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Vascular Flora of the Allison Prairie, Lawrence County, Illinois

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Vascular Flora of the Allison Prairie

Lawrence County, Illinois

(TITLE)

BY

Brian R. Garrard

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THESIS

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VASCULAR FLORA OF THE ALLISON PRAIRIE LAWRENCE COUNTY, ILLINOIS

ABSTRACT

Allison Prairie in Lawrence County, Illinois is a five acre recreation of a gravel prairie. The Allison Prairie Restoration is the largest and best remaining example of a sand and gravel prairie in the Wabash Border Natural Division of Illinois. A total of 112 species of vascular plants representing 35 families are known to exist at the Allison Prairie Restoration (Table 1). *Heterotheca camporum* (Greene) Shinners (golden aster), *Melilotus alba* Medic. (white sweet clover), and *Sporobolus asper* (Michx.) Kunth (dropseed) are dominants (Table 2 and 3). There is 1 gymnosperm species, *Juniperus virginiana* L. (red cedar), 30 monocot species and 81 dicot species. The largest family represented is the Poaceae with 22 species followed by the Asteraceae with 15 species and the Rosaceae with 9 species. Presently, a minimum of 28 of the 85 prairie plant species identified by Schwegman and others in a 1988 survey of cemetery and railroad prairies in the Wabash Border Natural Division are present on the site.

Twenty-six of the species identified are alien, not native to Illinois. This represents 23% of the species occurring at the Allison Prairie Restoration. *Melilotus alba* Medic. (white sweet clover), *Melilotus officinalis* (L.) Pallas (yellow sweet clover) and *Pastinaca sativa* L. (parsnip) are common exotic species with *Melilotus alba* Medic. being a dominant. This site contains the state endangered royal catchfly, *Silene regia* (Herkert 1991) and is the only privately owned royal catchfly population for which a management agreement exists (Edgin 1998). According to Ulaszek and Ketzner in their report to the Illinois Natural History Survey in 1991 the Allison Prairie Restoration is one of only four

remaining locations of the royal catchfly in Illinois. The site also contains one other noteworthy species *Opuntia humifusa* (Raf.) Raf. (prickly-pear cactus.) (Figure 4).

Future restoration efforts on the Allison Prairie site should focus on the continued removal of woody and herbaceous exotic species. Realistically, exotic species will probably always plague this site due to its disturbed and fragmented nature. However, keeping exotic species numbers below twenty percent should be an attainable objective. Continued seeding, transplanting and root-stock planting should occur with particular attention being paid to those species identified by Schwegman and others as being representative of the Wabash Border Division. From this list, plants such as *Aristida purpurascens* Poir (arrowfeather), *Sporobolus clandestinus* (Biehler) Hitchc. (dropseed), *Amorpha fruticosa* L. (false indigo), *Asclepias hirtella* (Pennell) Woodson (tall green milkweed), *Asclepias tuberosa* L. ssp. *interior* Woodson (butterfly weed), *Lithospermum carolinense* (J.F. Gmel.) MacM. (hairy pucoon), *Ratibida pinnata* (Vent.) Barnh. (gray-headed coneflower), and *Rudbeckia subtomentosa* Pursh. (fragrant coneflower) should receive primary focus as these plants represent dominants or typical associates in other gravel prairie sites like those in Tazewell County or Rock River Valley. Special consideration should be given to plants like *Sisyrinchium albibum* Raf. (blue-eyed grass), *Comandra umbellata* (L.) Nutt. (false toadflax), *Koeleria macrantha* (Ledeb.) Spreng. (June grass), *Echinacea pallida* Nutt. (pale coneflower), *Oxalis violacea* L. (purple oxalis), *Dodecatheon meadia* L. (shooting -star), *Corydalis micrantha* (Engelm.) Gray (slender corydalis), and *Lithospermum canescens* (Michx.) Lehm. Even though these plants did not make Schwegman's 1988 list, they represent common plants of gravel prairie remnants in northern Illinois which could also be included in the Allison Prairie

Restoration. Future analysis of the site should focus on a more in-depth soil analysis to determine the exact soil type and soil condition at the site. Emphasis should be placed on identifying trace elements possibly present in the soil which might indicate the degree to which earlier dumping on the site has affected restoration efforts.

ACKNOWLEDGEMENTS

I wish to thank Mr. Bob Edgin of the Illinois Nature Preserves Commission and Dr. Gordon Tucker, professor of Biology at Eastern Illinois University, for their assistance in the collection and identification of plant species. I would also like to thank the Bi-State Authority for their continued support of restoration efforts at this site.

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VASCULAR FLORA OF THE ALLISON PRAIRIE LAWRENCE COUNTY, ILLINOIS

INTRODUCTION

Allison Prairie is located about nine miles northeast of Lawrenceville, in Lawrence County, Illinois (Section 25, T4N, R11W). Elevation and latitude/longitude calculations place the Allison Prairie at approximately 420 ft. above sea level with a latitude of 38 degrees 46 minutes North and a longitude of 87 degrees 35 minutes west. The prairie, which is named after Allison township, is owned by the Bi-State Authority. The Bi-State Authority serves as the governing body for the Mid-American Air Center which is located directly west of the prairie site. The prairie is located within the Wabash Border Natural Division of Illinois (Figure 1), which includes the bottomlands of the Wabash River and its major tributaries (Schwegman 1973). The Allison Prairie Restoration is the largest and best remaining example of a sand and gravel prairie in the Wabash Border Natural Division of Illinois. Presently, a minimum of 28 of the 85 prairie plant species identified by Schwegman and others in a 1988 survey of cemetery and railroad prairies in the Wabash Border Natural Division are present on the site. This site contains the state endangered royal catchfly, *Silene regia* (Herkert 1991) and is the only privately owned royal catchfly population for which a management agreement exists (Edgin 1998). According to Ulaszek and Ketzner in their report to the Illinois Natural History Survey in 1991, the Allison Prairie Restoration is one of only four remaining locations of the royal catchfly in Illinois.

The site also contains one other noteworthy species *Opuntia humifusa* (Raf.) Raf. (prickly-pear cactus.) (Figure 4).

Approximately 1.7 million years ago the majority of this area was exposed to Pleistocene glaciation. Increased temperatures following this era and resulting melt waters created broad flood plains, meander scars, and terrace deposits of sand and gravel throughout this area of the state. The soils of this area consist of gravelly clay loam subsoils overlain with sandy loam surface soils that are six to twelve inches thick (Fehrenbacher and Odell 1956).

According to McClain (1997), Allison Prairie is one of the historic prairies of Illinois and was once ten miles long and five miles wide, with the eastern part extending near Wabash County. General Land Office survey notes indicate the southeast portion of township T4N, R11W in Lawrence County, Illinois contained a gravel prairie which was described as a nearly level, dry prairie with thin, gravelly soil (Edgin 1996). A map (Figure 2) of pre-settlement Lawrence County, Illinois shows the approximate locations of biotic communities identified by Edgin in his study (1996). Aerial soil survey maps from the 1950's indicate that approximately four gravel pits existed in the area around Allison Prairie, including one on the present site of the prairie restoration (Figure 3). Most of this original prairie has since been converted to crop land. However, small remnants of prairie can still be found in cemeteries and along railroads.

In 1988, John Schwegman and others surveyed cemetery and railroad prairie remnants in an attempt to list the various plant species associated with sand and gravel prairies in the Wabash Border Natural Division. Survey results indicated that these areas

once supported a minimum of 85 native plant species (Appendix 1), including the state endangered *Silene regia* Sims (royal catchfly). On May 16, 1991, the Illinois Department of Natural Resources and the Bi-State Authority entered a management agreement in hopes of restoring this natural community and providing additional habitat for the royal catchfly (Edgin 1998). Since then, the study area has been referred to as the Allison Prairie Restoration.

In October of 1991 representatives from the Division of Natural Heritage, Nature Preserves Commission, and volunteers initiated restoration efforts. Early restoration efforts involved sowing seeds and transplanting whole plants. Seed and plants for the site (Table 4) were collected from prairie remnants within the Wabash Valley area which included Price Cemetery, Otterburn Cemetery, CSXT Railroad west of Vincennes, Centerville Cemetery and an abandoned railroad a half mile south of Billet. Most of the planting was done in the area newly cleared by the bulldozer in bare gravel. In 1995, Indian grass, big blue stem, and dropseed were no-till drilled into the north one-half of the site (Edgin 1998). Prescribed burning, brush cutting, seed collection and sowing, and transplanting efforts have taken place since 1997. In the spring of 1999, Allison Prairie was burned a third time and root stock plants such as *Silphium terebinthinaceum* Jacq. (prairie dock), *Dalea purpurea* Vent. (purple prairie clover) and *Tradescantia ohioensis* Raf. (spiderwort) were obtained from the Illinois Department of Natural Resources and transplanted.

METHODS

Collection of Specimens

The Allison Prairie Restoration was visited five times during the study. Collection dates were varied to collect plants in flower or in fruit thus providing a more valid identification of species. The first visit was made on September 7, 1998 to survey the area and collect voucher specimens. The fall survey allowed for the collection of plants such as *Cirsium discolor* (Muhl.) Spreng. (field thistle) and *Eupatorium serotinum* Michx. (late boneset) which normally flower from late summer to late fall. A second survey was conducted on June 23, 1999 to collect plants such as *Silene antirrhina* L. (sleepy catchfly) and *Arenaria serpyllifolia* L. (thyme-leaved sandwort) which typically flower or set fruit in the early spring to mid-summer months. Three more surveys were conducted on June 29, July 6, and July 15, 1999 to collect plants such as *Dalea purpurea* Vent. (purple prairie clover) and *Cassia fasciculata* Michx. (partridge pea) which bloom at various times from June through August. Each time, the entire five acre area was surveyed and specimens were collected. After collection, specimens were pressed and dried. These specimens included a representative portion of the plant, or one or more plants if the species were small and herbaceous. They were placed flat against newspaper and arranged carefully (trimmed if necessary) so leaves or stems did not stick out of the edges of the paper. Excess soil was also removed from the specimens before pressing.

Specimens were labeled and included the following information:

1. Scientific name in italics and authority (*Silene antirrhina* L.)
2. Family (Caryophyllaceae - Pink Family)

3. Flower color, height of plant (for large herbs, shrubs, or trees, where the specimen represents a portion of the whole plant), milky sap, fragrance, texture, as appropriate (Perennial herb with pinkish-white, bifid petals; leaves opposite)
4. Ecological conditions where plant was growing, i.e. habitat (Gravel prairie)
5. General locality information (Allison Prairie)
6. Legal description: county, section, township, range, (Lawrence County, Section 25, T4N, R11W)
7. Date of collection - day, month, year (6 July 1999)
8. Collector's name and field number (Brian R. Garrard, No. 135)

Each preserved specimen will serve as a voucher specimen to be stored in the Stover-Ebinger Herbarium on the campus of Eastern Illinois University. Collection of voucher specimens will allow for future comparisons to be made with plants of the same genus and species collected from this particular prairie site at future dates or from other locations across the state and/or country. Table 1 lists the plants known to exist at the Allison Prairie Restoration from this study. This annotated list follows the nomenclature of Mohlenbrock (1986). An asterisk (*) marks each species not native to Illinois.

Sampling Technique

In July of 1999, one 50 meter transect was laid out and groundlayer species were analyzed using 1/4 m² quadrats randomly located every meter. A random numbers table (single digit) was used to determine the number of meters the quadrats were to be located to the right (even number) or left (odd number) of the transect line. For example, at three meters the random numbers table provided the number six. This meant that the quadrat

was placed six meters to the right of the tape, parallel to the three meter mark. The “cover” of each species was determined by using the Daubenmire (1959) cover classes as modified by Baily and Poulton (1968). The cover class rankings used are as follows:

Cover class 1 = 0-1%

Cover class 2 = 1-5%

Cover class 3 = 5-25%

Cover class 4 = 25-50%

Cover class 5 = 50-75%

Cover class 6 = 75-95%

Cover class 7 = 95-100%

A plant whose foliage covered approximately 10% of the quadrat when viewed from above was recorded as a class 3. Determinations were made for each plant rooted within the frame as outlined by Baily and Poulton (1968).

Analysis of Data

After collecting and recording data from the field site, the frequency, relative frequency, cover, relative cover and importance value of each species was determined.

A. Frequency - The number of plots that a particular species occurred in was compared to the total number of plots sampled. Frequency is highly dependent on the size and shape of the plots used. If plots are too large, then one is almost certain to find most of the species in a given sample plot. If plots are too small, then the same species will seldom be encountered in more than one plot.

Frequency percentage was calculated by taking the number of plots of occurrence

of a species, dividing it by the total number of plots multiplied by 100. For example, if a plant occurred in 26 of the 50 plots surveyed its frequency would be 52% ($26/50 \times 100$).

$$\text{Frequency (\%)} = \frac{\text{plots of occurrence of a species}}{\text{total plots}} \times 100$$

B. Relative frequency - Relative frequency indicates the number of times a particular species of plant occurred compared to the occurrence of all species. This calculation was made by taking the plots of occurrence of a species, divided by the total plots of occurrence of all species (total plots for species one + total plots for species two, etc.) times 100. For example, *Ambrosia artemissifolia* L. occurred in 46 plots and the total plots of occurrence of all species was 464. Therefore the relative frequency for *Ambrosia artemissifolia* L. was 9.91% ($46/464 \times 100$).

$$\text{Relative frequency (\%)} = \frac{\text{plots of occurrence of a species}}{\text{total plots of occurrence of all species}} \times 100$$

C. Cover - Cover can be visualized as expressing the proportion of ground covered by the species as the habitat is viewed from above. The sum of all cover class rankings for a species in the transect (ie. total cover) was divided by the total number of plots sampled. For example, the sum of all cover class rankings from each quadrant for *Andropogon gerardii* Vitman. (class 3 + class 1 + class 2, etc.) was 51.

Since there were a total of fifty plots sampled, *Andropogon gerardii* Vitman. had a cover calculation of 1.02 (51/50).

$$\text{Cover} = \frac{\text{total cover of a species}}{\text{total plots}}$$

D. Relative cover - Relative cover of a species is the proportion of its coverage compared to that of all species in the community and could be considered a measure of dominance in a community. Relative cover of a species was determined by dividing the total cover of a species by the total cover of all species then multiplying by 100. In this particular study the total cover of all species (cover species 1 + cover species 2, etc.) equaled 893. This meant that the relative cover for *Andropogon gerardii* Vitman. was 5.71% (51/893 x 100).

$$\text{Relative cover (\%)} = \frac{\text{total cover of a species}}{\text{total cover of all species}} \times 100$$

E. Importance value - The importance values (I.V.) of a species provide a more accurate indication of the importance of a particular species to the prairie since I.V. considers both the relative frequency and relative cover together rather than separately. Relative frequency considers only the occurrences and ignores cover, while relative cover considers only the cover and ignores occurrences. To calculate the importance values for each species, the sum of the relative frequency and relative cover was determined. For example, the grass *Sporobolus asper* (Michx.) Kunth with a relative frequency of 7.97 and a relative cover of 8.51 would have an importance value of 16.48 (7.97 + 8.51).

$$\text{Importance value} = \text{Relative frequency} + \text{Relative cover}$$

RESULTS AND DISCUSSION

Six prairie subclasses are recognized in Illinois with each being further distinguished to community type by soil moisture conditions (White and Madany 1978). These prairies are further differentiated by differences in climate, drainage, topography, degree of burning, etc. Many important prairie species respond in predictable ways along soil-moisture gradients. For example, *Cacalia tuberosa* Nutt. (Indian plantain) occurs in wet prairies and moist fields while *Viola pedatifida* G. Don (prairie violet) grows in upland prairies (Voigt and Mohlenbrock 1985). Characteristic forbs of dry, gravel, and/or sandy prairies include such plants as *Brickellia eupatorioides* (L.) Shinnery (false boneset), *Dalea purpurea* Vent. (purple prairie clover) and *Heterotheca camporum* (Greene) Shinnery (golden aster). These three forbs as well as other grasses and forbs like *Schizachyrium scoparium* (Michx.) Nash (little bluestem), *Monarda fistulosa* L. (wild bergamot), *Ruellia humilis* Nutt. (wild petunia), and *Cassia fasciculata* Michx. (partridge pea) are all present at the Allison Prairie Restoration site suggesting soil moisture conditions associated with dry-gravelly areas.

There is very little floristic information for gravel prairies in Illinois. A 1981-82 study of Manito Gravel Prairie in Tazewell County, Illinois found *Schizachyrium scoparium* (Michx.) Nash (little bluestem), *Bouteloua hirsuta* Lag (grama grass), and *Sporobolus clandestinus* (Biehler) Hitchc. (dropseed) as dominants (McFall 1984). None of these species though appear as dominant species in the Allison Prairie Restoration. There are, however, a few genera that are shared by both sites. These genera include *Sporobolus*, *Potentilla*, and *Arenaria*. One typical forb, *Plantago virginica* L. (dwarf

plantain) and one common grass *Schizachyrium scoparium* (Michx.) Nash (little bluestem) were reported for both sites. The difference in floral composition between the two prairies could be explained by two factors. First, and most obvious, there is a regional, climatic difference between the northern Manito Gravel Prairie which is located about 6 miles southwest of Pekin in Tazewell County, Illinois and the more southern Allison Prairie. The second and probably most important factor is the fact that the Manito Gravel Prairie was a relatively undisturbed site which had been idle for nearly 20 years before being acquired by the Department of Conservation in 1980 (McFall 1984). In contrast, Allison Prairie is more of a recent recreation of a gravel prairie in a highly disturbed and fragmented area. The past existence of a gravel pit on this site has resulted in a highly disturbed area. Also, restoration efforts on this prairie site have only been in place since 1991. The Manito Gravel Prairie exists in a more natural state with a focus more on preservation than on restoration.

With the exception of one low area on the north end of the site, Allison prairie would be considered a dry gravel prairie. In 1992, a dozer was used on the north end of the site to level the land and bury trash that had been illegally dumped at the site. This dozer was also used to push out the trees growing in an associated low area in an attempt to clear the area for reconstruction efforts. The majority of the plants identified in this survey that are associated with wet areas can be found in this low area on the north end. These wet area plants include such plants as *Cyperus strigosus* L. (sedge), *Ammania coccinea* Rottb. (long-leaved ammania), *Leersia lenticularis* Michx. (catchfly grass), *Eleocharis smallii* Britt. (spike rush), *Paspalum laeve* Michx. (bead grass), *Spartina*

pectinata Link. (cord grass), *Carex cristatella* Britt. (sedge), *Mimulus ringens* L. (monkey-flower), *Lycopus americanus* Muhl. (common water horehound) and *Typha latifolia* L. (common cat-tail).

The south end of the site contains a variety of tree and shrub species and has been the focus of intensive girdling, brush cutting and herbicidal treatment for the past three years. Much time and effort has gone into removing tree and brush on the south end in hopes of returning the site back to its original “pre-European settlement” condition. Presently this area contains a significant amount of *Heterotheca camporum* (Greene) Shinnery (golden aster). Other species present on this south end occur primarily due to rootstock plantings and include *Silphium terebinthinaceum* Jacq. (prairie dock), *Liatris pycnostachya* Michx. (prairie blazing-star), *Tradescantia ohioensis* Raf. (spiderwort), and *Dalea purpurea* Vent. (purple prairie clover).

According to Curtis (1959), prevalent species in xeric prairies in Wisconsin include plants such as *Bouteloua curtipendula* (Michx.) Torr. (side-oats grama grass) and *Brickellia eupatorioides* (L.) Shinnery (false boneset) with *Andropogon gerardii* Vitman. (big bluestem) *Schizachyrium scoparium* (Michx.) Nash (little bluestem), *Monarda fistulosa* L. (wild bergamot), and *Asclepias syriaca* L. (common milkweed) as prevalent associated species. All of these species are located in the Allison Prairie Restoration. Floristic analysis of the xeric prairies in Wisconsin by Curtis (1959) also reveals that one-half of the species are members of five families (Asteraceae, Poaceae, Fabaceae, Rosaceae, and Asclepiadaceae). This is true also for Allison Prairie with five dominant families being Poaceae, Asteraceae, Rosaceae, Cyperaceae, and Fabaceae/Caryophyllaceae.

In 1956, a study by Fell and Fell of the Gravel-Hill prairies of Rock River Valley in northern Illinois stated the constant grasses in this type of community are the mid-height grasses such as little bluestem, prairie dropseed, and side-oats grama all of which are found on true prairies. These three genera are found on the Allison Prairie Restoration suggesting this prairie is capable of supporting plants typically associated with xeric prairies.

A total of 112 species of vascular plants representing 35 families are known to exist at the Allison Prairie Restoration (Table 1). *Heterotheca camporum* (Greene) Shinnery (golden aster), *Melilotus alba* Medic. (white sweet clover), and *Sporobolus asper* (Michx.) Kunth (dropseed) are dominants (Table 2 and 3). There is 1 gymnosperm species, *Juniperus virginiana* L. (red cedar), 30 monocot species and 81 dicot species. The largest family represented is the Poaceae with 22 species followed by the Asteraceae with 15 species and the Rosaceae with 9 species.

Twenty-six of the species identified are alien, not native to Illinois. This represents 23% of the species occurring at the Allison Prairie Restoration. *Melilotus alba* Medic. (white sweet clover), *Melilotus officinalis* (L.) Pallas (yellow sweet clover) and *Pastinaca sativa* L. (parsnip) are common exotic species with *Melilotus alba* Medic. being a dominant. This percentage of alien species can be attributed in part to the highly fragmented nature of the prairie restoration. These habitat fragments often undergo changes in environmental conditions such as increased surface area (edge), changes in soil moisture conditions and increased opportunity for exotic species invasions (Whitfield and Niven 1997). The fairly significant number of disturbance related species present on the

site can most likely be attributed to the degree of disturbance at the site and the fact that the prairie has been burned for two of the past three years.

One endangered species occurs in the preserve. *Silene regia* Sims (royal catchfly) is listed as endangered in Illinois by Herkert (1991). This perennial herb ranges from Ohio to eastern Missouri, south to Alabama and Georgia (Gleason and Cronquist 1991) and occurs in dry-mesic barrens and prairies. Royal catchfly (Figure 5) has been vouchered from nine Illinois counties with the first Illinois collection from Wabash County in 1879. However, extant populations are known in Illinois only from Clark and Lawrence Counties (Herkert 1991). Population studies from 1998 indicate that the Allison Prairie Restoration site contains about 11 royal catchfly plants with 26 flowering stems (Edgin, personal communication). Royal catchfly seeds were collected by Eastern Illinois University Professor Dr. Gordon Tucker in the fall of 1998 and were successfully germinated in the EIU greenhouse.

In his report on the restoration efforts at Allison Prairie, Edgin (1998) lists three primary management objectives for the Allison Prairie Restoration. First, efforts will continue to be made to restore the prairie with emphasis being placed on those particular species identified by Schwegman and others in 1988. Second, populations of the state endangered *Silene regia* Sims. (royal catchfly) will continue to be monitored and preserved. Third, educational opportunities for the general public will continue to be provided through seed collection, transplanting, identification of new areas for seed collection, prescribed burning, and monitoring of royal catchfly populations.

Future plans for this site include the development of a brochure listing the species and location of plants on the site and also the development of a web page specifically for the prairie restoration.

Table 5 lists the management activities that have been conducted at the Allison Prairie Restoration since 1997. In comparing management activities with present conditions at the site, it appears that great strides have been made in clearing brush and removing trees on the south end. The south end also was the site of the first successful root-stock plantings of *Dalea purpurea* Vent. (purple prairie clover) in 1999. Also, monitoring figures for royal catchfly populations on the north end of the site suggest that the number of individual plants and flowering stems is also improving. Exotic and disturbance related species are still a concern. Twenty-three percent of the species identified at the site are considered exotics. In Illinois, there are approximately 3,040 species of plants with approximately 1,000 (33%) of these being exotics. Even though 23% of the Allison Prairie species are exotics, this figure does not suggest a significant difference from state averages. The occurrence of disturbance related species will most likely remain a problem

Recommendations

Future restoration efforts on the site should focus on the continued removal of woody and herbaceous exotic species. Realistically, exotic species will probably always plague this site due to its disturbed and fragmented nature. However, keeping exotic species numbers below twenty percent should be an attainable objective. Continued seeding, transplanting and root-stock planting should occur with particular attention being

paid to those species identified by Schwegman and others as being representative of the Wabash Border Division. From this list, plants such as *Aristida purpurascens* Poir (arrowfeather), *Sporobolus clandestinus* (Biehler) Hitchc. (dropseed), *Amorpha fruticosa* L. (false indigo), *Asclepias hirtella* (Pennell) Woodson (tall green milkweed), *Asclepias tuberosa* L. ssp. *interior* Woodson (butterfly weed), *Lithospermum carolinense* (J.F. Gmel.) MacM. (hairy pucoon), *Ratibida pinnata* (Vent.) Barnh. (gray-headed coneflower), and *Rudbeckia subtomentosa* Pursh. (fragrant coneflower) should receive primary focus as these plants represent dominants or typical associates in other gravel prairie sites like those in Tazewell County or Rock River Valley. Special consideration should be given to plants like *Sisyrinchium albidum* Raf. (blue-eyed grass), *Comandra umbellata* (L.) Nutt. (false toadflax), *Koeleria macrantha* (Ledeb.) Spreng. (June grass), *Echinacea pallida* Nutt. (pale coneflower), *Oxalis violacea* L. (purple oxalis), *Dodecatheon meadia* L. (shooting -star), *Corydalis micrantha* (Engelm.) Gray (slender corydalis), and *Lithospermum canescens* (Michx.) Lehm. Even though these plants did not make Schwegman's 1988 list, they represent common plants of gravel prairie remnants in northern Illinois which could also be included in the Allison Prairie Restoration. Future analysis of the site should focus on a more in-depth soil analysis to determine the exact soil type and soil condition at the site. Emphasis should be placed on identifying trace elements possibly present in the soil which might indicate the degree to which earlier dumping on the site has affected restoration efforts.

Appendix 1

Plant species of the Wabash River flood plain and terraces in Lawrence and nearby counties. Derived from lists compiled by John Schwegman of the Division of Natural Heritage, Eric Ulaszek of the Illinois Natural History Survey, and Michael Homoya of the Indiana Department of Natural Resources.

GRASSES AND SEDGES

Andropogon gerardii
Aristida purpurascens
Bouteloua curtipendula
Buchloe dactyloides *
Calamagrostis canadensis
Carex bicknellii
Carex gravida
Carex muhlenbergii
Chloris verticillata *
Cyperus aristatus
Cyperus filiculmis
Dichanthelium oligosanthes
Juncus torreyi
Leptoloma cognatum
Panicum virgatum
Paspalum ciliatifolium
Schizachyrium scoparium
Scirpus fluviatilis
Scirpus validus
Spartina pectinata
Sporobolus asper
Sporobolus clandestinus
Sorghastrum nutans
Tripsacum dactyloides

FORBS

Ambrosia artemisiifolia
Artemisia ludoviciana *
Asclepias amplexicaulis
Asclepias hirtella
Asclepias incarnata
Asclepias tuberosa
Asclepias syriaca

Asclepias viridiflora
Boltonia asteroides
Brickellia eupatorioides
Cacalia atriplicifolia
Cassia fasciculata
Cassia marilandica
Ceanothos americanus
Circium discolor
Coreopsis lanceolata
Coreopsis tripteris
Cornus drummondii
Cycloloma atriplicifolia
Dalea candida
Dalea purpurea
Desmodium canadense
Desmodium canescens
Desmodium sessilifolium
Erigeron strigosus
Eupatorium altissimum
Euphorbia corollata
Froelichia gracilis *
Gaillardia pulchella *
Gaura filipes
Helianthus divaricatus
Helianthus mollis
Helianthus rigidus
Heterotheca camporum
Hypericum sphaerocarpum
Lactuca canadensis
Lespedeza leptostachya
Lespedeza violacea
Lithospermum carolinense
Monarda fistulosa
Oenothera laciniata
Optunia humifusa
Parthenium integrifolium

Polanisia dodecandra
Polygonum coccineum
Psoralea onobrychis
Ratibida pinnata
Rosa carolina
Rudbeckia subtomentosa
Ruellia humilis
Silene regia
Silphium integrifolium
Silphium terebinthinaceum
Strophostyles umbellata
Tephrosia virginiana
Tradescantia ohioensis
Verbena stricta
Veronicastrum virginicum

POSSIBLY EXTIRPATED

Anemone caroliniana
Penstemon tubaeiflorus *
Callirhoe triangulata

* Probable native, western disjunct species.

Table 1. Known Vascular Flora of the Allison Gravel Prairie, Lawrence County, Illinois**CYPERACEAE - SEDGE FAMILY**

Carex annectens Bickn.
Carex cristatella Britt.
Carex grayi Carey
Cyperus strigosus L.
Eleocharis smallii Britt.
Scirpus pendulus Muhl.

POACEAE - GRASS FAMILY

Andropogon gerardii Vitman.
Bouteloua curtipendula (Michx.) Torr.
Buchloe dactyloides (Nutt.) Engelm.
Bromus commutatus Schrad. *
Bromus inermis Leyss. *
Bromus japonicus Thunb. *
Elymus canadensis L.
Elymus villosus Muhl.
Eragrostis spectabilis (Pursh.) Steud.
Festuca pratensis Huds. *
Leersia lenticularis Michx.
Panicum virgatum L.
Paspalum laeve Michx.
Phleum pratense L. *
Schizachyrium scoparium (Michx.) Nash
Setaria faberi Herrm. *
Setaria glauca (L.) Beauv.
Silphium terebinthinaceum Jacq.
Sorghastrum nutans (L.) Nash
Spartina pectinata Link
Sporobolus asper (Michx.) Kunth
Tridens flavus (L.) Hitchcock

ACANTHACEAE - ACANTHUS FAMILY

Ruellia humilis Nutt.

APIACEAE - CARROT FAMILY

Pastinaca sativa L. *

ASCLEPIADACEAE - MILKWEED FAMILY

Apocynum cannabinum L.
Asclepias incarnata L.
Asclepias syriaca L.
Cynanchum laeve (Michx.) Pers.

ASTERACEAE - ASTER FAMILY

Achillea millefolium L. *
Ambrosia artemisiifolia L.
Artemisia absinthium L. *
Bidens frondosa L.
Brickellia eupatorioides (L.) Shinnery

Centaurea cyanus L. *
Cirsium discolor (Muhl.) Spreng.
Conyza canadensis (L.) Cronq.
Erigeron strigosus Muhl.
Eupatorium serotinum Michx.
Heterotheca camporum (Greene) Shinnery
Lactuca serriola L. *
Liatris pycnostachya Michx.
Silphium terebinthinaceum Jacq.
Solidago canadensis L.
Tragopogon dubius Scop. *

CACTACEAE - CACTUS FAMILY

Opuntia humifusa (Raf.) Raf.

CAESALPINIACEAE - CAESALPINIA FAMILY

Cassia fasciculata Michx.
Cassia marilandica L.
Gleditsia triacanthos L.

CAMPANULACEAE - BELLFLOWER FAMILY

Campanula americana L.

CARYOPHYLLACEAE - PINK FAMILY

Arenaria serpyllifolia L. *
Dianthus armeria L. *
Saponaria officinalis L. *
Silene antirrhina L.
Silene regia Sims.

CHENOPODIACEAE - GOOSEFOOT FAMILY

Chenopodium album L.

COMMELINACEAE - SPIDERWORT FAMILY

Tradescantia ohioensis Raf.

CONVOLVULACEAE - MORNING-GLORY FAMILY

Convolvulus arvensis L. *
Ipomoea pandurata (L.) G.F.W. Mey.

CORNACEAE - DOGWOOD FAMILY

Cornus drummondii C.A. Mey.

CUPRESSACEAE - CYPRESS FAMILY

Juniperus virginiana L.

EUPHORBIACEAE - SPURGE FAMILY

Chamaesyce maculata (L.) Small
Croton capitatus Michx.
Euphorbia corollata L.
Poinsettia dentata (Michx.) Kl. & Garcke.

FABACEAE - PEA FAMILY

Dalea purpurea Vent.
Desmodium canadense (L.) DC.
Kummerowia stipulacea (Makim.) Makino *
Melilotus alba Medic. *
Melilotus officinalis (L.) Pallas *

GERANIACEAE - GERANIUM FAMILY

Geranium carolinianum L.

LAMIACEAE - MINT FAMILY

Lycopus americanus Muhl.
Monarda fistulosa L.
Nepeta cataria L. *
Teucrium canadense L. var. *virginicum* (L.) Eat.

LILIACEAE - LILY FAMILY

Allium vineale L. *

LYTHRACEAE - LOOSESTRIFE FAMILY

Ammannia coccinea Rottb.

MORACEAE - MULBERRY FAMILY

Morus alba L.

NYCTAGINACEAE - FOUR-O'CLOCK FAMILY

Mirabilis nyctaginea (Michx.) MacM.

ONAGRACEAE - EVENING PRIMROSE FAMILY

Oenothera biennis L.

OXALIDACEAE - OXALIS FAMILY

Oxalis stricta L.

PHYTOLACCACEAE - POKEWEEED FAMILY

Phytolacca americana L.

PLANTAGINACEAE - PLANTAIN FAMILY

Plantago virginica L.

POLYGONACEAE - BUCKWHEAT FAMILY

Polygonum pensylvanicum L.
Polygonum scandens L.
Rumex crispus L. *

ROSACEAE - ROSE FAMILY

Fragaria virginiana Duchesne.
Geum canadense Jacq.

Potentilla norvegica L. *

Potentilla recta L.

Potentilla simplex Michx.

Prunus serotina Ehrh.

Rosa multiflora Thunb. *

Rosa palustris Marsh.

Rubus allegheniensis Porter

SALICACEAE - WILLOW FAMILY

Populus deltoides Marsh.

Salix nigra Marsh.

SCROPHULARIACEAE - FIGWORT FAMILY

Mimulus ringens L.

Verbascum thapsus L. *

Veronica peregrina L.

SOLANACEAE - NIGHTSHADE FAMILY

Physalis alkekengi L. *

Solanum carolinense L.

Solanum ptycanthum Dunal.

TYPHACEAE - CAT-TAIL FAMILY

Typha latifolia L.

ULMACEAE - ELM FAMILY

Celtis occidentalis L.

Ulmus pumila L. *

VERBENACEAE - VERBENA FAMILY

Verbena stricta Vent.

Table 2. Importance values for the vascular plants of Allison Prairie

Species	Importance Value	Relative Frequency	Relative Cover
Bare Ground	34.41	10.78	23.63
Litter	20.63	10.78	9.85
<i>Heterotheca camporum</i>	21.89	9.91	11.98
<i>Melilotus alba</i>	20.57	9.48	11.09
<i>Sporobolus asper</i>	16.48	7.97	8.51
<i>Ambrosia artemisii</i>	16.29	9.91	6.38
<i>Andropogon gerardii</i>	11.31	5.60	5.71
<i>Arenaria serpyllifolia</i>	9.94	6.47	3.47
<i>Veronica peregrina</i>	7.54	4.96	2.58
<i>Bromus commutatus</i>	6.99	4.53	2.46
<i>Allium vineale</i>	4.26	2.80	1.46
<i>Opuntia humifusa</i>	3.75	1.51	2.24
<i>Schizachyrium scoparium</i>	3.62	1.94	1.68
<i>Chenopodium album</i>	2.62	1.72	0.90
<i>Bromus japonicus</i>	2.29	1.51	0.78
<i>Saponaria officinalis</i>	2.09	0.86	1.23
<i>Festuca pratensis</i>	1.96	1.29	0.67
<i>Achillea millefolium</i>	1.86	1.08	0.78
<i>Plantago virginica</i>	1.53	0.86	0.67
<i>Coryza canadensis</i>	1.10	0.65	0.45
<i>Erigeron strigosus</i>	0.99	0.65	0.34
<i>Melilotus officinalis</i>	0.99	0.43	0.56
<i>Potentilla simplex</i>	0.77	0.43	0.34
<i>Carex annectens</i>	0.65	0.43	0.22
<i>Oxalis stricta</i>	0.65	0.43	0.22
<i>Silene antirrhina</i>	0.65	0.43	0.22
<i>Silene regia</i>	0.56	0.22	0.34
<i>Rumex crispus</i>	0.54	0.43	0.11
<i>Artemisia absinthium</i>	0.44	0.22	0.22
<i>Cassia fasciculata</i>	0.33	0.22	0.11
<i>Chamaesyce maculata</i>	0.33	0.22	0.11
<i>Croton capitatus</i>	0.33	0.22	0.11
<i>Geranium carolinianum</i>	0.33	0.22	0.11
<i>Mirabilis nyctaginea</i>	0.33	0.22	0.11
<i>Oenothera biennis</i>	0.33	0.22	0.11
<i>Polygonum scandens</i>	0.33	0.22	0.11

Table 3. Importance values for the vascular plants of Allison Prairie by alphabetical listing

Species	Importance Value	Relative Frequency	Relative Cover
Bare Ground	34.41	10.78	23.63
Litter	20.63	10.78	9.85
<i>Achillea millefolium</i>	1.86	1.08	0.78
<i>Allium vineale</i>	4.26	2.80	1.46
<i>Ambrosia artemisii</i>	16.29	9.91	6.38
<i>Andropogon gerardii</i>	11.31	5.60	5.71
<i>Arenaria serpyllifolia</i>	9.94	6.47	3.47
<i>Artemisia absinthium</i>	0.44	0.22	0.22
<i>Bromus commutatus</i>	6.99	4.53	2.46
<i>Bromus japonicus</i>	2.29	1.51	0.78
<i>Carex annectens</i>	0.65	0.43	0.22
<i>Cassia fasciculata</i>	0.33	0.22	0.11
<i>Chamaesyce maculata</i>	0.33	0.22	0.11
<i>Chenopodium album</i>	2.62	1.72	0.90
<i>Conyza canadensis</i>	1.10	0.65	0.45
<i>Croton capitatus</i>	0.33	0.22	0.11
<i>Erigeron strigosus</i>	0.99	0.65	0.34
<i>Festuca pratensis</i>	1.96	1.29	0.67
<i>Geranium carolinianum</i>	0.33	0.22	0.11
<i>Heterotheca camporum</i>	21.89	9.91	11.98
<i>Melilotus alba</i>	20.57	9.48	11.09
<i>Melilotus officinalis</i>	0.99	0.43	0.56
<i>Mirabilis nyctaginea</i>	0.33	0.22	0.11
<i>Oenothera biennis</i>	0.33	0.22	0.11
<i>Opuntia humifusa</i>	3.75	1.51	2.24
<i>Oxalis stricta</i>	0.65	0.43	0.22
<i>Plantago virginica</i>	1.53	0.86	0.67
<i>Polygonum scandens</i>	0.33	0.22	0.11
<i>Potentilla simplex</i>	0.77	0.43	0.34
<i>Rumex crispus</i>	0.54	0.43	0.11
<i>Saponaria officianalis</i>	2.09	0.86	1.23
<i>Schizachyrium scoparium</i>	3.62	1.94	1.68
<i>Sporobolus asper</i>	16.48	7.97	8.51
<i>Silene antirrhina</i>	0.65	0.43	0.22
<i>Silene regia</i>	0.56	0.22	0.34
<i>Veronica peregrina</i>	7.54	4.96	2.58

Figure 1. Natural Divisions of Illinois as proposed by Schwegman in 1973.

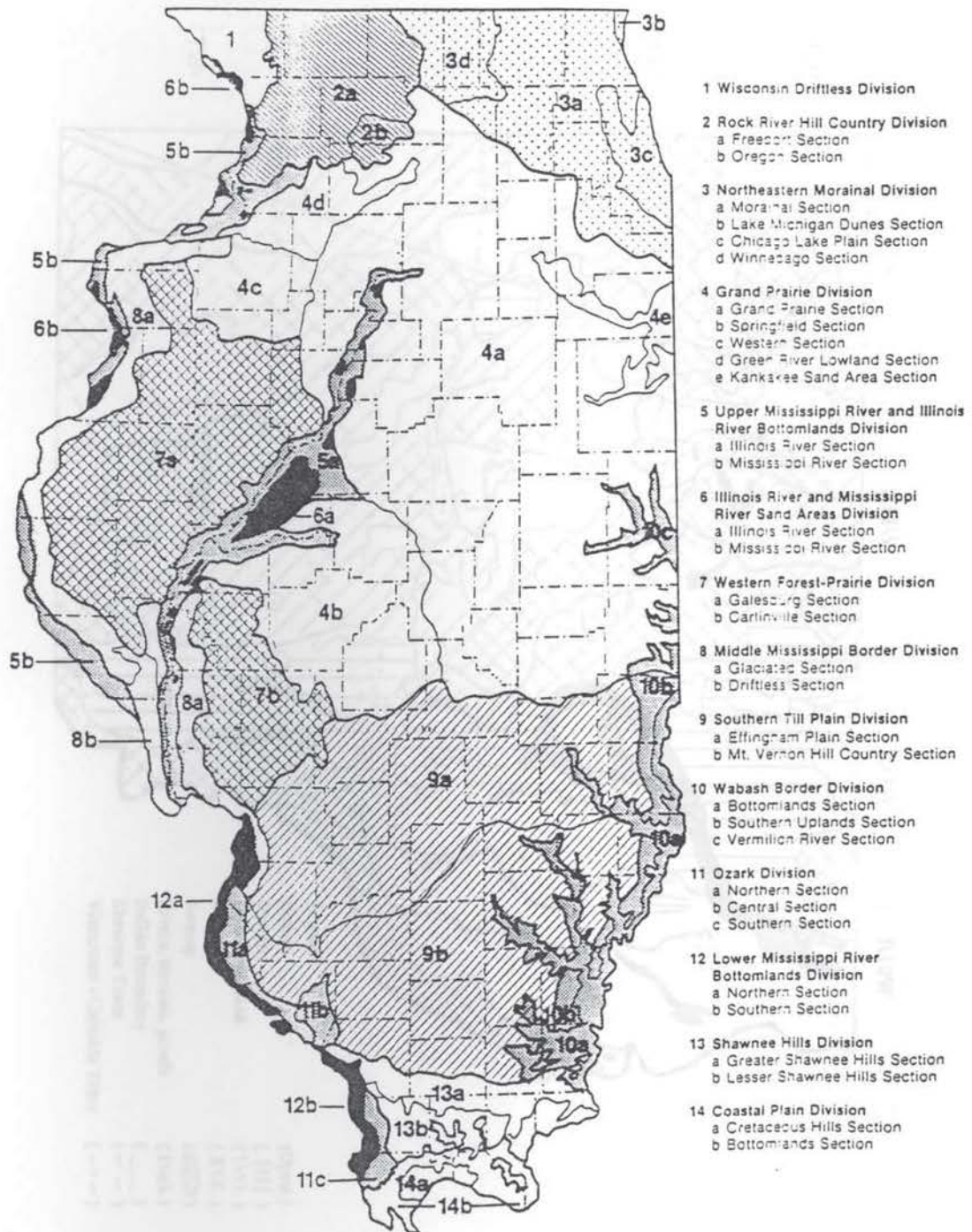


Figure 2. Map of pre-settlement Lawrence County, Illinois showing the approximate locations of biotic communities.

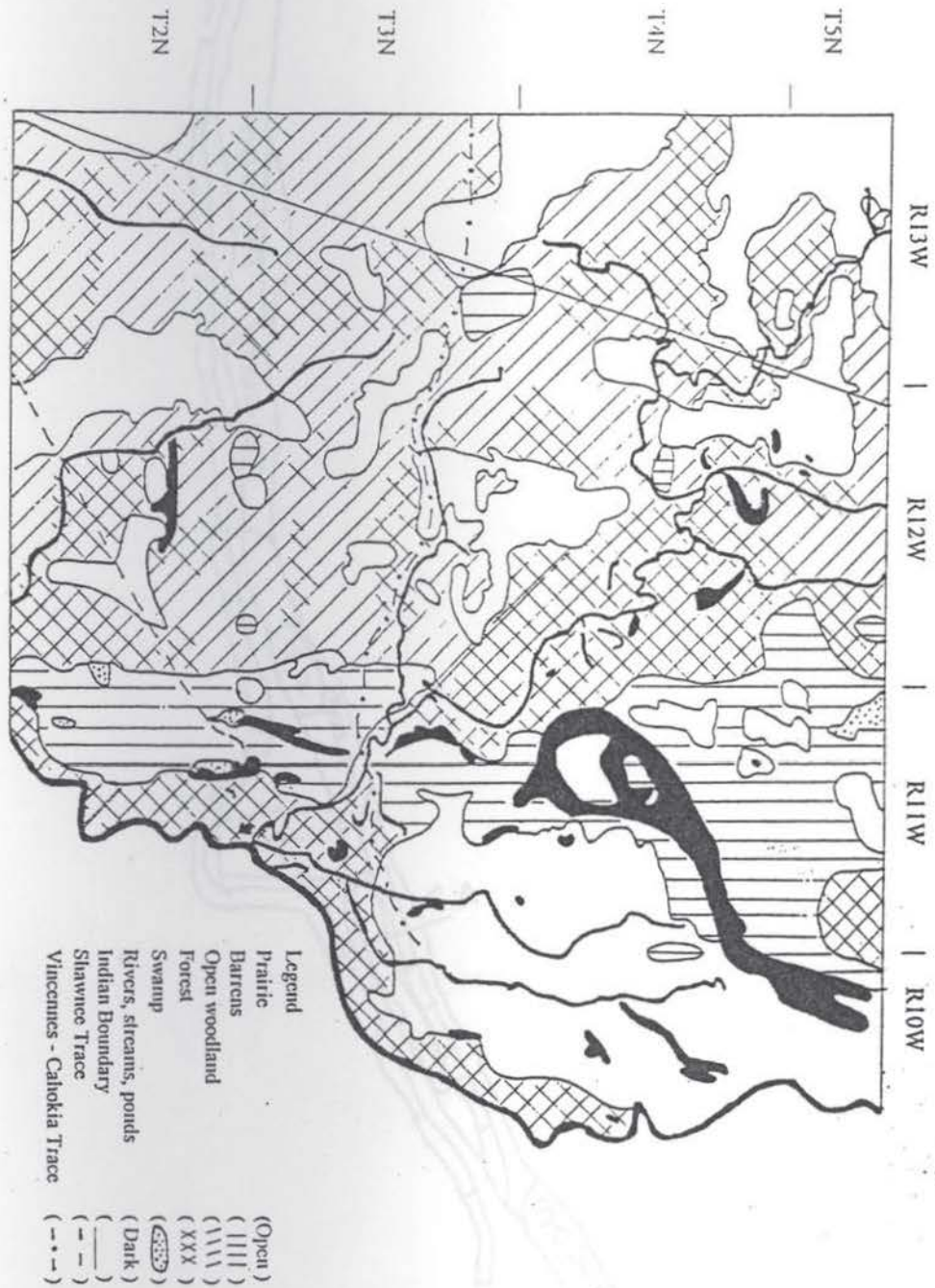


Figure 3. 1950's soil map of Lawrence County, Illinois Section 25, T4N, R11W showing the locations of gravel pits.

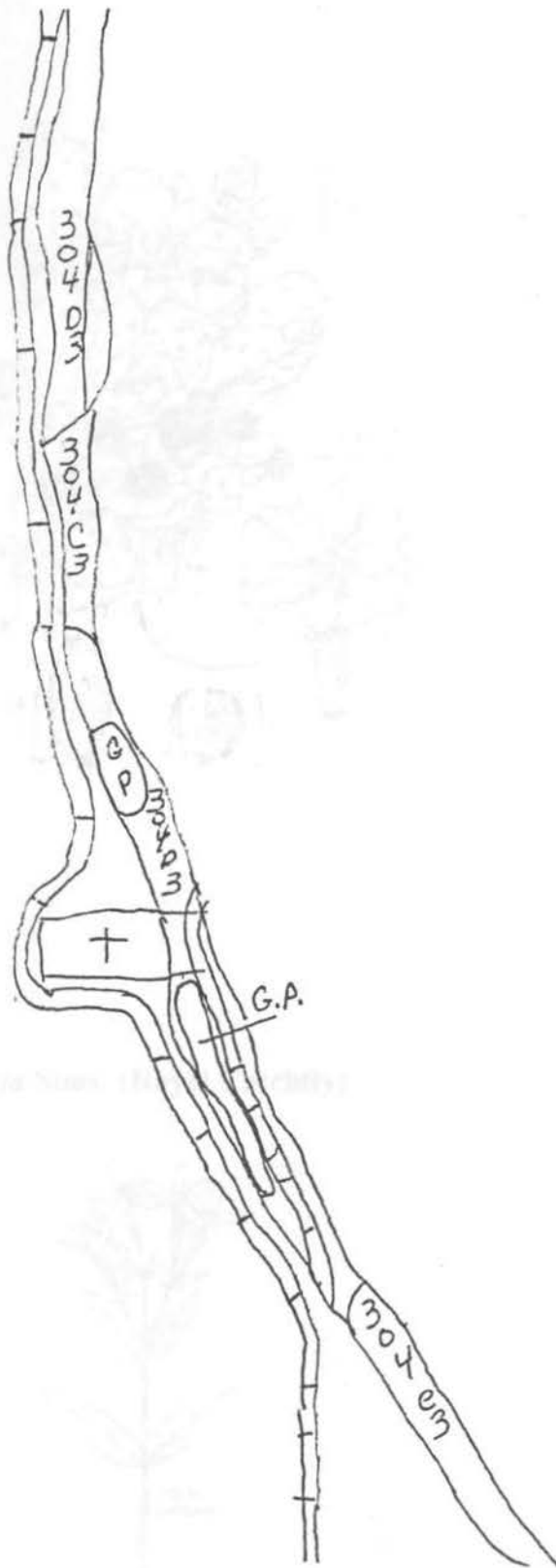


Figure 5. Illinois State University (1950)

Figure 4. *Opuntia humifusa* (Raf.) Raf. (Prickly-Pear Cactus)

PRICE CEMETERY

Buckleya distachyoides (Pursh) Rydb.
seeds of *B. distachyoides*

Brickellia eupatorioides (L.) Shumers

Carex sp.

C. lancofolia L.

3 plants in flat square nest

5 m NNW of above

13 paces SE of Buckley plants

between cactus beds on "flat"

10 m NE of first nest

ROADSIDE SOUTH

Spiranthes cernua (L.)

2 in grass near last *Carex* nest

HOWARD CEMETERY

Arenaria hololepis (L.)

Helianthus

Mussaenda

2 plants, 1 large and 1 small

1 plant

large and 1 small

CENTERVILLE CEMETERY

Bouteloua curtipendula (L.)

Andropogon gerardii (L.)

Sorghastrum nutans (L.)

Brickellia eupatorioides (L.)

Ratibida pinnata (Vest.)

Helianthus strumosus (L.)

1 plant and some seed from it

1 plant

1 plant and some seed

seed only

seed only

seed only

OTTERBURN CEMETERY

Leptochloa cognata (Schum.) Chase

Cyperus filicollis Vahl

Paspalum allanatum Michx.

2 plants

2 plants

1 plant

Figure 5. *Silene regia* Sims. (Royal Catchfly)

Sporobolus vagans (Michx.) Kuhn

Euphorbia corollata L.

Spartina patens Link.

Panicum oligosperum

Helianthus divaricatus (Cass.)

Trisetum cernuum L. var. *cernuum* (L.) Eastw.

Ruellia humilis Nutt.

Hypericum sphaerocarpum (Muhl.)

Lespedeza cuneata Michx.

1 big plant

1 plant

1 big clump

2 clumps of plants

3 big plants

2 plants

2 plants

2 plants and seed

1 big plant and some seed

BILLETT ABANDONED RAILROAD

Calamagrostis canadensis (Michx.) Beauv.

Schizachyrium scoparium (Michx.) Nash

Ratibida pinnata (Vest.) Barnh.

1 clump (probably this one all)

1 clump

seed only

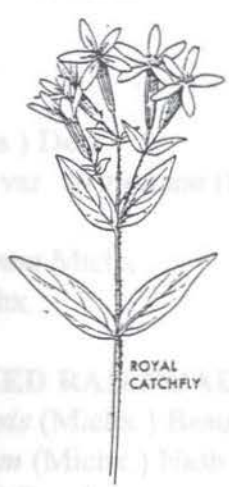
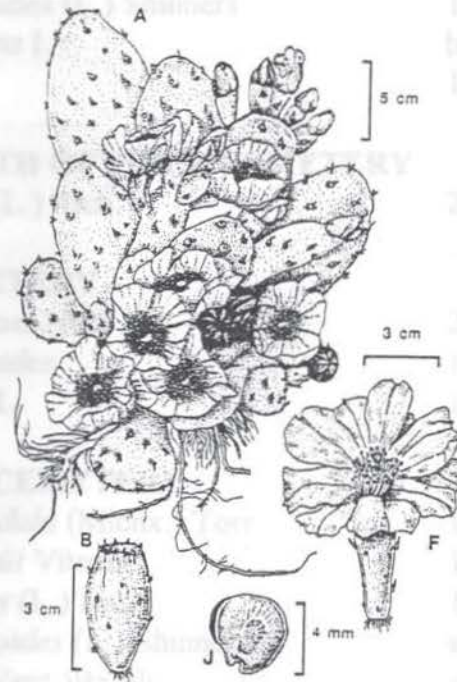


Table 4. Allison Prairie Transplants and Seeding**PRICE CEMETERY**

<i>Buchloe dactyloides</i> (Nutt.) Engelm	3 plants in flat square area
seeds of <i>B. dactyloides</i>	5 m NNW of above
<i>Brickellia eupatorioides</i> (L.) Shinnery	13 paces SE of <i>Buchloe</i> plants
<i>Coreopsis lanceolata</i> L.	between cactus beds on "hill"
<i>C. lanceolata</i> L.	10 m NE of first one.

ROADSIDE SOUTH OF PRICE CEMETERY

<i>Spiranthes cernua</i> (L.) Rich.	2 in grass near last <i>Coreopsis</i>
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HOWARD CEMETERY

<i>Artemisia ludoviciana</i> Nutt.	2 plants, 1 large and 1 small
<i>Heliopsis helianthoides</i>	1 plant
<i>Monarda fistulosa</i> L.	1 large and 1 small

CENTERVILLE CEMETERY

<i>Bouteloua curtipendula</i> (Michx.) Torr.	1 plant and some seed from it
<i>Andropogon gerardii</i> Vitman.	1 plant
<i>Sorghastrum nutans</i> (L.) Nash	1 plant and some seed
<i>Brickellia eupatorioides</i> (L.) Shinnery	seed only
<i>Ratibida pinnata</i> (Vent.) Barnh.	seed only
<i>Helianthus strumosus</i> L.	seed only

OTTERBURN CEMETERY

<i>Leptoloma cognatum</i> (Schult.) Chase.	2 plants
<i>Cyperus filiculmis</i> Vahl.	2 plants
<i>Paspalum ciliatifolium</i> Michx.	1 plant

CSXT RAILROAD

<i>Sporobolus aspera</i> (Michx.) Kunth	1 big plant
<i>Euphorbia corollata</i> L.	1 plant
<i>Spartina pectinata</i> Link.	1 big clump
<i>Panicum oligosanthes</i>	2 clumps of plants
<i>Helianthus rigidus</i> (Cass.) Desf.	3 big plants
<i>Teucrium canadense</i> L. var. <i>virginicum</i> (L.) Eat.	2 plants
<i>Ruellia humilis</i> Nutt.	2 plants
<i>Hypericum sphaerocarpum</i> Michx.	2 plants and seed
<i>Lespedeza capitata</i> Michx.	1 big plant and some seed

BILLETT ABANDONED RAILROAD

<i>Calamagrostis canadensis</i> (Michx.) Beauv.	1 clump (probably this, mowed)
<i>Schizachyrium scoparium</i> (Michx.) Nash	1 clump
<i>Ratibida pinnata</i> (Vent.) Barnh.	seed only

Table 5. Summary of Management Activities conducted at the Allison Prairie Restoration**1997**

Activity	Hours	Date
Prescribed burning	10.0	April
Royal Catchfly monitoring	2.0	July
Brush cutting	22.5	Nov. & Dec.
Seed Collection	11.0	Oct. - Dec.
Sowing and transplanting	2.5	Nov. & Dec.
Total hours	46.0	

1998

Month	Activity	No. of Days
February	Brush cutting/tree removal	2
March	Woody exotic species control	1
April	Herbaceous exotic species control	1
May	Woody exotic species control	1
June	Seed collection/sign maintenance	1
September	Brush cutting/tree removal	2
October	Seed collection/seeding	2
November	Tree removal	1
Total		11

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