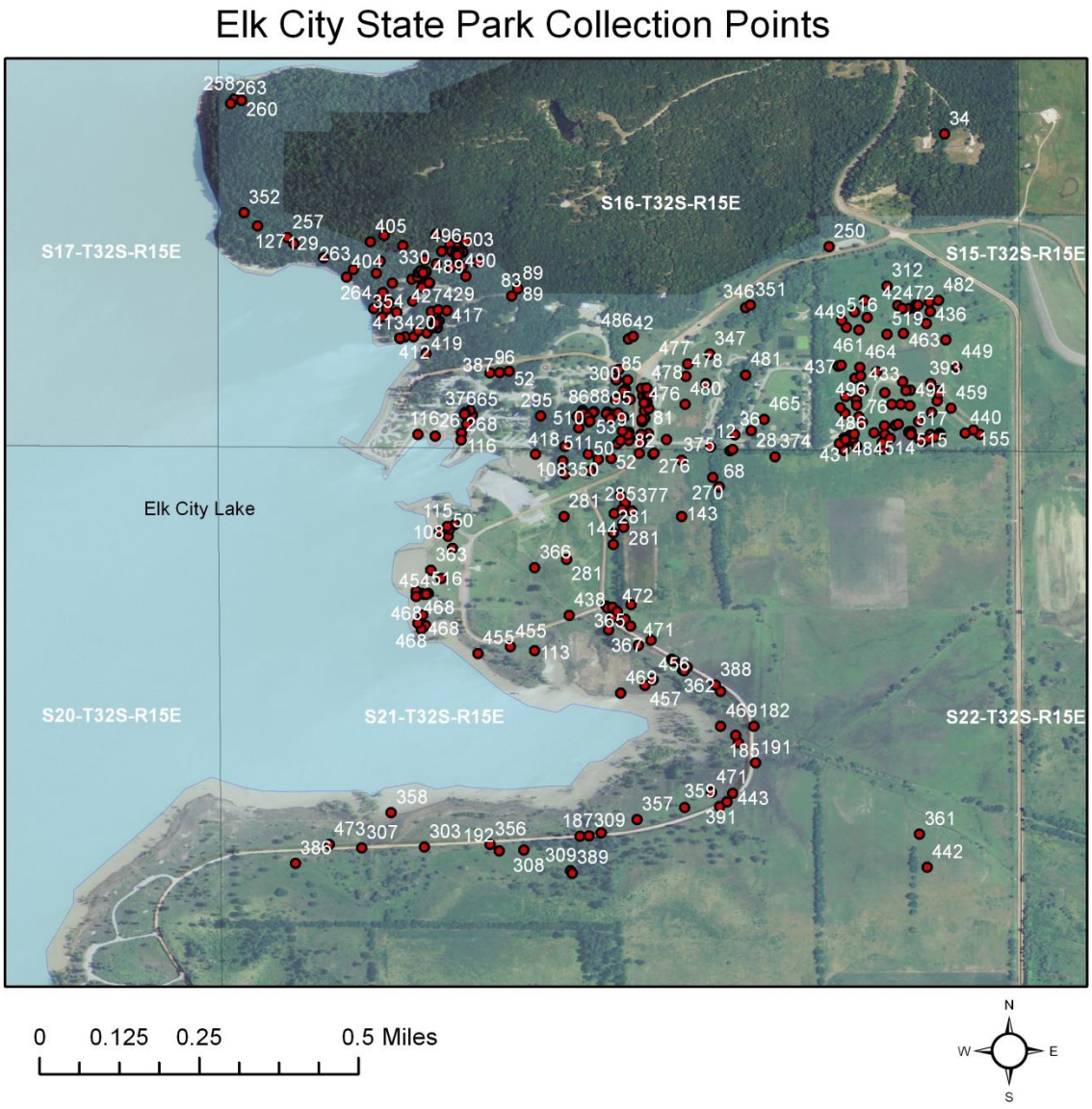


Figure15: Elk City State Park boundaries shaded light blue

Sources: Kansas Data Access and Support Center (KDASC): Photo background, Farm Services Agency, Public Land Survey System, Kansasgis.org Elk City State Park boundaries courtesy of The Montgomery County GIS Office

Appendix 2

Elk City State Park Species List Alphabetically by Family

Family	Scientific Name	Author	Common Name	CC	Native
Acanthaceae	*Justicia americana*	(L.) Vahl.	American water willow	5	L48N
Acanthaceae	*Ruellia humilis*	Nutt.	Hairy ruellia	3	L48N
Acanthaceae	*Ruellia strepens*	L.	Limestone ruellia	4	L48N
Alismataceae	*Sagittaria latifolia*	Willd.	Broad leaf arrowhead	4	L48N
Amaranthaceae	*Amaranthus tuberculatus*	(Moq.) J. D. Sauer	Tall water hemp	0	L48N
Anacardiaceae	*Rhus aromatica* Var serotina	Aiton (Green) Rehdr	Aromatic sumac	3	L48 N
Anacardiaceae	*Rhus glabra*	L.	Smooth Sumac	1	L48 N
Apiaceae	*Chaerophyllum procumbens*	(L.) Crantz	Wild chervil	0	L48N
Apiaceae	*Chaerophyllum tainturieri*	Hook	Chervil	2	L48N
Apiaceae	*Daucus carota*	L.	Queen Anne's Lace	*	L48 I
Apiaceae	*Ptilimnium nutallii*	(D.C.) Britton	Mock bishop's weed	6	L48 N
Apiaceae	*Zizia aurea*	(L.) W.D.J. Koch	Golden Alexanders	5	L48 N
Apocynaceae	*Apocynum cannabinum*	L	Dogbane, indian hemp	0	L48N
Apocynaceae	*Vinca minor*	L.	Common periwinkle	*	L48 I
Araceae	*Arisaema dracontium*	(L.) Schott.	Green Dragon	7	L48N
Asclepidaceae	*Asclepias tuberosa* ssp. Interior	L.	Butterfly milkweed	6	L48N
Asclepidaceae	*Asclepias viridiflora*	Raf.	Green Milkweed	6	L48 N
Asclepidaceae	*Asclepias asperula* ssp. Capricornu	Capricornu (Woodson) Woodson	Spider antelopehorn	5	L48 N
Asclepidaceae	*Asclepias verticillata*	L.	Whorled milkweed	1	L48N
Asclepidaceae	*Cynanchum laeve*	(Michx.) Pers.	Honeyvine milkweed	0	L48N
Asteraceae	*Achillea millefolium* ssp. Occidentalis D. C	L.	Western yarrow	1	L48N
Asteraceae	*Ambrosia artemisiifolia*	L.	Common ragweed	0	L48N
Asteraceae	*Ambrosia trifida*	L.	Giant ragweed	0	L48N
Asteraceae	*Amphiachyris dracunculoides*	(D.C.) Blake	Broomweed	2	L48N
Asteraceae	*Antennaria neglecta*	Green	Field pussytoes	2	L48N
Asteraceae	*Arnoglossum plantagineum*	Raf. (Syn. Cacalia plantaginea (raf.) Shinners	(tuberous)Indian Plantain	6	L48N
Asteraceae	*Bidens polylepis*	S. F. Blake	Begger's ticks	1	L48N
Asteraceae	*Cirsisum altissimum*	(L.) Spreng. USDA: (L.) Hill	Tall Thistle	2	L48N
Asteraceae	*Conyza canadensis*	(L.) Cronq	Horse Weed	0	L48 N
Asteraceae	*Coreopsis tinctoria*	Nutt.	Plains coreopsis	1	L48 N
Asteraceae	*Dracopsis amplexicaulis*	(Vahl) Cass.	Clasping cone flower	2	L48N
Asteraceae	*Echinacea pallida*	(Nutt.) Nutt.	Pale purple cone flower	7	L48 N

Family	Scientific Name	Author	Common Name	CC	Native
Asteraceae	*Eclipta prostrata*	(L.) L.	Yerba de Tajo	3	L48 N
Asteraceae	*Erigeron annuus*	(L.) Pers.	Annual fleabane	0	L48 N
Asteraceae	*Erigeron strigosus* var. strigosus	Muhl. Ex. Willd	Daisy Fleabane	4	L48N
Asteraceae	*Eupatorium serotinum*	Michx.	Late eupatorium	2	L48N
Asteraceae	*Eupatorium altissimum*	(L.)	White snakeroot	2	L48N
Asteraceae	*Helianthus annuus*	L.	Common sunflower	0	L48N
Asteraceae	*Hieracium longipilum*	Torr.	Long bearded hawkweed	5	L48 N
Asteraceae	*Krigia biflora*	(Walt.) Blake	False dandelion	6	L48N
Asteraceae	*Krigia caespitosa*	(Raf.) Chambers	Weedy dwarf dandelion	4	L48N
Asteraceae	*Lactuca serriola*	L.	Prickly Lettuce	*	L48 I
Asteraceae	*Pluchea camphorata*	(L.) D.C.	Camphorweed	4	L48N
Asteraceae	*Pyrrhopappus grandiflorus*	(Nutt.) Nutt.	Tuber False Dandelion	4	L48 N
Asteraceae	*Rudbeckia hirta*	L.	Black eyed susan	2	L48 N
Asteraceae	*Solidago canadensis* Var. gilvocanescens	(L.) Rydb.	Short hair goldenrod	2	L48N
Asteraceae	*Solidago ulmifolia* Var. ulmifolia	Muhl. Ex Willd.	Elm leaved goldenrod	4	l48N
Asteraceae	*Symphiotrichum oblongifolium*	(Nutt.) G.L. Nesom	Aromatic aster	5	L48N
Asteraceae	*Symphiotrichum pilosum*	(Willd) G.L. Nesom	White heath aster	0	L48N
Asteraceae	*Symphyotrichum ericoides* Var. ericoides	(L.) G.L. Nesom Syn. Aster ericoides	White heath aster	5	L48N
Asteraceae	*Vernonia baldwinii* ssp baldwinii	Torr.	Western ironweed	2	L48N
Asteraceae	*Xanthium strumarium* var. canadense	L. var. (Mill.) Torr. & A. Gray	Canada cocklebur	0	L48N
Boraginaceae	*Heliotropium indicum*	L.	Indian heliotrope	*	L48 I
Boraginaceae	*Heliotropium tenellum*	(Nutt) Torr.	Pasture heliotrope	7	L48N
Brassicaceae	*Alliaria petiolata*	(Bieb.) Cavara & Grande.	Garlic mustard	*	L48 I
Brassicaceae	*Barbarea vulgaris*	W. T. Aiton	Yellow Rocket,	*	L48 I
Brassicaceae	*Descurainia pinnata* ssp. brachycarpa	(Walter) Britton ssp. (Richardson) Detling	Western Tansy Mustard	1	L48N
Brassicaceae	*Draba cuneifolia*	Nutt.	Wedge leaf draba	3	L48 N
Brassicaceae	*Erysimum repandum*	L.	Bushy wallflower	*	L48I
Brassicaceae	*Rorippa palustris* ssp. Fernaldiana	(l.) Besser ssp (Butters & Abbe) Jonsell	Bog yellow cress	2	L48N
Brassicaceae	*Thlaspi arvense*	L.	Field pennycress	*	L48 I
Cactaceae	*Opuntia macrocarpa* Var. macrocarpa	Engelm.	Plains prickly pear	3	L48N
Campanulaceae	*Triodanis leptocarpa*	(Nutt.) Nieuw	Slimpod venus' looking glass	3	L48N
Campanulaceae	*Triodanis perfoliata*	(L.) Nieuw	Venus' looking glass	2	L48N
Capparaceae	*Polansia dodecandra* ssp. Trachysperma(T&G)	(L.) DC.	Clammy Weed	*	L48 N
Caprifoliaceae	*Lonicera japonica*	Thunb.	Japanese honeysuckle	*	L48 I
Caprifoliaceae	*Lonicera maackii*	(Rupr.) Herder FGP: Maxim	Maack's honeysuckle	*	L48 I
Caprifoliaceae	*Symphoricarpos orbiculatus*	Moench.	Coral berry, buckbrush	1	L48N
Caprifoliaceae	*Viburnum rufidulum*	Raf.	Rusty blackhaw	5	L48N
Caprifoliaceae	*Viburnum prunifolium*	L.	Black haw	6	L48N

Family	Scientific Name	Author	Common Name	CC	Native
Caryophyllaceae	*Dianthus armeria*	L.	Deptford Pink	*	L48 I
Caryophyllaceae	*Silene antirrhina*	L	Sleepy catchfly	0	L48N
Caryophyllaceae	*Stellaria media* ssp. media	(L.) Vill. FGP (L.) Cyr.	Common chickweed	*	L48 I
Commelinaceae	*Commelina communis*	L.	Dayflower	*	L48 I
Commelinaceae	*Tradescantia ohiensis*	Raf.	Spiderwort	5	L48N
Convolvulaceae	*Convolvulus arvensis*	L.	Field bindweed	*	L48 I
Convolvulaceae	*Ipomoea hederacea*	Jacq.	Ivy leaf morning glory	*	L48 I
Convolvulaceae	*Ipomoea pandurata*	L.	Big root morning glory	2	L48N
Cornaceae	*Cornus drummondii*	Thunb.	Rough leaved dogwood	1	L48N
Crassulaceae	*Penthorum sedoides*	L.	Ditch stonecrop	3	L48 N
Cupressacaeae	*Taxodium distichum*	(L.) Rich.	Bald Cypress	*	L48 N
Cupressaceae	*Juniperus virginiana* var. virginiana	L.	Eastern Red cedar	1	L48N
Cuscutaceae	*Cuscuta cuspidata*		Cusp dodder		L48 N
Cyperaceae	*Carex bicknellii*	Britton	Bicknell's sedge	8	L48N
Cyperaceae	*Carex davisii*	Schwein & Torr.	Davis' sedge	4	L48N
Cyperaceae	*Carex hystericina*	Muhl. Ex Willd.	Bottlebrush sedge	7	L48N
Cyperaceae	*Carex vulpinoidea* var. vulpinoidea	Michx.	Fox sedge	3	L48N
Cyperaceae	*Cyperus strigosus*	L.	Straw colored flat sedge	4	L48N
Cyperaceae	*Eleocharis compressa*	Sullivan	Flat-stem spike rush	6	L48 N
Cyperaceae	*Fimbristylis capillaris* ssp capillaris	(L.) Kunth. Ex C.B. Clark	Densetuft hair sedge	5	L48 N
Cyperaceae	*Fimbristylis vahlii*	(lam.) Link	Vahl's fimbry	5	L48N
Cyperaceae	*Scirpus pendulus*	Muhl.	Pendant bulrush	3	L48N
Ebenaceae	*Diospyros virginiana*	L.	American persimmon	2	L48N
Euphorbiaceae	*Chamaesyce nutans*	(Lag.) Small	Nodding spurge	0	L48 N
Euphorbiaceae	*Croton capitatus*	Michx	Wooly Croton	1	L48N
Euphorbiaceae	*Croton texensis*	(J.F. Klutzsch) Muell. Arg.	Texas Croton	1	L48 N
Euphorbiaceae	*Euphorbia corollata*	L.	Flowering spurge	5	L48 N
Euphorbiaceae	*Euphorbia dentata* var. Dentata	Michx.	Toothed spurge	0	L48 N
Fabaceae	*Amorpha canescens*	Pursh	Lead Plant	7	L48 N
Fabaceae	*Amorpha fruticosa*	L.	False indigo	6	L48N
Fabaceae	*Astragalus crassicarpus* var. crassicarpus	Nutt.	Ground plum milk vetch	7	L48N
Fabaceae	*Baptisia australis*	(L.) R. Br.	Wild blue indigo	6	L48N
Fabaceae	*Chamaecrista fasiculata* Var. fasciulata	(Michx.) Greene	Showy partridge pea	2	L48 N
Fabaceae	*Dalea purpurea*	Vent.	Purple Prairie Clover	7	L48 N
Fabaceae	*Desmanthus illinoensis*	(Michx.) Macmill. Ex B.L. Robinson & Fernald	Illinois bundle flower	2	L48N
Fabaceae	*Desmodium glutinosum*	(Muhl. Ex Willd.) Wood - or Alph. Wood.	Large flowered tick clover	3	L48 N
Fabaceae	*Desmodium illinoense*	A. Gray	Illinois tick clover	5	L48 N
Fabaceae	*Gleditsia triacanthos*	L.	Honey locust	0	L48 N
Fabaceae	*Gymnocladus dioicus*	(L.) K. Koch	Kentucky coffee tree	4	L48 N

Family	Scientific Name	Author	Common Name	CC	Native
Fabaceae	*Kummerowia striata*	(Thunb.) H & A USDA: (Thunb.) Schindl.	Japanese clover	*	L48 I
Fabaceae	*Lathyrus latifolius*	L.	Perrenial sweet pea	*	L48I
Fabaceae	*Lespedeza virginica*	(L.) Britton	Slender Bush Clover	5	L48 N
Fabaceae	*Lespedeza capitata*	Michx.	Round headed bush clover	6	L48N
Fabaceae	*Lespedeza cuneata*	(Dumont G. Don USDA: (Dum. Cours.) G. Don	Sericea lespedeza	*	L48I
Fabaceae	*Medicago lupulina*	L.	Black medick	*	L48I
Fabaceae	*Melilotus alba*	Medic.	White sweet clover	*	L48I
Fabaceae	*Melilotus officinalis*	(L.) Pall. / (L.) Lam.	Yellow sweet clover	*	L48 I
Fabaceae	*Pediomelum digitatum*	(Nutt.ex Torr. & A. Gray) Isely	Palm leaf scurf pea	7	L48N
Fabaceae	*Sesbania herbacea*	(Mill.) McVaugh.	Big pod sesbania	3	L48 N
Fagaceae	*Quercus macrocarpa* var. macrocarpa	MichX.	Bur Oak	4	L48N
Fagaceae	*Quercus muhlenbergii*	Engelm.	Chinkapin oak	5	L48N
Fagaceae	*Quercus palustris*	Muench	Pin oak	3	L48 N
Fagaceae	*Quercus rubra*	L.	Northern Red Oak	6	L48N
Fagaceae	*Quercus shumardii* var. shumardii	Buckley	Shumard oak	6	L48N
Fagaceae	*Quercus stellata*	Wangenh	Post-oak	4	L48N
Fagaceae	*Quercus* var. shumardii	Buckley	Shumard oak	6	L48N
Geraniaceae	*Geranium carolinianum* var. carolinanum	L.	Carolina crane's bill	0	L48N
Hamamelidaceae	*Liquidambar styraciflua*	L.	Sweetgum	*	L48 N
Hydrophyllaceae	*Ellisis nyctelea*	L.	Aunt lucy, waterpod	0	L48N
Iridaceae	*Sisyrinchium campestre*	Bicknell	Prairie blue eyed grass	6	L48N
Juglandaceae	*Carya ovata*	(Mill.) K. Koch	Shagbark hickory	5	L48N
Juncaceae	*Juncus interior* var. interior	Weigand	Inland rush	2	L48N
Lamiaceae	*Glechoma hederacea*	L.	Ground ivy	*	L48 I
Lamiaceae	*Lamium amplexicaule*	L.	Henbit	*	L48 I
Lamiaceae	*Monarda fistulosa* ssp. Fistulosa	L.	Wild Bergamot, Bee Balm	3	L48 N
Lamiaceae	*Monarda punctata* Vear. Occidentalis	(Epling) Palmer & Steyermark	Western spotted bee blam	5	L48 N
Lamiaceae	*Prunella vulgaris* ssp lanceolata	(L.) (W. Bartram) Hulten	Lance leaf self-heal	*	L48 I
Lamiaceae	*Pycnanthemum tenuifolium*	Schrad.	Slender Mountain Mint	7	L48N
Lamiaceae	*Salvia azurea*	Michx. Ex lam.	Blue Sage	5	L48N
Lamiaceae	*Scutellaria parvula* Var. missouriensis	var. (Torr.) Goodman & C. A. Lawson	Leonard's Skullcap	5	L48 N
Lamiaceae	*Teucrium canadense* Var. canadense	L.	American germander	1	L48 N
Liliaceae	*Allium canadense* Var. canadense	L.	Wild onion	2	L48 N
Liliaceae	*Nothoscordum bivalve*	(L.) Britton	False wild garlic	3	L48N
Losaceae	*Mentzelia oligosperma*	Nutt.	Stick leaf	4	L48N
Lythraceae	*Ammannia coccinea*	Rottb.	Scarlet tooth cup	2	L48 N
Malvaceae	*Abutilon theophrasti*	Medik.	Velvet leaf	*	L48 I
Malvaceae	*Hibiscus moscheutos*	L.	Rose mallow	4	L48 N

Family	Scientific Name	Author	Common Name	CC	Native
Malvaceae	*Hibiscus trionum*	L.	Flower an hour	*	L48 I
Moraceae	*Maclura pomifera*	(Raf.) C.K. Schneid.	Osage Orange	*	L48 N
Moraceae	*Morus alba*	L.	White mulberry	*	L48 I
Moraceae	*Morus rubra* var. rubra	L.	Red mulberry	5	L48N
Oleaceae	*Elaeagnus angustifolia*	L.	Russian olive	*	L49 I
Oleaceae	*Forsythia viridissima*	Lindl.	Greenstem forsythia	*	L48 I
Oleaceae	*Fraxinus americana*	L.	White ash	7	L48 N
Onagraceae	*Gaura longiflora*	Spach	Large flowered gaura		L48N
Onagraceae	*Oenothera speciosa*	Nutt.	Showy evening primrose	2	L48N
Onagraceae	*Oenothera villosa* var. villosa	Thunb.	Common evening primrose	0	L48N
Ophioglossaceae	*Botrychium dissectum*	Spreng.	Cut leaved Gape Fern	7	l48 N
Orchidaceae	*Spiranthes magnicamporum*	Sheviak.	Great plains lady's tresses	6	L48N
Oxalidaceae	*Oxalis dillenii*	Jacq.	Gray-green wood sorrel	4	L48N
Oxalidaceae	*Oxalis violacea*	L.	Violet wood sorrel	4	L48N
Passifloraceae	*Passiflora incarnata*	L.	Purple passion flower, maypop	4	L48 N
Phytolaccaceae	*Phytolacca americana*	L.	Common pokeweed	0	L48N
Plantaginaceae	*Plantago patagonica* Var. patagonica	Jacq.	Wooly plantain	1	L48 N
Poaceae	*Agrostis Hyemalis*	(Walter) Britton, Sterns,& Poggenb.	Hair grass	2	L48N
Poaceae	*Alopecurus carolinianus*	Walters	Carolina foxtail	0	L48N
Poaceae	*Andropogon gerardii*	Vitton	Big Bluestem	4	L48N
Poaceae	*Andropogon virginicus*	L.	Broomsedge bluestem	0	L48N
Poaceae	*Aristida oligantha*	Michx	Old field three awn	0	L48N
Poaceae	*Bothriochloa saccharoides*	(S.W.) Rydb	Silver bluestem	1	L48N
Poaceae	*Bouteloua curtipendula* Var. curtipendula	(Michx.) Torr.	Side oats grama	5	L48 N
Poaceae	*Bouteloua dactyloides*	(Nutt.) Engel. (Buchloe dactyloides)	Buffalo grass	3	L48N
Poaceae	*Bouteloua hirsuta* ssp hirsuta	Lag.	Hairy grama	6	L48 N
Poaceae	*Bromus inermis*	Layss.	Smooth Brome	*	L48NI
Poaceae	*Bromus inermis*	Layss.	Smooth Brome	*	L48NI
Poaceae	*Bromus japonicus*	Thunb. Ex Murr.	Japanese brome	*	L48 I
Poaceae	*Bromus racemosus*	L.	Hairy chess	*	L48I
Poaceae	*Chasmanthium latifolium*	(Michx.) Yates	Broad leaf Wood oats	4	L48 N
Poaceae	*Cynodon dactylon*	(L.) Pers.	Bermuda grass	*	L48 I
Poaceae	*Dactylis glomerata*	L.	Orchard grass	*	L48 I
Poaceae	*Dichanthelium acuminatum* Var. Lindheimeri	(S.W.)Gould & C. A. Clark (Nash) Gould & C.A. Clark	Linderheimer panic grass	3	L48 N
Poaceae	*Dichanthelium oligosanthes* var. scribnerianum	(Schult.)Gould var. (Nash) Gould	Scribner's panic grass	4	L48N
Poaceae	*Digitaria ciliaris*	(Retz.)Koeler	Southern crab grass	*	L48N
Poaceae	*Digitaria filiformis*	(L.) koeler	slender crab grass	2	L48N
Poaceae	*Digitaria ischaemum*	(Schreb.) Schreb ex. Muhl.	Smooth Crab Grass	*	L48 I

Family	Scientific Name	Author	Common Name	CC	Native
Poaceae	*Digitaria sanguinalis*	(L.) Scop	Hairy crabgrass	*	L48I
Poaceae	*Echinochloa muricata* var. microstachya	(Beauv.) Fern var. Weigand	Rough barnyard grass	0	L48N
Poaceae	*Elymus virginicus* Var. virginicus	L.	Virginia wild rye	3	L48 N
Poaceae	*Eragrostis capillaris*	(L.) Nees.	Lace grass	6	L48N
Poaceae	*Eragrostis spectabilis*	(Persh) Steud.	Purple love grass	3	L48N
Poaceae	*Hordeum pusillum*	Nutt.	Little Barley	0	L48N
Poaceae	*Leptochloa panicea* ssp. Mucronata	(Retz) Ohwi.	Red sprangletop	0	L48N
Poaceae	*Panicum acuminatum*	Sw.	Panic grass	3	L48N
Poaceae	*Panicum philadelphicum*	Bernh. Ex Trin	Philadelphia panic grass	4	L48N
Poaceae	*Paspalum dilatatum*	Poir.	Dallis grass	*	L48 I
Poaceae	*Paspalum setaceum* var. ciliatifolium	(Michx.) Vasey	Thin paspalum	2	L48N
Poaceae	*Poa annua*	L.	Annual bluegrass	*	L48 I
Poaceae	*Schizachne purpurascens*	(Torr.) Swallen	False melic		L48N
Poaceae	*Setaria faberi*	Herrn.	Chinese foxtail	*	L48I
Poaceae	*Setaria parviflora*	(Poir.) kerguelen	Knot root yellow foxtail	3	L48I
Poaceae	*Setaria pumila*	(Poir.) Roem. & J. A. Schultes	Yellow foxtail	*	L48I
Poaceae	*Setaria viridis* var viridis	(L.) P. Beauv	Green foxtail	*	L48I
Poaceae	*Sorghastrum nutans*	(L.) Nash	Indian grass	5	L48N
poaceae	*Sorghum halepense*	(L.) Pers.	Johnson grass	*	L48I
Poaceae	*Spenopholis obtusata*	(Michx.) Scribn.	Prairie wedgescale	4	L48N
Poaceae	*Sporobolus compositus*		Rough dropseed	3	L48N
Poaceae	*Tridens flavus*	(L.) Hitchcock	Purpletop tridens	1	L48N
Poaceae	*Tripsacum dactyloides*	(L.) L.	Eastern gamagrass	3	L48 N
Polygonaceae	*Polygonum pennsylvanicum*	L.	Pink smartweed	2	L48N
Polygonaceae	*Polygonum persicaria*	L.	Spotted lady's thumb	*	L48 I
Polygonaceae	*Polygonum punctatum*	Elliott	Dotted smart weed	3	L48N
Polygonaceae	*Rumex crispus* ssp. Crispus	L.	Curly dock	*	L48 I
Polypodiaceae	*Notholaena dealbata* Agyrochosma	(Pers.) Kunze.	Powdery false cloak fern	7	L48N
Portulacaceae	*Claytonia virginica*	L.	Spring Beauty	3	L48N
Primulaceae	*Anagallis arvensis (L.)* ssp foemina	(Mill.) Schinz & Thell.	Poorman's weather glass	*	L48I
Ranunculaceae	*Aquilegia canadensis*	L.	Wild columbine	7	L48 N
Ranunculaceae	*Clematis pitcheri*	Torr & A. Gray	Pitcher's clematis	4	L48N
Ranunculaceae	*Myosurus minimus*	L.	Mouse-tail	0	L48N
Ranunculaceae	*Ranunculus abortivus*	L.	Little leaf buttercup	1	L48N
Ranunculaceae	*Ranunculus sceleratus* var. sceleratus	L.	Cursed butercup	0	L48N
Rosaceae	*Geum canadense*	Jacq.	White avens	1	L48 N
Rosaceae	*Malus ioensis* var. ioensis	(Wood) Britton	Prairie crabapple	3	L48N
Rosaceae	*Prunus americana*	Marsh.	Wild plum american plum	3	L48 N
Rosaceae	*Rubus alleghenensis*	Porter	Common blackberry	4	L48N

Family	Scientific Name	Author	Common Name	CC	Native
Rubiaceae	*Cephalanthus occidentalis*	L.	Common Button Bush	4	L48 N
Rubiaceae	*Galium circaezans* var circaezans	Michx	Licorice bedstraw	3	L48N
Rubiaceae	*Galium triflorum*	Michx	Sweet scented bedstraw	6	L48N
Rubiaceae	*Houstonia longifolia*	(Gaertn.) Hook.	Slender leaf bluet	8	L48N
Rutaceae	*Ptelea trifoliata* SSP. Trifoliata	L.	Hop tree, Wafer Ash	6	L48N
Salicaceae	*Populus deltoides*	Bartram ex Marshall	Eastern cottonwood	0	L48N
Salicaceae	*Populus deltoides* ssp. Monilifera	W. Bartram ex Marsh ssp. (Aiton) Eckenwalder	Plains Cottonwood	0	L48 N
Salicaceae	*Salix nigra*	Marsh.	Black willow	2	L48N
Sapindaceae	*Cardiospermum halicacabum*	L.	Common Balloon Vine	*	L48 I
Sapotaceae	*Sideroxylon lanuginosum* ssp. Oblongifolium	Michx. Ssp. (Nutt.) T. D. Penn. syn. Bumelia Lanuginosa	Wooly buckthorn	5	L48N
Scrophulariaceae	*Agalinis tenuifolia*	(Vahl.) Raf.	Slender girardia	4	L48N
Scrophulariaceae	*Penstemon cobae*	Nutt.	Cobae penstemon	5	L48 N
Scrophulariaceae	*Penstemon tubiflorus* Var. tubiflorus	Nutt.	White tube beardtongue	3	L48N
Scrophulariaceae	*Verbascum thapsus*	L.	Common mullein	*	L48 I
Smilacaceae	*Smilax ecirrhata*		Greenbriar	5	L48N
Solanaceae	*Physalis heterophylla* var. heterophyla	Nees.	Clammy ground cherry	4	L48N
Solanaceae	*Physalis pumilla* var. hispida	(Waterfall) Hinton	Prairie ground cherry	4	L48 N
Solanaceae	*Solanum carolinense* var. carolinense	L.	Carolina horse-nettle	1	L48N
Typhaceae	*Typha angustifolia*	L.	Narrow leaf cattail	0	L48NI
Ulmaceae	*Celtis laevigata*	Willd.	Sugarberry	5	L48N
Ulmaceae	*Celtis occidentalis*	L.	Hackberry	1	L48N
Ulmaceae	*Ulmus americana*	L.	American elm	2	L48N
Ulmaceae	*Ulmus rubra*	Muhl.	Red elm, slippery elm	3	L48 N
Valerianaceae	*Valerianella radiata*	(L.)Dufr.	Corn salad	2	L48N
Verbenaceae	*Glandulariabipinnatafida* Var. ciliata	(Nutt.) Nutt var. (Benth) B.L Turner	Dakota vervain	4	L48N
Verbenaceae	*Phyla lanceolata*	(Michx.) Greene	Northern fog fruit	1	L48 N
Verbenaceae	*Verbena bracteata*	Lag. & Rodr.	Prostrate vervain	0	L48N
Verbenaceae	*Verbena hastata*	L.	Swamp verbena	1	L48N
Verbenaceae	*Verbena simplex*	Lehm.	Narrow leaved vervain	2	L48 N
Verbenaceae	*Verbena Stricta*	Vent.	Hoary verevain	1	L48N
Violaceae	*Viola sororia*	Willd	Downy blue violet		L48N
Violaceae	*Viola bicolor*	Pursh.	Johnny jump up	0	L48N
Vitaceae	*Cissus incisa*	(Nutt) Des. Moul.	Marine ivy	7	L48N
Vitaceae	*Parthenocissus quinquefolia*	(L.) Planchon	Virginia creeper	1	L48 N
Vitaceae	*Vitis riparia*	Michx	Riverbank grape	2	L48N

Appendix 3

Elk City State Park Species List Alphabetically by Scientific Name

Scientific Name	Family	Author	Common Name	CC	Native
Abutilon theophrasti	Malvaceae	Medik.	Velvet leaf	*	L48 I
Achillea millefolium ssp. Occidentalis D. C	Asteraceae	L.	Western yarrow	1	L48 N
Agalinis tenuifolia	Scrophulariaceae	(Vahl.) Raf.	Slender girardia	4	L48 N
Agrostis Hyemalis	Poaceae	(Walter) Britton, Sterns, & Poggenb.	Hair grass	2	L48 N
Alliaria petiolata	Brassicaceae	(Bieb.) Cavara & Grande.	Garlic mustard	*	L48 I
Allium canadense Var. canadense	Liliaceae	L.	Wild onion	2	L48 N
Alopecurus carolinianus	Poaceae	Walters	Carolina foxtail	0	L48 N
Amaranthus tuberculatus	Amaranthaceae	(Moq.) J. D. Sauer	Tall water hemp	0	L48 N
Ambrosia artemisiifolia	Asteraceae	L.	Common ragweed	0	L48 N
Ambrosia trifida	Asteraceae	L.	Giant ragweed	0	L48 N
Ammannia coccinea	Lythraceae	Rottb.	Scarlet tooth cup	2	L48 N
Amorpha canescens	Fabaceae	Pursh	Lead Plant	7	L48 N
Amorpha fruticosa	Fabaceae	L.	False indigo	6	L48N
Amphiachyris dracunculoides	Asteraceae	(D.C.) Blake	Broomweed	2	L48 N
Anagallis arvensis (L.) ssp foemina	Primulaceae	(Mill.) Schinz & Thell.	Poorman's weather glass	*	L48 I
Andropogon gerardii	Poaceae	Vitton	Big Bluestem	4	L48 N
Andropogon virginicus	Poaceae	L.	Broomsedge bluestem	0	L48 N
Antennaria neglecta	Asteraceae	Green	Field pussytoes	2	L48 N
Apocynum cannabinum	Apocynaceae	L	Dogbane, indian hemp	0	L48 N
Aquilegia canadensis	Ranunculaceae	L.	Wild columbine	7	L48 N
Arisaema dracontium	Araceae	(L.) Schott.	Green Dragon	7	L48N
Aristida oligantha	Poaceae	Michx	Old field three awn	0	L48N
Arnoglossumplantagineum	Asteraceae	Raf. (Syn. Cacalia plantaginea (raf.) Shinners	(tuberous)Indian Plantain	6	L48 N
Asclepias tuberosa ssp. Interior	Asclepidaceae	L.	Butterfly milkweed	6	L48 N
Asclepias viridiflora	Asclepidaceae	Raf.	Green Milkweed	6	L48 N
Asclepias asperula ssp. Capricornu	Asclepidaceae	Capricornu (Woodson) Woodson	Spider antelopehorn	5	L48 N
Asclepias verticillata	Asclepidaceae	L.	Whorled milkweed	1	L48 N
Astragalus crassicarpus var. crassicarpus	Fabaceae	Nutt.	Ground plum milk vetch	7	L48 N
Baptisia australis	Fabaceae	(L.) R. Br.	Wild blue indigo	6	L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Barbarea vulgaris	Brassicaceae	W. T. Aiton	Yellow Rocket,	*	L48 I
Bidens polylepis	Asteraceae	S. F. Blake	Begger's ticks	1	L48 N
Bothriochloa saccharoides	Poaceae	(S.W.) Rydb	Silver bluestem	1	L48 N
Botrychium dissectum	Ophioglossaceae	Spreng.	Cut leaved Gape Fern	7	l48 N
Bouteloua curtipendula Var. curtipendula	Poaceae	(Michx.) Torr.	Side oats grama	5	L48 N
Bouteloua dactyloides	Poaceae	(Nutt.) Engel. (Buchloe dactyloides)	Buffalo grass	3	L48 N
Bouteloua hirsuta ssp hirsuta	Poaceae	Lag.	Hairy grama	6	L48 N
Bromus inermis	Poaceae	Layss.	Smooth Brome	*	L48 NI
Bromus japonicus	Poaceae	Thunb. Ex Murr.	Japanese brome	*	L48 I
Bromus racemosus	Poaceae	L.	Hairy chess	*	L48I
Cardiospermum halicacabum	Sapindaceae	L.	Common Balloon Vine	*	L48 I
Carex bicknellii	Cyperaceae	Britton	Bicknell's sedge	8	L48 N
Carex davisii	Cyperaceae	Schwein & Torr.	Davis' sedge	4	L48 N
Carex hystericina	Cyperaceae	Muhl. Ex Willd.	Bottlebrush sedge	7	L48 N
Carex vulpinoidea var. vulpinoidea	cyperaceae	Michx.	Fox sedge	3	L48 N
Carya ovata	Juglandaceae	(Mill.) K. Koch	Shagbark hickory	5	L48 N
Celtis laevigata	Ulmaceae	Willd.	Sugarberry	5	L48 N
Celtis occidentalis	Ulmaceae	L.	Hackberry	1	L48 N
Cephalanthus occidentalis	Rubiaceae	L.	Common Button Bush	4	L48 N
Chaerophyllum procumbens	Apiaceae	(L.) Crantz	Wild chervil	0	L48 N
Chaerophyllum tainturieri	Apiaceae	Hook	Chervil	2	L48 N
Chamaecrista fasiculata Var. fasciulata	Fabaceae	(Michx.) Greene	Showy partridge pea	2	L48 N
Chamaesyce nutans	Euphorbiaceae	(Lag.) Small	Nodding spurge	0	L48 N
Chasmanthium latifolium	Poaceae	(Michx.) Yates	Broad leaf Wood oats	4	L48 N
Cirsisum altissimum	Asteraceae	(L.) Spreng. USDA: (L.) Hill	Tall Thistle	2	L48 N
Cissus incisa	Vitaceae	(Nutt) Des. Moul.	Marine ivy	7	L48 N
Claytonia virginica	Portulacaceae	L.	Spring Beauty	3	L48 N
Clematis pitcheri	Ranunculaceae	Torr & A. Gray	Pitcher's clematis	4	L48 N
Commelina communis	Commelinaceae	L.	Dayflower	*	L48 I
Convolvulus arvensis	Convolvulaceae	L.	Field bindweed	*	L48 I
Conyza canadensis	Asteraceae	(L.) Cronq	Horse Weed	0	L48 N
Coreopsis tinctoria	Asteraceae	Nutt.	Plains coreopsis	1	L48 N
Cornus drummondii	cornaceae	Thunb.	Rough leaved dogwood	1	L48 N
Croton capitatus	Euphorbiaceae	Michx	Wooly Croton	1	L48 N
Croton texensis	Euphorbiaceae	(J.F. Klutzsch) Muell. Arg.	Texas Croton	1	L48 N
Cuscuta cuspidata	Cuscutaceae		Cusp dodder		L48 N
Cynanchum laeve	Asclepidaceae	(Michx.) Pers.	Honeyvine milkweed	0	L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Cynodon dactylon	Poaceae	(L.) Pers.	Bermuda grass	*	L48 I
Cyperus strigosus	Cyperaceae	L.	Straw colored flat sedge	4	L48 N
Dactylis glomerata	Poaceae	L.	Orchard grass	*	L48 I
Dalea purpurea	Fabaceae	Vent.	Purple Prairie Clover	7	L48 N
Daucus carota	Apiaceae	L.	Queen Anne's Lace	*	L48 I
Descurainia pinnata ssp. brachycarpa	Brassicaceae	(Walter) Britton ssp. (Richardson) Detling	Western Tansy Mustard	1	L48 N
Desmanthus illinoensis	Fabaceae	(Michx.) Macmill. Ex B.L. Robinson & Fernald	Illinois bundle flower	2	L48 N
Desmodium glutinosum	Fabaceae	(Muhl. Ex Willd.) Wood - or Alph. Wood.	Large flowered tick clover	3	L48 N
Desmodium illinoense	Fabaceae	A. Gray	Illinois tick clover	5	L48 N
Dianthus armeria	Caryophyllaceae	L.	Deptford Pink	*	L48 I
Dichanthelium acuminatum Var. Lindheimeri	Poaceae	(S.W.)Gould & C. A. Clark (Nash) Gould & C.A. Clark	Linderheimer panic grass	3	L48 N
Dichanthelium oligosanthes var. scribnerianum	Poaceae	(Schult.)Gould var. (Nash) Gould	Scribner's panic grass	4	L48 N
Digitaria ciliaris	Poaceae	(Retz.)Koeler	Southern crab grass	*	L48 N
Digitaria filiformis	Poaceae	(L.) koeler	Slender crab grass	2	L48 N
Digitaria ischaemum	Poaceae	(Schreb.) Schreb ex. Muhl.	Smooth Crab Grass	*	L48 I
Digitaria sanguinalis	Poaceae	(L.) Scop	Hairy crabgrass	*	L48 I
Diospyros virginiana	Ebenaceae	L.	American persimmon	2	L48 N
Draba cuneifolia	Brassicaceae	Nutt.	Wedge leaf draba	3	L48 N
Dracopsis amplexicaulis	Asteraceae	(Vahl) Cass.	Clasping cone flower	2	L48 N
Echinacea pallida	Asteraceae	(Nutt.) Nutt.	Pale purple cone flower	7	L48 N
Echinochloa muricata var. microstachya	Poaceae	(Beauv.) Fern var. Weigand	Rough barnyard grass	0	L48 N
Eclipta prostrata	Asteraceae	(L.) L.	Yerba de Tajo	3	L48 N
Elaeagnus angustifolia	Oleaceae	L.	Russian olive	*	L49 I
Eleocharis compressa	Cyperaceae	Sullivan	Flat-stem spike rush	6	L48 N
Ellisis nyctelea	Hydrophyllaceae	L.	Aunt lucy, waterpod	0	L48 N
Elymus virginicus Var. virginicus	Poaceae	L.	Virginia wild rye	3	L48 N
Eragrostis capillaris	Poaceae	(L.) Nees.	Lace grass	6	L48 N
Eragrostis spectabilis	Poaceae	(Persh) Steud.	Purple love grass	3	L48 N
Erigeron annuus	Asteraceae	(L.) Pers.	Annual fleabane	0	L48 N
Erigeron strigosus var. strigosus	Asteraceae	Muhl. Ex. Willd	Daisy Fleabane	4	L48 N
Erysimum repandum	Brassicaceae	L.	Bushy wallflower	*	L48 I
Eupatorium serotinum	Asteraceae	Michx.	Late eupatorium	2	L48 N
Eupatorium altissimum	Asteraceae	(L.)	White snakeroot	2	L48 N
Euphorbia corollata	Euphorbiaceae	L.	Flowering spurge	5	L48 N
Euphorbia dentata var. Dentata	Euphorbiaceae	Michx.	Toothed spurge	0	L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Fimbristylis capillaris ssp capillaris	Cyperaceae	(L.) Kunth. Ex C.B. Clark	Densetuft hair sedge	5	L48 N
Fimbristylis Vahlii	Cyperaceae	(lam.) Link	Vahl's fimbry	5	L48N
Forsythia viridissima	Oleaceae	Lindl.	Greenstem forsythia	*	L48 I
Fraxinus americana	Oleaceae	L.	White ash	7	L48 N
Galium circaezans var circaezans	Rubiaceae	Michx	Licorice bedstraw	3	L48 N
Galium triflorum	Rubiaceae	Michx	Sweet scented bedstraw	6	L48 N
Gaura longiflora	Onagraceae	Spach	Large flowered gaura		L48 N
Geranium carolinianum var. carolinanum	Geraniaceae	L.	Carolina crane's bill	0	L48 N
Geum canadense	Rosaceae	Jacq.	White avens	1	L48 N
Glandulariabipinnatafida Var. ciliata	Verbenaceae	(Nutt.) Nutt var. (Benth) B.L Turner	Dakota vervain	4	L48 N
Glechoma hederacea	Lamiaceae	L.	Ground ivy	*	L48 I
Gleditsia triacanthos	Fabaceae	L.	Honey locust	0	L48 N
Gymnocladus dioicus	Fabaceae	(L.) K. Koch	Kentucky coffee tree	4	L48 N
Helianthus annuus	Asteraceae	L.	Common sunflower	0	L48 N
Heliotropium indicum	Boraginaceae	L.	Indian heliotrope	*	L48 I
Heliotropium tenellum	Boraginaceae	(Nutt) Torr.	Pasture heliotrope	7	L48 N
Hibiscus moscheutos	Malvaceae	L.	Rose mallow	4	L48 N
Hibiscus trionum	Malvaceae	L.	Flower an hour	*	L48 I
Hieracium longipilum	Asteraceae	Torr.	Long bearded hawkweed	5	L48 N
Hordeum pusillum	Poaceae	Nutt.	Little Barley	0	L48 N
Houstonia longifolia	Rubiaceae	(Gaertn.) Hook.	Slender leaf bluet	8	L48 N
Ipomoea hederacea	Convolvulaceae	Jacq.	Ivy leaf morning glory	*	L48 I
Ipomoea pandurata	Convolvulaceae	L.	Big root morning glory	2	L48 N
Juncus interior var. interior	Juncaceae	Weigand	Inland rush	2	L48 N
Juniperus virginiana var. virginiana	Cupressaceae	L.	Eastern Red cedar	1	L48 N
Justicia americana	Acanthaceae	(L.) Vahl.	American water willow	5	L48 N
Krigia biflora	Asteraceae	(Walt.) Blake	False dandelion	6	L48 N
Krigia caespitosa	Asteraceae	(Raf.) Chambers	Weedy dwarf dandelion	4	L48 N
Kummerowia striata	fabaceae	(Thunb.) H & A USDA: (Thunb.) Schindl.	Japanese clover	*	L48 I
Lactuca serriola	Asteraceae	L.	Prickly Lettuce	*	L48 I
Lamium amplexicaule	Lamiaceae	L.	Henbit	*	L48 I
Lathyrus latifolius	fabaceae	L.	Perrenial sweet pea	*	L48 I
Leptochloa panicea ssp. Mucronata	Poaceae	(Retz) Ohwi.	Red sprangletop	0	L48 N
Lespedeza virginica	Fabaceae	(L.) Britton	Slender Bush Clover	5	L48 N
Lespedeza capitata	Fabaceae	Michx.	Round headed bush clover	6	L48 N
Lespedeza cuneata	Fabaceae	(Dumont G. Don USDA: (Dum. Cours.) G. Don	Sericea lespedeza	*	L48 I

Scientific Name	Family	Author	Common Name	CC	Native
Liquidambar styraciflua	Hamamelidaceae	L.	Sweetgum	*	L48 N
Lonicera japonica	Caprifoliaceae	Thunb.	Japanese honeysuckle	*	L48 I
Lonicera maackii	Caprifoliaceae	(Rupr.) Herder FGP: Maxim	Maack's honeysuckle	*	L48 I
Maclura pomifera	Moraceae	(Raf.) C.K. Schneid.	Osage orange	*	L48 N
Malus ioensis var. ioensis	Rosaceae	(Wood) Britton	Prairie crabapple	3	L48 N
Medicago lupulina	Fabaceae	L.	Black medick	*	L48 I
Melilotus alba	Fabaceae	Medic.	White sweet clover	*	L48 I
Melilotus officinalis	Fabaceae	(L.) Pall. / (L.) Lam.	Yellow sweet clover	*	L48 I
Mentzelia oligosperma	Losaceae	Nutt.	Stick leaf	4	L48 N
Monarda fistulosa ssp. Fistulosa	Lamiaceae	L.	Wild bergamot, Bee balm	3	L48 N
Monarda punctata Vear. Occidentalis	Lamiaceae	(Epling) Palmer & Steyermark	Western spotted bee blam	5	L48 N
Morus alba	Moraceae	L.	White mulberry	*	L48 I
Morus rubra var. rubra	Moraceae	L.	Red mulberry	5	L48 N
Myosurus minimus	Ranunculaceae	L.	Mouse-tail	0	L48 N
Notholaena dealbata Agyrochosma	Polypodiaceae	(Pers.) Kunze.	Powdery false cloak fern	7	L48 N
Nothoscordum bivalve	Liliaceae	(L.) Britton	False wild garlic	3	L48 N
Oenothera speciosa	Onagraceae	Nutt.	Showy evening primrose	2	L48 N
Oenothera villosa var. villosa	Onagraceae	Thunb.	Common evening primrose	0	L48 N
Opuntia macrocarpa Var. macrocarpa	Cactaceae	Engelm.	Plains prickly pear	3	L48 N
Oxalis dillenii	Oxalidaceae	Jacq.	Gray-green wood sorrel	4	L48 N
Oxalis violacea	Oxalidaceae	L.	Violet wood sorrel	4	L48 N
Panicum acuminatum	Poaceae	Sw.	Panic grass	3	L48 N
Panicum philadelphicum	Poaceae	Bernh. Ex Trin	Philadelphia panic grass	4	L48 N
Parthenocissus quinquefolia	Vitaceae	(L.) Planchon	Virginia creeper	1	L48 N
Paspalum dilatatum	Poaceae	Poir.	Dallis grass	*	L48 I
Paspalum setaceum var. ciliatifolium	Poaceae	(Michx.) Vasey	Thin paspalum	2	L48 N
Passiflora incarnata	Passifloraceae	L.	Purple passion flower, maypop	4	L48 N
Pediomelum digitatum	Fabaceae	(Nutt.ex Torr. & A. Gray) Isely	Palm leaf scurf pea	7	L48 N
Penstemon cobae	Scrophulariaceae	Nutt.	Cobae penstemon	5	L48 N
Penstemon tubiflorus Var. tubiflorus	Scrophulariaceae	Nutt.	White tube beardtongue	3	L48 N
Penthorum sedoides	Crassulaceae	L.	Ditch stonecrop	3	L48 N
Phyla lanceolata	Verbenaceae	(Michx.) Greene	Northern fog fruit	1	L48 N
Physalis heterophylla var. heterophyla	Solanaceae	Nees.	Clammy ground cherry	4	L48 N
Physalis pumilla var. hispida	Solanaceae	(Waterfall) Hinton	Prairie ground cherry	4	L48 N
Phytolacca americana	Phytolaccaceae	L.	Common pokeweed	0	L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Plantago patagonica Var. patagonica	Plantaginaceae	Jacq.	Wooly plantain	1	L48 N
Pluchea camphorata	Asteraceae	(L.) D.C.	Camphorweed	4	L48 N
Poa annua	Poaceae	L.	Annual bluegrass	*	L48 I
Polansia dodecandra ssp. Trachysperma(T&G)	Capparaceae	(L.) DC.	Clammy Weed	*	L48 N
Polygonum pennsylvanicum	Polygonaceae	L.	Pink smartweed	2	L48 N
Polygonum persicaria	Polygonaceae	L.	Spotted lady's thumb	*	L48 I
Polygonum punctatum	Polygonaceae	Elliott	Dotted smart weed	3	L48 N
Populus deltoides	Salicaceae	Bartram ex Marshall	Eastern cottonwood	0	L48 N
Populus deltoides ssp. Monilifera	Salicaceae	W. Bartram ex Marsh ssp. (Aiton) Eckenwalder	Plains Cottonwood	0	L48 N
Prunella vulgaris ssp lanceolata	Lamiaceae	(L.) (W. Bartram) Hulten	Lance leaf self-heal	*	L48 I
Prunus americana	Rosaceae	Marsh.	Wild plum american plum	3	L48 N
Ptelea trifoliata SSP. Trifoliata	Rutaceae	L.	Hop tree, Wafer Ash	6	L48 N
Ptilimnium nutallii	Apiaceae	(D.C.) Britton	Mock bishop's weed	6	L48 N
Pycnanthemum tenuifolium	Lamiaceae	Schrad.	Slender Mountain Mint	7	L48 N
Pyrrhopappus grandiflorus	Asteraceae	(Nutt.) Nutt.	Tuber False Dandelion	4	L48 N
Quercus macrocarpa var. macrocarpa	Fagaceae	MichX.	Bur Oak	4	L48 N
Quercus muhlenbergii	Fagaceae	Engelm.	Chinkapin oak	5	L48 N
Quercus palustris	Fagaceae	Muench	Pin oak	3	L48 N
Quercus rubra	Fagaceae	L.	Northern Red Oak	6	L48 N
Quercus shumardii var. shumardii	Fagaceae	Buckley	Shumard oak	6	L48 N
Quercus stellata	Fagaceae	Wangenh	Post-oak	4	L48 N
Quercus var. shumardii	Fagaceae	Buckley	Shumard oak	6	L48 N
Ranunculus abortivus	Ranunculaceae	L.	Little leaf buttercup	1	L48 N
Ranunculus sceleratus var. sceleratus	Ranunculaceae	L.	Cursed butercup	0	L48 N
Rhus aromatica Var serotina	Anacardiaceae	Aiton (Green) Rehdr	Aromatic sumac	3	L48 N
Rhus glabra	Anacardiaceae	L.	Smooth Sumac	1	L48 N
Rorippa palustris ssp. Fernaldiana	Brassicaceae	(l.) Besser ssp (Butters & Abbe) Jonsell	Bog yellow cress	2	L48 N
Rubus alleghenensis	Rosaceae	Porter	Common blackberry	4	L48 N
Rudbeckia hirta	Asteraceae	L.	Black eyed susan	2	L48 N
Ruellia humilis	Acanthaceae	Nutt.	Hairy ruellia	3	L48 N
Ruellia strepens	Acanthaceae	L.	Limestone ruellia	4	L48 N
Rumex crispus ssp. Crispus	Polygonaceae	L.	Curly dock	*	L48 I
Sagittarialatifolia	Alismataceae	Willd.	Broad leaf arrowhead	4	L48 N
Salix nigra	Salicaceae	Marsh.	Black willow	2	L48 N
Salvia azurea	Lamiaceae	Michx. Ex lam.	Blue Sage	5	L48 N
Schizachne purpurascens	Poaceae	(Torr.) Swallen	False melic		L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Scirpus pendulus	Cyperaceae	Muhl.	Pendant bulrush	3	L48 N
Scutellaria parvula Var. missouriensis	Lamiaceae	var. (Torr.) Goodman & C. A. Lawson	Leonard's Skullcap	5	L48 N
Sesbania herbacea	Fabaceae	(Mill.) McVaugh.	Big pod sesbania	3	L48 N
Setaria faberi	Poaceae	Herrn.	Chinese foxtail	*	L48 I
Setaria parviflora	Poaceae	(Poir.) kerguelen	knot root yellow foxtail	3	L48 I
Setaria pumila	Poaceae	(Poir.) Roem. & J. A. Schultes	Yellow foxtail	*	L48 I
Setaria viridis var viridis	Poaceae	(L.) P. Beauv	Green foxtail	*	L48 I
Sideroxylon lanuginosum ssp. Oblongifolium	Sapotaceae	Michx. Ssp. (Nutt.) T. D. Penn. syn. Bumelia Lanuginosa	Wooly buckthorn	5	L48 N
Silene antirrhina	Caryophyllaceae	L	Sleepy catchfly	0	L48 N
Sisyrinchium campestre	iridaceae	Bicknell	Prairie blue eyed grass	6	L48 N
Smilax ecirrhata	Smilacaceae		Greenbriar	5	L48 N
Solanum carolinense var. carolinense	Solanaceae	L.	Carolina horse-nettle	1	L48 N
Solidago canadensis Var. gilvocanescens	Asteraceae	(L.) Rydb.	Short hair goldenrod	2	L48 N
Solidago ulmifolia Var. ulmifolia	Asteraceae	Muhl. Ex Willd.	Elm leaved goldenrod	4	l48 N
Sorghastrum nutans	Poaceae	(L.) Nash	Indian grass	5	L48 N
Sorghum halepense	poaceae	(L.) Pers.	Johnson grass	*	L48 I
Spenopholis obtusata	Poaceae	(Michx.) Scribn.	Prairie wedgescale	4	L48 N
Spiranthes magnicamporum	Orchidaceae	Sheviak.	Great plains lady's tresses	6	L48 N
Sporobolus compositus	Poaceae	(Poir) Merr.	Rough dropseed	3	L48 N
Stellaria media ssp. media	Caryophyllaceae	(L.) Vill. FGP (L.) Cyr.	Common chickweed	*	L48 I
Symphiotrichum oblongifolium	Asteraceae	(Nutt.) G.L. Nesom	Aromatic aster	5	L48 N
Symphiotrichum pilosum	Asteraceae	(Willd) G.L. Nesom	White heath aster	0	L48 N
Symphoricarpos orbiculatus	Caprifoliaceae	Moench.	Coral berry, buckbrush	1	L48 N
Symphyotrichum ericoides Var. ericoides	Asteraceae	(L.) G.L. Nesom Syn. Aster ericoides	White heath aster	5	L48 N
Taxodium distichum	Cupressacaeae	(L.) Rich.	Bald Cypress	*	L48 N
Teucrium canadense Var. canadense	Lamiaceae	L.	American germander	1	L48 N
Thlaspi arvense	Brassicaceae	L.	Field pennycress	*	L48 I
Tradescantia ohiensis	Commelinaceae	Raf.	Spiderwort	5	L48 N
Tridens flavus	Poaceae	(L.) Hitchcock	Purpletop tridens	1	L48 N
Triodanis leptocarpa	Campanulaceae	(Nutt.) Nieuw	Slimpod venus' looking glass	3	L48 N
Triodanis perfoliata	Campanulaceae	(L.) Nieuw	Venus' looking glass	2	L48 N
Tripsacum dactyloides	Poaceae	(L.) L.	Eastern gamagrass	3	L48 N
Typha angustifolia	Typhaceae	L.	Narrow leaf cattail	0	L48 NI
Ulmus americana	Ulmaceae	L.	American elm	2	L48 N
Ulmus rubra	Ulmaceae	Muhl.	Red elm, slippery elm	3	L48 N

Scientific Name	Family	Author	Common Name	CC	Native
Valerianella radiata	Valerianaceae	(L.)Dufr.	Corn salad	2	L48 N
Verbascum thapsus	Scrophulariaceae	L.	Common mullein	*	L48 I
Verbena bracteata	Verbenaceae	Lag. & Rodr.	Prostrate vervain	0	L48 N
Verbena hastata	Verbenaceae	L.	Swamp verbena	1	L48 N
Verbena simplex	Verbenaceae	Lehm.	Narrow leaved vervain	2	L48 N
Verbena Stricta	Verbenaceae	Vent.	Hoary verevain	1	L48 N
Vernonia baldwinii ssp baldwinii	Asteraceae	Torr.	Western ironweed	2	L48 N
Viburnum rufidulum	Caprifoliaceae	Raf.	Rusty blackhaw	5	L48 N
Viburnum prunifolium	Caprifoliaceae	L.	Black haw	6	L48 N
Vinca minor	Apocynaceae	L.	Common periwinkle	*	L48 I
Viola sororiai	Violaceae	Willd	Downy blue violet		L48 N
Viola bicolor	Violaceae	Pursh.	Johnny jump up	0	L48 N
Vitis riparia	Vitaceae	Michx	Riverbank grape	2	L48 N
Xanthium strumarium var. canadense	Asteraceae	L. var. (Mill.) Torr. & A. Gray	Canada cocklebur	0	L48 N
Zizia aurea	Apiaceae	(L.) W.D.J. Koch	Golden Alexanders	5	L48 N

Appendix 4
Elk City State Park Collection GPS Coordinates

NO	Latitude	Longitude	Family	*Genus*	*Specific epithet*	Sub Species ssp.	Author	Common name (s)
1	N 37 15 19.86	W 095 46 19.95	Rubiaceae	*Hedyotis*	*crassifolia*		Raf.	Small bluets
2	N 37 15 18.59	W 095 46 20.35	Asteraceae	*Taraxicum*	*officiinale*		Weber	Common dandelion
3	N 37 15 2855	W 095 46 17.73	Rosaceae	*Prunus*	*americana*		Marsh.	Wild plum, american plum
4	N 37 15 23.30	W 095 46 26.30	Asteraceae	*Taraxicum*	*officinale*		Weber	Common dandelion
5	N 37 15 30.87	W 095 46 45.98	Cupressaceae	*Juniperus*	*virginiana*	var. virginiana	L.	Eastern Red cedar
6	N 37 15 30.87	W 095 46 45.98	Cupressaceae	*Juniperus*	*virginiana*	var. virginiana	L.	Eastern Red cedar
7	N 37 15 21.02	W 095 16.52	Aceraceae	*Acer*	*rubrum*		L.	Red Maple
12	N 37 15 17.37	W 095 46 20.12	Brassicaceae	*Draba*	*cuneifolia*		Nutt.	Wedge leaf draba
26	N 37 15 18.25	W 095 46 42.66	Caryophyllaceae	*Stellaria*	*media*	ssp. media	(L.) Vill. FGP (L.) Cyr.	Common chickweed
28	N 37 15 18.69	W 095 46 16.79	Lamiaceae	*Lamium*	*amplexicaule*		L.	Henbit
34	N 37 15 42.44	W 095 46 47.00	Oleaceae	*Forsythia*	*viridissima*		Lindl.	Greenstem forsythia
36	N 37 15 18.36	W 095 46 18.15	Rosaceae	*Prunus*	*americana*		Marsh.	Wild plum american plum
42	N 37 15 26.25	W 095 46 26.83	Salicaceae	*Populus*	*deltoides*		Bartram ex Marshall	Eastern cottonwood, plains cottonwood
50	N 37 15 10.00	W 095 46 41.60	Rosaceae	*Malus*	*ioensis*	var. ioensis syn, pyrus ioensis	(Wood) Britton	Prairie crabapple, wild crabapple
50	N 37 15 17.80	095 46 27.55	Apocynaceae	*Vinca*	*minor*		L.	Common periwinkle
52	N 37 15 23.57	W 095 46 36.61	Liliaceae	*Nothoscordum*	*bivalve*		(L.) Britton	False wild garlic, crow poison
52	N 37 15 16.41	095 46 28.24	Violaceae	*Viola*	*sororiai*		Willd	Downy blue violet
53	N 37 15 2026	W 095 46 29.66	Liliaceae	*Nothoscordum*	*bivalve*		(L.) Britton	False wild garlic, crow poison
54	N 37 15 21.24	095 46 27.91	Violaceae	*Viola*	*bicolor*	Syn. Rafinesquii Greene	Pursh.	Johnny jump up

NO	Latitude	Longitude	Family	*Genus*	*Specific epithet*	Sub Species ssp.	Author	Common name (s)
65	N 37 15 19.98	W 095 46 39.60	Verbenaceae	*Glandularia*	*bipinnatafida*	Var. ciliata	(Nutt.) Nutt var. (Benth) B.L Turner	Dakota vervain, davis mountain mock vervain
68	N 37 15 14.05	W 095 46 19.42	Ulmaceae	*Ulmus*	*americana*		L.	American elm
72	N 37 15 28.74	W 095 46 03.88	Oxalidaceae	*Oxalis*	*dillenii*		Jacq.	Gray-green wood sorrel
76	N 37 15 19.36	W 095 46 07.70	Ranunculaceae	*Ranunculus*	*abortivus*		L.	Little leaf buttercup, earlt wood buttercup
81	N 37 15 18.46	W 095 46 25.22	Brassicaceae	*Alliaria*	*petiolata*		(Bieb.) Cavara & Grande.	Garlic mustard
82	N 37 15 18.05	W 095 46 26.74	Oleaceae	*Elaeagnus*	*angustifolia*		L.	Russian olive
83	N 37 15 29.77	W 095 46 36.38	iridaceae	*Sisyrinchium*	*campestre*		Bicknell	Prairie blue eyed grass, white eyed grass
85	N 37 15 22.89	W 095 46 27.84	Oxalidaceae	*Oxalis*	*violacea*		L.	Violet wood sorrel
86	N 37 15 20.19	W 095 46 29.75	Oxalidaceae	*Oxalis*	*violacea*		L.	Violet wood sorrel
88	N 37 15 20.22	W 095 46 28.58	Apiaceae	*Chaerophyllum*	*tainturieri*		Hook	Chervil
89	N 37 15 30.38	W 095 46 35.89	Caprifoliaceae	*Lonicera*	*maackii*		(Rupr.) Herder FGP: Maxim	Amur honeysuckle, Maack's honeysuckle
89	N 37 15 30.38	W 095 46 35.89	Ulmaceae	*Celtis*	*laevigata*		Willd.	Sugarberry
91	N 37 15 20.04	W 095 46 28.16	Fabaceae	*Gymnocladus*	*dioicus*		(L.) K. Koch	Kentucky coffee tree
95	N 37 15 20.07	W 095 46 28.64	Caprifoliaceae	*Viburnum*	*rufidulum*		Raf.	Southern blackhaw, rusty blackhaw
96	N 37 15 23.44	W 095 46 38.17	Caprifoliaceae	*Viburnum*	*rufidulum*		Raf.	Southern blackhaw, rusty blackhaw
102	N 37 15 0901	W 095 46 41.22	Moraceae	*Maclura*	*pomifera*		(Raf.) C.K. Schneid.	Osage Orange, Hedge apple, Bois D'arc
103	N 37 15 06.52	W 095 46 42.16	Apiaceae	*Chaerophyllum*	*procumbens*		(L.)Crantz	Wild Chervil
104	N 37 15 10.00	W 095 46 41.60	Portulacaceae	*Claytonia*	*virginica*		L.	Spring Beauty
105	N 37 15 0531	W 095 46 43.20	Poaceae	*Bouteloua*	*dactyloides*	Syn. Buchloe dactyloides	(Nutt.) Engel. (Buchloe dactyloides)	Buffalo grass
106	N 37 15 10.95	W 095 46 41.04	Asteraceae	*Krigia*	*biflora*		(Walt.) Blake	False dandelion
107	N 37 15 10.40	W 095 46 42.30	Liliaceae	*Nothoscordum*	*bivalve*		(L.) Britton	False wild garlic, crow poison
107	N 37 15 15.12	W 095 46 32.04	Brassicaceae	*Thlaspi*	*arvense*		L.	Field pennycress, frenchweed, stinkweed
108	N 37 15 16.75	W 095 46 34.46	Ranunculaceae	*Myosurus*	*minimus*		L.	Mouse-tail

NO	Latitude	Longitude	Family	*Genus*	*Specific epithet*	Sub Species ssp.	Author	Common name (s)
108	N 37 15 10.57	W 095 46 41.48	Brassicaceae	*Erysimum*	*repandum*		L.	Bushy wallflower, spreading wallflower
109	N 37 15 04.39	W 095 46 26.63	Valerianaceae	*Valerianella*	*radiata*		(L.)Dufr.	Corn salad
111	N 37 15 20.36	W 095 46 39.77	Oxalidaceae	*Oxalis*	*dillenii*		Jacq.	Gray-green wood sorrel
112	N 37 15 19.24	095 46 40.07	Brassicaceae	*Thlaspi*	*arvense*		L.	Field pennycress, frenchweed, stinkweed
113	N 37 15 00.58	W 095 46 34.50	Brassicaceae	*Erysimum*	*repandum*		L.	Bushy wallflower, spreading wallflower
114	N 37 15 04.21	W 095 46 42.10	Apiaceae	*Ptilimnium*	*nuttallii*		(D.C) Britton	Mock Bishop's weed
115	N 37 15 20.18	W 095 46 40.16	Brassicaceae	*Rorippa*	*palustris*	ssp. Fernaldiana	(l.) Besser ssp (Butters & Abbe) Jonsell	Bog yellow cress, Fernald's yellow cress FlMo720
115	N 37 15 10.80	W 095 46 41.67	Brassicaceae	*Descurainia*	*pinnata*	ssp. brachycarpa	(Walter) Britton ssp. (Richardson) Detling	Western Tansy Mustard
116	N 37 15 18.49	W 095 46 40.50	Cyperaceae	*Eleocharis*	*compressa*		Sullivan	Flat-stem spike rush
116	N 37 15 18.40	W 095 46 4405	Ranunculaceae	*Ranunculus*	*sceleratus*	var. sceleratus	L.	Cursed butercup, cursed crowfoot
117	N 37 15 28.69	W 95 46 46.60	Ranunculaceae	*Ranunculus*	*abortivus*		L.	Little leaf buttercup, earlt wood buttercup
117	N 37 15 28.69	W 95 46 46.60	Poaceae	*Alopecurus*	*carolinianus*		Walters	Carolina foxtail
118	N 37 15 29.35	W 095 46 44.49	Poaceae	*Hordeum*	*pusillum*		Nutt.	Little Barley
119	N 37 15 29.65	W 095 46 47.17	Rutaceae	*Ptelea*	*trifoliata*	SSP. Trifoliata	L.	Hop tree, Wafer Ash, common wafer ash
119	N 37 15 31.55	W 095 46 43.67	Rutaceae	*Ptelea*	*trifoliata*	SSP. Trifoliata	L.	Hop tree, Wafer Ash, common wafer ash
119	N 37 15 31.70	095 46 43.42	Fagaceae	*Quercus*	*macrocarpa*	var. macrocarpa	MichX.	Bur Oak
119	N 37 15 30.07	W 095 46 46.94	Moraceae	*Morus*	*rubra*	var. rubra	L.	Red mulberry
119	N 37 15 30.82	W 095 46 46.15	Fagaceae	*Quercus*	*shumardii*	var. shumardii no acorn	Buckley	Shumard oak
119	N 37 15 30.82	W 095 46 46.15	Fagaceae	*Quercus*	*muhlenbergii*		Engelm.	Chinkapin oak, yellow chestnut oak
120	N 37 15 31.23	W 095 46 43.97	Ulmaceae	*Ulmus*	*rubra*		Muhl.	red elm, slippery elm
120	N 37 15 30.48	W 095 46 43.76	Caprifoliaceae	*Viburnum*	*prunifolium*		L.	Black haw
120	N 37 15 29.24	W 095 46 46.38	Caprifoliaceae	*Viburnum*	*prunifolium*		L.	Black haw
123	N 37 15 34.08	W 095 46 54.22	Fagaceae	*Quercus*	*palustris*		Muench	Pin oak

NO	Latitude	Longitude	Family	*Genus*	*Specific epithet*	Sub Species ssp.	Author	Common name (s)
125	N 37 15 21.63	W 095 46 47.13	Fagaceae	*Quercus*	*muhlenbergii*		Engelm.	Chinkapin oak, yellow chestnut oak
127	N 37 15 35.54	W 095 46 57.19	Fagaceae	*Quercus*	*rubra*		L.	Northern Red Oak
128	N 37 15 20.15	W 095 46 27.68	Juglandaceae	*Carya*	*ovata*		(Mill.) K. Koch	Shagbark hickory
129	N 37 15 36.72	W 095 46 41.24	Fabaceae	*Amorpha*	*fruticosa*		L.	False indigo, Indigobush amorpha
130	N 37 15 31.16	W 095 46 44.54	Vitaceae	*Vitis*	*riparia*		Michx	Riverbank grape
131	N 37 15 31.35	W 195 46 44.08	Sapotaceae	*Sideroxylon*	*lanuginosum*	ssp. Oblongifolium	Michx. Ssp. (Nutt.) T. D. Penn. syn. Bumelia Lanuginosa	Wooly buckthorn
132	N37 15 30.84	W 095 46 43.10	Ranunculaceae	*Aquilegia*	*canadensis*		L.	Wild columbine
133	N 37 15 31.73	W 095 46 43.91	Plantaginaceae	*Plantago*	*patagonica*	Var. patagonica	Jacq.	Wooly plantain, patagonian plantain, wooly indian wheat
134	N 37 15 18.57	W 095 46 26.79	Fabaceae	*Melilotus*	*officinalis*		(L.) Pall. / (L.) Lam.	Yellow sweet clover
135	N 37 15 17.87	W 095 46 26.82	Scrophulariaceae	*Penstemon*	*cobae*		Nutt.	Cobae penstemon, cobae beardtongue
136	N 37 15 19.71	W 095 46 25.51	Apiaceae	*Zizia*	*aurea*		(L.) W.D.J. Koch	Golden Zizia, Golden Alexanders
139	N 37 15 18.35	W 095 46 26.89	Asclepidaceae	*Asclepias*	*asperula*	ssp. Capricornu	(Decne.) Wods. Capricornu (Woodson) Woodson	Spider antelopehorn, antelopehorns
140	N 37 15 13.51	W 095 46 27.96	Liliaceae	*Allium*	*canadense*	Var. canadense	L.	Wild onion, meadow garlic
141	N 37 15 11.62	W 095 46 22.49	Poaceae	*Spenopholis*	*obtusata*		(Michx.) Scribn.	Prairie wedgescale
142	N 37 15 11.87	W 095 46 27.99	Cyperaceae	*Carex*	*bicknellii*	var. opaca	(F.J. Hern) P. Rothr & Reznicek	Bicknell's sedge
142	N 37 15 13.41	W 095 45 27.50	Cyperaceae	*Carex*	*vulpinoidea*	var. vulpinoidea	Michx.	Fox sedge
142	N 37 15 11.02	W 095 46 27.29	Poaceae	*Dichanthelium*	*oligosanthes*	var. scribnerianum	(Schult.)Gould var. (Nash) Gould	Scribner's rosette grass, scribner's panic grass
142	N 37 15 12.71	W 095 46 27.11	Cyperaceae	*Carex*	*davisii*		Schwein & Torr.	Davis' sedge
143	N 37 15 11.62	W 095 46 22.49	Poaceae	*Hordeum*	*pusillum*		Nutt.	Little Barley
144	N 37 15 09.32	W 095 46 28.07	Rosaceae	*Rubus*	*alleghenensis*		Porter	Common blackberry
145	N 37 15 19.10	W 095 46 05.89	Poaceae	*Schizachne*	*purpurascens*		(Torr.) Swallen	False melic
146	N 37 15 18.63	W 095 46 0375	Poaceae	*Dichanthelium*	*oligosanthes*	var. scribnerianum	(Schult.)Gould var. (Nash) Gould	Scribner's rosette grass, scribner's panic grass

NO	Latitude	Longitude	Family	*Genus*	*Specific epithet*	Sub Species ssp.	Author	Common name (s)
147	N 37 15 17.80	W 095 46 02.67	Juncaceae	*Juncus*	*interior*	var. interior	Weigand	Inland rush
147	N 37 15 18.32	W 095 46 08.70	Campanulaceae	*Triodanis*	*leptocarpa*		(Nutt.) Nieuw	Slimpod venus' looking glass, slender venus' looing glass
148	N 37 15 17.97	W 095 46 02.99	Convolvulaceae	*Convolvulus*	*arvensis*		L.	Field bindweed
149	N 37 46 18.50	W 095 46 01.36	Juncaceae	*Juncus*	*interior*	var. interior	Weigand	Inland rush
150	N 37 15 19.45	W 095 46 03.09	Cyperaceae	*Scirpus*	*pendulus*		Muhl.	Pendant bulrush, nodding bulrush, rufous bulrush
152	N 37 15 17.96	W 095 45 58.61	Cyperaceae	*Carex*	*bicknellii*		Britton	Bicknell's sedge
153	N 37 15 18.35	W 095 45 59.90	Poaceae	*Spenopholis*	*obtusata*		(Michx.) Scribn.	Prairie wedgescale
153	N 37 46 17.18	W 095 46 06.01	Onagraceae	*Oenothera*	*speciosa*		Nutt.	Showy evening primrose, pink ladies
155	N 37 15 17.74	W 095 45 58.93	Poaceae	*Hordeum*	*pusillum*		Nutt.	Little Barley
155	N 37 15 17.74	W 095 46 58.93	Poaceae	*Agrostis*	*Hyemalis*		(Walter) Britton, Sterns,& Poggenb.	Hair grass, tickle grass, winter bentgrass
155	N 37 15 18.38	W 095 46 02.14	Polygonaceae	*Rumex*	*crispus*	ssp. Crispus	L.	Curly dock
156	N 37 15 18.37	W 095 46 05.85	Poaceae	*Bromus*	*inermis*		Layss.	Smooth Brome
157	N 37 15 18.19	W 095 45 58.63	Poaceae	*Bromus*	*inermis*		Leyss.	Smooth brome
157	N 37 15 17.81	W 095 45 59.60	Poaceae	*Poa*	*annua*		L.	annual bluegrass
158	N 37 15 17.82	W 095 46 08.89	Poaceae	*Agrostis*	*Hyemalis*		(Walter) Britton, Sterns,& Poggenb.	Hair grass, tickle grass, winter bentgrass
159	N 37 15 18.07	W 095 46 08.47	Geraniaceae	*Geranium*	*carolinianum*	var. carolinanum	L.	Carolina crane's bill
162	N 37 15 20.86	W 095 46 05.31	Verbenaceae	*Verbena*	*simplex*		Lehm.	Narrow leaved vervain, narrow leaved verbena
163	N 37 15 24.02	W 095 46 09.68	cyperaceae	*Carex*	*vulpinoidea*	var. vulpinoidea	Michx.	Fox sedge
176	N 37 15 23.53	W 095 46 06.53	Apiaceae	*Chaerophyllum*	*procumbens*		(L.) Crantz	Wild chervil, spreading chervil
179	N 37 15 04.26	W 095 46 28.67	Asteraceae	*Achillea*	*millefolium*	ssp. Occidentalis D. C.	L.	Western yarrow
180	N 37 15 03.36	W 095 46 28.10	Apocynaceae	*Apocynum*	*cannabinum*		L	Dogbane, indian hemp
181	N 37 14 59.90	W 095 46 23.30	Acanthaceae	*Justicia*	*americana*		(L.) Vahl.	American water willow American dianthra
182	N 37 14 54.37	W 095 46 16.58	Asteraceae	*Krigia*	*caespitosa*		(Raf.) Chambers	Weedy dwarf dandelion

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183	N 37 15 01.60	W 095 46 29.88	Campanulaceae	*Triodanis*	*leptocarpa*		(Nutt.) Nieuw	Slimpod venus' looking glass, slender venus' looking glass
184	N 37 14 58.99	W 095 46 22.41	Caryophyllaceae	*Silene*	*antirrhina*		L	Sleepy catchfly
185	N 37 14 53.03	W 095 46 17.84	Oleaceae	*Fraxinus*	*americana*		L.	White ash
185	N 37 14 53.63	W 095 46 18.07	Polygonaceae	*Polygonum*	*pennsylvanicum*		L.	Pink smartweed, Pennsylvania smartweed
186	N 37 15 03.99	W 095 46 28.59	Campanulaceae	*Triodanis*	*perfoliata*		(L.) Nieuw	Venus' looking glass
187	N 37 14 45.30	W 095 46 30.81	Polygonaceae	*Polygonum*	*persicaria*		L.	Spotted lady's thumb
188	N 34 14 47.69	W 095 46 22.24	Polygonaceae	*Polygonum*	*pennsylvanicum*		L.	Pink smartweed, Pennsylvania smartweed
189	N 37 14 59.74	W 095 46 23.21	Liliaceae	*Allium*	*canadense*	Var. canadense	L.	Wild onion, meadow garlic
190	N 37 14 45.58	W 095 46 29.05	Poaceae	*Alopecurus*	*carolinianus*		Walters	Carolina foxtail
191	N 37 14 51.36	W 095 46 16.44	Solanaceae	*Solanum*	*carolinense*	var. carolinense	L.	Carolina horse-nettle
192	N 37 15 30.90	W 095 46 43.38	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail
234	N 37 15 17.03	W 095 46 18.51	Geraniaceae	*Geranium*	*carolinianum*	var. carolinanum	L.	Carolina crane's bill
235	N 37 15 31.06	W 095 15 31.06	Cyperaceae	*Eleocharis*	*compressa*		Sullivan	Flat-stem spike rush
236	N 37 15 28.41	W 095 46 45.81	Scrophulariaceae	*Penstemon*	*cobae*		Nutt.	Cobae penstemon, cobae beardtongue
237	N 37 15 31.61	W 095 46 43.66	cornaceae	*Cornus*	*drummondii*		Thunb.	Rough leaved dogwood
238	N 37 15 31.33	W 095 46 44.11	Caprifoliaceae	*Lonicera*	*maackii*		(Rupr.) Herder FGP: Maxim	Amur honeysuckle, Maack's honeysuckle
240	N 37 15 32.21	095 46 40.42	Fagaceae	*Quercus*	*shumardii*	var. shumardii no acorn	Buckley	Shumard oak
243	N 37 15 32.58	W 095 46 39.15	Fagaceae	*Quercus*	*stellata*		Wangenh	Post-oak
244	N 37 15 33.65	W 095 46 32.84	Scrophulariaceae	*Penstemon*	*tubiflorus*	Var. tubiflorus	Nutt.	White tube beardtongue
245	N 37 15 32.26	W 095 46 35.92	Fagaceae	*Quercus*	*muhlenbergii*		Engelm.	Chinkapin oak, yellow chestnut oak
245	N 37 15 35.12	W 095 46 40.14	Caprifoliaceae	*Viburnum*	*rufidulum*		Raf.	Southern blackhaw, rusty blackhaw
245	N 34 15 46.83	W 095 46 34.86	Vitaceae	*Cissus*	*trifoliata*	Syn. Cissus incisa	(L.) L.	Marine vine, possum grape, sorrel vine
246	N 37 15 37.23	W 095 46 37.89	Rubiaceae	*Galium*	*triflorum*		Michx	sweet scented bedstraw

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247	N 37 15 35.30	095 46 39.17	Rubiaceae	*Galium*	*triflorum*		Michx	sweet scented bedstraw
248	N 37 15 36.00	W 095 46 43.51	Vitaceae	*Parthenocissus*	*quinquefolia*		(L.) Planchon	Virginia creeper
250	N 37 15 33.82	W 095 46 40.43	Moraceae	*Morus*	*rubra*	var. rubra	L.	Red mulberry
253	N 37 15 34.02	W 095 46 41.03	Ulmaceae	*Celtis*	*occidentalis*		L.	Hackberry
254	N 37 15 33.63	095 46 40.97	Lamiaceae	*Glechoma*	*hederacea*		L.	ground ivy
256	N 37 15 31.65	W 095 46 47.47	Fabaceae	*Pediomelum*	*digitatum*	syn. Psoralea digitata	(Nutt.ex Torr. & A. Gray) Isely	Palm leaf scurf pea, Palm leaf indian bread root
257	N 37 15 34.58	095 46 54.73	Rubiaceae	*Houstonia*	*longifolia*		(Gaertn.) Hook.	Slender leaf bluet, longleaf summer bluet
258	N 37 15 45.97	W 095 46 59.09	Fagaceae	*Quercus*	*muhlenbergii*		Engelm.	Chinkapin oak, yellow chestnut oak
260	N 37 15 45.87	W 095 46 58.50	Rubiaceae	*Galium*	*circaezans*	var circaezans	Michx	Licorice bedstraw, woods bedstraw
262	N 37 15 04.11	W 095 46 28.54	Convolvulaceae	*Ipomoea*	*pandurata*		L.	Big root morning glory
263	N 37 15 02.64	W 095 46 27.91	Fabaceae	*Melilotus*	*alba*		Medic.	White sweet clover
263	N 37 15 02.47	W 095 46 27.75	fabaceae	*Lathyrus*	*latifolius*		L.	Perrenial sweet pea
264	N 37 15 04.11	W 095 46 28.54	Acanthaceae	*Ruellia*	*strepens*		L.	limestone ruellia
265	N 37 14 44.71	W 095 46 40.34	Asteraceae	*Pyrrhopappus*	*grandiflorus*		(Nutt.) Nutt.	Tuber Flase Dandelion, Tuberous desert chickory
266	N 37 15 01.32	W 095 46 25.69	Asteraceae	*Dracopis*	*amplexicaulis*		(Vahl.) Cass.	Clasping coneflower coneflower
266	N 37 14 43.99	W 095 46 55.45	Asteraceae	*Dracopsis*	*amplexicaulis*		(Vahl) Cass.	Clasping cone flower
267	N 37 15 53.34	095 46 16.27	Asteraceae	*Lactuca*	*serriola*		L.	Prickly Lettuce, Wild Lettuce
268	N 37 15 01.92	W 095 46 40.53	Amaranthaceae	*Amaranthus*	*tuberculatus*	Syn Amaranthus rudis Sauer	(Moq.) J. D. Sauer	Tall water hemp, rough fruit amaranth
268	N 37 15 17.62	W 095 46 27.76	Verbenaceae	*Verbena*	*bracteata*		Lag. & Rodr.	Prostrate vervain, big bract vervain
270	N 37 15 19.40	W 095 46 25.69	Verbenaceae	*Verbena*	*bracteata*		Lag. & Rodr.	Prostrate vervain, big bract vervain
270	N 37 15 14.85	W 095 46 19.95	Brassicaceae	*Rorippa*	*palustris*	ssp. Fernaldiana	(l.) Besser ssp (Butters & Abbe) Jonsell	Bog yellow cress, Fernald's yellow cress FlMo720
272	N 37 15 16.82	N 095 46 25.94	Poaceae	*Bromus*	*racemosus*	Syn. B. commutatus	L.	Hairy chess, bald brome
272	N 37 15 16.77	W 095 46 24.81	Poaceae	*Schizachne*	*purpurascens*		(Torr.) Swallen	False melic

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272	N 37 15 16.82	W 095 46 25.94	Poaceae	*Agrostis*	*Hyemalis*		(Walter) Britton, Sterns,& Poggenb.	Hair grass, tickle grass, winter bentgrass
273	N 37 15 17.13	W 095 46 18.33	Juncaceae	*Juncus*	*interior*	var. interior	Weigand	Inland rush
274	N 37 15 20.36	W 095 46 30.60	Poaceae	*Bromus*	*japonicus*		Thunb. Ex Murr.	Japanese brome (USDA arvensis)
276	N 37 15 3605	W 095 46 3527	Poaceae	*Bromus*	*racemosus*	Syn. B. commutatus	L.	Hairy chess, bald brome
277	N 37 15 34.20	W 095 46 40.29	Caryophyllaceae	*Dianthus*	*armeria*		L.	Deptford Pink
278	N 37 15 33.94	W 95 46 41.00	Lamiaceae	*Prunella*	*vulgaris*	ssp lanceolata	(L.) (W. Bartram) Hulten	Lance leaf self heal, heal all
279	N 37 15 33.53	W 095 46 41.17	Rosaceae	*Geum*	*canadense*		Jacq.	White avens
279	N 37 15 33.53	W 095 46 41.17	Ophioglossaceae	*Botrychium*	*dissectum*		Spreng.	Cut leaved Gape Fern
280	N 37 15 33.41	W 095 46 41.27	Cactaceae	*Opuntia*	*macrocarpa*	Var. macrocarpa	Engelm.	Plains prickly pear
281	N 37 15 08.09	W 095 45 31.91	Rubiaceae	*Houstonia*	*longifolia*		(Gaertn.) Hook.	Slender leaf bluets long leaf summer bluet
281	N 37 15 10.74	W 095 46 2722	Asteraceae	*Arnoglossum*	*plantagineum*	Syn. Cacalia plataginea	Raf. (Syn. Cacalia plantaginea (raf.) Shinners	(tuberous)Indian Plantain, groove stem Indian plantain
281	N 37 15 11.61	W 095 46 32.12	Asclepidaceae	*Asclepias*	*viridiflora*		Raf.	Green Milkweed, Green Comet Milkweed
281	N 37 15 10.30	W 095 46 28.09	Asteraceae	*Echinacea*	*pallida*		(Nutt.) Nutt.	Pale purple cone flower, Pale echinacea
283	N 37 15 17.72	W 095 46 06.08	Poaceae	*Agrostis*	*Hyemalis*		(Walter) Britton, Sterns,& Poggenb.	Hair grass, tickle grass, winter bentgrass
285	N 37 15 17.53	W 096 45 58.41	Poaceae	*Dichanthelium*	*acuminatum*	Var. Lindheimeri	(S.W.)Gould & C. A. Clark (Nash) Gould & C.A. Clark	Linderheimer panic grass
287	N 37 15 20.19	W 095 46 02.06	Poaceae	*Eragrostis*	*spectabilis*		(Pursh) Steud.	Purple love grass
290	N 37 15 22.00	W 095 46 04.13	Poaceae	*Panicum*	*acuminatum*		Sw.	Panic grass
291	N 37 15 17.07	W 095 46 09.19	Cyperaceae	*Carex*	*hystericina*		Muhl. Ex Willd.	Bottlebrush sedge, porcupine sedge
291	N 37 15 19.12	W 095 46 05.00	Cyperaceae	*Carex*	*vulpinoidea*	var. vulpinoidea	Michx.	Fox Sedge
292	N 37 15 29.27	W 095 46 02.21	Poaceae	*Spenopholis*	*obtusata*		(Michx.) Scribn.	Prairie wedgescale
293	N 37 15 28.77	W 095 46 03.38	Apiaceae	*Daucus*	*carota*		L.	Queen Anne's Lace, Wild Carrot

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294	N 37 15 19.81	W 095 46 27.22	Asteraceae	*Erigeron*	*strigosus*	var. strigosus	Muhl. Ex. Willd	Daisy Fleabane
295	N 37 15 02.91	W 095 46 34.01	Verbenaceae	*Verbena*	*simplex*		Lehm.	Narrow leaved vervain, narrow leaved verbena
296	N 37 15 19.69	W 095 46 28.34	Anacardiaceae	*Rhus*	*glabra*		L.	Smooth Sumac
298	N 37 15 23.71	W 095 46 27.61	Poaceae	*Bromus*	*inermis*		Layss.	Smooth Brome
299	N 37 15 21.45	W 095 46 27.00	Fabaceae	*Gleditsia*	*triacanthos*		L.	Honeylocust
300	N 37 15 22.08	W 095 46 27.09	Cyperaceae	*Scirpus*	*pendulus*		Muhl.	Pendant bulrush, nodding bulrush, rufous bulrush
301	N 37 15 21.97	095 46 27.23	Asteraceae	*Pyrrhopappus*	*grandiflorus*		(Nutt.) Nutt.	Tuber Flase Dandelion, Tuberous desert chickory
303	N 37 14 44.44	W 095 46 4352	Poaceae	*Dactylis*	*glomerata*		L.	Orchard grass
304	N 37 14 58.92	W 095 46 22.26	Poaceae	*Schizachne*	*purpurascens*		(Torr.) Swallen	False melic
305	N 37 14 15.23	W 095 46 1694	Poaceae	*Bromus*	*racemosus*	Syn. B. commutatus	L.	Hairy chess, bald brome
306	N 37 14 44.72	W 095 46 33.32	Anacardiaceae	*Rhus*	*aromatica*	Var serotina	Aiton (Green) Rehdr	Aromatic sumac
307	N 37 14 44.36	W 095 46 48.66	Asteraceae	*Coreopsis*	*tinctoria*		Nutt.	Plains coreopsis, golden tickseed
308	N 37 14 44.18	W 095 46 35.39	Oleaceae	*Fraxinus*	*americana*		L.	White ash
309	N 37 14 42.47	W 095 46 31.58	Rubiaceae	*Cephalanthus*	*occidentalis*		L.	Common Button Bush
309	N 37 14 45.36	N 095 46 30.07	Salicaceae	*Salix*	*nigra*		Marsh.	Black willow
309	N 37 15 33.61	095 46 40.48	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail
310	N 37 15 17.65	W 095 46 09.58	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail
312	N 37 15 01.88	W 095 46 27.49	Apiaceae	*Ptilimnium*	*nutallii*		(D.C.) Britton	Moch bishop's weed, lace flower
312	N 37 15 3060	W 095 46 057	Rubiaceae	*Cephalanthus*	*occidentalis*		L.	Common Button Bush
313	N 37 15 18.51	W 095 46 06.75	Moraceae	*Morus*	*alba*		L.	White mulberry silkworm mulberry
314	N 37 15 18.08	W 095 46 05.44	Poaceae	*Setaria*	*viridis*	var. viridis	(L.) P. Beauv.	Green foxtail
316	N 37 15 18.04	W 095 46 02.34	Fabaceae	*Desmanthus*	*illinoensis*		(Michx.) Macmill. Ex B.L. Robinson & Fernald	Illinois bundle flower

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317	N 37 15 19.24	W 095 46 04.78	Poaceae	*Echinocloa*	*muricata*		(Beauv.) Fern.	Barnard grass
319	N 37 15 33.8	W 095 46 40.87	Poaceae	*Sorghum*	*halepense*		(L.) Pers.	Johnson grass
320	N 37 15 32.15	W 095 46 41.34	Poaceae	*Bromus*	*inermis*		Leyss.	Smooth brome
323	N 37 15 34.02	095 46 41.46	Lamiaceae	*Teucrium*	*canadense*	Var. canadense	L.	American germnander, Canada germander
325	N 37 15 31.80	W 095 46 43.40	Verbenaceae	*Phyla*	*lanceolata*	Syn. Lippia lanceolata	(Michx.) Greene	Northern fog fruit
327	N 37 15 30.85	W 095 46 43.14	Poaceae	*Bothriochloa*	*saccharoides*	Syn. A. saccharoides	(S.W.) Rydb	Silver bluestem, silverstem
328	N 37 15 33.34	W 095 46 39.09	Fabaceae	*Dalea*	*purpurea*		Vent.	Purple Prairie Clover
329	37 15 31.86	095 46 43.84	Rubiaceae	*Houstonia*	*longifolia*		(Gaertn.) Hook.	Slender leaf bluet, longleaf summer bluet
330	N 37 15 31.69	W 095 46 43.64	Fagaceae	*Quercus*	*muhlenbergii*		Engelm.	Chinkapin oak, yellow chestnut oak
333	N 37 15 16.76	W 095 46 30.12	Ulmaceae	*Ulmus*	*rubra*		Muhl.	red elm, slippery elm
335	N 37 15 20.16	W 095 46 30.59	Fabaceae	*Desmanthus*	*illinoensis*		(Michx.) Macmill. Ex B.L. Robinson & Fernald	Illinois bundle flower
336	N 37 15 19.40	W 095 46 30.05	Lamiaceae	*Monarda*	*punctata*	Vear. Occidentalis	(Epling) Palmer & Steyermark	Western spotted bee blam
337	N 37 15 19.86	W 095 46 31.05	Commelinaceae	*Commelina*	*communis*		L.	Dayflower, asiatic dayflower
338	N 37 15 313	W 095 46 799	Fabaceae	*Amorpha*	*canescens*		Pursh	Lead Plant
338	N 37 15 19.84	W 095 46 30.15	Poaceae	*Elymus*	*virginicus*	Var. virginicus	L.	Virginia wild rye
339	N 37 15 290	W 095 46 480	Poaceae	*Chasmanthium*	*latifolium*		(Michx.) Yates	Indian Wild oats, Broad leaf Wood oats, wild oats
340	N 37 15 15.41	W 095 46 29.95	Poaceae	*Chasmanthium*	*latifolium*		(Michx.) Yates	Indian Wild oats, Broad leaf Wood oats, wild oats
342	N 37 15 16.34	W 095 46 29.32	Lamiaceae	*Teucrium*	*canadense*	Var. canadense	L.	American germnander, Canada germander
346	N 37 15 28.83	W 095 46 17.26	Asteraceae	*Lactuca*	*serriola*		L.	Prickly Lettuce, Wild Lettuce
347	N 37 15 24.99	W 095 46 2018	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail
348	N 3715 22.56	W 095 46 2052	Moraceae	*Maclura*	*pomifera*		(Raf.) C.K. Schneid.	Osage Orange, Hedge apple, Bois D'arc
349	N 37 15 17.96	W 095 46 23.71	Poaceae	*Agrostis*	*Hyemalis*		(Walter) Britton, Sterns,& Poggenb.	Hair grass, tickle grass, winter bentgrass
350	N 37 15 16.18	W 095 46 32.22	Orchidaceae	*Spiranthes*	*magnicamporum*		Sheviak.	Great plains lady's tresses

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351	N 37 15 32.99	W 095 46 2347	Poaceae	*Tripsacum*	*dactyloides*		(L.) L.	Eastern gamagrass
352	N 37 15 36.62	W 095 46 58.29	Hamamelidaceae	*Liquidambar*	*styraciflua*		L.	Sweetgum
353	N37 15 27.24	W 095 46 42.92	Asclepidaceae	*Asclepias*	*verticillata*		L.	Whorled milkweed
354	N 37 15 28.04	W 095 46 47.01	Poaceae	*Cynodon*	*dactylon*		(L.) Pers.	Bermuda grass
356	N 37 14 44.65	W 095 46 3816	Poaceae	*Elymus*	*virginicus*	Var. virginicus	L.	Virginia wild rye
357	N 37 14 46.68	W 095 46 26.13	Asteraceae	*Rudbeckia*	*hirta*		L.	Black eyed susan
358	N 37 14 47.25	W 095 46 46.24	Fabaceae	*Desmodium*	*glutinosum*		(Muhl. Ex Willd.) Wood - or Alph. Wood.	Large flowered tick clover, pointed leaf tick trefoil
359	N 37 14 47.75	W 095 46 19.37	Asteraceae	*Eclipta*	*prostrata*		(L.) L.	Yerba de Tajo, False daisy
361	N 37 14 45.49	W 095 46 302	Acanthaceae	*Ruellia*	*humilis*		Nutt.	Fringe leaf ruellia, hairy ruellia
362	N 37 14 57.25	W 095 46 19.30	Solanaceae	*Physalis*	*pumilla*	var. hispida	(Waterfall) Hinton	Prairie ground cherry
363	N 37 15 07.20	W 095 46 43.01	Fabaceae	*Chamaecrista*	*fasiculata*	Var. fasciulata	(Michx.) Greene	Showy partrige pea
364	N 37 15 05.22	W 095 46 43.57	Cuscutaceae	*Cuscuta*	*cuspidata*			Cusp dodder
365	N 37 15 02.61	W 095 46 26.67	Euphorbiaceae	*Euphorbia*	*dentata*	ver. Dentata	Michx.	Toothed spurge
366	N 37 15 07.41	095 46 34.50	Brassicaceae	*Barbarea*	*vulgaris*	Syn. Barbarea Vulgaris R. Br.	W. T. Aiton	Yellow Rocket, Winter Cress
367	N 37 15 273	W 095 46 43	Oleaceae	*Fraxinus*	*americana*		L.	White ash
368	N 37 15 28.01	W 095 46 07.31	Cupessacaeae	*Taxodium*	*distichum*		(L.) Rich.	Bald Cypress
369	N 37 15 29.43	W 095 46 07.53	Poaceae	*Digitaria*	*filiformis*		(L.) koeler	slender crab grass
371	N 37 15 21.15	W 095 46 159	Asteraceae	*Dracopis*	*amplexicaulis*		(Vahl.) Cass.	Clasping coneflower coneflower odd inflorescence
371	N 37 15 21.15	W 095 46 159	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
372	N 37 15 22.00	W 095 46 0156	Euphorbiaceae	*Croton*	*capitatus*		Michx	Wooly Croton, Hogwort
373	N37 15 21.74	W 095 46 046	Lamiaceae	*Monarda*	*fistulosa*	ssp. Fistulosa	L.	Wild Bergamot, Bee Balm
374	N 37 15 16.54	W 095 46 14.86	Lamiaceae	*Pycnanthemum*	*tenuifolium*		Schrad.	Slender Mountain Mint, common horse Mint
375	N 37 15 16.26	W 095 46 2249	Verbenaceae	*Verbena*	*hastata*		L.	Swamp verbena, Blue Vervain

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376	N 37 15 20.04	W 095 46 4024	Verbenaceae	*Verbena*	*Stricta*		Vent.	Hoary verevain
377	N 37 15 12.09	W 095 46 26.54	Boraginaceae	*Heliotropium*	*tenellum*		(Nutt) Torr.	Pasture heliotrope
379	N 37 15 3407	W 095 46 3922	Asteraceae	*Helianthus*	*annuus*		L.	Common sunflower
380	N 37 15 26.15	W 095 46 00.89	Poaceae	*Elymus*	*virginicus*	Var. virginicus	L.	Virginia wild rye
381	N 37 15 2904	W 095 46 0336	Fabaceae	*Chamaecrista*	*fasiculata*	Var. fasciulata	(Michx.) Greene	Showy partrige pea
382	N 37 15 27.49	W 095 46 02.48	Sapindaceae	*Cardiospermum*	*halicacabum*		L.	Common Balloon Vine
383	N 37 15 28.47	W 095 46 08.35	Poaceae	*Eragrostis*	*capillaris*		(L.) Nees.	Lace grass
384	N 37 15 18.68	W 095 46 2735	Acanthaceae	*Ruellia*	*strepens*		L.	Woodland ruellia, smooth ruellia, wild petunia
386	N 37 14 43.07	W 095 46 54.08	Asteraceae	*Lactuca*	*serriola*		L.	Prickly Lettuce, Wild Lettuce
387	N 37 15 0147	W 095 46 25.57	Passifloraceae	*Passiflora*	*incarnata*		L.	Purple passion flower, maypop
387	N 37 15 23.47	W 095 46 37.39	Asteraceae	*Vernonia*	*baldwinii*	ssp baldwinii	Torr.	Western ironweed, Baldwin's ironweed
388	N 37 14 57.75	W 095 46 1974	Asteraceae	*Hieracium*	*longipilum*		Torr.	Long bearded hawkweed, hairy hawkwed
389	N 37 14 42.29	W 095 46 31.44	Fabaceae	*Gleditsia*	*triacanthos*		L.	Honeylocust
391	N 37 14 48.14	W 095 46 18.77	Malvaceae	*Hibiscus*	*moscheutos*		L.	Rose mallow, crimson eyed rose mallow
393	N37 15 22.55	W 095 46 0210	Salicaceae	*Populus*	*deltoides*	ssp. Monilifera	W. Bartram ex Marsh ssp. (Aiton) Eckenwalder	Plains Cottonwood
394	N 37 15 23.19	W 095 46 0785	Salicaceae	*Populus*	*deltoides*		Bartram ex Marshall	Eastern cottonwood, plains cottonwood
395	N 37 15 21.83	W 095 46 05.85	Malvaceae	*Abutilon*	*theophrasti*		Medik.	Velvet leaf
397	N 37 15 33.37	W 095 46 40.83	Ebenaceae	*Diospyros*	*virginiana*		L.	American persimmon
401	N 37 15 34.33	W 095 46 40.16	Hydrophyllaceae	*Ellisis*	*nyctelea*		L.	Aunt lucy, waterpod
402	N 37 15 32.89	W 095 46 4089	Asteraceae	*Helianthus*	*annuus*		L.	Common sunflower
402	N 37 15 17.41	W 095 46 08.18	Asteraceae	*Lactuca*	*serriola*		L.	Prickly Lettuce, Wild Lettuce
404	N37 15 31.32	W 095 46 49.89	asteraceae	*Helianthus*	*annuus*		L.	Common sunflower
404	N 37 15 26.42	095 46 44.41	Poaceae	*Bouteloua*	*curtipendula*		(Michx.) Torr.	Side oats grama grass

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405	N37 15 32.99	W 095 46 59.47	Scrophulariaceae	*Verbascum*	*thapsus*		L.	Common mullein, flannel mullein
405	N 37 15 4253	W 0954701.71	Poaceae	*Elymus*	*virginicus*	Var. virginicus	L.	Virginia wild rye
406	N 37 15 2732	W 095 46 4267	Asteraceae	*Conyza*	*canadensis*		(L.) Cronq	Horse Weed, canada fleabane
406	N 37 15 27.96	W 095 46 42.53	poaceae	*Sorghum*	*halepense*		(L.) Pers.	Johnson grass
406	N 37 15 26.73	W 095 46 43.33	Euphorbiaceae	*Croton*	*texensis*		(J.F. Klutzsch) Muell. Arg.	Texas Croton, Skunkweed, Dove weed
407	N 37 15 27.17	W 095 46 42.47	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
407	N 37 14 26.92	W 095 46 44.01	Euphorbiaceae	*Croton*	*texensis*		(J.F. Klutzsch) Muell. Arg.	Texas Croton, Skunkweed, Dove weed
407	N 37 15 27.17	W 095 46 42.47	Capparaceae	*Polansia*	*dodecandra*	ssp. Trachysperma(T&G)	(L.) DC.	Clammy Weed
407	N 37 15 27.39	W 095 46 42.57	Lythraceae	*Ammannia*	*coccinea*		Rottb.	Scarlet tooth cup, tooth cup
408	N 37 15 27.73	W 095 46 42.34	Cyperaceae	*Cyperus*	*strigosus*		L.	Straw colored flat sedge, false nutgrss, umbrella sedge
408	N 37 15 27.73	W 095 46 42.34	Boraginaceae	*Heliotropium*	*indicum*		L.	Turnsole, India (n) Heliotrope
408	N 37 15 27.15	W 095 46 4291	Poaceae	*Leptochloa*	*panicea*	ssp. Mucronata	(Retz) Ohwi.	Red sprangletop
409	N 37 15 27.36	W 095 46 42.76	Cyperaceae	***Fimbristylis***	*vahlii*	ssp capillaris	(L.) Kunth. Ex C.B. Clark	Densetuft hair sedge, hair sedge
409	N 37 15 27.27	W 095 46 42.86	Hydrophyllaceae	*Ellisis*	*nyctelea*		L.	Aunt lucy, waterpod
411	N 37 15 27.65	W 095 46 42.57	Cyperaceae	*Fimbristylis*	*Vahlii*		(lam.) Link	Vahl's fimbry
412	N 37 15 26.40	W 095 46 45.11	Boraginaceae	*Heliotropium*	*indicum*		L.	Turnsole, India (n) Heliotrope
413	N 37 15 26.28	W 095 46 45.51	Rubiaceae	*Galium*	*circaezans*	var. triflorum	Michx	Licorice bedstraw
416	N 37 15 2747	W 095 46 4268	Rubiaceae	*Galium*	*triflorum*		Michx	sweet scented bedstraw
416	N37 15 2755	W 095 46 4261	Alismataceae	*Sagittaria*	*latifolia*		Willd.	Broad leaf arrowhead, duck potato
417	N 37 15 2857	W 095 46 4169	Crassulaceae	*Penthorum*	*sedoides*		L.	Ditch stonecrop
417	N 37 15 2857	W 095 46 4169	Polygonaceae	*Polygonum*	*punctatum*		Elliott	Dotted smart weed
418	N 37 15 17.39	W 095 46 32.03	Lamiaceae	*Teucrium*	*canadense*	Var. canadense	L.	American germander, wood sage
419	N37 15 2504	W 095 46 4340	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail

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420	N 37 15 26.31	W 095 46 45.66	Poaceae	*Setaria*	*viridis*	var viridis	(L.) P. Beauv	Green foxtail
424	N 37 15 18.74	095 46 04.44	Boraginaceae	*Heliotropium*	*indicum*		L.	Indian heliotrope, turnsole
427	N 37 15 20.14	W 095 45 59.85	Crassulaceae	*Penthorum*	*sedoides*		L.	Ditch stonecrop
429	N 37 15 19.75	W 095 45 59.47	Lamiaceae	*Scutellaria*	*parvula*	Michx. Var. missouriensis	var. (Torr.) Goodman & C. A. Lawson	Leonard's Skullcap
430	N 37 15 18.09	W 095 46 09.19	Lamiaceae	*Scutellaria*	*parvula*	Michx. Var. missouriensis	var. (Torr.) Goodman & C. A. Lawson	Leonard's Skullcap
431	N 37 15 17.95	W 095 46 09.07	Amaranthaceae	*Amaranthus*	*tuberculatus*	Syn Amaranthus rudis Sauer	(Moq.) J. D. Sauer	Tall water hemp, rough fruit amaranth
433	N 37 15 22.06	W 095 46 07.62	Convolvulaceae	*Convolvulus*	*arvensis*		L.	Field bindweed
436	N 37 15 28.51	W 095 46 02.16	Asteraceae	*Solidago*	*ulmifolia*	Var. ulmifolia	Muhl. Ex Willd.	Elm leaved goldenrod
437	N 37 15 24.80	W 095 46 09.44	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
438	N 37 15 03.50	W 095 46 31.69	Scrophulariaceae	*Agalinis*	*tenuifolia*		(Vahl.) Raf.	Slender girardia, Slender false foxglove
439	N 37 15 05.28	W 095 46 43.77	Asteraceae	*Pluchea*	*camphorata*		(L.) D.C.	Camphorweed, stinkweed, inland marsh fleabane, camphor pluchea
440	N 37 15 01.58	W 095 46 40.74	Asteraceae	*Erigeron*	*strigosus*	var. strigosus	Muhl. Ex. Willd	Daisy Fleabane
442	N 37 14 42.77	W 095 47 02.41	asteraceae	*Helianthus*	*annuus*		L.	Common sunflower
443	N 37 14 48.86	W 095 46 18.33	Poaceae	*Bothriochloa*	*saccharoides*	Syn. A. saccharoides	(S.W.) Rydb	Silver bluestem, silverstem
449	N 37 15 00.38	W 095 46 46.38	Poaceae	*Aristida*	*oligantha*		Michx	Old field three awn, prairie three awm
449	N 37 15 00.38	W 095 46 38.94	Asteraceae	*Solidago*	*ulmifolia*	Var. ulmifolia	Muhl. Ex Willd.	Elm leaved goldenrod
453	N 37 15 05.46	W 095 46 44.19	Asteraceae	*Amphiachyris*	*dracunculoides*		(D.C.) Blake	Broomweed, prairie broomweed
454	N 37 15 05.05	W 095 46 44.19	Onagraceae	*Oenothera*	*villosa*	var. villosa	Thunb.	Common evening primrose, hairy evening primrose
455	N 37 15 00.36	W 095 46 39.16	Asteraceae	*Eupatorium*	*serotinum*		Michx.	Late boneset, late eupatorium
455	N 37 15 00.36	W 095 46 39.16	Malvaceae	*Hibiscus*	*trionum*		L.	Venice mallow, flower an hour
456	N 37 14 58.18	W 095 46 24.81	Convolvulaceae	*Convolvulus*	*arvensis*		L.	Field bindweed
457	N 37 14 57.74	W 095 46 25.49	Cyperaceae	*Fimbristylis*	*vahlii*	ssp capillaris	(L.) Kunth. Ex C.B. Clark	Densetuft hair sedge, hair sedge
458	N 37 15 18.60	W 095 46 0396	Cyperaceae	*Fimbristylis*	*Vahlii*		(lam.) Link	Vahl's fimbry

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459	N 37 15 20.55	W 095 46 00.47	Primulaceae	*Anagallis*	*arvensis (L.)*	ssp foemina Syn Anagallis caerulea	(Mill.) Schinz & Thell.	Poorman's weather glass
460	N 37 15 20.85	W 095 46 04.54	Asclepidaceae	*Cynanchum*	*laeve*		(Michx.) Pers.	Honeyvine milkweed, sandvine, climbing milkweed
461	N 37 15 26.96	W 095 46 0799	Euphorbiaceae	*Chamaesyce*	*nutans*	Syn Euphorbia nutans	(Lag.) Small	Nodding spurge, eye bane
463	N 37 15 26.70	095 46 04.33	Solanaceae	*Physalis*	*heterophylla*	var. heterophyla	Nees.	Clammy ground cherry
464	N 37 15 23.90	W 095 46 07.90	Fabaceae	*Sesbania*	*herbacea*	syn. Exaltata	(Mill.) McVaugh.	Big pod sesbania, pea tree
465	N 37 15 19.63	W095 46 25.73	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
465	N 37 15 21.58	W095 46 25.67	Asteraceae	*Cirsisum*	*altissimum*		(L.) Spreng. USDA: (L.) Hill	Tall Thistle
466	N 37 15 21.68	W 095 46 25.37	Typhaceae	*Typha*	*angustifolia*		L.	Narrow leaf cattail
467	N 37 15 20.33	W 095 46 25.54	Onagraceae	*Gaura*	*longiflora*		Spach	Large flowered gaura, long flower bee blossom
468	N 37 15 02.63	W095 46 43.44	Fabaceae	*Lespedeza*	*cuneata*		(Dumont G. Don USDA: (Dum. Cours.) G. Don	Chinese bush clover, sericea lespedeza
468	N 37 15 03.54	W 095 46 43.66	Poaceae	*Setaria*	*pumila*		(Poir.) Roem. & J. A. Schultes	Yellow foxtail
468	N37 15 02.36	W 095 46 43.77	Asteraceae	*Symphyotrichum*	*ericoides*	Var. ericoides	(L.) G.L. Nesom Syn. Aster ericoides	White heath aster
468	N 37 15 02.86	W 095 46 44.05	Poaceae	*Setaria*	*parviflora*		(Poir.) Roem. & J. A. Schultes	Yellow foxtail
469	N 37 14 57.09	W 095 46 27.49	Poaceae	*Setaria*	*pumila*		(Poir.) Roem. & J. A. Schultes	Yellow foxtail
469	N 37 14 54.38	W 095 46 19.29	Poaceae	*Eragrostis*	*spectabilis*		(Persh) Steud.	Purple love grass
469	N37 15 43.39	W 095 46 43.39	Poaceae	*Paspalum*	*dilatatum*		Poir.	Dallis grass
471	N 37 14 48.91	W 095 46 20.04	Convolvulaceae	*Convolvulus*	*arvensis*		L.	Field bindweed
471	N 037 15 01.01	W 095 46 26.40	Poaceae	*Digitaria*	*sanguinalis*		(L.) Scop	Hairy crabgrass
472	N 37 15 0380	W 095 46 27.76	Convolvulaceae	*Ipomoea*	*hederacea*		Jacq.	Ivy leaf morning glory
473	N 37 14 44.63	W 095 46 51.32	Poaceae	*Setaria*	*faberi*		Herrn.	Chinese foxtail, Giant foxtail, Japanese bristlegrass
474	N 37 15 22.17	W 095 46 25.42	Hydrophyllaceae	*Ellisis*	*nyctelea*		L.	Aunt lucy, waterpod
474	N 37 15 21.01	W 095 46 25.32	Fabaceae	*Sesbania*	*herbacea*	syn. Exaltata	(Mill.) McVaugh.	Big pod sesbania, pea tree

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474	N 37 15 19.63	W095 46 25.73	Asteraceae	*Xanthium*	*strumarium*	var. canadense	L. var. (Mill.) Torr. & A. Gray	Canada cocklebur
474	N 37 15 22.16	W095 46 25.79	Poaceae	*Echinochloa*	*muricata*	var. microstachya	(Beauv.) Fern var. Weigand	Rough barnyard grass
475	N 37 15 18.32	W 095 46 25.65	Poaceae	*Eragrostis*	*capillaris*		(L.) Nees.	Lace grass
475	N 37 15 21.49	W 095 46 25.36	Sapindaceae	*Cardiospermum*	*halicacabum*	with fruit	L.	Common Balloon Vine
476	N 37 15 17.76	W 095 46 25.76	Asteraceae	*Symphiotrichum*	*oblongifolium*		(Nutt.) G.L. Nesom	Aromatic aster
476	N 37 15 21.72	W 095 46 25.17	Poaceae	*Digitaria*	*ciliaris*		(Retz.)Koeler	Southern crab grass
476	N 37 15 1838	W 095 46 2580	Poaceae	*Echinochloa*	*muricata*	var. microstachya	(Beauv.) Fern var. Weigand	Rough barnyard grass
476	N 37 15 20.96	W 095 46 25.56	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
477	N 37 15 24.17	W 095 46 21.98	Poaceae	*Setaria*	*parviflora*		(Poir.) kerguelen	knot root yellow foxtail
478	N 37 15 22.19	W 095 46 25.35	Poaceae	*Bothriochloa*	*saccharoides*	Syn. A. saccharoides	(S.W.) Rydb	Silver bluestem, silverstem
478	N 37 15 23.16	W 095 46 22.12	Poaceae	*Paspalum*	*setaceum*	var. ciliatifolium	(Michx.) Vasey	Thin paspalum
480	N 37 15 20.86	W 095 46 22.22	Poaceae	*Digitaria*	*ischaemum*		(Schreb.) Schreb ex. Muhl.	Smooth Crab Grass
481	N 37 15 23.28	W 095 46 17.27	Poaceae	*Eragrostis*	*capillaris*		(L.) Nees.	Lace grass
482	N 37 15 29.43	W 095 46 01.48	Asteraceae	*Erigeron*	*annuus*		(L.) Pers.	Annual fleabane, Eastern daisy fleabane
483	N 37 15 21.51	W 095 46 09.08	Poaceae	*Panicum*	*philadelphicum*		Bernh. Ex Trin	Philadelphia panic grass/witch grass
483	N 37 15 21.22	W 095 46 08.19	Poaceae	*Eragrostis*	*spectabilis*		(Persh) Steud.	Purple love grass
484	N 37 15 18.43	W 095 46 08.36	Poaceae	*Aristida*	*oligantha*		Michx	Old field three awn, prairie three awm
485	N 37 15 20.11	W 095 46 09.11	Poaceae	*Setaria*	*pumila*		(Poir.) Roem. & J. A. Schultes	Yellow foxtail
486	N 37 15 26.46	W 095 46 26.46	fabaceae	*Kummerowia*	*striata*		(Thunb.) H & A USDA: (Thunb.) Schindl.	Japanese clover, common lespedeza
486	N 37 15 20.57	W 095 46 09.50	Ulmaceae	*Ulmus*	*rubra*		Muhl.	red elm, slippery elm
489	N 37 15 33.38	W 095 46 4098	Poaceae	*Eragrostis*	*spectabilis*		(Persh) Steud.	Purple love grass
489	N 37 15 33.43	W 095 46 40.87	Fabaceae	*Lespedeza*	*capitata*		Michx.	Round headed bush clover
490	N 37 15 33.35	W 095 46 40.65	Fabaceae	*Lespedeza*	*virginica*		(L.) Britton	Slender Bush Clover, slender bush lespedeza

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494	N 37 15 20.76	W 095 46 03.80	Malvaceae	*Hibiscus*	*trionum*		L.	Venice mallow, flower an hour
496	N 37 15 42.45	W 095 46 35.84	Fabaceae	*Desmodium*	*illinoense*		A. Gray	Illinois tick clover
496	N 37 15 03.44	W 095 46 42.13	Poaceae	*Aristida*	*oligantha*		Michx	Old field three awn, prairie three awm
503	N 37 15 33.14	095 46 40.81	Fabaceae	*Desmodium*	*illinoense*		A. Gray	Illinois tick clover
510	N 37 15 19.48	W 095 46 30.00	Poaceae	*Bouteloua*	*curtipendula*	Var. curtipendula	(Michx.) Torr.	Side oats grama
511	N 37 15 18.93	W 095 46 30.91	Poaceae	*Bouteloua*	*hirsuta*	ssp hirsuta	Lag.	Hairy grama
514	N 37 15 18.52	W 095 46 03.87	Euphorbiaceae	*Euphorbia*	*corollata*		L.	Flowering spurge
515	N 37 15 18.37	W 095 46 03.72	Poaceae	*Aristida*	*oligantha*		Michx	Old field three awn, prairie three awm
516	N 37 15 27.26	W 095 46 09.40	fabaceae	*Kummerowia*	*striata*		(Thunb.) H & A USDA: (Thunb.) Schindl.	Japanese clover, common lespedeza
516	N 37 15 20.15	W 095 45 59.64	Asteraceae	*Symphiotrichum*	*oblongifolium*		(Nutt.) G.L. Nesom	Aromatic aster
517	N 37 15 18.37	W 095 46 03.73	Asclepidaceae	*Asclepias*	*tuberosa*	ssp. Interior	L.	Butterfly milkweed
519	N 37 15 26.61	W 095 46 05.69	Araceae	*Arisaema*	*dracontium*		(L.) Schott.	Green Dragon, dragon root
520	N 37 15 18.14	W 095 46 27.10	Anacardiaceae	*Toxicodendron*	*radicans*	ssp. Negundo	(Green) Gillis	Poison Ivy
521	N 37 15 18.65	W 095 46 27.13	Asteraceae	*Ambrosia*	*trifida*		L.	Giant ragweed, great ragweed
522	N 37 15 19.28	W 095 46 07.38	Asteraceae	*Ambrosia*	*artemisiifolia*		L.	Common ragweed
523	N 37 15 28.49	W 095 46 08.63	Asteraceae	*Antennaria*	*neglecta*		Greene	Field pussytoes
524	N 37 15 18.37	W 095 46 05.36	Asteraceae	*Bidens*	*polylepis*		S.F. Blake	tickseed sunflower
525	N 37 15 29.47	W 095 46 42.61	Asteraceae	*Eupatorium*	*altissimum*	Ageratina altissima	(L.)	White snakeroot
526	N 37 15 31.12	W 095 46 27.11	Caprifoliaceae	*Lonicera*	*japonica*		Thunb.	Japanese honeysuckle
527	N 37 15 12.04	W 095 46 27.03	Commelinaceae	*Commelina*	*communis*		(L.)	Asiatic dayflower
528	N 37 15 14.45	W 095 46 26.39	Commelinaceae	*Tradescantia*	*ohiensis*		Raf.	Common spiderwort
529	N 37 15 23.20	W 095 46 41.44	Fabaceae	*Medicago*	*lupulina*		L.	Black medick
530	N 37 15 32.91	W 095 46 39.95	Fabaceae	*Baptisia*	*australis*		(L.) R. Br.	Wild Blue Indigo
531	N 37 15 24.18	W 095 46 50.78	Fabaceae	*Astragalus*	*crassicarpus*	var. crassicarpus	Nutt.	ground plum milk vetch

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532	N 37 15 32.42	W 095 46 41.62	Lamiaceae	*Salvia*	*azurea*		Michx. Ex lam.	Blue sage Pitcher sage
533	N 37 15 33.35	W 095 46 27.67	Losaceae	*Mentzelia*	*oligosperma*		Nutt.	Stickleaf
534	N 37 15 20.62	W 095 46 26.51	Phytolaccaceae	*Phytolacca*	*americana*		L.	American Pokeweed
535	N 37 15 18.01	W 095 46 26.51	Poaceae	*Poa*	*annua*		L.	annual bluegrass
536	N 37 15 18.01	W 095 46 32.13	Poaceae	*Tridens*	*flavus*		(L.) Hitchcock	Redtop, purpletop tridens
537	N 37 15 08.20	W 095 46 23.94	Poaceae	*Sporobolus*	*compositus*			Rough Dropseed
538	N 37 15 12.27	W 095 46 41.20	Poaceae	*Andropogon*	*gerardii*		Vitman	Big bluestem
539	N 37 15 33.61	W 095 46 41.55	Poaceae	*Sorghastrum*	*nutans*		(L.) Nash	Indian Grass
540	N 37 15 11.69	W 095 46 28.10	Poaceae	*Andropogon*	*virginicus*		(L.)	Broomsedge bluestem
541	N 37 15 34.88	W 095 46 46.55	Polypodiaceae	*Notholaena*	*dealbata*	Agyrochosma	(Pers.) Kunze.	Powdery false cloak fern
542	N 37 15 20.58	W 095 46 31.32	Smilacaceae	*Smilax*	*ecirrhata*		(Engelm)S.Wats.	Greenbriar