

**A SURVEY OF THE  
GRAND RIVER NATIONAL GRASSLAND,  
FOR BAIRD'S SPARROWS, SPRAGUE'S PIPITS, BURROWING OWLS  
AND OTHER SOUTH DAKOTA SENSITIVE BIRD SPECIES**

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## ABSTRACT

The Grand River National Grassland (GRNG) in northwestern South Dakota was surveyed during June and August for Baird's sparrows, Sprague's pipits, burrowing owls, and other South Dakota sensitive bird species (scientific names of wildlife species are listed in Appendix A). The survey consisted of 10 strategically placed routes through the GRNG totaling 150.3 miles with 133 observation stations to listen and look for Baird's sparrows and Sprague's pipits. Baird's sparrows were found on 6 routes and at 8% of the observation stations. Overall, 17 observations of 20 Baird's sparrows (1.2 birds/observation) were made during June and August. The Baird's sparrow was primarily found on the northern portion of the GRNG with 15 of the 17 observations in areas with crested wheatgrass (*Agropyron cristatum*) plantings. The Sprague's pipit was observed on 8 routes and at 14% of the observation stations. Thirty-nine observations of 49 Sprague's pipits (1.3 birds/observations) were made during all the survey work in June and August. The Sprague's pipit was found throughout most of the GRNG except for the badlands portion. The Sprague's pipit appeared to be associated with broad areas of upland prairie with a significant native grass component. Burrowing owls were surveyed by visiting each black-tailed prairie dog colony on or adjacent to the GRNG during early August. Burrowing owls were observed at 16 of the 29 prairie dog colonies (55%). The 29 colonies totaled approximately 1,820 acres with the average colony size being 62.7 acres. The average size of colonies used by burrowing owls (83.4 acres) was greater than those not used by owls (8.8 acres). During the survey, 35 pairs of owls were identified, and 101 young were counted with an average of 2.9 juvenile owls per family. Twenty prairie dog colonies were surveyed for mountain plovers (*Charadrius montanus*) during June, and no plovers were found. Only the largest prairie dog colony (554 acres) on the GRNG was considered to contain suitable mountain plover habitat. Nocturnal surveys for common poorwills were conducted during June. Poorwills were heard calling on 1 of 7 routes and at 3 of 46 stations. The 3 stations with poorwill calls were restricted to 1 general area at the base of an unnamed butte. An additional poorwill was heard calling in early June when camped at the Humphrey Draw Wildlife Area. During June and early August, approximately 50 miles of hardwood draws were systematically surveyed for raptor nests and owls. Nineteen large owls were observed with the great-horned owl being the most common species found in the hardwood draws, but 1 long-eared owl and 1 barn owl were also observed. Although, great blue herons were observed on and adjacent to the GRNG, no heron rookeries were found on the GRNG. No long-billed curlews (*Numenius americanus*) were observed on the GRNG even though there was apparently suitable grassland habitat for this species. Observations of other wildlife species were recorded and are discussed in this report.

## INTRODUCTION

The Great Plains prior to settlement contained a great diversity of plant and wildlife species that spanned most of the mid-North American continent. However, much of the Great Plains has been converted to agricultural cropland and pastureland, and many of the native plant and wildlife species have been impacted through this process. Tracts of Federal lands throughout the western Great Plains have preserved some of the prairie grassland diversity. The Grand River National Grassland

(GRNG) in northwestern South Dakota protects about 164,000 acres of grasslands. Although much of this area was formerly cultivated, the GRNG consist of 8 large blocks of grass dominated landscape. These grasslands provide habitat for several sensitive grassland dependent bird and mammal species. There are 29 black-tailed prairie dog colonies totaling about 1,820 acres that are located on or adjacent to the GRNG. In addition to creating a high density of burrows in the prairie environment, prairie dogs alter grassland plant species composition (increased forb abundance) and structure (decreased vegetation height). These changes to the prairie grasslands are important to and sought out by some wildlife species. The burrowing owl is one grassland species that is closely associated with prairie dog colonies. Black-tailed prairie dog distribution and abundance was greatly reduced during the 20th century through agricultural conversion of grasslands, poisoning campaigns, and the introduction of sylvatic plague. The burrowing owl on the Great Plains has probably declined proportionately in relation to the decline in black-tailed prairie dogs. Burrowing owls are attracted to prairie dog colonies because of the availability of burrows and low growing vegetation. The mountain plover is another grassland bird species attracted to prairie dog colonies. Mountain plovers require a high percentage of bare ground, very low growing vegetation, and broad level topography for successful nesting and brood rearing. These habitat requirements are frequently met in prairie dog colonies (Knowles et al. 1982).

Other grassland bird species such as the Baird's sparrow and Sprague's pipit require taller lightly grazed or ungrazed vegetation for nesting purposes. These are also ground nesting birds, but they require denser vegetation to provide structure and cover for their nests. These species are adapted to forage among taller vegetation and do not require bare ground and short vegetation to pursue insects or search for seeds. Some bird species such as the upland sandpiper require tall vegetation for nesting purposes, but prefer shorter vegetation for foraging areas. On rangelands managed for cattle grazing, the reduction of prairie dogs and the development of numerous water sources to promote uniform grazing intensity has the potential to impact many grassland bird species.

The GRNG also contains hardwood draws, which provide a unique habitat within the grassland environment. Green ash (*Fraxinus pennsylvanica*), boxelder (*Acer negundo*), cottonwood trees (*Populus* spp.), willow (*Salix* spp.), buffaloberry (*Shepherdia argentea*), chokecherry (*Prunus virginiana*), and snowberry (*Symphoricarpos occidentalis*) are common trees and shrubs found along drainages on the GRNG. The larger trees are used by several grassland raptors for nesting purposes. Approximately 50 miles of hardwood draws exist on the GRNG west of Highway 73, and in addition, the GRNG contains some cottonwood-dominated bottomlands along the South Grand River. Swainson's hawks, red-tailed hawks, ferruginous hawks and golden eagles have been reported to nest on the GRNG (Knowles 2001). A raptor survey in 2001 found 35 Swainson's hawk nests (15 active) and 4 red-tailed hawk nests (2 active). Nests constructed by these species can be used by great horned owls and other owl species for nesting. Also nesting in the hardwood draws are black-billed magpies. A survey of the hardwood draws in 2001 found 14 active and 121 inactive magpie nests. Magpie nests are frequently used by long-eared owls for nesting (Marks 1986).

During the summer of 2001, surveys were conducted on the GRNG in Perkins and Corson Counties, South Dakota for several bird species considered as uncommon or sensitive in South Dakota. Specific surveys were conducted for the burrowing owl, Baird's sparrow, Sprague's pipit, and

common poorwill. Systematic observations of other bird species of interest were made incidental to this survey, and during an intensive survey of the western portion of the GRNG for raptors (Knowles 20001). This report summarizes the results of these surveys on the GRNG for uncommon and sensitive bird species.

## STUDY AREA AND METHODS

The study area consisted of the entire GRNG. However, hardwood draws were surveyed only west of Highway 73, an area comprising about 182 square miles. This general area was transected by the North and South Grand Rivers, which converge and are impounded by the Shadehill Reservoir in the northeastern portion of the study area. All drainages on the study area were tributaries to the North and South Grand Rivers, and the Grand River. The GRNG were characterized by rolling grassland prairie phasing into gently broken topography close to the North and South Grand Rivers. Elevation within the study area ranged from 2,200 to 2,900 feet. The central and northwestern portions of the study area contained sandstone capped buttes. Higher elevation sites were represented by Square Top Butte, White Butte, Black Horse Butte and several other unnamed similar structures. The northeastern portion of the study area contained badland features locally known as Little Egypt.

Hardwood draws occurred in several portions of the study area, but the most extensive and best-developed hardwood draws were found in the Shadehill and Square Top Butte areas. These areas had numerous north trending drainages, which supported dense stands of trees. Generally trees and shrubs grew in the drainage bottoms and on slopes with at least some northerly exposure. These sites appeared to be sufficiently wet and cool to support deciduous trees and shrubs. The hardwood draws were dominated by green ash. Typically, green ash stands were comprised of one or two size classes. Usually boxelder and willow occurred with low frequency in the bottom of the drainages. Cottonwood trees were also present in low numbers usually associated with a seep at the base of a side slope, or an area with standing water. A mature stand of cottonwood trees also occurred on bottomlands of the South Grand River. Quaking aspen (*Populus tremuloides*) and American elm (*Ulmus americana*) occurred with limited distribution within the study area. Collectively, all these trees species provided intermittent closed canopy stands along many of the north trending drainages.

Western snowberry was the dominant shrub on the GRNG. It occurred both as an understory shrub in green ash stands and as a closed canopy shrub in openings on the drainage bottoms, on north exposures above the ash stands, on south exposures up to about mid slope, and in swales. Buffaloberry and chokecherry were also common shrubs and occurred immediately above green ash stands on north exposures and at the heads of drainages. Buffaloberry usually formed dense thickets, and the tickets at the heads of drainages were generally not associated with green ash stands. An occasional Rocky Mountain juniper (*Juniperus scopulorum*) was present in hardwood draws, but they were not important in this study area. Herbaceous understory vegetation was dominated by smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). In some sites native sedges (*Carex* spp.) were still present. Upland areas were dominated by grasses with western wheatgrass (*Agropyron smithii*), little bluestem (*Andropogon scoparius*), blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*) being common native species.

However, much of the upland area had been planted to crested wheatgrass, and in these areas, crested wheatgrass was often the dominant species.

Ten Baird's sparrow and Sprague's pipit survey routes totaling 150.3 miles with 133 stations were run from 22 June to 1 July and on 12 August. The survey consisted of driving 2-track trails through suitable habitat, and stopping at about 1 mile intervals to listen for a 10-minute period for calls of these two species. The number of Baird's sparrows and Sprague's pipits observed at each station was recorded. Observations of other bird species observed within a 400-yard radius of the station were noted as being present, but the number of individual birds was not recorded. These transects were conducted from sunrise to about 10AM when the temperature and wind increased sufficiently to cause a noticeable decline in bird activity. On a couple of occasions, transects were run during a late evening period (2 hours before sunset to sunset). Transects generally ranged from 5-15 miles long, and generally contained 10-15 stations.

Specific surveys were conducted for the common poorwill during late June. These surveys consisted of driving 2-track trails and gravel roads from about 10 PM (1.5 hours after sunset) to 12 AM, and stopping at 0.5-1.0 mile intervals to listen for poorwill calls. There were 7 poorwill survey routes and they generally surveyed the same areas surveyed Sprague's pipits and Baird's sparrows. However, the routes in some cases were altered to provide better coverage of areas close to the North and South Grand Rivers and Grand River. On 1 survey night in the Humphrey Draw area, the survey consisted of sitting at 1 location for about 2 hours to listen for poorwills because a poorwill was heard in this area during early June. On another night, the general area was also surveyed using a vehicle route. In addition, during other survey work in June and early August, I camped on the study area and made an effort each night to listen for poorwills in the vicinity of the camp sites.

The burrowing owl survey was conducted from 3-11 August 2001. The survey consisted of visiting each prairie dog colony on or adjacent to the GRNG during morning (sunrise to 10 AM) and evening (5 PM to sunset) periods. The burrowing owl survey followed methods described by Atkinson (2001). Burrowing owl family groups in each colony were identified and recorded, and each family group was carefully counted to determine the number of young and adults present. Approximately one hour or more was required to obtain an accurate count of a family group, but even with this level of effort, the counts should be considered a minimum since individual owls were constantly entering and exiting burrows during the survey period. I also visited most of the prairie dog colonies during late June to look for mountain plovers and assess the colonies as potential plover habitat. During these visits, all species of wildlife observed on the colonies were recorded. The Forest Service provided acreage estimates for most of the prairie dog colonies on lands they administered. These acreages were determined from a 1999-2000 mapping effort. This mapping effort consisted of driving the perimeter of the prairie dog colony while recording coordinates with a GPS unit. These data had been differentially corrected, converted to shape files and then imported into a GIS program. There was no mapping information for 5 colonies located entirely or primarily on public lands. I estimated acreages by recording UTM coordinates along the perimeter of the colonies with a GPS unit (Garmin 12XL), plotting these coordinates on graph paper, counting the squares encompassed by the resulting polygon, and then multiplying the number of square by the area represented by a square. Some of the colonies were located on private lands and acreages of these

colonies were visually estimated.

The presence of the North and South Grand Rivers, Shadehill Reservoir, and numerous smaller reservoirs in or adjacent to the study area, suggested the possibility of great blue heron rookeries in this area. On 19 April, the western portion of the GRNG was surveyed from the air to determine the status of 16 previously recorded raptor nests. During this survey, an effort was made to check likely stands of cottonwood trees for heron rookeries. All observations of great blue herons during the June and August survey work were noted, and herons observed flying before sunrise or after sunset were assumed to be headed from or to a rookery. The direction of flights was noted and stands of cottonwood trees transected by the flight lines were checked for heron rookeries.

In late May, June, and early August, all drainages west of Highway 73 with stands of green ash and its plant associates were walked looking for raptor nests and magpie nests. The beginning and ending point of each transect was recorded with a GPS unit to establish the exact location of the transect and determine the straight-line distance between the beginning and ending points. Information recorded on raptor nests observed during the ground survey included UTM coordinates determined with a GPS unit, nest substrate (tree species, cliff, gumbo knob, hillside), activity status of the nest (active inactive), nest condition (good, fair, poor, destroyed), and raptor species. Raptor nests not associated with hardwood draws were located by checking isolated trees and scanning hillsides, gumbo knobs and cliffs with binoculars. All observations of raptors and owls were recorded while walking these transects.

## RESULTS AND DISCUSSION

### BAIRD'S SPARROW SURVEY

Baird's sparrows were observed at 11 (8%) stations on 6 (60%) routes with a total of 13 birds (0.09 birds/station) being observed. During the entire field period 20 Baird's sparrows (1.2 birds/observations) were observed (Table 1). All observations except 1 were on the northern portion of the GRNG. During August 1, Baird's sparrow was observed on the Corson County unit of the GRNG. Of the 17 observations of Baird's sparrows, all but 2 observations were at grassland sites where crested wheatgrass was a dominant plant species. However, none of the Baird' sparrow observations were in dense, single species stands of crested wheatgrass. All sites used by Baird's sparrows showed little or no impacts of grazing during 2001. Topographic sites used by Baird's sparrows were rolling prairie usually at the upper portions of drainages. The Baird's sparrow was not common on the GRNG, and appeared to be restricted primarily to the northern portion of the GRNG.

Table 1. List of Baird's sparrows observed on the Grand River National Grassland during June and August 2001.

Number Observed	Date	Location of Observations	
		Deg., Min. N Latitude	Deg., Min. W Longitude
2	24 June	45, 47.928	102, 33.833

1	26 June	45, 52.397	102, 29.693
1	27 June	45, 53.077	102, 29.664
2	27 June	45, 53.703	102, 29.223
1	27 June	45, 53.298	102, 30.783
1	27 June	45, 49.502	102, 22.697
2	28 June	45, 52.885	102, 29.274
1	28 June	45, 51.176	102, 20.445
1	29 June	45, 47.463	102, 03.149
1	30 June	45, 52.449	102, 47.853
1	30 June	45, 51.439	102, 43.167
1	30 June	45, 51.464	102, 42.998
1	30 June	45, 51.325	102, 40.478
1	03 Aug	45, 48.265	102, 03.751
1	05 Aug	45, 37.054	102, 54.687
1	12 Aug	45, 51.792	102, 47.366
1	12 Aug	45, 55.268	102, 46.119

The habitat preference of this species on the GRNG appeared to be areas of rolling prairie with taller grasses. Others have reported the Baird's sparrow to be associated with idled to moderately grazed native and tame grasslands (Dechant et al. 2001a). However, not all introduced grasses are used by Baird's sparrows. Tame stands of smooth brome and Kentucky bluegrass may be avoided, while stands of crested wheatgrass are readily used (Dechant et al. 2001a). Baird's sparrows are reported to avoid areas dominated by western snowberry (Dechant et al. 2001) which was a common shrub on the GRNG. Areas of heavy or continuous grazing that significantly reduces residual vegetation and litter are also avoided by the Baird's sparrow (Dechant 2001a).

#### SPRAGUE'S PIPIT SURVEY

Thirty-nine observations of 49 Sprague's pipits (1.3 birds/ observations) were made during all the survey work in June and August (Table 2). Sprague's pipits were still engaged in aerial displays during early August, and 12 (31%) of the observations were made in August. Sprague's pipits were observed on 8 of the 10 (80%) survey routes in June and August, and at 18 (14%) of the 133 stations with 23 birds being observed (0.18 birds per station). All observations of the Sprague's pipit were of birds hovering over specific sites. Up to 3 birds were observed in a general area, but most frequently only a single bird was observed. The Sprague's pipit was widely distributed on the GRNG. The only area where I failed to observe pipits was in the badland portion of the GRNG east of Highway 73. Pipits appeared to be associated with large blocks of grasslands dominated by native grass species. Pipits were frequently observed flying over low ridges while calling. Pipits were observed calling over 5 prairie dog colonies but it was not determine if they were associated with the colonies.

The Sprague's pipit was relatively common and widely distributed on the GRNG. The habitat preference of this species appeared to be upland prairie with a significant native grass component. The Sprague's pipit was not found in areas of extensive crested wheatgrass plantings such as observed for the Baird's sparrow. These 2 species were observed together in one area, but in that

case the Baird's sparrow was using a mesic upland swell that was dominated by native grass species.

Others have reported the Sprague's pipit to be associated with grasses of intermediate height in areas of extensive native prairie (Dechant et al. 2001b). Male breeding territories are reported to be in areas with ridgetops and specific nest sites are reported to contain sufficient litter to develop a covered nest and nest entrance. Sprague's pipits are reported to have 2 distinct breeding periods; 1 in late May and early June, and another in late July and early August. This was consistent with my observations on the GRNG. Sprague's pipits are usually associated with areas of light to moderate livestock grazing and avoid areas of intensive grazing (Dechant et al. 2001b). With the exception of 5 Sprague's pipit observations close to prairie dog colonies, their use of grasslands sites on the GRNG were generally associated with lightly grazed areas.

Table 2. List of Sprague's pipits observed on the Grand River National Grassland during June and August 2001.

Number Observed	Date	Location of Observations	
		Deg., Min. N Latitude	Deg., Min. W Longitude
2	05 June	45, 42.930	102, 10.780
1	09 June	45, 52.562	102, 47.583
1	11 June	45, 34.239	102, 34.106
1	12 June	45, 34.723	102, 34.164
1	21 June	45, 35.876	102, 33.039
1	21 June	45, 36.156	102, 29.774
1	21 June	45, 35.876	102, 33.039
1	21 June	45, 34.239	102, 34.106
1	21 June	45, 34.724	102, 34.164
1	22 June	45, 36.529	102, 31.264
1	22 June	45, 37.059	102, 31.630
2	22 June	45, 36.192	102, 29.768
1	22 June	45, 36.195	102, 29.135
1	22 June	45, 35.109	102, 31.706
1	23 June	45, 38.848	102, 29.901



Table 2. Continued.

Number Observed	Date	Location of Observations	
		Deg., Min. N Latitude	Deg., Min. W Longitude
1	23 June	45, 38.558	102, 30.252
1	26 June	45, 36.677	101, 59.692
2	26 June	45, 37.513	101, 59.366
1	26 June	45, 37.615	101, 58.238
3	26 June	45, 37.272	101, 57.149
1	27 June	45, 52.274	102, 33.418
1	28 June	45, 49.155	102, 23.757
1	29 June	45, 48.271	102, 05.441
1	30 June	45, 51.465	102, 42.998
3	30 June	45, 51.558	102, 41.655
1	30 June	45, 50.038	102, 37.208
2	30 June	45, 50.480	102, 36.787
1	03 Aug	45, 40.956	102, 13.314
1	03 Aug	45, 48.004	102, 06.828
1	03 Aug	45, 48.265	102, 03.750
1	05 Aug	45, 36.221	101, 58.095
1	05 Aug	45, 36.807	101, 59.060
1	05 Aug	45, 36.407	101, 58.129
1	06 Aug	45, 35.166	102, 24.346
3	07 Aug	45, 37.922	102, 29.238
1	10 Aug	45, 39.178	102, 29.894
1	10 Aug	45, 39.180	102, 29.978
1	10 Aug	45, 38.868	102, 28.896
1	12 Aug	45, 51.398	102, 43.108

LONG-BILLED CURLEW

No long-billed curlews were observed on the GRNG during June. During the August survey period there would have been little opportunity to observe curlews. In Montana, curlews leave their breeding areas by late July and are rarely found in August. The habitat on much of the GRNG appeared suitable for curlews based on vegetation and topography. Long-billed curlews were found in low numbers on grassland benches north of the Black Hills about 150 miles south of the GRNG during 1989 and 1990 (Knowles 1997). The habitat in this area appeared very similar to the GRNG. Long-billed curlews have also been reported in southwestern North Dakota (Jeb Williams, North Dakota Game and Fish biologist, pers. commun.). Curlews prefer broad areas of relatively level topography with short to moderate grass height (Dechant et al. 1999a). The long-billed curlew is tolerant of moderate livestock grazing and in areas with taller grasses may even benefit from grazing. In Montana, areas used by curlews frequently are the

same sites used by Sprague's pipits. The lack of long-billed curlews on the GRNG is surprising and does not appear to be based on lack of suitable habitat.

### UPLAND SANDPIPER

The upland sandpiper was a very common bird on the GRNG. This was also a common bird on the grassland benches north of the Black Hills and overlapped with the long-billed curlew in use of grassland habitats (Knowles 1997). In June and even in August, the upland sandpiper was frequently observed foraging on prairie dog colonies (13 of 29 colonies). In early June, adults were observed on the colonies, but by late June, entire families were observed foraging on colonies. In the larger colonies, I often observed more than 1 sandpiper family on a prairie dog colony. One upland sandpiper nest was found, and it was located in taller grass and was not associated with prairie dogs. The observation of upland sandpipers nesting in taller grasses and foraging in short grass areas is consistent with other published accounts of the upland sandpiper habitat use (Dechant et al. 1999b).

Only the horned lark (23 of 29), meadowlark (18 of 29) and burrowing owl (17 of 29) were observed with greater frequency on prairie dog colonies than the upland sandpiper, while the killdeer (13 of 23) was observed with the same frequency on prairie dog colonies as the upland sandpiper. It is recognized that the horned lark, burrowing owl and killdeer are benefited by prairie dogs, and it should also be recognized that the upland sandpiper can be benefited by prairie dogs. However, the relationship of upland sandpipers to prairie dogs is not a simple one.

Whereas other prairie dog associated bird species nest within prairie dog colonies, the upland sandpiper must have tall grasses available to construct their grass-lined and grass-roofed nests. Such sites are not available on prairie dog colonies and nesting must occur off of colonies. In dryer grasslands in Montana, the upland sandpiper is not associated with prairie dog colonies. The meadowlark has similar nesting requirements as the upland sandpiper and its use of the prairie dog colonies is for foraging purposes as well.

### BURROWING OWL SURVEY

A total of 29 prairie dog colonies was examined for burrowing owls from 3-11 August. These colonies totaled approximately 1,820 acres with the average colony size being 62.7 acres. (Colonies #11-14 and #17-20 were each probably once single large colonies that were fragmented into series of smaller colonies by poisoning. These small colonies were separated from each other by more than 200 yards and were considered separate colonies in this survey.) The majority (76%) of prairie dog colonies were less than 50 acres, but 81% of the prairie dog acreage was accounted for by colonies over fifty acres. The 3 largest prairie dog colonies accounted for 61% of the prairie dog acreage.

Burrowing owls were observed in 16 (55%) of the 29 colonies during the August survey (Table 3). A burrowing owl was observed in colony #21 during early June, but two visits to this colony during August failed to reveal any owls. Apparently this owl family was lost between early June and early August. During the June survey, burrowing owls were observed at 12 of 20 (60%) colonies visited. Burrowing owls were subsequently observed at 3 of these colonies in August where owls were not observed in June. Colony #21 was the only colony where owls were

observed in June, but not in August. Overall, burrowing owls were observed in 17 (59%) of the 29 prairie dog colonies. Only the horned lark was observed with greater frequency on prairie dog colonies (23 of 29). One burrowing owl was found in June at a badger-excavated burrow on the northern portion of the GRNG in an area with no prairie dogs. This site was visited in August and an owl was found here again, but there was no indication that this was a pair of owls with a family. This was the only burrowing owl observed off of a prairie dog colony during the survey.

Burrowing owls appeared to selectively use larger prairie dog colonies. The average size of colonies used by burrowing owls (83.4 acres) was greater than those not used by owls (8.8 acres) (This analysis included colony #21 which was used by an owl in June). Only 1 of 8 colonies less than 10 acres was occupied by burrowing owls. The percentage of prairie dog colonies occupied by burrowing owls increased as the size class of the colonies increased. All colonies over 50 acres were used by burrowing owls. Prairie dog colonies in the 20-49 acres size class accounted for largest number of burrowing owls observed. This size class also accounted for a high proportion the colonies and had nearly 90% burrowing owl occupancy rate. A graph of the number of burrowing owls observed per 100 acres of colonies within each size class shows a decline in burrowing owl density from the smaller size classes to the larger prairie dog colony size classes. During the field observations, it was apparent many burrowing owl families were located near the outer edge of the larger colonies. The relationship of burrowing owl numbers to prairie dog colony size may be correlated more with length of colony perimeter than area of a colony. Area increases as a function of a square while the perimeter increases in a linear manner, and this may explain the apparent decline in burrowing owl density as colony size increases. It appears prairie dog colonies need to be at least 20 acres or larger to obtain consistent burrowing owl use and to have opportunity for multiple burrowing owl families on a colony. Overall, on the GRNG, burrowing owls would be benefited by more and larger prairie colonies.

During the August survey, a total of 165 burrowing owls were observed with an average of 10.3 owls per colony, and a density of 0.13 owls per acre for those colonies used by owls. During this survey, 35 burrowing owl families were identified with an average of 2.9 young per family. This would be a minimum estimate since it is possible that not all juvenile owls were counted. No young were observed with 1 pair of adults. Excluding this observation, brood sizes ranged from 1 to 6 but most (82%) owl families contained 2 to 4 young. The total number of owls observed in prairie dog colonies was strongly correlated with the number owl families observed suggesting that most owl pairs successfully raised young in 2001.

In Montana, Atkinson (2001) conducted a two-year study of burrowing owls on prairie dog colonies. In 1999, he and his 28-person survey team visited 209 colonies totaling 10,079 acres, and in 2000 they visited 193 colonies totaling 9,602 acres. Prairie dog colony occupancy rate by burrowing owls was 38% and 42% in 1999 and 2000, respectively (Atkinson 2001). The average number of burrowing owls observed per colony during the two survey years was 2.35 and 3.83, respectively. In 2000, the average number of young observed per family in Montana was 2.48. Atkinson (2000) reported that the average prairie dog colony used by owls was 70.3

acres compared to an average colony size of 36.0 acres where owls were not found. This is further evidence that prairie dog colony size is important to burrowing owl occupancy. Density of burrowing owls on the occupied prairie dog colonies in Montana was 0.05 owls per acre. Burrowing owl density, percent occupancy rate, and number of young per family were higher on the GRNG than in Montana. However, the Montana data represent a random sample of prairie dog colonies throughout the state. Specific surveys of prairie dog complexes in Montana have shown considerable variation of burrowing owl occupation between areas and between years (Knowles 1998). For example, surveys of over 150 prairie dog colonies in Phillips and Blaine Counties in north-central Montana in 1983 and 1998 found 51% and 60% of the colonies occupied by burrowing owls while similar surveys in Custer County in southeastern Montana in 1977, 1979, and 1996 (44-128 colonies surveyed) found occupancy rates of 14%, 27%, and 5% of the colonies occupied (Knowles 1998). On the Little Missouri National Grassland, a survey of 128 prairie dog colonies in the late 1990s found a burrowing owl occupancy rate of 34%, and the average number of owls observed per occupied colony was 10.3 (Gary Foley, USDA Forest Service biologist, pers. commun.).

A variety of other wildlife species was observed in the prairie dog colonies during the June and August visits (Table 4). Frequently (45% of the colonies), upland sandpipers were observed foraging in the prairie dog colonies. Many of these observations included adults with broods. Loggerhead shrikes were observed in 6 of the colonies primarily during August. The golden eagle was observed in or flying over 7 colonies, and ferruginous hawks were observed standing in 6 of the colonies. Other common bird species found in colonies included the horned lark, killdeer, chestnut-collared longspur, and meadowlark. My general impression was that all these species were attracted to prairie dog colonies for foraging purposes, but for horned larks, chestnut-collared longspurs, and killdeer, prairie dog colonies probably provided suitable nesting habitat as well. Although badgers were only observed in 5 of the colonies, sign of badger activity was evident in most colonies. A recently shot badger was found in 1 colony. The number of 13-lined ground squirrels recorded in Table 4 greatly underestimates their abundance. In fact, they were so common in prairie dog colonies; I frequently neglected to record observations of this species

Table 3. Summary of burrowing owls observed during the August 2001 survey of Grand River National Grassland prairie dog colonies.

Colony No.	Acres	No. Owl		Owls Observed	
		Families	Total	Adults	Juveniles
1	328	1	6	2	4
2	12	0			
3	18	0			
4	8	1	5	2	3
5	14	2	10	4	6
6	22	2	11	4	7
7	270	2	11	4	7
8	524	7	34	14	20
9	20*	2	9	3	6
10	31	0			
11	2	0			
12	5	0			
13	10	0			
14	20*	1	4	1	3
15	31	1	4	2	2
16	1	0			
17	20*	1	3	0	3
18	2*	0			
19	2*	0			
20	17	0			
21	72	0			
22	101	3	18	5	13
23	70	6	27	12	15
24	129	3	9	6	3
25	2	0			
26	35	1	4	1	3
27	4	0			
28	10*	1	6	2	4
29	40*	1	4	2	2
<b>TOTAL</b>	<b>1820</b>	<b>35</b>	<b>165</b>	<b>64</b>	<b>101</b>

\* Colony partially or totally located on private land; acreage is an estimate.

Table 4. List of prairie dog colonies found on and adjacent to the Grand River National Grassland and associated wildlife species observed within the colonies during June and August 2001.

Colony No.	Wildlife Species Observed
1	badger, 13-lined ground squirrel, ferruginous hawk, northern harrier, upland sandpiper, meadow lark, black-billed magpie, loggerhead shrike, burrowing owl**, horned lark, chestnut-collared longspur, eastern kingbird, Sprague's pipit
2	badger, killdeer, meadowlark, horned lark
3	killdeer, horned lark, American kestrel
4	burrowing owl, horned lark, chestnut-collared longspur, killdeer, Sprague's pipit, northern harrier, meadowlark
5	golden eagle, burrowing owl, brown-headed cowbird, meadowlark, chestnut-collared longspur, horned lark, Sprague's pipit
6*	burrowing owl, meadowlark, horned lark
7	burrowing owl** meadowlark, horned lark, brown-headed cowbird, lark bunting, barn swallow, upland sandpiper, Great Plains toad
8	badger, golden eagle, ferruginous hawk, burrowing owl, American kestrel, upland sandpiper, killdeer, horned lark, meadowlark, mourning dove, Sprague's pipit, loggerhead shrike, northern flicker, chestnut-collared longspur
9	coyote, burrowing owl**, golden eagle, ferruginous hawk, horned lark, killdeer, meadowlark, chestnut-collared longspur
10	pronghorn, horned lark, chestnut-collared longspur, brown-headed cowbird, killdeer, Sprague's pipit, meadowlark
11	pronghorn, upland sandpiper, loggerhead shrike
12	pronghorn, upland sandpiper, mourning dove, meadowlark, horned lark, black-billed magpie, loggerhead shrike

Table 4. Continued.

Colony No.	Wildlife Species Observed
13*	pronghorn, ferruginous hawk, chestnut-collared longspur, meadowlark,
14	white-tailed jackrabbit, pronghorn, golden eagle, American kestrel, burrowing owl, meadowlark, horned lark, killdeer
15	pronghorn, eastern kingbird, killdeer, upland sandpiper meadowlark, brown-headed cowbird, horned lark, burrowing owl
16	upland sandpiper, horned lark
17*	burrowing owl, upland sandpiper
18*	
19*	
20	13-lined ground squirrel, killdeer, chestnut-collared longspur, upland sandpiper, meadowlark, horned lark, loggerhead shrike
21	golden eagle, burrowing owl***, upland sandpiper, meadowlark, horned lark, eastern kingbird, brown-headed cowbird
22	bison, badger, golden eagle, upland sandpiper, burrowing owl, meadowlark, horned lark, mourning dove, loggerhead shrike
23	pronghorn, coyote, ferruginous hawk, killdeer, chestnut-collared longspur, upland sandpiper, meadowlark, horned lark, burrowing owl
24*	coyote, ferruginous hawk, prairie falcon, killdeer, horned lark, burrowing owl, Great Plains toad
25*	northern harrier, horned lark
26*	badger, burrowing owl, killdeer, horned lark
27*	

Table 4. Continued.

Colony No.	Wildlife Species Observed
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28*	burrowing owl**, horned lark
29	golden eagle, burrowing owl, killdeer, upland sandpiper, meadowlark, horned lark, mourning dove

\* visited only in August

\*\* observed only in August

\*\*\* observed only in June

This survey clearly showed that on the GRNG the burrowing owl is closely associated with black-tailed prairie dogs. The association of burrowing owls on the Great Plains with black-tailed prairie dogs has been reported by others (Butts 1982, Clark et al. 1982, Desmond and Savidge 1996). The infrequency of burrowing owl observations off of prairie dog colonies on the GRNG suggests that in the absence of prairie dogs in this area, burrowing owls would not maintain a viable population. Observations of burrowing owl families during August showed that the owls use many burrows within the vicinity of the nest burrow. Isolated burrows dug by badgers and coyotes off of prairie dog colonies probably do not provide the density of burrows required by burrowing owls to consistently fledge adequate number of young. In addition, burrowing owls also require the short vegetation found in prairie dog colonies. The data collected during this survey also shows that burrowing owl numbers are directly related to acreage of a prairie dog colony and that small prairie dog colonies are marginal habitat for burrowing owls. It can be safely predicted that if there were more prairie dog colonies and larger colonies on the GRNG there would be more burrowing owls. If the 64 adult burrowing owls counted in this census were an isolated population, this number would not represent a viable population. However, the burrowing owl is a mobile and migratory species, and quite likely this population has interchange of individuals with burrowing owls on prairie dog colonies located on the Standing Rock Indian Reservation to the east of the GRNG, and with burrowing owls on prairie dog colonies on the Little Missouri National Grassland northwest of the GRNG. The actual regional population is probably considerably larger than 64.



In 2001, South Dakota state regulations prohibited the shooting of prairie dogs prior to 15 June. After this date, recreational prairie dog shooters were observed shooting prairie dogs on the GRNG. Based on vehicle tracks through the colonies and direct observations of shooters, Colonies 1, 7, 8, and 21 received multiple shooting bouts and had easy vehicle access. The road to Colony 7 even had signs with arrows and distances noted. Colony 23 was an isolated colony with no obvious road to the colony. This colony appeared to have received only a single shooting bout. The number of owls in colony 23 should be contrasted to owls observed in colonies 1,7,8, and 21, which were similar in size or larger. An adult owl was observed in colony 21 in early June, but no owls were observed in this colony during 2 visits in August. At colony 1, I had just finished my census of owls when 4 shooters arrived and shot prairie dogs here for the day. I returned to this colony 2 days later to recount owls and found 1 fewer owl and found the owls scattered throughout the colony. Although there were no direct observations of burrowing owls being shot by recreational shooters, these observations suggest that shooting can influence burrowing owl numbers and behavior.

#### LONG-EARED OWL SURVEY

Approximately 50 miles of hardwood draws were walked during June and August. Nineteen large owls were observed during this survey. These owls were difficult to identify to species because they roosted in dense stands of green ash, and flew low through trees when flushed. One long-eared owl was observed roosting in a tree prior to being flushed. This bird was brown, lacked a white throat patch and had vertical ear tufts. Several great-horned owls were observed at close range, and all were gray colored, had a distinct white throat patch and ear tufts that were not vertical. The long-eared owl was observed in a well-developed green ash stand north of Square Butte. One barn owl was observed on bottomlands of the South Grand River within an area of mixed green ash and cottonwood trees.

#### COMMON POORWILL SURVEY

During late June, surveys were conducted for poorwills on 8 nights. On 7 of these nights, routes were run with a total of 46 stops to listen for poorwills. Three poorwills were heard at 3 stations on 1 route. On 1 night I listened for 2 hours at a single location in the Humphrey Draw area where a poorwill was previously heard in early June. One of my 7 routes was also centered on this area. My 2 attempts to relocate the poorwill in the Humphrey Draw area did not result in any additional poorwill observations. Table 6 shows the locations where poorwill calls were heard. Two of the poorwills were heard calling near the base of an unnamed butte; another poorwill was situated between this butte and the North Grand River. The poorwill heard at a campsite was located in an upper drainage area at the Humphrey Draw Wildlife Area.

Table 6. Locations from which common poorwill calls were recorded during June 2001 on the Grand River National Grassland.

Date	Number Calls Heard	Location of Observations	
		Deg., Min. N Latitude	Deg., Min. W Longitude
8 June	many	45, 50.495	102, 30.706
29 June	3	45, 50.044	102, 36.714
29 June	4	45, 50.042	102, 36.356
29 June	1	45, 50.034	102, 35.654

GREAT BLUE HERON SURVEY

No heron rookery was found on the GRNG during the April aerial survey, nor during subsequent fieldwork on the GRNG during June and August. Two great blue herons were observed on the GRNG and 9 herons were observed in areas adjacent to the GRNG. Most of the heron observations were north and east of the study area. One crepuscular flight was observed in late June. The direction of flight was noted and a line was drawn on a map to indicate possible rookery locations. The flight line of this heron was searched in August and no rookery was found. Two potential sites represented by groves of mature cottonwood trees surrounding livestock reservoirs were located along the flight line, but these were on private lands well off the GRNG. No nests could be observed from the county roads, but the trees were fully leafed out. The legal descriptions of these 2 sites are NE28, T22N, R16E, and SE22, 22N, R16E. Table 7 lists the locations of all heron observations.

Table 7. Locations of great blue herons observed during June and August 2001 on the Grand River National Grassland..

Date	Number,	Site	Location of Observations	
			Deg., Min. N Latitude	Deg., Min. W Longitude
26 June	1	creek	45, 32.729	101, 52.900
29 June	1	aerial	45, 48.267	102, 09.618
28 June	1	pond	45, 48.279	102, 16.946
06 Aug	2	reservoir	45, 35.185	102, 28.021
11 Aug	1	pond	45, 48.513	102, 21.362
11 Aug	5	reservoir	45, 46.930	102, 01.058

### MOUNTAIN PLOVER SURVEY

Mountain plovers on the northern Great Plains are frequently associated with black-tailed prairie dog colonies (Knowles et al. 1982, Knowles and Knowles 1984). Twenty prairie dog colonies were visited during June to assess these sites for mountain plover use. Only the large 524-acre prairie dog colony in Corson County contained suitable habitat for mountain plovers. Other colonies were too small and/or occurred in areas with unsuitable topography. As a result of this survey, it was concluded that the GRNG contained insufficient suitable prairie dog habitat to sustain a population of mountain plovers.

### INCIDENTAL WILDLIFE OBSERVATIONS

A variety of other wildlife species was observed during the survey period. Appendix A lists the common and scientific names of all species observed on the GRNG during June and August 2001. This included 75 bird, 11 mammal, 5 amphibian, and 4 reptile species. The majority of the bird species were associated with hardwood draws. American kestrels and three species of woodpeckers were associated with cottonwood bottomlands along the South Grand River. The common flicker was observed occasionally in hardwood draws, but overall, the larger diameter cottonwood trees with a softer wood appeared to provide better habitat for woodpeckers. The loggerhead shrike was found throughout the study area and was a conspicuous bird in the hardwood draw habitat. This bird appeared to be associated with buffaloberry thickets found along the margins of green ash stands. In southeastern Alberta, loggerhead shrike breeding habitat also contained significant buffaloberry shrub habitat (Prescott and Collister 1993). During August, shrike families were observed in 6 (21%) prairie dog colonies. Atkinson (2001) also noted loggerhead shrikes in 2-3% of the prairie dog colonies visited.

In addition to the Baird's sparrow and Sprague's pipit, the GRNG provided habitat for a variety of common grassland bird species. During the Baird's sparrow and Sprague's pipit survey a total of 36 bird species was recorded. The meadowlark was the most frequently recorded bird during the survey being observed at 94% of the stations (Table 8). Other common birds included the grasshopper sparrow, horned lark, chestnut-collared longspur, and brown-headed cowbird. Table 8 lists the frequency of occurrence of all birds observed during the Baird's sparrow and Sprague's pipit survey.

Table 8. Frequency of occurrence of bird species recorded at 133 observation stations during the June 2001 Baird's sparrow and Sprague's pipit survey on the Grand River National Grassland.

Bird Species	Frequency of occurrence (%)
Meadowlark	94
Grasshopper sparrow	71
Horned lark	49
Chestnut-collared longspur	45
Upland sandpiper	33
Brown-headed cowbird	29
Lark bunting	19
Sprague's pipit	14
Red-winged blackbird	12
Baird's sparrow	8
Mourning dove	8
Killdeer	8
Northern harrier	8
Northern rough-winged swallow	8
Ringed neck pheasant	6
Western kingbird	5
Swainson's hawk	5
Bobolink	4
Night hawk	4
Ferruginous hawk	4
Eastern kingbird	4
Golden eagle	3
Sharp-tailed grouse	2
Cliff swallow	2
American crow	1
Brown thrasher	1
Burrowing owl	1
Loggerhead shrike	1
Savannah sparrow	1
Kingfisher	1
Marbled godwit	1
Yellow warbler	1
American goldfinch	1
Common flicker	1
Rock dove	1
Starling	<1

On the night of 24 June during a poorwill survey in the Little Egypt area, a thunderstorm move into the area at about 23:30. During a 4.1-mile segment of the route, 17 toads were counted in the wheel ruts of the 2-track vehicle trail. Sixteen of these toads were Great Plains toads and 1 was a spadefoot toad. This density of toads was not found on other poorwill routes. I passed through a portion of this route segment on another night and toads were again common suggesting that the approaching thunderstorm on 24 June was not entirely responsible for increased toad activity. Two other spadefoot toads were later found in this general area. Great Plains toads were observed at several upland locations on the GRNG, and included nocturnal observations next to livestock tanks and in prairie dog colonies. The Woodhouse's toad was observed at several locations along the South and North Grand Rivers, and Grand River.

### CONSERVATION CONSIDERATIONS

The GRNG represents an isolated grassland block that is largely surrounded by cultivated cropland and hayland. Even within the exterior boundaries of the GRNG, much of the private land separating the eight Federally managed grassland blocks is converted to agricultural purposes. Despite this level of isolation and habitat fragmentation, the GRNG supports abundant and diverse wildlife populations. Although large ungulates and carnivores have been purposely extirpated from this area, much of the native fauna remains - offering vivid evidence of the biological value of maintaining blocks of grassland habitat even within agricultural areas.

The black-tailed prairie dog is a grassland species that was targeted for extirpation early in the settlement process. On the GRNG, very large former prairie dog colonies are still visible in the vicinity of colonies 4-6, 29, and 8, 9, 24 and 25. Quite likely, the complex of colonies located either side of the South Grand River was once a series of very large colonies. Even though prairie dogs are greatly reduced from presettlement numbers, there still remains a viable prairie dog population on the GRNG with prairie dogs occupying about 1% of the land area. This level of prairie dog abundance has been sufficient to maintain the burrowing owl, but the black-footed ferret (*Mustela nigripes*) has been extirpated from the GRNG. The mountain plover, which may have formerly been associated with prairie dog colonies in this area, is also not present. If prairie dogs were allowed to expand to occupy vacated habitat in the vicinity of large former colonies, the GRNG could serve as a black-footed ferret reintroduction site, ferret reintroduction would be possible when prairie dogs occupy 3-5% (5,000 to 10,000 acres) of the GRNG. Data gathered during this survey clearly show that burrowing owls would also be benefited by an increase in prairie dog acreage. The level of burrowing owl reproduction documented in this study would be sufficient that burrowing owl numbers would increase to occupy new prairie dog habitat, as it would become available. As a minimum, it is apparent that the small prairie dog colonies (<20 acres) should be allowed to expand to at least 20-40 acres to increase the level of burrowing owl occupancy of the prairie dog colonies.

The swift fox is a native grassland species that appears to be extirpated from the GRNG. During the June and August surveys, I did not see any sign of this species, and Giddings (1997) does not

show Perkins or Corson Counties as being occupied by swift foxes. This extirpation may be relatively recent since Sharps (1977) reported swift foxes in Perkins County during the 1970s. The GRNG appears to contain suitable habitat for swift foxes, and reintroduction of this species to the GRNG would be feasible, provided the reintroduction effort included other suitable habitat in near by suitable sites in North Dakota, Montana, Wyoming and South Dakota. Reestablishing an extirpated population is an opposite process of extinction. Extinction involves fragmenting a large metapopulation into small isolated populations and then the small isolated populations sequentially go to extinction over time. The goal of reintroduction should be to establish isolated populations that can be linked into a large metapopulation. For the swift fox, sufficient habitat remains to develop a viable population over a broad area.

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## **APPENDIX A**

### **LIST OF WILDLIFE SPECIES OBSERVED ON THE GRAND RIVER NATIONAL GRASSLAND**



Table A-1. Common and scientific names of all wildlife species observed on the Grand River National Grassland during June and August 2001.

Common Name	Scientific Name
American crow	<i>Corvus brachyrhynchos</i>
American goldfinch	<i>Carduelis tristis</i>
American kestrel	<i>Falco sparverius</i>
American robin	<i>Turdus migratorius</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
American widgeon	<i>Anas americana</i>
Baird's sparrow	<i>Ammodramus bairdii</i>
Barn owl	<i>Tyto alba</i>
Barn swallow	<i>Hirundo rustica</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Blue-winged teal	<i>Anas discors</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Brown thrasher	<i>Toxostoma rufum</i>
Burrowing owl	<i>Athene cunicularia</i>
Canada goose	<i>Branta canadensis</i>
Canvasback	<i>Aythya collaris</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chipping sparrow	<i>Spizella passerina</i>
Clay-colored sparrow	<i>Spizella pallida</i>
Cliff swallow	<i>Hirundo pyrrhonota</i>
Common grackle	<i>Quiscalus quiscalus</i>
Common flicker	<i>Colaptes auratus</i>
Common poorwill	<i>Phalaenoptilus nuttallii</i>
Common nighthawk	<i>Chordeiles minor</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
European starling	<i>Sturnus vulgaris</i>
Field sparrow	<i>Spizella pusilla</i>
Gadwall	<i>Anas strepera</i>
Gray catbird	<i>Dumetella carolinensis</i>
Gray partridge	<i>Perdix perdix</i>
Golden eagle	<i>Aquila chrysaetos</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Great blue heron	<i>Ardea herodias</i>
Great-horned owl	<i>Bubo virginianus</i>
Hairy woodpecker	<i>Picoides villosus</i>
Horned lark	<i>Alauda arvensis</i>
House wren	<i>Troglodytes aedon</i>

Killdeer  
Lark bunting  
Lark sparrow  
Least flycatcher  
Loggerhead shrike  
Long-eared owl  
Mallard  
Marbled godwit  
Merlin  
Mourning dove  
Northern harrier  
Northern oriole  
Northern pintail  
Northern rough-winged swallow  
Shoveler  
Peep  
Red-headed woodpecker  
Red-tailed hawk  
Ring-necked pheasant  
Rock dove  
Rock wren  
Ruddy duck  
Savannah sparrow  
Say's pheobe  
Sharp-tailed grouse  
Sprague's pipit  
Swainson's hawk  
Turkey vulture  
Upland sandpiper  
Vesper sparrow  
Warbling vireo  
Western kingbird  
Wild Turkey  
Willow flycatcher  
Yellow-headed blackbird  
Yellow warbler

*Charadrius vociferus*  
*Calamospiza melanocorys*  
*Chondestes grammacus*  
*Empidonax minimus*  
*Lanius ludovicianus*  
*Asio otus*  
*Anus platyrhynchos*  
*Limosa fedoa*  
*Falco columbarius*  
*Zenaida macroura*  
*Circus cyaneus*  
*Icterus galbula*  
*Anas acuta*  
*Stelgidoperyx serripennis*  
*Anas clypeata*  
*Calidris spp.*  
*Melanerpes erythrocephalus*  
*Buteo jamaicensis*  
*Phasianus colchicus*  
*Columba livia*  
*Salpinctes obsoletus*  
*Oxyura jamaicensis*  
*Passerculus sandwichensis*  
*Sayornis saya*  
*Tympanuchus phasianellus*  
*Anthus spragueii*  
*Buteo swainsoni*  
*Cathartes aura*  
*Bartramia longicauda*  
*Pooecetes gramineus*  
*Vireo gilvus*  
*Tyrannus verticalis*  
*Meleagris gallopavo*  
*Empidonax traillii*  
*Xanthocephalus xanthocephalus*  
*Dendroica petechia*

Great Plains toad  
Leopard frog  
Northern chorus frog  
Plains spadefoot  
Woodhouse's toad

*Bufo cognatus*  
*Rana pipens*  
*Pseudacris triseriata*  
*Scaphiopus bombifrons*  
*Bufo woodhousei*

Bullsnake  
Plains garter snake  
Prairie rattlesnake  
Western hognose snake  
Western painted turtle

*Pituophis melanoleucus*  
*Thamnophis radix*  
*Crotalus viridis*  
*Heterodon nasicus*  
*Chrysemys picta*

American pronghorn  
Badger  
Bison  
Black-tailed prairie dog  
Cottontail rabbit  
Coyote  
Mule deer  
Northern pocket gopher  
Porcupine  
Raccoon  
Striped skunk  
13-lined ground squirrel  
White-tailed deer  
White-tailed jackrabbit

*Antilocapra americana*  
*Taxidea taxus*  
*Bison bison*  
*Cynomys ludovicianus*  
*Sylvilagus spp.*  
*Canis latrans*  
*Odocoileus hemionus*  
*Thomomys talpoides*  
*Erethizon dorsatum*  
*Procyon lotor*  
*Mephitis mephitis*  
*Spermophilus tridecemlineatus*  
*Odocoileus virginianus*  
*Lepus townsendii*