A Survey of Natural Area Sites in Cherokee County, Kansas

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Cover Photo: Native Low Prairie in Cherokee County, 2005. Photo Hillary Loring. This Low Prairie is protected under the Wetlands Reserve Program of the USDA Natural Resources Conservation Service

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Abstract

During the summer and fall of 2005, the Kansas Biological Survey surveyed 29 high-quality natural areas in Cherokee County.

The high-quality prairie communities that were surveyed during this study were Unglaciated Tallgrass Prairie, Low Prairie, and Hardpan Prairie. The high-quality forests surveyed in this study are classified as Ozark Upland Forest.

Based on the site surveys, we determined species richness values and floristic quality index (FQI) scores for each parcel. Species richness varied from 133 to 35. FQI scores ranged from a high of 43.6 to 19.5 for the lowest. State ranked rare plant species were identified at 28 of the 29 sites for a total of 118 new state records.

We suggest several management recommendations for landowners as well as opportunities for both landowners and planning commissions to conserve some of these biologically rich tracts of land.

A ranking of preservation priorities is provided along with a map showing the locations of the high-quality prairies and forests in Cherokee County.

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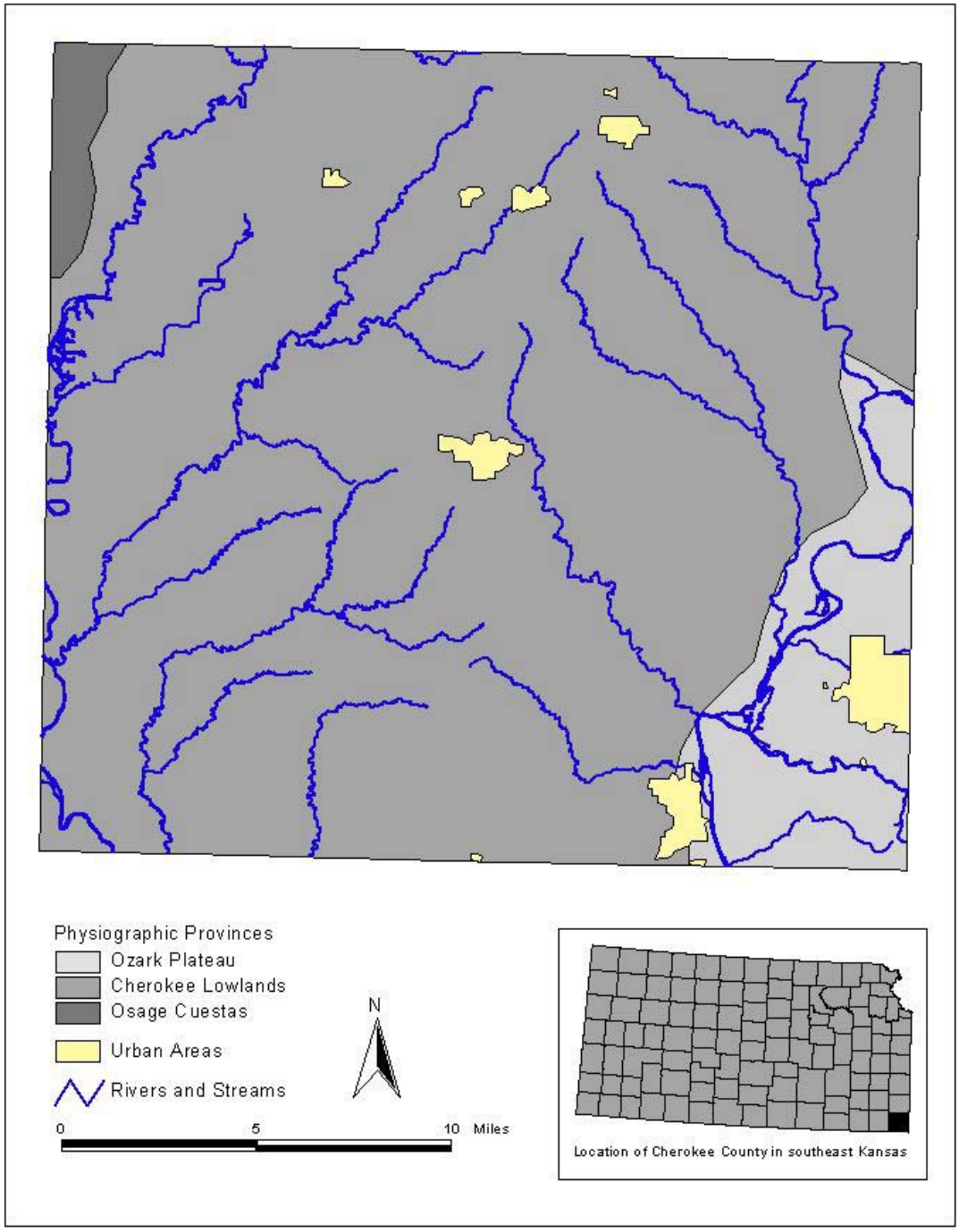

Figure 1.1 — The study area in southeast Kansas, showing Cherokee County, rivers and streams, the Ozark Plateau, the Cherokee Lowlands, and the Osage Cuestas.

Chapter 1: Introduction

1.1. Project Purpose

In 2005, the Kansas Biological Survey was funded by a grant from Phelps Dodge Corporation to survey the known high-quality prairies and forests in Cherokee County. In the early 1990's, thirty parcels in Cherokee County were recognized as examples of high-quality natural areas. These were recorded into the Kansas Natural Heritage Database. Since one of the 30 sites is owned and protected by the Kansas Department of Wildlife and Parks, it was not included in the study. This current survey will allow us to assess changes in land use and habitat quality of these 29 natural areas over the last 10 years.

High-quality natural areas are those places on the landscape that support plant communities that closely approximate the native vegetation (e.g., native tallgrass prairie or an Ozark oak-dogwood forest) that existed prior to Euro-American settlement. Healthy natural areas benefit native biological diversity. They are reservoirs of biological diversity and sanctuaries for sensitive and declining species.

Our goal was to relocate, classify, and evaluate the natural communities of the 29 sites by compiling a plant species list, recording ecological characteristics of the property, mapping more accurately the current boundaries of the natural area, and determining a floristic quality assessment for each site. This information was then used to establish a priority of conservation for these sites.

Chapter 2: General Description of Cherokee County

2.1. Survey Area and Landscape Features

The survey took place in Cherokee County in southeast Kansas. This area is bounded on the north side by Neosho County, on the west by Labette County, on the east by the state of Missouri, and on the south by Oklahoma. It is traversed by the Neosho River, the Spring River, and by several creeks. The county lies within three physiographic provinces, the Ozark Plateau, the Cherokee Lowlands, and a small portion of the Osage Cuestas. Cherokee County is the only county in Kansas that lies within the Ozark Plateau physiographic province. The county is underlain by Pennsylvanian and Mississippian limestone and sandstone. The Pennsylvanian deposits contain much sandstone and sandy shale as well as the most important coal beds in the state. Alluvium from the Holocene and Pleistocene is found along the major drainages. The only outcropping of Mississippian limestone in Kansas lies in Cherokee County.

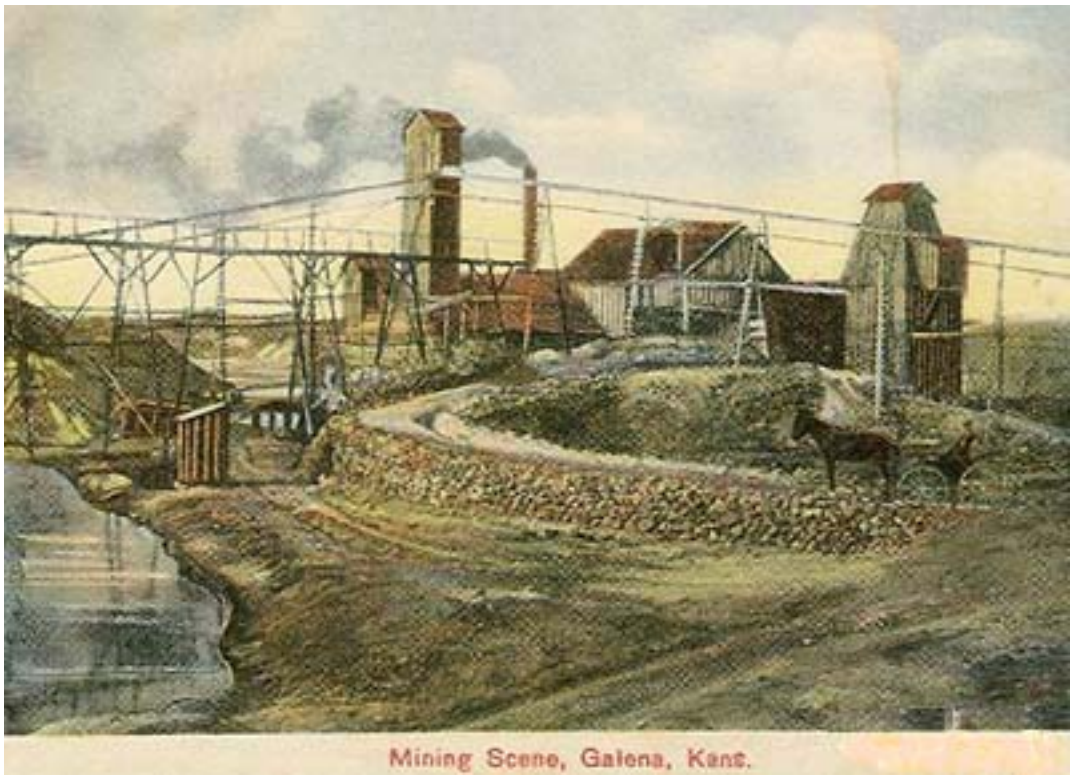

Figure 2.1. Old postcard of Galena, Kansas.

2.2. Land-Use History and Trends

Prior to Euro-American settlement, most of the land in this area was prairie. European settlement began in the 1850s. In 1904, Nathaniel Thompson Allison compiled and edited a history of Cherokee County.

Forty years ago, when there was scarcely any land in the county that had been touched with the plow, and when there were no roads established by any public act, the meager woodland was found only along Spring River and its larger tributaries, and probably a mere fringe along the Neosho River and the larger streams which flow into it. The county was almost a solid sward of prairie grass; and from the higher points, which afforded views of the land as it lay in the repose which Nature had given it through the centuries, many of the most pleasing landscapes could be seen. To those who came first, with implements of tillage for bringing the virgin soil into subserviency to the purposes of civilization, it was "a goodly land," fair to look upon and full of promise, and to those who stayed and endured the hardships incident to pioneer life, sowing and reaping as the years went on, it yielded its fruits in season, and with these the quiet satisfaction which comes with faithful husbandry. (Allison 1904)

2.3. Natural Communities in Cherokee County

The four major community types in Cherokee County are discussed below (Lauver et al. 1999).

Southeastern Tallgrass Prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Other species include leadplant (*Amorpha canescens*), many-flowered scurfpea (*Psoralea tenuiflora*) and whip razorsedge (*Scleria triglomerata*). It is typically found on nearly level to moderately steep slopes on uplands in soils that are moderately deep to deep, somewhat poorly drained to well drained silts and loams, formed in clayey, old alluvium or from shale, limestone, or sandstone.

Figure 2.2 — *Aster patens* in Southeastern Tallgrass Prairie east of Baxter Springs

Low Prairie is dominated by prairie cordgrass (*Spartina pectinata*), sedges (*Carex* species), and spikesedge (*Eleocharis* species). Other common species include swamp milkweed (*Asclepias incarnata*), lance-leaf aster (*Aster lanceolatus*), and sawtooth sunflower (*Helianthus grosseserratus*). This community type occurs in floodplains along rivers, streams, and creeks in deep, poorly drained soil. These areas are frequently inundated with surface water for extended periods, especially in the winter and spring. Only specialized plant species are adapted to this dramatic flooding regime. Because of that, low prairies tend to contain fewer species (a lower species richness) than other prairie types

Figure 2.3 — Gray Hairstreak butterflies on *Asclepias hirtella* in Low Prairie in southwest Cherokee County

Hardpan Prairie is dominated by little bluestem (*Andropogon scoparius*) and side-oats grama (*Bouteloua curtipendula*). Indicator species include switchgrass (*Panicum virgatum*), blue hearts (*Buchnera americana*), and Arkansas ironweed (*Vernonia arkansana*). The soil is usually silty loam with an impermeable or slowly permeable silty clay subsoil layer. This fine-textured subsoil layer is very hard when dry and firm when moist, increasing runoff and restricting the downward growth of plant roots. The vegetation is dominated by medium tall herbaceous species, with scattered low shrubs. As with the Low Prairie community type, the Hardpan Prairie tends to have a lower species richness than the Southeastern Tallgrass Prairie. The fluctuating conditions, from very wet to very dry, are tolerated by a limited number of species.

Ozark Upland Forest is characterized by the presence of white oak (*Quercus alba*) and flowering dogwood (*Cornus florida*), as well as bitternut (*Carya cordiformis*), shagbark hickory (*Carya ovata*), sassafras (*Sassafras albidum*), and farkleberry (*Vaccinium arboreum*). It occurs on level to steep uplands on cherty, silty, well-drained soils, formed from cherty limestone.

The most significant forest community type found in Cherokee County is the Ozark Upland Forest. Within Kansas this forest type occurs only in Cherokee County and only in the Ozark Plateau.

Figure 2.4 — Identifying plants in an Ozark Upland Forest, Cherokee County

Chapter 3: Inventory Methods

3.1. Sites

The Kansas Natural Heritage Inventory (KSNHI) maintains a database of high-quality natural areas from across the state. Over the last 20 years, 30 sites have been recorded for Cherokee County. The database typically includes maps, species lists, notes on ecological characteristics of the site, a ranking grade, and the location of the site. The 29 sites examined in this study are shown in Figure 3.1. and described in Table 3.1.

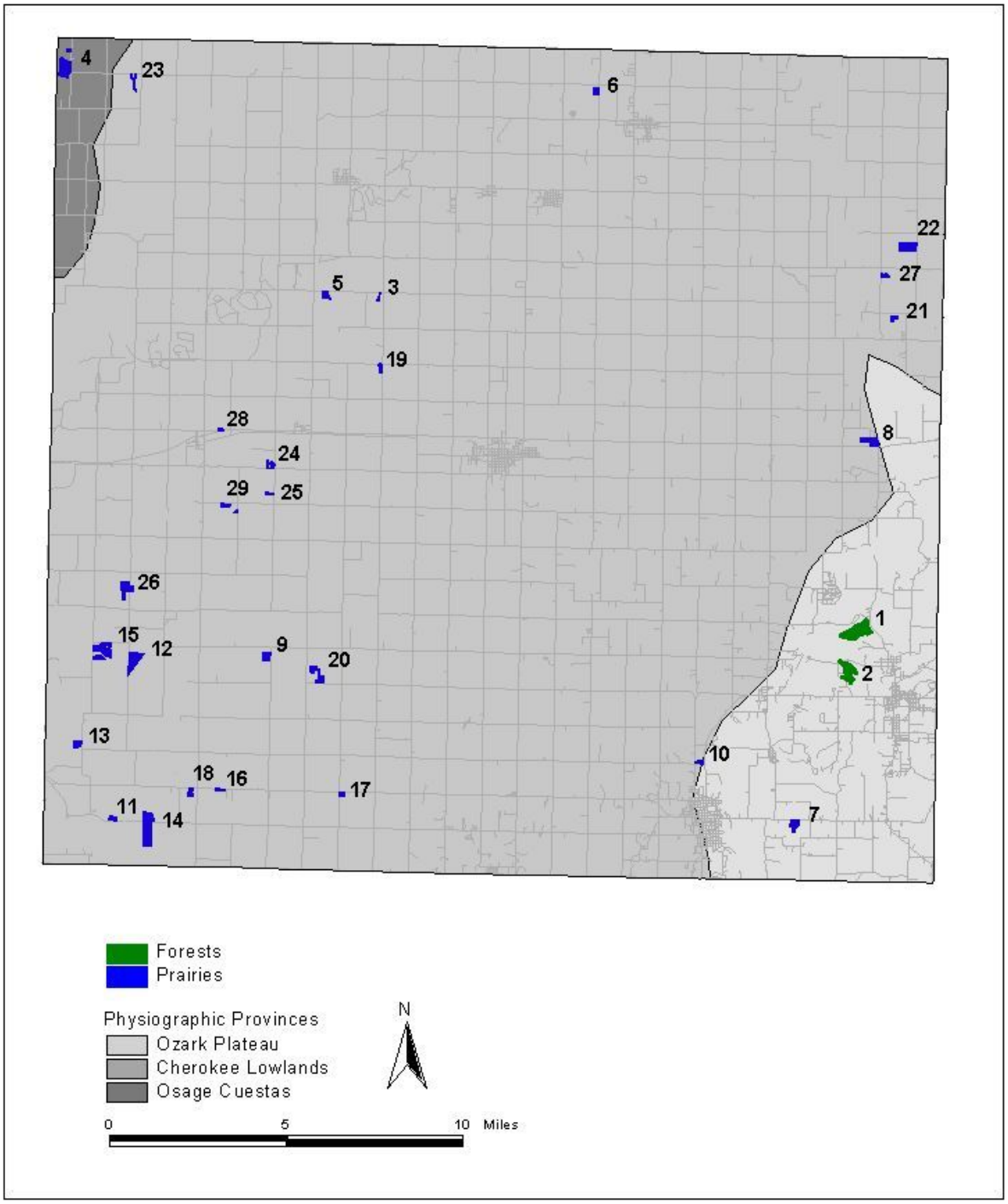

Figure 3.1. Locations of Known Natural Areas in Cherokee County. Site numbers on the map correspond to map number in Table 3.1.

Table 3.1. Map Numbers, Community Type, and Heritage Codes of All Sites.

Map Number	Heritage Code	Community Type
1	CEGL002066*002	Ozark Upland Forest
2	CEGL002066*003	Ozark Upland Forest
3	CEGL002204*171	Southeastern Tallgrass Prairie
4	CEGL002204*186	Southeastern Tallgrass Prairie
5	CEGL002204*187	Southeastern Tallgrass Prairie
6	CEGL002204*203	Southeastern Tallgrass Prairie
7	CEGL002204*205	Southeastern Tallgrass Prairie
8	CEGL002204*212	Southeastern Tallgrass Prairie
9	CEGL002204*235	Southeastern Tallgrass Prairie
10	CEGL002204*328	Southeastern Tallgrass Prairie
11	CEGL002223*005	Low Prairie
12	CEGL002223*006	Low Prairie
13	CEGL002223*007	Low Prairie
14	CEGL002223*008	Low Prairie
15	CEGL002223*009	Low Prairie
16	CEGL002249.003	Hardpan prairie
17	CEGL002249.004	Hardpan prairie
18	CEGL002249.005	Hardpan prairie
19	CEGL002249.006	Hardpan prairie
20	CEGL002249.007	Hardpan prairie
21	CEGL002249.008	Hardpan prairie
22	CEGL002249.009	Hardpan prairie
23	CEGL002249.010	Hardpan prairie
24	CEGL002249.011	Hardpan prairie
25	CEGL002249.012	Hardpan prairie
26	CEGL002249.013	Hardpan prairie
27	CEGL002249.014	Hardpan prairie
28	CEGL002249.015	Hardpan prairie
29	CEGL002249.016	Hardpan prairie

3.2. Landowner Contact

The ownership of each parcel was determined by using county land ownership maps and by obtaining information from County offices in the courthouse. The owners were contacted by telephone. All of the landowners agreed to let researchers walk on their property.

3.3. Ranking Criteria

We used standard Natural Heritage procedures (NatureServe 2005c) to determine potential natural area rankings: a grade was assigned to each community and species occurrence to summarize its quality and condition. The potential grades range from A to D. For plant communities, an A-grade indicates a pristine or relatively undisturbed occurrence, while a D-grade site is severely degraded.

Sites are ranked by using three key factors: landscape context, size, and condition. Landscape context is the extent to which an area is imbedded in a landscape of intact natural communities. Normally, landscape context and size are weighted more heavily than condition. The rationale is that landscape context and size cannot improve, or can do so only slightly with time, whereas condition is a more variable attribute and can be improved fairly quickly with appropriate management inputs. Also, the assessed condition of a prairie remnant may vary with season, observer, management, or environmental conditions.

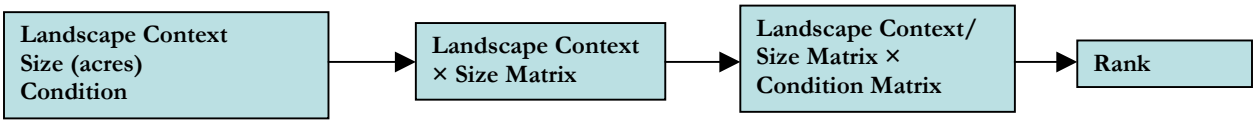

Figure 3.2. Summary of evaluation process for determining rank and viability of conservation targets.

Landscape Context — Landscape context refers to the general condition of the landscape in which a site occurs, considering such issues as disturbance regimes, fragmentation, topography, and biological diversity. Landscape context is ranked A–D. Generally speaking, A-grade landscapes have not been converted to human land uses (like cropland or housing) and are dominated by natural communities. Natural processes, species interactions, and species migrations can occur across all natural communities and experience no complete barriers. Surrounding vegetation is greater than 80% natural. B-grade landscapes have experienced some land conversion, but natural communities remain well connected. Natural processes and species interactions and migrations can occur across many natural communities and experience few barriers. Surrounding vegetation is 50–80% natural. C-grade landscapes are fragmented by cultural land, including cropland or developed areas. Barriers severely affect many natural processes, species interactions, and migrations, and many species are unable to maintain viable populations. Surrounding vegetation is 20–50% natural. D-grade landscapes are surrounded almost entirely by cultural land. Natural processes and species migrations are severely compromised and cannot occur at natural scales. The biological diversity is severely diminished.

Size — All parcels were mapped with ArcView 3.3 software, using 2002 aerial photographs as the base map. The size of each parcel was determined by the computer program.

Condition — Condition refers to impact that human disturbance has had on a site. Condition can be estimated by any of several available methods. Most Natural Heritage programs use subjective field assessments, which are based on estimates of native species richness, abundance of exotic species, and ecological processes. As with landscape context, condition may be ranked from A–D, with A being the best (least affected by human disturbance) and D being the worst (severely affected by human disturbance).

The determination of condition at a site was a primary purpose of our fieldwork. For each site we visited, we took note of the ecological and physical characteristics present and put together an extensive and accurate plant species list for each site. Plant species that could not be determined with confidence in the field were brought back to the Kansas Biological Survey and the R. L. McGregor Herbarium for identification.

3.3.b. Floristic Quality Assessment

Floristic Quality Assessment (FQA) is a standardized tool used to estimate the floristic quality of a natural area based on the vascular plants growing there (Taft et al.1997; Freeman and Morse 2002). A summary and explanation of FQA is included below (Freeman and Morse 2002). By extension, it can be used to assess the overall ecological quality of a site. Ecologists, botanists, environmental professionals, and land managers use FQA to establish baseline assessments, to conduct long-term monitoring, and to assess restoration progress in a variety of ecological settings (Herman et al. 1997; Taft et al. 1997). Developed in the 1970s (Wilhelm 1977; Swink and Wilhelm 1979), the method has been refined from its original form (Wilhelm and Ladd 1988; Taft et al. 1997; Rooney and Rogers 2002) and now is in use or development in numerous states and provinces in the United States and Canada (Taft et al. 1997).

The method was developed to avoid subjective measures of natural community quality, such as "high" or "low." Some elements of FQA still are subjective, but the method has clear advantages over other evaluation tools, including repeatability and ease of application. Ideally, FQA should be used with other content-based and context-based measures (*sensu* Rooney and Rogers 2002) to estimate the integrity of native plant communities (Taft et al. 1997).

The FQA method is based on calculating an average coefficient of conservatism (C) and a floristic quality index (FQI) for a site. It may be used to compare several sites supporting the same community type (*e.g.*, several Glaciated Tallgrass Prairies) but should not be used to compare different community types (Rooney and Rogers 2002). A coefficient of conservatism is an integer from 0–10 that is assigned to each native plant species in a given geographic region—often a state or province. Naturally occurring hybrids and infraspecific taxa usually are not assigned coefficients.

Coefficients of conservatism express two basic ecological tenets: plants differ in their tolerance of the type, frequency, and amplitude of anthropogenic disturbance, and plants vary in their fidelity to remnant natural plant communities (Taft et al.1997). As employed in FQA, these two principles exhibit an inverse relationship: the lower a species' tolerance of human-mediated disturbance, the higher its likelihood of occurring

only in a natural plant community. Low coefficient values (0–3) denote taxa often found in highly disturbed habitats and without a strong affinity for natural communities. High coefficient values (7–10) denote species that tolerate only limited disturbance and usually are found in natural communities. With these principles as a guide, the C value applied to each species represents a relative rank based on observed behavior and patterns of occurrence in Kansas natural communities. Non-native species are not assigned coefficients because they were not part of the presettlement landscape. They do have an effect on FQA, however, and they may be incorporated in the assessment process.

The FQA process begins with a thorough inventory of vascular plants at a site of interest. The checklist then is used to calculate a floristic quality index (FQI) for the site. A mean C value (mean C) is calculated. The mean C value for a site is the arithmetic mean of the coefficients of all native vascular plants occurring on the entire site (mean $C = \Sigma C/N$), without regard to dominance or frequency. Non-native taxa are excluded from the calculation of mean C. The FQI is the mean C multiplied by the square root of the total number of taxa ($\sqrt{N}$) inventoried on the site (FQI = mean $C \times \sqrt{N}$). Separate calculations may be made using N = all taxa (native and non-native) and N = native taxa only (see analysis and discussion in Taft et al. 1997). The basic formula for FQI combines the conservatism of the taxa with a measure of the taxon richness of the site. By multiplying by $\sqrt{N}$ instead of N, the formula reduces the effect of the size of the site (larger sites tend to have a larger total number of species) (Wilhelm 1977; Taft et al. 1997).

3.3.c. State Ranking of Rare Species

Natural Heritage programs across the United States assign state ranks to rare species (NatureServe 2005b). For state-ranked plant species, the following factors are considered in assessing conservation status: total number and condition of populations; population size; range extent and area of occupancy; short- and long-term trends in the above factors; scope, severity, and immediacy of threats to the species; number of protected and managed populations; intrinsic vulnerability, and environmental restrictions.

State conservation status ranks of species are based on a 1–5 scale, ranging from critically imperiled (S1) to demonstrably secure (S5). The two state rankings of interest are the S1 (critically imperiled) and S2 (imperiled) species. We noted the presence of each S1 and S2 plant species found in our survey.

3.4. Site Description Format

Once permission to survey a site was received from the landowner, each site was visited by a crew of one to three biologists who filled out data sheets with the following information:

1) latitude and longitude by GPS and a general description of the area;
2) landscape description of the site and the surrounding area;
3) description of the vegetative community and ranking (according to standard Heritage methodology; NatureServe 2005c);

4) the names of all plant species found on the site (the taxonomy used was from the Great Plains Flora Association 1991);
5) any occurrences of rare, threatened, or endangered species; and
6) the outline of the site on an aerial photograph of the area.

Data were entered into the Kansas Natural Heritage Inventory database and into plant species databases.

Chapter 4: Survey Results and Discussion

4.1. Results

A list of all plant species seen at each of the 29 sites was compiled. This list plus other on-site assessments were used to determine a Condition Grade for each site. Full lists of all plant species noted in the course of the surveys are included in Appendix B (prairie sites) and Appendix C (forest sites).

4.2. Natural Areas and Their Importance

4.2.a. Plant Communities and Their Distribution

Plant Communities — The ranks and distribution of the 29 sites across the four community types surveyed are shown in Table 4.1. The total acreages encompassed by those community types are presented in Table 4.2.

Table 4.1. Ranks of Sites by Community Type.

Community Type	B Sites	C Sites	D Sites	Total no. of sites
Southeastern Tallgrass Prairie	2	5	1	8
Hardpan Prairie	4	10		14
Low Prairie	3	2		5
Ozark Upland Forest		2		2
Total Sites by Rank	9	19	1	29

Table 4.2. Acreage of Sites by Community Type and by Rank.

Community Type	B-Rank	C-Rank	D-Rank	Total
Southeastern Tallgrass Prairie	95.30	162.79	32.20	290.29
Hardpan Prairie	136.70	190.96		327.66
Low (Wet) Prairie	225.02	156.79		381.81
Ozark Upland Forest		299.66		299.66
Total Acres by Rank	457.02	810.20	32.20	1299.45

To be considered A-grade according to Heritage methods, all three prairie community types would have to be surrounded by a large-acreage, high-quality prairie landscape. Such landscape no longer exists in Cherokee County, so no prairie in the county had an overall rank of A.

None of the 27 prairie sites in the Heritage database had been significantly degraded by agricultural practices since they were originally surveyed in the early 1990's. Two of the sites have been fenced and have been or are currently being grazed, which may lead to future degradation. Since many of the conservative prairie species are highly palatable to cattle, grazing pressure quickly changes the species composition of a prairie, decreasing the number, abundance, and frequency of conservative species. Grazed areas usually rank lower than hay meadows that have never been grazed.

Both of the forest sites were still intact. The sites are large, unfenced, and have multiple owners.

Native Tallgrass Prairie Sites — Why They Remain
The prairie sites that do remain in Cherokee County usually fall into one of a few categories. Most are on soils that are often too wet to plow or that drain so slowly that crops planted there would rot. Luckily, their unsuitability for crops was probably recognized, thus preventing them from being plowed. A few are in drainages and serve as erosion resistant waterways. It is possible that a few were spared due to the tradition of keeping a hay meadow on every homestead. Landowners were not questioned as to why they maintained their hay meadows.

Forest Communities — Why They Remain
The two forest sites examined by this study were mostly on steep, rocky areas, unsuitable for agriculture. A third forest site, the Spring River Wildlife Area, owned by the Kansas Department of Wildlife and Parks was not surveyed since it is already protected. These sites were probably forest when the European settlers arrived in Kansas. No large trees were noted in any of the sites. The largely even-aged stands of trees on these sites and the presence of several multiple-trunked trees are usually considered indications of historical logging. It is probable that early settlers harvested trees for both building materials and firewood. For the above reasons, the forests surveyed in this study only received a C rank.

4.2.b. Floristic Quality Assessment Results

The Floristic Quality Index provides baseline data for these communities (see Appendix A). Since all of the parcels examined in the course of this survey were previously identified as high-quality natural areas, high FQI scores are to be expected. If similar areas under typical grazing regimes were surveyed and compared, they would probably rank considerably lower. Index scores ranged from a low of 19.47 to the high score of 43.64. High and Low FQI results for each community type are shown below in Table 4.3. Because of repeated flooding and poor drainage, the Hardpan Prairie and the Low

Prairie community types typically have lower species richness and FQI scores than do the Southeastern Tallgrass Prairie sites.

Table 4.3. Ranges of FQI Results by Community Type.

	High FQI	Low FQI
Southeastern Tallgrass Prairie	43.64	27.58
Hardpan prairie	40.78	20.98
Low Prairie	24.55	19.47
Ozark Upland Forest	42.99	29.01

4.3. Significant Plant Species

4.3.a. Indicator Species and Conservative Species

To determine if sites are high-quality native prairies or high-quality native forests, we look for species that are indicators of quality. These are typically referred to as *conservative species,* which are species that have high fidelity to certain community types (reflected by a high coefficient of conservatism). Many of these species—for example, the high-quality prairie indicators New Jersey tea (*Ceanothus americanus*) and blue hearts (*Buchnera americana*)—occur almost exclusively on our highest-quality sites. Finding one of these species often means that other important species might be present, and they often indicate that some of our rarest species might also be present, such as buffalo clover (*Trifolium reflexum*). (Note: All species nomenclature follows The Flora of the Great Plains, 1991.)

Table 4.4. The Most Conservative Prairie Plants Found during the Survey.

Species Name	Common Name	No. of Sites Where Found
COEFFICIENT OF CONSERVATISM = 10:		
Trifolium reflexum	buffalo clover	1
COEFFICIENT OF CONSERVATISM = 9:		
Aster paludosus	southern prairie aster	2
Buchnera americana	blue hearts	19
Ceanothus americanus	New Jersey tea	1
Crotonopsis elliptica	rushfoil	1
Psoralea psoralioides	Sampson's snakeroot	11
COEFFICIENT OF CONSERVATISM = 8:		
Agalinis skinneriana	Skinner's agalinis	2
Aster oolentangiensis	azure aster	10
Camassia scilloides	wild hyacinth	3
Carex laeviconica	smoothcone sedge	1
Centaurium texense	Texas centaury	1

Coreopsis grandiflora	bigflower coreopsis	5
Dodecatheon meadia	shooting star	4
Fimbristylis puberula	hairy fimbristylis	8
Ludwigia glandulosa	creeping seedbox	1
Nemastylis geminiflora	prairie pleatleaf	1
Polygala incarnata	slender milkwort	4
Polygala sanguinea	blood milkwort	10
Prenanthes aspera	rough rattlesnakeroot	2
Scleria triglomerata	whip razorsedge	6
Spermacoce glabra	smooth buttonweed	6
Spiranthes vernalis	spring ladies'-tresses	7
Sporobolus heterolepis	prairie dropseed	1

Note — Coefficients of conservatism range from 1 to 10. The higher the coefficient, the more conservative the plant species is considered, and its presence is indicative of a high-quality community. See Section 3.3.b above for discussion of conservative species.

Table 4.5. The Most Conservative Forest Plants Found during the Survey.

Species Name	Common Name	No. of Sites Where Found
COEFFICIENT OF CONSERVATISM = 9:		
Asarum canadense	Canadian wild-ginger	1
Aster paludosus	bog wide-head-aster	1
COEFFICIENT OF CONSERVATISM = 8:		
Agalinis gattingeri	Gattinger's agalinis	1
Aster anomalus	many-ray aster	2
Aster turbinellus	prairie aster	1
Lespedeza hirta	hairy bush-clover	1
Vaccinium arboreum	farkleberry	1

Note — Coefficients of conservatism range from 1 to 10. The higher the coefficient, the more conservative the plant species is considered, and its presence is indicative of a high-quality community. See Section 3.3.b above for discussion of conservative species.

4.3.b. S1 and S2 Species

The rare plant species found during our survey work [Kansas state-ranked critically imperiled (S1) and imperiled species (S2)] are listed in Table 4.6 and Table 4.7. These 25 prairie species and 23 forest species are not known from many locations throughout the state. Finding these species of statewide importance at numerous sites indicates that the sites surveyed provide valuable reserves of plant diversity. While all S1 and S2 species are uncommon in Kansas, not all of them are conservative or faithful to high-quality habitats. Those two measures, S1-S2 and conservatism, provide differing, but valuable ways to examine the species component of sites.

Table 4.6. Kansas State-Ranked S1 (Critically Imperiled) and S2 (Imperiled) Plant Species Found While Surveying Prairie Sites in Cherokee County

Species Name	Common Name	No. of Sites Where Found
STATE RANK = S1:		
Agalinis skinneriana	Skinner's agalinis	2
Callirhoe digitata	finger poppy-mallow	1
Centaurium texense	Texas centaury	1
Desmodium obtusum	blunt-lobe tick-clover	1
Ludwigia glandulosa	creeping seedbox	1
Rubus ostryifolius	highbush blackberry	1
Vernonia gigantean	giant ironweed	1
Vernonia marginata	plains ironweed	1
STATE RANK = S2:		
Aster paludosus	southern prairie aster	2
Crotonopsis elliptica	rushfoil	1
Desmodium ciliare	little-leaf tick-clover	1
Elephantopus carolinianus	Carolina elephant's-foot	1
Eragrostis capillaries	lace grass	1
Eragrostis intermedius	plains love grass	1
Erigeron tenuis	slender fleabane	5
Lespedeza repens	creeping bush-clover	3
Phalaris caroliniana	Carolina canarygrass	2
Psoralea psoralioides	Sampson's snakeroot	11
Rhynchospora recognita	globe beak-rush	1
Sassafras albidum	white sassafras	1
Spermacoce glabra	smooth buttonweed	6
Sporobolus heterolepis	prairie dropseed	1
Verbesina helianthoides	gravel-weed crownbeard	2
Vernonia missurica	Missouri ironweed	1
Viola sagittata	arrowleaf violet	12

Note — Ranks are determined by the Kansas Natural Heritage Inventory.

Table 4.7. Kansas State-Ranked S1 (Critically Imperiled) and S2 (Imperiled) Plant Species Found While Surveying Ozark Forest Sites in Cherokee County

Species Name	Common Name	No. of Sites Where Found
STATE RANK = S1:		
Aster anomalus	many-ray aster	2
Aster turbinellus	prairie aster	1
Cornus florida	flowering dogwood	1
Cuscuta coryli	hazel dodder	1
Eleocharis lanceolata	lanceolate spikesedge	1
Lespedeza hirta	hairy bush-clover	1

Lindera benzoin	common spicebush	1
Rubus ostryifolius	highbush blackberry	1
Solidago radula	rough goldenrod	1
Vaccinium arboreum	farkleberry	1
STATE RANK = S2:		
Agrostis perennans	autumn bentgrass	1
Aster paludosus	bog wide-head-aster	1
Betula nigra	river birch	1
Carya laciniosa	kingnut hickory	1
Carya texana	black hickory	1
Carya tomentosa	mockernut hickory	2
Eragrostis capillaris	lace grass	1
Gillenia stipulata	Indian physic	1
Hieracium gronovii	Gronovius' hawkweed	1
Lespedeza procumbens	trailing lespedeza	2
Pycnanthemum pilosum	whorled mountain mint	1
Sassafras albidum	white sassafras	1
Scutellaria ovata	egg-leaf skullcap	1

Note — Ranks are determined by the Kansas Natural Heritage Inventory.

4.3.c. Non-Native and Invasive Plant Species

Non-native species are plants that did not occur in this country prior to the arrival of European settlers. Many non-native plants can become invasive, aggressively establishing themselves in new habitats, especially habitats that have experienced localized or generalized disturbance. The species listed in Table 4.8 were noted as occurring within the natural areas in this study. Only two species classified as state noxious weeds were noted during the surveys. In general, non-native species were scarce in the sites surveyed. Where they occurred, they were few in number. Since the presence of weeds is seen as an indication of disturbance, one of the factors that affects the condition grade given to a natural area is the presence and abundance of weedy species.

Table 4.8. Non-Native Prairie and Forest Plant Species Found at Survey Sites. (No. of Sites = 29)

Scientific Name	Common Name	No. of Sites Where Found
Agrostis stolonifera	redtop	5
Bromus japonicus	Japanese brome	12
Camelina microcarpa	small-seeded false flax	1
Campsis radicans	trumpet vine	8
Convolvulus arvensis	field bindweed*	2
Dactylis glomerata	orchardgrass	1
Dianthus armeria	Deptford pink	3
Digitaria ischaemum	smooth crabgrass	1
Festuca arundinacea	tall fescue	12

Hemerocallis fulva	day lily	1
Hypericum perforatum	common St. John's-wort	1
Ipomoea hederacea	ivy-leaf morning-glory	2
Lactuca serriola	prickly lettuce	1
Lespedeza cuneata	sericea lespedeza*	10
Lespedeza stipulacea	Korean lespedeza	3
Lespedeza striata	Japanese lespedeza	12
Lysimachia nummularia	moneywort	1
Maclura pomifera	Osage orange	5
Medicago lupulina	black medick	4
Melilotus albus	white sweet clover	2
Oxalis corniculata	creeping ladies sorrel	1
Parthenium hysterophorus	ragweed parthenium	1
Poa pratensis	Kentucky bluegrass	6
Polygonum persicaria	lady's-thumb smartweed	3
Potentilla recta	sulphur cinquefoil	2
Prunella vulgaris	self-heal	3
Rumex crispus	curly dock	6
Setaria glauca	yellow foxtail	1
Sida spinosa	prickly sida	1
Solanum sarrachoides	viscid nightshade	1
Sorghum halepense	Johnsongrass	3
Taraxacum officinale	common dandelion	1
Trifolium campestre	low hop clover	1
Trifolium pratense	pratense	8
Verbascum blatteria	moth mullein	2

4.4. Management Recommendations

Several high-quality prairies and a few high-quality forests still exist in southeast Kansas. Other high-quality plant communities also persist in this area. Private landowners own the majority of remaining areas of high-quality native prairie and forest, and it is thanks to them that these native communities still exist.

4.4.a. Landowners and Managers

With the majority of remaining high-quality prairies and forests being held as private property, encouragement of conservation and continued good management is essential. Various means need to be found to encourage good management for biological diversity through education, direct management, and conservation of these high-quality native tracts.

The various measures and grades determined in the course of this survey can serve as guidelines to an order of site priority for conservation. Table 4.9 lists the natural areas surveyed in order of their rank and size.

Table 4.9 Priorities for Protection. Natural area sites in order by rank and size.

Map Number	Community Type	Rank	Size (acres)	FQI	Species Richness (Total species)	Total native species per site
15	Low Prairie	B	102.68	23.2	42	38
12	Low Prairie	B	94.48	23.3	52	46
26	Hardpan Prairie	B	68.38	35.1	99	95
8	SE Tallgrass Prairie	B	54.44	35.3	85	75
20	Hardpan Prairie	B	49.85	37.2	94	83
7	SE Tallgrass Prairie	B	40.86	37.7	86	78
13	Low Prairie	B	27.86	19.5	43	38
19	Hardpan Prairie	B	11.46	39.1	92	86
28	Hardpan Prairie	B	7.02	21.0	41	39
1	Ozark Upland Forest	C	182.25	43.0	129	115
14	Low Prairie	C	139.74	21.0	43	37
2	Ozark Upland Forest	C	117.41	29.0	52	48
4	SE Tallgrass Prairie	C	98.75	43.6	133	120
22	Hardpan Prairie	C	79.75	36.2	62	59
5	SE Tallgrass Prairie	C	23.78	27.6	56	50
18	Hardpan Prairie	C	19.03	39.9	86	79
6	SE Tallgrass Prairie	C	17.89	29.1	55	53
11	Low Prairie	C	17.05	24.6	44	43
23	Hardpan Prairie	C	16.91	28.9	66	59
24	Hardpan Prairie	C	14.33	28.3	59	56
21	Hardpan Prairie	C	14.28	36.0	72	67
10	SE Tallgrass Prairie	C	12.52	34.9	84	76
17	Hardpan Prairie	C	11.88	24.9	35	33
25	Hardpan Prairie	C	11.60	40.8	91	81
3	SE Tallgrass Prairie	C	9.86	35.7	81	72
16	Hardpan Prairie	C	9.69	29.2	67	60
27	Hardpan Prairie	C	9.69	37.9	72	71
29	Hardpan Prairie	C	3.81	33.1	78	70
9	SE Tallgrass Prairie	D	32.20	29.1	63	56

4.4.b. Conservation Easements

One way to maintain the natural areas that remain is for property owners to preserve the high-quality property that they have. Conservation easements are a tool that provides

landowners with tax benefits when they agree to limit the kind of development that can occur on their property. Planning commissions and nonprofit organizations can educate landowners about conservation easements and encourage their use. Conservation easements held by the Kansas Land Trust, The Nature Conservancy, and the Kansas Department of Wildlife & Parks have already been put into place to protect the ecological values of forests and prairies in many areas of Kansas.

4.4.c. Additional Inventory Surveys

While surveying sites in Cherokee County, several previously unrecorded, high-quality hay meadows were sighted and their locations were approximately mapped for future inventory work. Additional inventory work in Cherokee County would increase both the number and types of known natural area sites. There are over 20 community types that could potentially persist in Cherokee County as high-quality natural areas. Further surveys would undoubtedly uncover some of these. Increased knowledge of the natural landscape would allow for better understanding, management, and planning.

A native hay meadow in the process of being plowed up for the first time was also noted during the survey. Loss of natural areas continues.

4.5. Threats

There are many potential threats to the remaining natural areas of Cherokee County. Although the population of the county is relatively small, there is expansion around the towns as well as suburban sprawl. The American dream of a house on a few acres often results in the sale of farmsteads and their subsequent division into small acreage tracts. These and other threats make protection in the near future important.

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Appendix A
Prairie Plant Species Found at Prairie Sites
(No. of Prairie Sites =27)

Nomenclature follows Great Plains Flora Association. 1991

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Acalypha monoccocca	slender copperleaf	1
Acalypha virginica	Virginia copperleaf	8
Achillea millefolium	milfoil	19
Agalinis fasciculata	fascicled agalinis	3
Agalinis skinneriana	Skinner's agalinis	2
Agrostis hyemalis	winter bentgrass	13
Agrostis stolonifera	redtop	4
Allium canadense	Canada wild onion	2
Ambrosia artemisiifolia	common ragweed	5
Ambrosia psilostachya	western ragweed	12
Ambrosia trifida	giant ragweed	1
Amorpha canescens	lead plant	12
Amorpha fruticosa	false indigo	12
Andropogon gerardii	big bluestem	27
Andropogon saccharoides	silver beardgrass	4
Andropogon scoparius	little bluestem	24
Andropogon ternarius	split-beard bluestem	1
Andropogon virginicus	broomsedge bluestem	24
Antennaria neglecta	field pussytoes	14
Apocynum cannabinum	hemp dogbane	26
Aristida adscensionis	sixweeks threeawn	1
Aristida dichotoma	Curtiss' threeawn	1
Aristida longispica	slim-spike threeawn	4
Aristida oligantha	old-field threeawn	7
Aristida purpurascens	arrow-feather threeawn	2
Asclepias amplexicaulis	bluntleaf milkweed	1
Asclepias hirtella	prairie milkweed	24
Asclepias incarnata	swamp milkweed	9
Asclepias stenophylla	narrowleaf milkweed	2
Asclepias sullivantii	Sullivant's milkweed	3
Asclepias tuberosa	butterfly milkweed	7
Asclepias verticillata	whorled milkweed	5
Asclepias viridiflora	green-flowered milkweed	5
Asclepias viridis	green Antelopehorn milkweed	18
Aster ericoides	heath aster	21
Aster laevis	smooth blue aster	2

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Aster lanceolatus	lance-leaf aster	10
Aster oolentangiensis	azure aster	10
Aster paludosus	southern prairie aster	2
Aster parviceps	small-head aster	1
Aster patens	sky-drop aster	1
Aster pilosus	hairy aster	6
Aster praealtus	common willow-leaved aster	10
Baptisia alba	white wild indigo	2
Baptisia australis	blue false indigo	10
Baptisia bracteata	plains wild indigo	15
Bidens frondosa	devil's beggar-ticks	2
Bidens polylepis	coreopsis beggar-ticks	8
Boltonia asteroides	violet boltonia	5
Bouteloua curtipendula	side-oats grama	2
Bromus japonicus	Japanese brome	12
Buchnera americana	blue hearts	18
Cacalia plantaginea	Indian plantain	6
Callirhoe digitata	finger poppy-mallow	1
Camassia scilloides	wild hyacinth	3
Campsis radicans	trumpet creeper	7
Carex annectens	yellowfruit sedge	6
Carex brevior	straw sedge	9
Carex bushii	Bush's sedge	14
Carex frankii	Frank's sedge	1
Carex gravida	heavy sedge	1
Carex hyalinolepsis	shoreline sedge	1
Carex lacustris	hairy sedge	1
Carex laeviconica	smoothcone sedge	1
Carex lupulina	hop sedge	2
Cassia chamaecrista	showy partridgepea	1
Cassia marilandica	Maryland senna	2
Castilleja coccinea	Indian paintbrush	1
Ceanothus americanus	New Jersey tea	1
Celtis occidentalis	common hackberry	1
Centaurium texense	Texas centaury	1
Cephalolanthus occidentalis	common buttonbush	6
Chasmanthium latifolium	sea oats	1
Chenopodium berlandeiri	pitseed goosefoot	1
Chrysopsis pilosa	soft goldenaster	1
Cicuta maculata	common water hemlock	4
Cinna arundinacea	eastern wood-reed	1
Cirsium altissimum	tall thistle	4

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Clematis pitcheri	Pitcher's clematis	4
Convolvulus arvensis	field bindweed	2
Coreopsis grandiflora	bigflower coreopsis	5
Coreopsis palmata	finger coreopsis	3
Coreopsis tinctoria	plains coreopsis	2
Crotalaria sagittalis	rattlebox	4
Croton capitatus	woolly croton	1
Croton monanthogynus	one-seed croton	1
Crotonopsis elliptica	rushfoil	1
Cuscuta glomerata	cluster dodder	1
Cuscuta indecora	large alfalfa dodder	1
Cyperus acuminatus	tape-leaf flat-sedge	2
Cyperus erythrorhizos	redroot fladsedge	1
Cyperus esculentus	yellow nut-sedge	3
Cyperus ovularis	globe flatsedge	11
Cyperus strigosus	false nutsedge	12
Dactylis glomerata	orchardgrass	1
Dalea candida	white prairie clover	14
Dalea purpurea	purple prairie clover	1
Delphinium virescens	plains larkspur	1
Desmanthus illinoensis	Illinois bundleflower	7
Desmodium ciliare	little-leaf tick-clover	1
Desmodium illinoense	Illinois tickclover	2
Desmodium obtusum	blunt-lobe tick-clover	1
Desmodium paniculatum	panicled tickclover	3
Desmodium perplexum	Dillen's tick-clover	1
Desmodium sessilifolium	sessile-leaf tickclover	14
Dianthus armeria	Deptford pink	3
Dichanthelium acuminatum	pointed dichanthelium	25
Dichanthelium oligosanthes	Scribner's panicum	9
Dichanthelium scoparium	velvet dichanthelium	6
Dichanthelium sphaerocarpon	roundseed dichanthelium	1
Digitaria ischaemum	smooth crab grass	1
Diodia teres	rough buttonweed	2
Diospyros virginiana	common persimmon	3
Dodecatheon meadia	shooting star	4
Dracopis amplexicaulis	clasping coneflower	1
Echinacea pallida	pale purple coneflower	2
Echinochloa muricata	prickly barnyardgrass	11
Eclipta prostrata	yerba de tajo	1
Eleocharis compressa	flatstem spikesedge	2
Eleocharis macrostachya	large-spike spike-rush	1

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Elephantopus carolinianus	Carolina elephant's-foot	1
Elymus canadensis	Canada wildrye	5
Elymus virginicus	Virginia wildrye	10
Eragrostis capillaris	lace grass	1
Eragrostis intermedius	plains love grass	1
Eragrostis spectabilis	purple love grass	21
Erigeron annuus	annual fleabane	3
Erigeron strigosus	daisy fleabane	13
Erigeron tenuis	slender fleabane	5
Eryngium yuccifolium	button snakeroot	14
Eupatorium altissimum	tall joe-pye-weed	3
Eupatorium perfoliatum	clasping-leaf joe-pye-weed	2
Eupatorium serotinum	fall joe-pye-weed	4
Euphorbia corollata	flowering spurge	15
Euphorbia maculata	spotted mat-spurge	8
Euphorbia nutans	eyebane	5
Euthamia gymnospermoides	viscid euthamia	10
Festuca arundinacea	tall fescue	12
Festuca octoflora	sixweeks fescue	1
Fimbristylis puberula	hairy fimbristylis	8
Fragaria virginiana	wild strawberry	1
Gaura longiflora	biennial gaura	3
Geum canadense	white avens	1
Gleditsia triacanthos	honey locust	1
Gnaphalium obtusifolium	fragrant cudweed	1
Hedyotis nigricans	narrowleaf bluets	3
Helenium autumnale	common sneezeweed	11
Helianthus annuus	common sunflower	1
Helianthus grosseserratus	sawtooth sunflower	8
Helianthus maximilianii	Maximilian's sunflower	3
Helianthus mollis	ashy sunflower	19
Helianthus rigidus	stiff sunflower	1
Helianthus tuberosus	Jerusalem artichoke	1
Heliopsis helianthoides	rough ox-eye	2
Heliotropium tenellum	pasture heliotrope	1
Hemerocallis fulva	orange daylily	1
Hibiscus laevis	halberd-leaved rose mallow	4
Hieracium longipilum	longbeard hawkweed	11
Hypericum drummondii	nits-and-lice	2
Hypericum mutilum	slender St. John's-wort	2
Hypericum perforatum	common St. John's-wort	1
Hypericum punctatum	spotted St. John's-wort	3

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Ipomoea hederacea	ivy-leaf morning-glory	2
Iva annua	annual sumpweed	4
Juncus effusus	common rush	3
Juncus interior	inland rush	8
Juncus marginatus	grass-leaf rush	5
Juncus scirpoides	needlepod rush	3
Juncus torreyi	Torrey's rush	6
Juniperus virginiana	western red cedar	1
Koeleria pyramidata	Junegrass	12
Kuhnia eupatorioides	false boneset	2
Lactuca ludoviciana	Louisiana lettuce	1
Lactuca serriola	prickly lettuce	1
Leersia oryzoides	rice cut grass	1
Leersia virginiana	white grass	1
Leptoloma cognatum	fall witch grass	3
Lespedeza capitata	round-head lespedeza	11
Lespedeza cuneata	sericea lespedeza	10
Lespedeza repens	creeping bush-clover	3
Lespedeza stipulacea	Korean clover	3
Lespedeza striata	Japanese clover	12
Lespedeza violacea	prairie lespedeza	6
Lespedeza virginica	slender bush lespedeza	13
Leucosperum multifida	paleseed	1
Liatris aspera	rough gayfeather	5
Liatris pycnostachya	thickspike gayfeather	16
Linum sulcatum	grooved flax	1
Lippia lanceolata	northern fogfruit	3
Lobelia cardinalis	cardinal-flower	1
Lobelia spicata	palespike lobelia	12
Lotus purshianus	prairie trefoil	2
Ludwigia alternifolia	bush seedbox	1
Ludwigia glandulosa	creeping seedbox	1
Ludwigia palustris	marsh seedbox	1
Lycopus americanus	American bugleweed	2
Lysimachia nummularia	moneywort	1
Lythrum alatum	winged loosestrife	1
Maclura pomifera	Osage orange	4
Medicago lupulina	black medick	4
Melilotus albus	white sweet clover	2
Mirabilis albida	white four-o'clock	1
Monarda citriodora	lemon beebalm	1
Monarda fistulosa	wild bergamot	1

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Muehlenbergii sobolifera	rock muhly	1
Myosotis verna	Virginia forget-me-not	1
Nemastylis geminiflora	prairie pleat leaf	1
Nothoscordum bivalve	yellow false-garlic	2
Opuntia humifusa	eastern prickly pear	1
Oxalis dillenii	green wood sorrel	11
Oxalis violacea	violet wood sorrel	11
Panicum anceps	beaked panicum	1
Panicum rigidulum	red-top witch grass	17
Panicum virgatum	switchgrass	26
Parthenium hysterophorus	ragweed feverfew	1
Paspalum floridanum	Florida paspalum	19
Paspalum laeve	field paspalum	14
Paspalum pubiflorum	hairy-seed paspalum	1
Paspalum setaceum	sand paspalum	16
Passiflora incarnata	May-pop passion-flower	1
Pedicularis canadensis	wood betony	2
Penstemon digitalis	smooth beardtongue	5
Penstemon tubaeflorus	tube beardtongue	14
Penthorum sedoides	ditch stonecrop	1
Phalaris arundinacea	reed canarygrass	2
Phalaris caroliniana	Carolina canarygrass	2
Physalis heterophylla	clammy groundcherry	1
Physalis longifolia	common ground cherry	3
Physalis pumila	prairie ground cherry	5
Physalis viriginiana	Virginia ground-cherry	1
Physostegia angustifolia	narrow-leaf lion's-heart	13
Physostegia viriginiana	virginia lionsheart	4
Plantago aristata	bracted plantain	1
Plantago patagonica	woolly plantain	2
Plantago virginica	pale-seeded plantain	2
Poa pratensis	Kentucky bluegrass	6
Polygala incarnata	slender milkwort	4
Polygala sanguinea	blood milkwort	10
Polygala verticillata	whorled milkwort	6
Polygonum amphibium	swamp smartweed	4
Polygonum bicorne	pink smartweed	3
Polygonum hydropiperoides	swamp smartweed	3
Polygonum lapathifolium	curlytop knotweed	1
Polygonum persicaria	spotted lady's thumb	2
Polygonum punctatum	dotted smartweed	2
Polygonum ramosissimum	bushy knotweed	1

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Polytaenia nuttallii	prairie parsley	8
Potentilla recta	sulphur cinquefoil	2
Potentilla simplex	old-field cinquefoil	8
Prenanthes aspera	rough rattlesnakeroot	2
Prunella vulgaris	self-heal	3
Prunus virginiana	choke cherry	1
Psoralea esculenta	prairie turnip	1
Psoralea psoralioides	Sampson's snakeroot	11
Psoralea tenuiflora	many-flowered scurfpea	7
Ptilimnium nuttallii	Nuttall's mock bishop-weed	3
Pycnanthemum tenuifolium	slender mountain mint	22
Pyrropappus carolinianus	Carolina false-dandelion	1
Quercus borealis	northern red oak	1
Quercus stellata	post oak	2
Ratibida pinnata	grayhead prairie coneflower	1
Rhus copallina	dwarf sumac	7
Rhus glabra	smooth sumac	1
Rhynchospora recognita	globe beak-rush	1
Rosa arkansana	prairie wild rose	12
Rosa setigera	climbing rose	1
Rubus flagellaris	northern dewberry	6
Rubus ostryifolius	highbush blackberry	1
Rudbeckia hirta	black-eyed Susan	20
Rudbeckia subtomentosa	sweet coneflower	1
Ruellia humilis	fringeleaf ruellia	25
Rumex altissimus	pale dock	6
Rumex crispus	curly dock	6
Sabatia campestre	prairie rose-gentian	4
Salvia azurea	blue sage	9
Sassafras albidum	white sassafras	1
Schedonnardus paniculatus	tumble grass	1
Schrankia nuttallii	sensitive briar	20
Scirpus atrovirens	green bulrush	1
Scleria triglomerata	whip razorsedge	6
Scutellaria parvula	small skullcap	1
Sedum pulchellum	showy stonecrop	1
Setaria geniculata	knot-root bristle grass	23
Setaria glauca	yellow bristle grass	1
Sida spinosa	prickly sida	1
Smilax hispida	bristly greenbrier	1
Solanum carolinense	Carolina horse nettle	19
Solidago canadensis	Canada goldenrod	16

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Solidago missouriensis	Missouri goldenrod	15
Solidago mollis	ashy goldenrod	1
Solidago nemoralis	gray goldenrod	3
Solidago rigida	stiff goldenrod	3
Solidago speciosa	noble goldenrod	1
Sorghastrum nutans	Indiangrass	24
Sorghum halepense	Johnson grass	3
Spartina pectinata	prairie cordgrass	9
Spermacoce glabra	smooth buttonweed	6
Spiranthes gracilis	southern slender ladies'-tresses	8
Spiranthes vernalis	spring ladies'-tresses	7
Sporobolus asper	rough dropseed	12
Sporobolus cryptandrus	sand dropseed	1
Sporobolus heterolepis	prairie dropseed	1
Strophostyles leiosperma	slick-seed bean	15
Stylosanthes biflora	two-flower pencil-flower	3
Symphoricarpos orbiculatus	buckbrush	1
Taraxacum officinale	common dandelion	1
Tephrosia virginiana	goat's rue	4
Teucrium canadense	American germander	1
Toxicodendron radicans	common poison ivy	1
Tradescantia ohiensis	Ohio spiderwort	3
Tragia betonicifolia	nettleleaf noseburn	3
Tragia ramosa	branched noseburn	1
Tragopogon dubius	goat's beard	1
Tridens flavus	purpletop	16
Tridens strictus	long-spike tridens	16
Trifolium campestre	low hop clover	1
Trifolium pratense	red clover	8
Trifolium reflexum	buffalo clover	1
Triodanis biflora	small Venus'-looking-glass	1
Triodanis leptocarpa	slimpod Venus' looking glass	2
Tripsacum dactyloides	eastern gammagrass	12
Ulmus rubra	red elm	2
Verbascum blatteria	moth mullein	2
Verbena hastata	blue vervain	3
Verbesina alternifolia	wingstem crownbeard	3
Verbesina helianthoides	gravel-weed crownbeard	2
Vernonia marginata	plains ironweed	1
Vernonia arkansana	Arkansas ironweed	16
Vernonia baldwinii	common ironweed	10
Vernonia fasiculata	prairie ironweed	5

Prairie Plant Species Found at Prairie Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Vernonia gigantea	giant ironweed	1
Vernonia missurica	Missouri ironweed	1
Viola pedatifida	prairie violet	4
Viola sagittata	arrowleaf violet	12
Viola sororia	downy blue violet	2

Appendix B
Forest Plant Species Found at Forest Sites
(No. of Forest Sites = 2)

Nomenclature: *The Flora of the Great Plains*, 1991

Forest Plant Species Found at Survey Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Acalypha virginica	Virginia copperleaf	1
Acer saccharinum	silver maple	1
Acer saccharum	sugar maple	2
Achillea millefolium	milfoil	1
Agalinis gattingeri	Gattinger's agalinis	1
Agrostis perennans	autumn bentgrass	1
Agrostis stolonifera	redtop	1
Ambrosia artemisiifolia	common ragweed	1
Amorpha canescens	lead plant	1
Amphicarpaea bracteata	hog peanut	2
Andropogon gerardii	big bluestem	1
Andropogon scoparius	little bluestem	1
Andropogon virginicus	broomsedge bluestem	1
Antennaria parlinii	plantain-leaf pussy's-toes	1
Arabis canadensis	Canada rockcress	1
Aristida dichotoma	Curtiss' threeawn	1
Asarum canadense	Canadian wild-ginger	1
Asimina triloba	pawpaw	1
Aster paludosus	bog wide-head-aster	1
Aster turbinellus	prairie aster	1
Aster anomalus	many-ray aster	2
Aster drummondii	Drummond's aster	1
Aster patens	sky-drop aster	1
Aureolaria grandiflora	big-flowered false foxglove	1
Baptisia bracteata	plains wild indigo	1

Forest Plant Species Found at Survey Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Betula nigra	river birch	1
Boehmeria cylindrica	small-spike false-nettle	1
Botrychium virginianum	rattlesnake fern	1
Bulbostylis capillaris	dense-tuft hair-sedge	1
Cacalia atriplicifolia	pale Indian-plantain	1
Camelina microcarpa	little-pod false-flax	1
Campsis radicans	trumpet creeper	1
Carya cordiformis	bitternut hickory	2
Carya laciniosa	kingnut hickory	1
Carya ovata	shagbark hickory	1
Carya texana	black hickory	1
Carya tomentosa	mockernut hickory	2
Cassia marilandica	Maryland senna	1
Cassia nictitans	sensitive partridgepea	1
Ceanothus sp.	New Jersey tea	1
Celtis occidentalis	common hackberry	1
Cercis canadensis	redbud	2
Chasmanthium latifolium	sea oats	2
Chenopodium berlandieri	pitseed goosefoot	1
Cirsium altissimum	tall thistle	1
Comandra umbellata	bastard toadflax	1
Commelina sp.	dayflower	1
Coreopsis sp.	coreopsis	1
Cornus drummondii	roughleaf dogwood	1
Cornus florida	flowering dogwood	1
Cryptotaenia canadensis	honewort	1
Cuscuta coryli	hazel dodder	1
Cyperus ovularis	globe flatsedge	1
Desmodium cuspidatum	long-leaf tickclover	1
Desmodium glutinosum	large-flowered tickclover	1
Desmodium paniculatum	panicled tickclover	1
Desmodium perplexum	Dillen's tick-clover	1
Dichanthelium acuminatum	pointed dichanthelium	2
Dichanthelium linearifolium	slimleaf dichanthelium	1
Eleocharis lanceolata	lanceolate spikesedge	1
Eleocharis obtusa	blunt spikesedge	1
Elymus canadensis	Canada wildrye	2
Elymus virginicus	Virginia wildrye	2
Eragrostis capillaris	lace grass	1
Eragrostis spectabilis	purple love grass	1
Eupatorium altissimum	tall snakeroot	1
Eupatorium purpureum	bluestem joe-pye-weed	1
Eupatorium rugosum	white snakeroot	2
Euphorbia corollata	flowering spurge	1

Forest Plant Species Found at Survey Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Euphorbia dentata	eastern toothed spurge	1
Festuca octoflora	sixweeks fescue	1
Galium circaezans	woods bedstraw	1
Galium triflorum	sweet-scent bedstraw	1
Geum canadense	white avens	1
Gleditsia triacanthos	honey locust	1
Gymnocladus dioica	Kentucky coffee-tree	1
Helianthus hirsutus	hairy sunflower	1
Helianthus mollis	ashy sunflower	1
Heuchera richardsonii	Richardson's alumroot	1
Hieracium gronovii	Gronovius' hawkweed	1
Hypericum punctatum	spotted St. John's-wort	1
Juglans nigra	black walnut	1
Kuhnia eupatorioides	Texas false boneset	1
Lespedeza hirta	hairy bush-clover	1
Lespedeza procumbens	trailing lespedeza	2
Lespedeza virginica	slender bush lespedeza	2
Lindera benzoin	common spicebush	1
Ludwigia palustris	water purslane	1
Maclura pomifera	Osage orange	1
Menispermum canadense	moonseed	1
Morus rubra	red mulberry	1
Muehlenbergii sobolifera	rock muhly	2
Myosotis verna	Virginia forget-me-not	1
Oxalis corniculata	creeping ladies sorrel	1
Panicum flexile	wiry witchgrass	1
Panicum rigidulum	red-top witch grass	1
Panicum virgatum	switchgrass	1
Parthenocissus quinquefolia	Virginia creeper	2
Paspalum laeve	field paspalum	1
Pedicularis canadensis	wood betony	1
Penstemon tubaeflorus	tube beardtongue	1
Phryma leptostachya	lopseed	1
Platanus occidentalis	common sycamore	1
Polygonum persicaria	lady's-thumb smartweed	1
Polygonum virginianum	Virginia knotweed	1
Populus deltoides	plains cottonwood	1
Porteranthus stipulatus	Indian physic	1
Potentilla simplex	old-field cinquefoil	1
Prunus serotina	black cherry	2
Pycnanthemum pilosum	hairy mountain mint	1
Pycnanthemum tenuifolium	slender mountain mint	1
Quercus marilandica	black-jack oak	2
Quercus muehlenbergii	chinquapin oak	1

Forest Plant Species Found at Survey Sites		
Species Name	**Common name**	**No. of Sites Where Found**
Quercus rubra	northern red oak	1
Quercus shumardii	Shumard's oak	1
Quercus stellata	post oak	2
Quercus velutina	black oak	2
Rhus aromatica	aromatic sumac	2
Rhus copallina	dwarf sumac	1
Rhus glabra	smooth sumac	1
Rosa sp.	rose	1
Rubus flagellaris	northern dewberry	1
Rubus ostryifolius	highbush blackberry	1
Rudbeckia hirta	black-eyed Susan	1
Rudbeckia laciniata	goldenglow	1
Ruellia strepens	limestone ruellia	1
Sassafras albidum	white sassafras	2
Schrankia nuttallii	sensitive briar	1
Scutellaria ovata	egg-leaf skullcap	1
Sicyos angulatus	wall bur-cucumber	1
Smilax ecirrata	carrion flower	1
Smilax hispida	bristly greenbrier	2
Solanum sarrachoides	viscid nightshade	1
Solidago nemoralis	gray goldenrod	1
Solidago radula	rough goldenrod	1
Solidago speciosa	noble goldenrod	1
Solidago ulmifolia	elmleaf goldenrod	2
Spiranthes cernua	nodding ladies'-tresses	1
Symphoricarpos orbiculatus	buckbrush	1
Tephrosia virginiana	goat's rue	1
Toxicodendron radicans	common poison ivy	1
Tridens flavus	purpletop	2
Triosteum perfoliatum	common horsegentian	1
Ulmus rubra	red elm	2
Vaccinium arboreum	farkleberry	1
Verbesina alternifolia	wingstem crownbeard	1
Verbesina virginica	white crownbeard	1
Vernonia fasiculata	prairie ironweed	1
Vitis riparia	riverbank grape	1

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