2003

2003 Survey of Priority Natural Communities in Jefferson County, Nebraska

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Introduction

This survey was undertaken to update information on native plant communities and wildlife habitats in Nebraska to facilitate the development of the Nebraska Game and Parks Commission's (NGPC) Comprehensive Wildlife Plan. The specific intent of the project was to identify and map all large blocks of privately owned native plant communities within the survey area. In 2003, the surveys focused on eastern Nebraska, specifically deciduous forest communities along the Missouri River, tallgrass prairies of southeastern Nebraska (Pawnee, Gage, Jefferson, and eastern Thayer counties), and loess mixed-grass prairies in central Nebraska. A brief survey of the Elkhorn River valley in Madison County from Battle Creek west to Neligh was also conducted.

Methods

Survey sites were initially identified by examination of air photo imagery and topographic maps. Imagery used included 1999 black and white compressed digital ortho quarter quads (COQQs) (Missouri River bluff forests and the Elkhorn River in Madison County) and USDA Farm Service Administration 2001 color COQQs (prairie in Gage, Jefferson and eastern Thayer counties). Pawnee County prairies were located using NGPC maps of potential prairie sites developed by Steinauer (1990) via color infrared aerial photography and aerial reconnaissance. USGS 7.5 minute topographic maps were used to locate potential loess mixed-grass prairie sites in central Nebraska. It was assumed from information gathered in previous surveys (Steinauer, pers. comm.) that any remaining quality prairie sites in the loess hills region would be located on steep slopes that are subject to less intense grazing pressure and are less likely to have been row cropped in the past. Surveys were generally confined to southwestern Custer County in the vicinity of Broken Bow and Arnold.

Surveys for deciduous forests were conducted on private lands in the eastern tier of counties bordering the Missouri River. Douglas, Sarpy and Washington counties were excluded due to the high degree of forest fragmentation resulting from urbanization and associated residential development. Thurston County was also not included as plant community surveys of the Omaha and Winnebago Indian Reservations were previously conducted by Rolfsmeier (2001). The initial intent was to conduct field surveys on all forested tracts greater than 80 acres in size, but the inability to locate some landowners and denial of access by others prevented this from occurring.

Landowners were contacted, and permission to access their properties granted prior to any field surveys being conducted. Nebraska Natural Heritage Program (NHHP) Ecological Community Survey Forms were completed for all plant communities and NHHP Rare Plant Survey Forms for all rare plants (S1 or S2 species) did you do any S3s? encountered. Locations of plant communities and rare plants were marked on USGS 7.5 minute topographic maps. Completed ecological community and rare plant survey forms and accompanying maps were deposited with NGPC for inclusion in the NHHP database. Community nomenclature for this project follows Steinauer and Rolfsmeier (2003).

Results

Deciduous Forest Communities

Forest community occurrences documented in 2003 are summarized in Table 1. No outstanding examples of deciduous forest communities were found during the surveys with most sites having been impacted by a combination of logging, grazing and/or garlic mustard (*Alliaria petiolata*) invasion. Deciduous forest communities are generally highly fragmented along the Missouri River bluffs of Nebraska, with only nine sites greater than 500 acres in size documented. Although the total acreage of contiguously forested land within the larger occurrences may be relatively high, they are often essentially fragmented due to highly irregular boundaries created by clearing of ridge tops and gentle slopes for cropland and pasture.

Table 1. Deciduous forest sites identified during the Nebraska 2003 survey for priority natural communities.

Site	County	Community Type	Approx. Ac.	Condition Rank
Golden Spring Forest	Burt	Lowland Hackberry-Black Walnut Forest	100	C-D
Applebee Woodland	Burt	Upland Bur Oak Forest	150	C
Blyburg Lake Bluffs	Dakota	Red Oak-Basswood & Bur Oak Forest	1200	B to C
Jackson Bluffs	Dakota	Bur Oak-Basswood-Ironwood Forest (?)	600	?
Aowa Bluffs	Dakota/Dixon	Bur Oak-Basswood-Ironwood Forest	900	B to C
Burbank Bluffs	Dixon	Bur Oak-Basswood-Ironwood Forest	1200	BC to C
Obert Forest	Dixon/ Cedar	Bur Oak-Basswood-Ironwood Forest	1000	B to C
Peru Bluffs	Nemaha	Oak-Hickory-Ironwood Forest	300	C to D
Honey Creek Forest	Nemaha	Oak-Hickory-Ironwood Forest	350	?
Indian Cave North	Nemaha	Oak-Hickory-Ironwood Forest (?)	900	?
Hoch Woodland	Otoe	Oak-Hickory-Ironwood Forest	90	C
Berthold Bluffs	Otoe	Oak-Hickory-Ironwood Forest	350	B-C
Sagittarius Forest	Otoe	Oak-Hickory-Ironwood Forest	90	?
S. Branch Camp Creek	Otoe	Oak-Hickory-Ironwood Forest	200	?
Indian Cave South	Richardson	Oak-Hickory-Ironwood Forest	800	?
Fargo School Bluffs	Richardson	Oak-Hickory-Ironwood Forest	500	C
Argo Bluffs	Richardson	Oak-Hickory-Ironwood Forest	250	C-D
Rulo Bluffs Vicinity	Richardson	Oak-Hickory-Ironwood Forest	1200	B to C

The highest concentration of privately-owned forested lands in Nebraska occurs in Dixon and Dakota counties where five of the largest deciduous forest occurrences are located. The Dixon/Dakota county forests are composed primarily of Bur Oak-Basswood-Ironwood Forest although Bur Oak forest is common, and a significant amount of Red Oak-Basswood Forest is present on north and east facing slopes in Dakota County. All forest communities observed in Dixon and Dakota counties are impacted to varying degrees by grazing and eastern red cedar invasion with cedar invasion becoming more severe the further one travels north and west along the Missouri River.

Nemaha and Richardson counties also support relatively large amounts of forest communities with two large blocks (ca. 800 and 900 acres) of what is assumed to be primarily Oak-Hickory-Ironwood Forest are present on the northern and southern boundaries of Indian Cave State Park in Nemaha and Richardson counties. The composition and floristic quality of these two sites

could not be assessed as neither landowner would allow access to their properties. A 1200 acre occurrence of Oak Hickory Ironwood Forest is present in Richardson County between TheNebraska/Kansas border and the mouth of the Big Nemaha River. This occurrence includes the Nature Conservancy's Rulo Bluffs Preserve which supports the highest quality forest occurrence observed during the survey. Also present in Richardson County is the 500 acre Fargo School Bluffs site. Although portions of this site have very high species diversity and is the only site in Nebraska known to support a population of Jacob's ladder (*Polemonium reptans*) its quality is reduced due to a severe infestation of garlic mustard.

In addition to the occurrences mentioned above and smaller tracts listed in Table 1, numerous smaller tracts of deciduous forest not noted in this survey are scattered along the length of the Missouri River. These tracts are primarily confined to narrow bands along the Missouri River bluff face and adjacent drainage bottoms. No deciduous forest communities were documented in Knox County, as all bur oak forests seen were severely infested with eastern red cedar and confined to narrow bands in ravine bottoms.

Garlic mustard is a serious threat to deciduous forest communities in Nebraska, as it appears to be well established along the Missouri River from Dakota County southward. Nearly all forest occurrences examined from northern Richardson to Burt County are heavily infested. Currently, it does not appear to be present in areas north of Dakota County and it is rare on areas examined south of the Big Nemaha River in Richardson County. The extent to which this aggressive exotic species will spread in Nebraska is not known, but it has been seen as far north as Ponca State Park (Rolfsmeier pers. comm.) county and as far west as Hall County (Helzer pers. comm.).

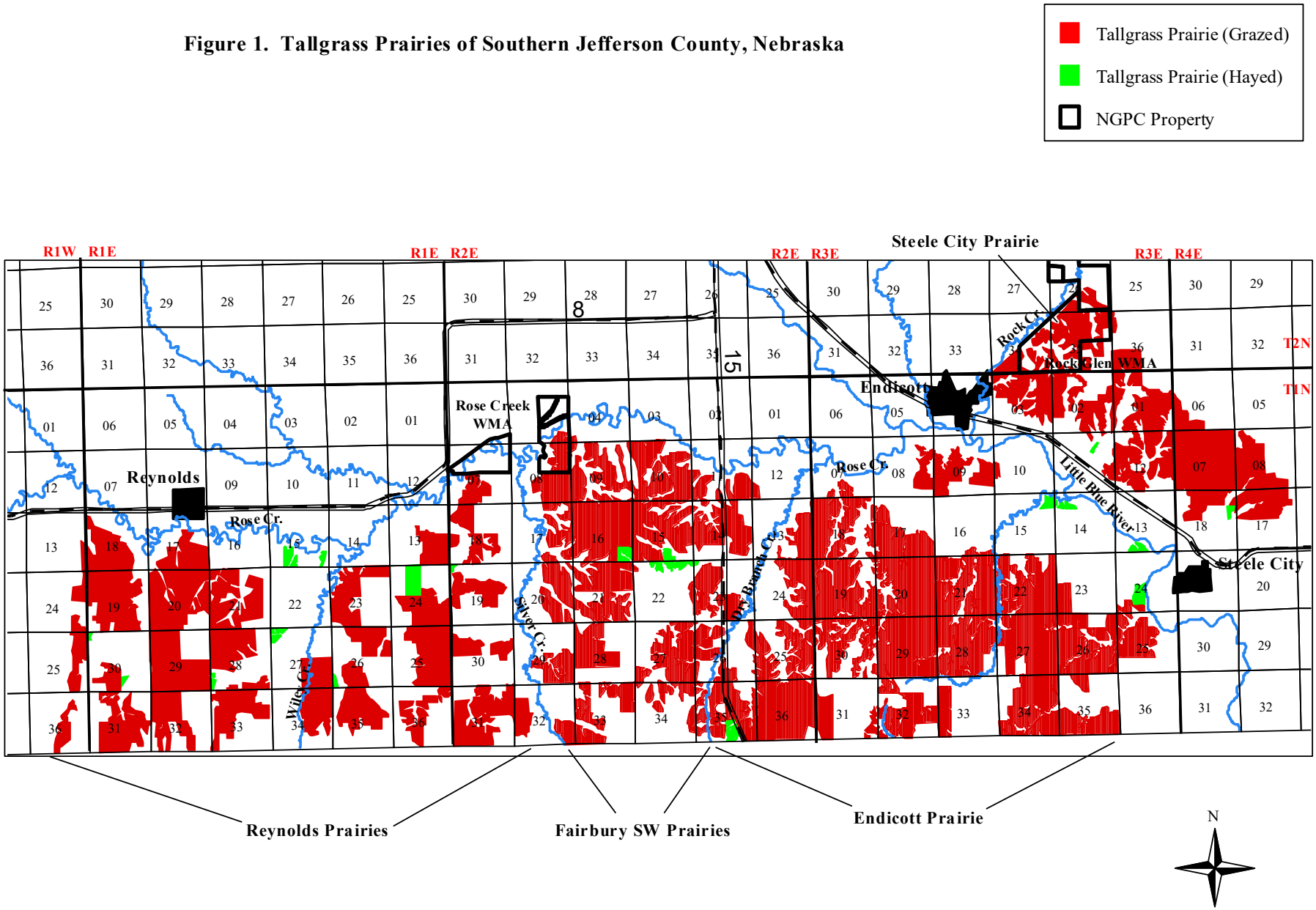
Prairie Communities

Prairie evaluation within the survey area was often difficult due to drought conditions during 2002 and 2003. Spring rains in 2003 produced conditions favorable for the growth of exotic cool season grasses, with subsequent summer drought creating an environment unfavorable for the development of native warm season grasses. This resulted in prairies with above ground biomass dominated by Kentucky Bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*) and cheat-grass (*B. tectorum*) with native warm season grasses relatively uncommon in many places. Future observations of prairies that were surveyed in 2003 may indicate that floristic quality is somewhat higher than indicated from this season's surveys. A summary of prairie communities surveyed is presented in Table 2. Excluded from the table are approximately 50 small tallgrass prairie occurrences from Pawnee and Gage counties that range in size from 1 to 40 acres.

The largest and most significant tallgrass prairie occurrences in southeastern Nebraska occur on rocky hills (sandstone and limestone) in southern Jefferson County. These prairies are primarily south of Rose Creek with an additional occurrence on the north side of the Little Blue River north of Steele City. A map of the distribution of the southern Jefferson County prairies is provided in Figure 1. For mapping purposes the prairies were somewhat arbitrarily divided into four separate occurrences (Table 2) as follows: Endicott Prairie, a nearly contiguous, irregularly shaped, 8800 acre tract east of Dry Branch Creek; Fairbury SW Prairies, 4900 acres of prairie between Dry Branch and Spring Creeks; Reynolds Prairies, 6500 acres of prairie fragments west of Spring Creek; and Steele City Prairie, 3350 acres of prairie on the north side of the Little Blue River north and west of Steele City. Endicott, Steele City, and Fairbury SW Prairies occur on soils that are derived principally from sandstone and sandy shale while the Reynolds Prairies are

on soils derived primarily from limestone. In general, these prairies are ranked C to CD with very limited amounts of B ranked prairie present. Forb diversity is generally low due to

Figure 1. Tallgrass Prairies of Southern Jefferson County, Nebraska



overgrazing and herbicide application. Primary land use in the area is grazing, with small hay meadows widely scattered within the occurrences. Many of the southern Jefferson County prairies are threatened by invasion of woody species, particularly eastern red cedar (*Juniperus virginiana*), honey locust, (*Gleditsia triacanthos*), rough dogwood (*Cornus drummondi*), and smooth sumac (*Rhus glabra*). In general, the Endicott prairies are of greatest interest due to the size and contiguous nature of the occurrence. Of additional interest in the Endicott Prairie is the presence of high quality spring/seep communities that are locally common in ravines within the Turkey and School Creeks drainages and to a lesser extent the Cole Creek drainage. The Reynolds Prairies are generally of lower interest as they are highly fragmented due to the greater proportion of tillable soils in the southwestern part of the county. In addition to the above mentioned prairies, a low quality, highly fragmented tallgrass prairie occurrence, the Powell Prairies (ca 2000 acres), is present to the northwest of Fairbury on rocky slopes on the north side of the Little Blue River.

Table 2. Prairie communities identified during the Nebraska 2003 survey for priority natural communities.

Site	County	Prairie Type	Approx. Ac.	Condition Rank
Christen's Canyon Prairie	Custer	Loess Mixed-grass Prairie	40	B
Hidden Valley Prairie	Custer	Loess Mixed-grass Prairie	60	BC
Pine Canyon Prairie	Custer	Loess Mixed-grass Prairie	80	B
Big Indian Creek Prairie	Gage	Tallgrass Prairie	1200	C to D
Holmesville Prairie	Gage	Tallgrass Prairie	380	C
Endicott Prairie	Jefferson	Tallgrass Prairie	8800	B to D
Fairbury SW Prairie	Jefferson	Tallgrass Prairie	4900	C to D
Powel Prairies	Jefferson	Tallgrass Prairie	2000	C to D
Reynolds Prairies	Jefferson	Tallgrass Prairie	6500	C to D
Steele City Prairie	Jefferson	Tallgrass Prairie	3350	C to CD
Big Sandy Creek	Jefferson/Thayer	Southern Sand/Gravel Mixed Grass Prairie	250	B to CD
Little Blue River	Jefferson/Thayer	Tallgrass Prairie	2000	C to CD
Burchard Lake Prairie	Pawnee	Tallgrass Prairie	3500	C to D
Little Blue River	Thayer	Southern Sand/Gravel Mixed Grass Prairie	500	C to CD

Significant amounts of tallgrass prairie and southern sand/gravel mixed grass prairie are present on hills adjacent to the Little Blue River and Big Sandy Creek in western Jefferson and eastern Thayer counties. These prairies are somewhat fragmented with tallgrass prairies generally occurring on bluffs and hillsides with shallow soils over limestone and shale, and southern sand/gravel mixed-grass prairies on thin soils over coarse sands and gravel.

The prairies surveyed in Pawnee County consist primarily of small hay meadows ranging in size from 1 to 40 acres. The only large tallgrass prairie occurrence in the county is one of approximately 3500 acres in the vicinity of Burchard Lake. This prairie is fairly low quality pasture with very low forb diversity and common to abundant exotic cool season grasses throughout most of the occurrence. Two tallgrass prairies of significant size were noted in

southern Gage County. Big Indian Creek Prairie is located on stony bluffs and hills adjacent to Big Indian Creek and Holmesville Prairie is on rough sandstone hills on the west side of the Big Blue River. Both prairies have very low forb diversity and a high component of exotic cool season grasses. Portions of Big Indian Creek Prairie are threatened by eastern red cedar invasion.

The Loess hills region of central Nebraska appears to support very little native loess mixed-grass prairie of any quality. Exotic cool season species dominate throughout the area examined. The abundance of cool season species may have been magnified this season by spring rains and summer drought conditions, but previous survey work has also failed to locate significant occurrences of quality loess mixed grass prairie (Rolfsmeier pers. comm.). The best examples are confined to extremely steep slopes that are inaccessible to cattle and too xeric for exotic cool season species to dominate.

Rare Plant Species

A summary of the rare (S1/S2) plant species encountered during the survey is provided in Table 3. A total of 35 occurrences from 16 families were documented, with three species poor-joe (*Diodia teres*), knotty-leaf rush (*Juncus acuminatus*), and Jacob's-ladder (*Polemonium reptans*) being new records for Nebraska. A fourth new record from Burt County, New York Fern (*Thelypteris noveboracensis*), is likely non-native given that the species was evidently a commonly planted ornamental in the past (Rolfsmeier pers. com.).

Table 3. NNHP rare species occurrences documented. (* indicates new species record for NE.)

Species	Common Name	Family	County	Occurrences
Arisaema dracontium	Green dragon	Araceae	Richardson	1
Aristida purpurascens	Arrow-leaf three-awn	Poaceae	Jefferson	2
Asplenium platyneuron	Ebony spleenwort	Aspleniaceae	Jefferson	1
Carex frankii	Frank's sedge	Cyperaceae	Jefferson	1
Desmodium sessilifolium	Sessile-leaf tick-clover	Fabaceae	Jefferson	1
Diodia teres *	Poorjoe	Rubiaceae	Jefferson	3
Dulichium arundinaceum	Pond sedge	Cyperaceae	Jefferson	5
Heteranthera multiflora	Bouquet mud plantain	Pontederiaceae	Jefferson	1
Hypericum mutilum	Dwarf St. John's-wort	Clusiaceae	Jefferson	1
Isanthus brachiatus	False pennyroyal	Lamiaceae	Jefferson	1
Juncus acuminatus *	Knotty-leaf rush	Juncaceae	Jefferson	4
Juncus effusus	Soft rush	Juncaceae	Jefferson	2
Liatris pycnostachya	Thick-spike gayfeather	Asteraceae	Pawnee	3
Ludwigia alternifolia	Bushy seedbox	Onagraceae	Jefferson	1
Pedicularis lanceolata	Swamp lousewort	Scrophulariaceae	Custer	1
Pellaea atropurpurea	Purple cliff brake	Pteridaceae	Nemaha	1
Polemonium reptans *	Jacob's-ladder	Polemoneaceae	Richardson	1
Potemogeton diversifolius	Water-thread pondweed	Potamogetonaceae	Jefferson	2
Tephrosia virginiana	Hoary pea	Fabaceae	Jefferson	3

Conclusion

A total of 18 privately-owned deciduous forest occurrences ranging in size from 90 to 1200 acres were documented along the Missouri River in eastern Nebraska. Nine of the occurrences are over 500 acres in size. The largest concentrations of deciduous forests are in Richardson and Nemaha counties in southeastern Nebraska and Dakota and Dixon counties in northeastern Nebraska. Fourteen prairie communities ranging in size from 40 to 8800 acres were documented form southeastern Nebraska and the loess hills region of central Nebraska. The greatest concentration of tallgrass prairie within the survey area is in southern Jefferson County where approximately 23,000 acres of prairie is present within the Steele City, Endicott, Fairbury SW, and Reynolds prairies. In addition to the plant community occurrences, 35 rare plant occurrences were also documented.

References

Helzer, Chris. 2003. Personal communication. Land steward. The Nature Conservancy. Aurora, NE.

Rolfsmeier, Steve. 2001. Survey of native plant communities of the Omaha and Winnebago Indian Reservations, Thurston County, Nebraska. Nebraska Game and Parks Commission. Lincoln, NE.

Rolfsmeier, 2003. Personal communication. Assistant curator. Chadron State College Herbarium. Chadron, Nebraska.

Steinauer, Gerry. 1990. Final report on the natural areas inventory of Pawnee County, Nebraska, with recommendation for future inventories. Nebraska Game and Parks Commission. Lincoln, NE.

Steinauer, Gerry. 2003. Personal communication. Botanist. Nebraska Natural Heritage Program. Nebraska Game and Parks Commission.