ECOLOGICAL RESOURCES SUMMARY:

TECHNICAL REPORT FOR CAMECO RESOURCES – 2011

PROPOSED MARSLAND EXPANSION AREA URANIUM PROJECT

DAWES COUNTY, NEBRASKA

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Cameco Resources, Inc.
Proposed Marsland Expansion Area Uranium Project
Technical Report - 2011

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ECOLOGICAL RESOURCES

INTRODUCTION

The purpose of this report is to describe the current ecological resources and review the existing documentation, reports of biological surveys, and inventories, in order to determine the potential impacts to wildlife, their habitats, and any special-status plant species that occur within the proposed in-situ Marsland Expansion Area Uranium Project.

REGIONAL SETTING

The project area occurs within the Western High Plains Level III ecoregion and is characterized by a semi-arid to arid climate, with annual precipitation ranging from 13 to 20 inches. Higher and drier than the Central Great Plains to the east, much of the West High Plains comprises a smooth to slightly irregular plain having a high percentage of dryland agriculture. Potential natural vegetation is dominated by drought tolerant short-grass prairie and large areas of mixed-grass prairie in the northwest portion of Nebraska. Specifically, the northern portion of the project area occurs within the Pine Ridge Escarpment Level IV ecoregion with ponderosa pine woodlands associated with mixed-grass prairie on ridge tops and north-facing and east-facing slopes. The southern portion, predominantly rangelands, is made up of mixed-grass prairie with areas of moderate relief and is characteristic of the Sandy and Silty Tablelands Level IV ecoregion (Chapman et al. 2001).

LOCAL SETTING – MARSLAND EXPANSION AREA

The proposed Marsland Expansion Project Area (MEPA) is located in southwest Dawes County, Nebraska within Sections 26, 35, 36 T30N:R51W; Sections 1, 2, 12, 13 T29N:R51W; and Sections 7, 18, 19, 20, 29, 30, T29:R50W. The project area encompasses 4,649 acres approximately 4 miles northeast of Marsland, Nebraska (**Figure 1**). Landownership is exclusively private within the project area and the buffer area. The northern portion of the buffer intersects with the administrative boundary of the Nebraska National Forest-Pine Ridge Ranger District. However, the administrative boundary was proclaimed by congress mainly for the purposes of limiting the area in which land swaps and acquisitions could be undertaken, and the boundary itself provides no jurisdiction on nonfederal parcels.

CLIMATE

The climate in northwest Nebraska is characterized by wide seasonal fluctuations in precipitation and temperatures. The region receives an annual average of 16.48 inches of precipitation and seasonal temperatures range from 11 – 90°F (High Plains Regional Climate Center). A monthly climate summation for the Chadron National Weather Station, located approximately 0.9 miles northwest of Chadron, Nebraska, is summarized in **Table 1**.

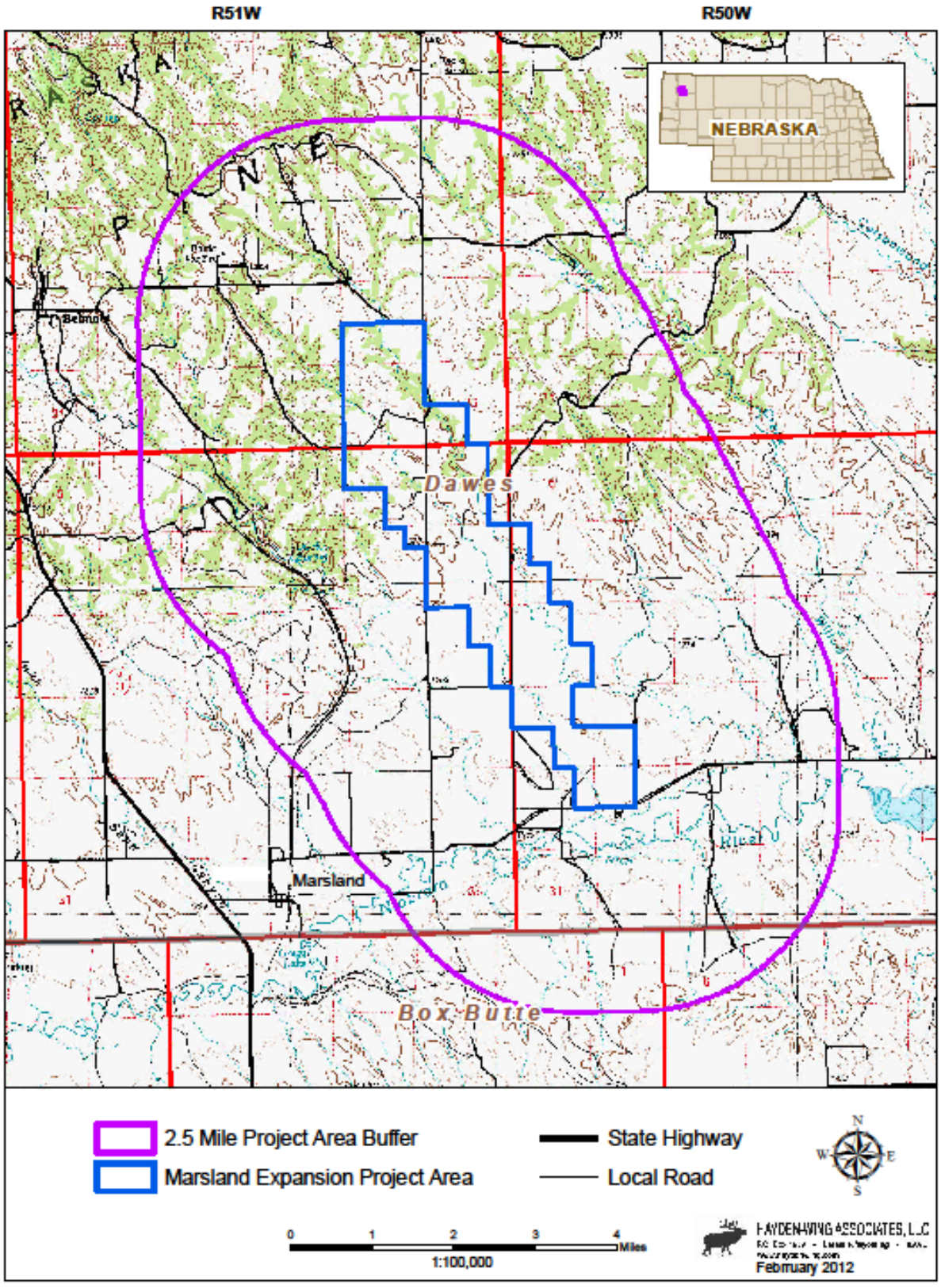

Figure 1. Marsland Expansion Project Area located in southwest Dawes County, Nebraska.

Table 1. Monthly climate summary for Chadron National Weather Station from Aug. 1, 1894 - Feb. 28, 2009.

Summary	Month												
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Average Maximum Temperature (F°)	35.8	40.4	48.2	59.2	69.4	80.5	89.5	88.1	77.6	64.6	48.2	38.6	61.7
Average Minimum Temperature (F°)	11.7	15.8	23.0	33.2	43.6	53.1	60.1	58.0	47.2	35.4	23.4	14.8	34.9
Average Total Precipitation (Inches)	0.49	0.49	0.94	1.93	2.89	2.81	2.09	1.38	1.40	1.03	0.56	0.46	16.48
Average Total Snowfall (Inches)	6.6	6.4	8.9	6.0	0.8	0.0	0.0	0.0	0.3	2.3	5.6	6.7	43.6
Average Snow Depth (Inches)	2.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0

Source: Three Crow Expansion Area Technical Report, Crow Butte Resources, Inc - 2010.

EXISTING DISTURBANCE

Human expansion into the region was prompted by the development of the transcontinental railroad by the Union Pacific Railroad during the late 1800's. As a result of this expansion, the region became a regional railroad trade hub and eventually a source for agriculture, intensive rangeland, mining, and human development. Disturbance within the project area is limited to one small residence (i.e., farmhouse), farming and ranching activity, watering sites for cattle (i.e., windmills, water tanks, etc.), improved gravel and unimproved two-track roads, and one small gravel pit.

PRE-EXISTING BASELINE DATA

Ecological studies have been conducted for several other mines in the general area of the MEPA, including the Crow Butte Resources' Crow Butte Uranium Project (Radioactive Source Matterials License SUA-1534) and the Three Crow Expansion Area Uranium Project. The first baseline study was conducted for the Crow Butte Mine in 1982 and additional baseline data were collected in 1987, 1995, 1996, 1997, and 2004 (CBR 2007). Baseline data, including field observations, agency contacts, and literature searches, were conducted for the Three Crow Expansion Area in 2005 and 2008.

TERRESTRIAL WILDLIFE AND PLANT RESOURCES

The information presented in this report summarizes the baseline data collected for the Crow Butte Mine and Three Crow Expansion Area between 1982 and 2008, and from field observations, surveys, and mapping that were conducted for the MEPA in 2011. Information from surveys and observations recorded late in 2011 will be incorporated into the report in 2012.

Methods

Baseline studies were performed by Hayden-Wing Associates, LLC (HWA) during 2011 to determine presence or absence of federally- or state-listed species as well as regional species of concern deemed by the state. Surveys were conducted in accordance with approved protocols established by state and federal agencies. Surveys were performed for: (1) winter bald eagle (*Haliaeetus leucocephalus*) roosts, (2) raptor nests, (3) burrowing owl (*Athene cunicularia*) nests, (4) black-tailed prairie dog (*Cynomys ludovicianus*) colonies, (5) swift fox (*Vulpes velox*), (6) threatened and endangered fish species, and (7) wetland habitat. In addition, amphibian breeding habitat was documented, opportunistically, as well as all other wildlife species observed within or near the project area.

The goal was to document and summarize the ecological resources not only within the project area but also the 2.5-mile buffer of the project area. Aerial surveys conducted included the entire 2.5-mile buffer area but groundwork was almost entirely restricted to the project area due to

limited landowner access. Thus, certain ecological resources within the buffer area were identified using aerial surveys, documented from public roads, and/or mapped using National Agriculture Imagery Program (NAIP) imagery (e.g., prairie dog colonies). When possible, these resources were later verified and mapped from the ground if landowner permission was granted.

Information was also gleaned from recent field surveys conducted for the Three Crow Expansion Area in 2005 and 2008, and from the baseline surveys conducted for the Crow Butte Mine in 1982. In 2005, primary floral and faunal species were identified through observation to determine the distribution and composition of vegetation communities that occurred within the project area. Raptor surveys were also conducted and compiled with past ecological data during 2008.

Vegetation and Land Cover Types

Vegetation classifications were applied to the MEPA through heads-up digitizing of NAIP imagery and categorized into 8 vegetation communities similar to the definitions in the Three Crow Expansion Area Technical Report **(Map 1)**. These communities include: mixed-grass prairie, degraded rangeland, mixed-conifer, cultivated, drainage, structure biotope, range-rehabilitation, and deciduous streambank forest. The mixed-conifer vegetation type was not defined in the Three Crows Expansion Area Technical Report, but was present in the Marsland Expansion Area. The degraded rangeland class was added following field observations. Vegetation types were groundtruthed, and species composition of each type was observed. Vegetation types represent a variety of species compositions and relative abundances. **Table 2** illustrates the abundance of vegetation and habitat types within the MEPA.

Mixed-Grass Prairie

The most common vegetation type present in the MEPA is mixed-grass prairie, comprising 65% of the area. Common species observed in this vegetation type include the following grasses: needle-and-thread grass (*Hesperostipa comata*), junegrass (*Koeleria macrantha*), sandberg bluegrass (*Poa secunda*), and threadleaf sedge (*Carex filifolia*). The non-native species cheatgrass (*Bromus tectorum*) and Kentucky bluegrass (*Poa pratensis*) were also abundant in this vegetation type (**Figure 2)**. Common forbes observed included: white sagebrush (*Artemesia ludoviciana*), fringed sagebrush (*A. frigida*), phlox (*Phlox sp.*), locoweed (*Oxytropis sp.*), lupine (*Lupinus sp.*), pussytoes (*Antennaria sp.*) and yucca (*Yucca glauca*). This vegetation type is the most common in the northern portion of the project area, and is quite variable in composition.

Degraded Rangeland

Areas where non-native species, predominantly cheatgrass, have overtaken the landscape are classified as degraded rangeland (**Figure 3**). Considerable portions of the southern half of the project area were observed to have larges patches dominated by cheatgrass and Kentucky

bluegrass. The southernmost portion of the project area has large patches dominated by smooth brome. Overall biodiversity in these areas is lower than in areas of mixed-grass prairie. While

Table 2 Marsland Expansion Project Area vegetation and habitat types and approximate acreages.

Habitat Type	Acres	Percent
Mixed-Grass Prairie	3023	65.0
Degraded Rangeland	638	13.7
Mixed-Conifer	423	9.1
Cultivated	291	6.3
Drainage	133	2.9
Range-Rehabilitation	66	1.4
Structure Biotope	66	1.4
Deciduous Streambank Forest	10	0.2

Figure 2. Example photograph of mixed-grass prairie vegetation type.

Figure 3. Example photograph of cheatgrass dominated landscape classified as degraded rangeland.

Figure 4. Example photograph of mixed conifer habitat dominated by ponderosa pine.

non-native grasses are common throughout the project area, the southern portion of the project area had sections that were particularly dominated by these species. This area comprises 13.7% of the project area.

Mixed Conifer

Mixed-conifer forests are concentrated along drainages in the northern third of the project area, often expanding out onto nearby hills and plains (**Figure 4)**. This vegetation type is dominated by ponderosa pine (*Pinus ponderosa*), with chokecherry (*Prunus virginiana*), skunkbush sumac (*Rhus trilobata*), and snowberry (*Symphoricarpus albus*) common in the understory. A combination of native and non-native grasses were common, with smooth brome (*Bromus inermus*) being particularly abundant in low-lying areas. Pussytoes was a commonly observed forb. Mixed-conifer forests comprise 9.1% of the project area, making it the most common of the forested vegetation types.

Cultivated

Cultivated fields make up approximately 6.3% of the project area and include regional crops such as alfalfa (*Medicago sativa*), wheat (*Triticum* spp.), oats (*Avena* spp.), corn (*Zea mays*), barley (*Hordeum* spp.), and rye (*Secale cereale*). In an environment not altered by humans, areas occupied by this vegetation type would most likely be occupied by mixed-grass prairie.

Drainages

Drainages in the south end of the project area are well drained and usually dry, covering 2.9% of the project area (**Figure 5**). The vegetation composition in these intermittent tributaries to the Niobrara River is similar to surrounding grassland, though the vegetation is generally more robust. Meadow death camas *(Zigadenus venenosus)*, wild onion (*Allium sp.)*, and monkeyflower (*Mimulus sp.)* were observed in these areas. In the north side of the project area conifers dominate the overstory of drainages with smooth brome in the understory. Standing water was only observed in the northern portion of the survey area, mostly in the area mapped as deciduous streambank forest. The weed houndstongue (*Cynoglossum officinale*) was observed in low densities.

Deciduous Streambank Forest

Deciduous stands found along ephemeral streams make up a very small portion of the project area, totaling less than 1%. The most common overstory species observed within this habitat type include eastern cottonwood (*Populus deltoids*), boxelder (*Acer negundo*), and willow (*Salix sp.*). Snowberry was the dominant shrub, with Kentucky bluegrass, smallwing sedge (*Carex microptera*), *Rumex sp.* and annual mustards (*Brassicaceae sp.*) common in the understory.

Structure Biotopes

The term "structure biotopes" refers to man-made features, with the exception of cultivated land. Common examples include roads, highways, buildings, farmlands, cities, and industry infrastructure. This habitat type covers 1.4% of the project area. Dominant plant species in these areas are often non-native weedy species, including smooth brome (*Bromus inermis*), cheatgrass (*Bromus tectorum*), white sweetclover (*Melilotus alba*) yellow sweetclover (*Melilotus officinalis*) and mustard species (*Brassicaceae*).

Range Rehabilitation

Previously cultivated fields are defined as range rehabilitation areas, and are generally heavily grazed (**Figure 6**). Seasonal haying is also an important component of these areas. Vegetation of this habitat type is variable, with weedy species being more prevalent in areas with greater disturbance from cattle. Crested wheatgrass (*Agropyron cristatum*) was the dominant grass species observed, while fringed sagebrush was also common. This habitat type comprises 1.4% of the project area.

Figure 5. Example photograph of site classified as "drainage" vegetation type.

Figure 6. Example photograph of site classified as “range rehabilitation” vegetation type.

Mammals

Information concerning current and historical mammal observations and distribution within and near the MEPA was obtained from a variety of sources including the Nebraska Game and Parks Commission (NGPC) and the Nebraska National Heritage Program (NNHP). The NNHP is a primary repository for wildlife information in the state of Nebraska and contains records of wildlife observations for birds, mammals, herptiles, fish, and species at-risk in the state. Wildlife information for the MEPA was supplemented with survey data collected by HWA during spring/summer 2011 as part of the baseline and monitoring data requirements. A list of known and expected mammal species for Dawes County can be found in **Appendix A-1**.

Big Game

Six big game species occur or potentially occur in the vicinity of the MEPA, including pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis*), bison (*Bison bison*), and elk (*Cervus elaphus*). Big game populations are managed by the NGPC. Population objectives are set annually based on multiple factors including, but not limited to, the carrying capacity of the habitat, herd production and health, and weather (e.g., drought).

<u>Pronghorn Antelope</u>

Pronghorn occur mainly in the western half of Nebraska with the highest densities occurring in Sioux and Dawes counties (NGPC 2011a). This species typically inhabits short-grass prairie, grasslands, and shrublands and are migratory between summer and winter ranges. The project area is located in the Box Butte Antelope Hunting Unit extends from the Wyoming/Nebraska border, north from the North Platte River, east to Nebraska Highway 250, and south from the Pine Ridge Escarpment. In 2005 and 2006, 60 and 43 antelope, respectively, were harvested within this hunt unit; in 2009, 36 pronghorn were harvested (NGPC 2011a). Pronghorn were observed regularly throughout the project area in 2011 and they appear to be relatively common year-round.

Mule Deer

Mule deer are found throughout Nebraska, but are more common in the western half of the state. They inhabit a wide variety of habitats (e.g., sagebrush-steppe, grasslands, foothills) and feed on succulent grasses, forbs, shrubs, and agricultural crops. Mule deer tend to have elevational migrations, moving from uplands during the warmer months to lowlands in the winter where denser, taller vegetation cover allows for manageable snow levels for feeding deer. The MEPA is located within the Pine Ridge Hunt Unit and encompasses areas of Box Butte, Dawes, Sheridan and Sioux counties north of the Niobrara River and west of Nebraska Highway 27. In 2010, 10,709 mule deer were harvested in the state (NGPC 2011a). Mule deer were seen within the project area during fieldwork in 2011 but not in high numbers, though numbers are likely higher during winter.

White-tailed Deer

White-tailed deer are found throughout the state, but have higher densities in the eastern half. They prefer riparian habitats (woodlands and riparian shrubs) and tend not to occupy xeric habitats as mule deer frequently do. White-tailed deer hunting in the region encompasses the same unit as previously described for mule deer. Currently, the NGPC has a goal of reducing white-tailed deer populations in eastern Nebraska by increasing harvest numbers. In 2010, a record 77,028 white-tailed deer were harvested in the state.

Relative to the MEPA, white-tailed deer were commonly seen around the agricultural and riparian habitats but they were also seen in the higher elevations and in the forested areas.

Elk

Elk occur in the northwestern portion of Nebraska in a wide variety of habitats including sagebrush-steppe, grasslands and forests. Elk are migratory and move between summer and winter ranges. NGPC estimated the state elk population at approximately 2,300 individuals and approximately 64% of the population inhabits the Pine Ridge area. The Marsland Project Area is located in the Pine Ridge area, within the Ash Creek Elk Unit, specifically located east of Nebraska Highway 2, north of Spur L7E and west of U.S. Highway 385. In 2010, elk harvest in

the Pine Ridge included 114 individuals with an estimated 1,000-1,200 individuals comprising the population.

Relatively large numbers of elk are known to occur year-round within the project area. During the fall and winter the elk occupy many of the agricultural fields and lower elevation upland habitat. Although still found in the lower elevations during the spring and summer, the majority of the herd appears to move north to higher elevations in the forested portions of the Pine Ridge during the warmer portions of the year.

Bighorn Sheep

Bighorn sheep were reintroduced into Nebraska in the early 1980's; the current population is estimated at 300 sheep, divided between two populations in the Pine Ridge and Wildcat Hills (NGPC 2011a). The reintroduction project began in 1981 when 12 bighorn sheep were first released in Fort Robinson State Park. Between 1988 and 1993, a total of 44 sheep were released, and in 2005 an additional 49 were released into the Pine Ridge area. As a result of disease, population numbers have declined; currently a hunting season for bighorn sheep remains closed until the number of mature rams increases (NGPC 2011a). Appropriate escape terrain habitat is not present within the Marsland Expansion Project Area, and it is therefore extremely unlikely that bighorn sheep would occur within the project area itself.

Bison

Fort Robinson State Park currently manages a herd of 200 bison. These bison are contained in a compound and do not occur within the project area boundary.

Carnivores

The following species have been documented or are expected to be present within the MEPA: coyote (*Canis latrans*) and red fox (*Vulpes vulpes*) typically occupy grassland, shrub-steppe, and agricultural habitats; long-tailed weasel (*Mustela frenata*) are habitat generalists and can be found in a wide variety of habitats; bobcat (*Lynx rufus*) tend to occupy woodland and shrubland habitat; badgers (*Tazidea taxus*) inhabit areas with loose soils that are suitable for digging burrows which frequently includes roadsides, prairie dog colonies, and areas near surface disturbance; and mountain lion (*Puma concolor*) which prey upon mule and white-tailed deer and tend to occupy wooded habitats. Coyotes are considered non-game species and residents do not need a permit to harvest this species. Mountain lion permits are not available and lions cannot be trapped or hunted in Nebraska. Badger (*Taxidea taxus*), beaver (*Castor canadensis*), bobcat, long-tailed weasel, muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), red fox and striped skunk (*Mephitis mephitis*) are open to hunting and trapping with appropriate permits.

Using infrared-triggered remote trail cameras, which were deployed for documenting the presence/absence of swift fox (see Swift Fox section), we documented the presence of coyotes

and badger within the project area. Several of the other carnivore species are expected to be present, such as red fox, bobcat, raccoon, striped skunk and long-tailed weasel even though they were not detected by the cameras.

Small Mammals

Small mammals occupy a wide variety of habitats within the region but most are considered common and widespread. Species that are known to occur or are potentially present include the deer mouse (*Peromyscus maniculatus*), white-footed mouse (*Peromyscus leucopus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), meadow jumping mouse (*Zapus hudsonius*), plains pocket gopher (*Geomys bursarius*), least chipmunk (*Tamias minimus*) and meadow vole (*Microtus pennsylvanicus*). Muskrat and beaver are known to occur in or near the project area, especially near the Niobrara River along the southern edge of the project area. Porcupine (*Erethizon dorsatum*) occurs in the wooded areas of the project area, as does the Eastern fox squirrel (*Sciurus niger*). Four rabbit species are known or suspected to occur within the project area including: white-tailed jackrabbit (*Lepus townsendii*), black-tailed jackrabbit (*Lepus californicus*), eastern cottontail (*Sylvilagus floridanus*), and desert cottontail (*Sylvilagus auduboni*).

Two bat species have been recorded within a few miles of the MEPA including the fringe-tailed myotis (*Myotis thysanodes*) and the long-legged myotis (*Myotis volans*). Both bat species are listed at Tier I At-Risk species by Nebraska Natural Legacy Project (NNLP) and the fringe-tailed myotis is listed as Sensitive in the nearby Pine Ridge Ranger District by the Nebraska National Forest Service (NFS). According to the NFS (Pers. Comm J. Abegglen, NFS, June 7, 2011), the fringe-tailed myotis is known to occur in the ponderosa pine habitat near the Marsland project area. Both species may be present in the project area if suitable hibernacula habitat exists (e.g., caves, mines, buildings, cliff crevices, hollows in snags, or hollow areas under the bark of trees). Also, it is likely that these and other bat species use the project area for foraging, but no formal bat surveys were conducted by HWA in 2011.

Black-tailed prairie dogs, which are listed as sensitive in the Pine Ridge Ranger District by the Nebraska National Forest, are known to occur in the vicinity of the project area. A total of four colonies were found during aerial surveys; two are situated along the project area border and two are located within the 2.5-mile buffer. All four are occupied with prairie dogs. The smallest is only 0.63 acres in size, which is located just east of the boundary in section 7, T29N:R50W. The other colony that borders the project area is approximately 20 acres in size and located in section 30, T29N:R50W. The current boundaries of both of these colonies were mapped on foot in 2011. The two colonies in the buffer area were much larger--one south of the project area measured 47 acres and one east of the project area measured 151 acres in size (**Map 1**). The southernmost colony (section 36, T29N:R51W and sections 2 and 3, T28N:R51W) was mapped entirely using NAIP 2010 imagery due to a lack of access, but the colony to the east (sections 16

and 21, T29N:R50W) was partly mapped from the ground (i.e., portion in section 21) and the remaining portion was mapped using NAIP imagery due to a lack of landowner permission. Prairie dogs, groundhogs (*Marmota monax*), and porcupine are considered non-game species in Nebraska and residents do not need a permit to harvest these species. Prairie dog colonies, however, provide habitat for several other at-risk or sensitive species, such as swift fox, long-billed curlew (*Numenius americanus*), ferruginous hawks (*Buteo regalis*), and burrowing owls. Therefore, avoidance of prairie dog colonies is recommended by U.S. Fish Wildlife Service (USFWS) and Nebraska Game and Parks Commission for projects involving ground disturbance activity.

BIRDS

The Nebraska Ornithologists Union lists 291 bird species occurring in Dawes County and 455 species recorded in the state (NOU 2011). Of the 455 species in the state, 329 occur regularly (reported 9 out of the past 10 years); 78 are accidental (occurring less than two times in the past ten years); 42 are casual (occurring between 4-7 times in the past ten years); four are extirpated and two are extinct (**Appendix A-2**; NOU 2011). During a survey conducted in 1982, 201 bird species were documented in an area just north of the MEPA (Crow Butte Resources, 2010). Although formal point count bird surveys were not performed for the project area, a total of 73 bird species were documented in and around the project area in 2011, the majority of which are believed to breed locally. Of the 73 species, 68 were documented during the 1982 baseline survey, four were listed as "reported by knowledgeable individual" in previous ecological surveys (blue jay [*Cyanocitta cristata*], eastern bluebird [*Sialia sialis*], northern mockingbird [*Mimus polyglottos*], and peregrine falcon [*Falco peregrines*]), and one was new for the list of species (Eurasian-collared dove [*Streptopelia decaocto*]).

Wintering Bald Eagles

All potential bald eagle roosting habitat within 2.5 miles of the MEPA was surveyed on three separate occasions during the 2010/2011 winter. Potential roosting habitat was defined as any medium or large deciduous or coniferous tree or group of trees. All potential habitat was identified and delineated using NAIP imagery from 2010. Aerial surveys were conducted using a Cessna 172 fixed-winged aircraft. Survey dates included December 14, 2010, January 12, and February 8, 2011, and all surveys were conducted between 30 minutes pre-sunrise to one hour post-sunrise or between one hour pre-sunset to 30 minutes post-sunset. Large blocks of potential habitat (i.e., conifer forest) were flown using north-south transects spaced by 0.5 miles. Linear habitat (i.e., riparian habitat) was flown by flying parallel to the habitat type. Information recorded for each eagle sighting included: number of adults, number of subadults, behavior, and perch type.

During the winter surveys, no bald eagles were seen within the MEPA and one adult bald eagle was seen on one occasion (Dec. 14, 2010) in the buffer area (**Map 2**). The results suggest bald

eagles are present in the vicinity of the MEPA during the winter and likely use the surrounding habitat for feeding and roosting, but apparently regularly-attended roost locations are not present even though suitable roosting habitat exists in the area.

Raptors

Several raptor species are known or expected to occur in or around the MEPA. Grasslands, shrublands, and scattered trees provide suitable nest substrates for a variety of species for breeding, hunting, and wintering. The Niobrara River drainage immediately south of the site provides habitat for tree nesting species and provides potential roosting sites for wintering raptors (e.g., bald eagle, rough-legged hawk [*Buteo lagopus*]). All raptors and their nests are protected from "take" or disturbance under the Migratory Bird Treaty Act (16 USC, §703 *et seq.*). Golden eagles and bald eagles also are afforded additional protection under the Bald and Golden Eagle Protection Act, amended in 1973 (16 USC, §669 *et seq.*). In addition, several raptor species are considered at-risk or sensitive by NNLP and/or Nebraska National Forest-Pine Ridge Ranger District.

Aerial surveys were conducted for documenting raptor nests throughout the MEPA and the 2.5-mile buffer area on April 28 and May 13, 2011. A ground survey for confirming nest locations, determining nest status, and for searching for new nests was conducted May 10-12. The ground survey was limited to the project area and areas adjacent to public roads in the buffer area due to minimal landowner access. Additional ground surveys for determining nest productivity of known nests, including nests in the buffer area found during the aerial surveys, were conducted June 7-8 and July 7-8.

A total of eight raptor nests were documented within the MEPA during 2011, including: three active red-tailed hawk (*Buteo jamaicensis*), two active burrowing owl, one active great horned owl (*Bubo virginianus*), and two inactive stick nests of unknown species. An additional 18 nests were documented within the buffer area, including: four active red-tailed hawk, two active great horned owl, nine active burrowing owl, one active Swainson's hawk (*Buteo swainsoni*), one active ferruginous hawk, and one inactive stick nest of an unknown species **(Table 3)**. One additional active great horned owl nest was located just outside the buffer area. Of the five species documented in and around the MEPA, two (ferruginous hawk and burrowing owl) are designated by the NNLP as Tier I At-Risk species. All but one of the burrowing owl nests were found in active prairie dog colonies **(Figure 7)**. Also as an interesting side-note, one of the breeding adult red-tailed hawks for nest #19 is a rare partial-albino (**Figure 8**). With the exception of a few normally-colored wing feathers, the plumage of this bird is almost entirely white. It was paired with a typical light-morph adult red-tailed hawk (Krider's subspecies) but it was unclear which was the male and female. According to a local landowner (pers. comm. B. Troester), the unique bird was first noticed in 2009.

Figure 7. Only active burrowing owl nest (nest #18) not found within a prairie dog colony.

Of the six active nests in the MEPA, only the great horned owl nest #13 and red-tailed hawk nest #20 (**Figure 9**) were confirmed productive (i.e., at least one fledged chick) at the time of the last survey. Both great horned owl nests in the buffer area (#7 and #10) had large chicks during the first ground survey and both likely fledged young, and red-tailed hawk nest #12 in the buffer was confirmed productive on the last survey. Otherwise the remaining active nests still had young to medium-aged nestlings when surveyed last or, in the case of the burrowing owl nests, production could not be determined due to chicks remaining underground or the burrow entrances were too obscured by vegetation to observe chicks during the final ground survey.

Several additional raptor species were observed in and around the project area during the spring surveys, including: Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius*), and peregrine falcon (*Falco peregrinus*).

With the exception of peregrine falcons, for which little nesting habitat exists within the project area, all the other species are possible breeders in and around the project area. Other species documented within ten miles of the location and have the potential to occur and breed within the MEPA include: bald eagle, osprey (*Pandion haliaetus*), merlin (*Falco columbarius*), prairie falcon (*Falco mexicanus*), sharp-shinned hawk (*Accipiter striatus*), northern goshawk (*Accipiter gentilis*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), barn owl *(Tyto alba*), northern saw-whet owl (*Aegolius acadicus*), and eastern screech owl (*Megascops asio*). Rough-legged hawks are common within the MEPA during the winter, and other species that have the potential to occur during migration or winter include: broad-winged hawk (*Buteo platypterus*),

Figure 8. Partial albino red-tailed hawk (Krider's subspecies) near nest #19.

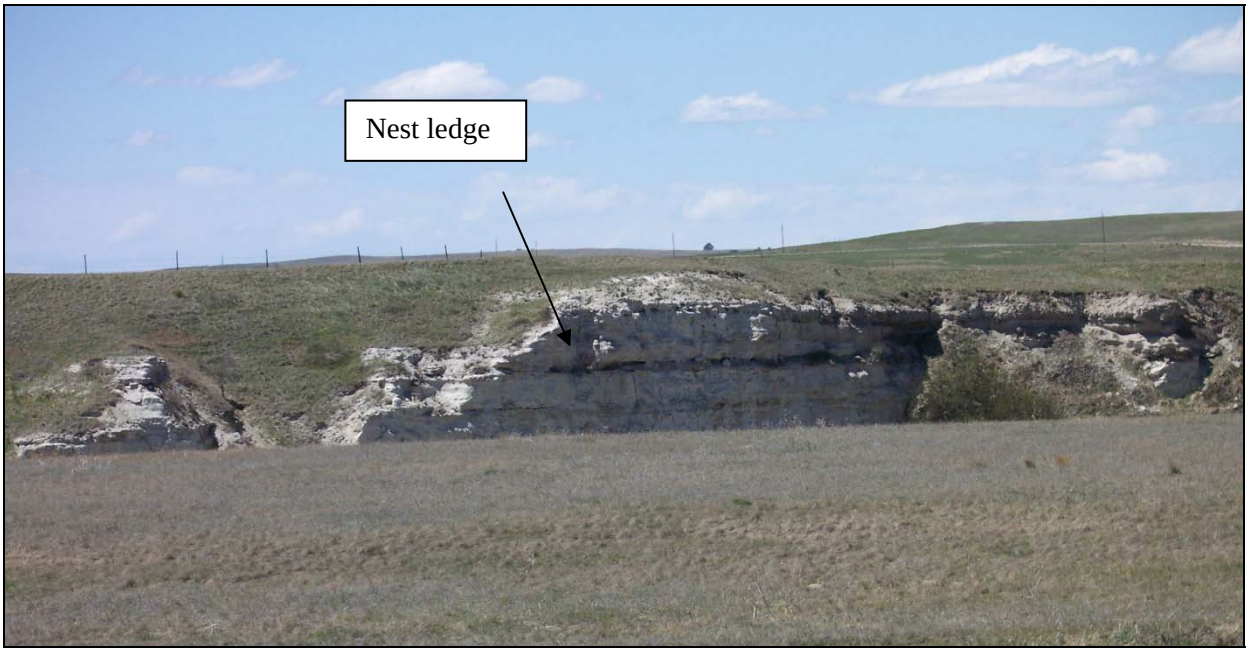

Figure 9. Rare cliff habitat within project area which was the location of a productive great horned owl nest (nest #13).

Table 3. Raptor nest locations within 2.5 miles of the proposed Marsland Expansion Project during 2011.

Nest #	Species	Year Discovered	Substrate*	Condition	Status**	UTM Nad83 X83	UTM Nad83 Y83	Legal Location QQ	Legal Location Sect.	Legal Location TWN-N	Legal Location RNG-W
1	Red-tailed Hawk	2011	CTL	Good	Active	644460	4701177	NW	31	29	50
2	Red-tailed Hawk	2011	PON	Fair	Active	640975	4711637	SW	26	30	51
3	Unknown	2011	PON	Poor	Inactive	641436	4711472	SW	26	30	51
4	Red-tailed Hawk	2011	PON	Excellent	Active	643116	4709931	SW	36	30	51
5	Unknown	2011	SNA	Excellent	Inactive	641812	4709703	SE	35	30	51
6	Unknown	2011	PON	Fair	Inactive	638913	4708430	SE	4	29	51
7	Great Horned Owl	2011	WIT	Excellent	Active	642111	4701567	SE	26	29	51
8	Swainson's Hawk	2011	WIT	Excellent	Active	642083	4701315	NE	35	29	51
9	Red-tailed Hawk	2011	CTL	Excellent	Active	642995	4703525	SW	24	29	51
10	Great Horned Owl	2011	CTL	Excellent	Active	643044	4703522	SW	24	29	51
11***	Great Horned Owl	2011	CTL	Excellent	Active	640261	4702595	NW	27	29	51
12	Red-tailed Hawk	2011	CTL	Excellent	Active	642740	4701388	NE	35	29	51
13	Great Horned Owl	2011	CLF	Good	Productive	643940	4707583	NE	12	29	51
14	Burrowing Owl	2011	BUR	Good	Active	645259	4706629	SE	7	29	50
15	Burrowing Owl	2011	BUR	Good	Active	645544	4702907	NE	30	29	50
16	Burrowing Owl	2011	BUR	Good	Active	645434	4702927	NW	30	29	50
17	Burrowing Owl	2011	BUR	Good	Active	645388	4702992	NW	30	29	50
18	Burrowing Owl	2011	BUR	Good	Active	646539	4702888	NW	29	29	50
19	Red-tailed Hawk	2011	CTL	Good	Active	646485	4701667	SW	29	29	50
20	Red-tailed Hawk	2011	PON	Excellent	Productive	643410	4708735	center	1	29	51
21	Ferruginous Hawk	2011	CTL	Excellent	Active	644634	4699818	NW	2	28	51
22	Burrowing Owl	2011	BUR	Good	Active	648229	4704489	NW	21	29	50
23	Burrowing Owl	2011	BUR	Good	Active	647919	4704672	NW	21	29	50
24	Burrowing Owl	2011	BUR	Good	Active	647597	4704664	NW	21	29	50
25	Burrowing Owl	2011	BUR	Good	Active	648169	4704389	NW	21	29	50
26	Burrowing Owl	2011	BUR	Good	Active	645303	4702960	NW	30	29	50
27	Burrowing Owl	2011	BUR	Good	Active	645239	4703013	NW	30	29	50

* Substrate: BUR-burrow, CTL-cottonwood live, CLF-cliff, PON-ponderosa pine, SNA-snag, WIT-willow tree

** Status: Active - eggs, nestlings, or bird in incubating position on nest; Inactive - no eggs or chicks; Productive - fledged ≥ 1 young; Tended - fresh nest material added to nest

**** >2.5 miles from project area

red-shouldered hawk (*Buteo lineatus*), gyrfalcon (*Falco rusticolus*), and snowy owl (*Bubo scandiacus*).

Northern goshawk, Cooper's hawk, and sharp-shinned hawk are typically forest-nesting raptors. Potential nesting habitat includes scattered, mixed conifer forests which are located in the northern portion of the project area and in the buffer. These forests may also provide nesting habitat for red-tailed hawk, osprey, merlin, American kestrel, and long-eared owls. Owls and falcons with only a few exceptions are dependent on other species for the availability of nests. Long-eared owls and merlins are secondary stick nesters (i.e., use stick nests of other species, such as magpie and crow nests) and the smaller owls and kestrels are secondary cavity nesters (i.e., use tree cavities established by other species, such as woodpeckers). Ferruginous hawks are found primarily in mixed-grass prairie and sagebrush steppe habitats during the spring, summer, and fall. They generally build nests on the ground, rock outcrops, cliff ledges, or small isolated trees. The one ferruginous hawk nest documented in the buffer area of the project is in a small isolated tree. Swainson's hawks typically nest in small trees or large shrubs along water features (e.g., irrigation ditches, streams) frequently near agricultural areas. Within the project area, the majority of *Buteo* nests are located in the deciduous trees along the Niobrara River, shelterbelts, trees around farmhouses and old homesteads, and the ponderosa pine trees in the northern portion of the project area. Golden eagles commonly nest on cliffs and in large trees. Although cliff habitat is limited within the project area, golden eagle nests are known to occur just north of the project area and suitable nesting habitat (i.e., large trees) occurs within the MEPA and the buffer area. Prairie falcons and peregrine falcons are strictly cliff-nesting species, and although they have been documented near the project area, cliff habitat within the project area is limited and nests are unlikely.

Passerines

Many species of neotropical songbirds utilize the MEPA for breeding, feeding, migration, wintering, and as year-round habitats. All habitats throughout the project area are likely used to some degree by various species. The Migratory Bird Treaty Act (16 USC, §703 *et seq.)* protects 836 migratory bird species (to-date) and their eggs, feathers, and nests from disturbances (USFWS 2011a). See **Appendix A-2** for a list of known or expected bird species for the project area and surrounding buffer.

Upland Game Birds

Wild turkey (*Meleagris gallopavo*), ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), and sharp-tailed grouse (*Tympanuchus phasianellus*) occur in the MEPA. The site is located in the Panhandle hunting region for upland game birds and is managed by the NGPC. Wild turkeys in the Pine Ridge area utilize habitats in the foothills, plateaus, forest habitats, and riparian draws and are likely to be distributed throughout the project area. Ring-necked pheasants often utilize open grasslands and agricultural areas and are fairly common.

Gray partridge, which are introduced and uncommon, and are often located in areas near dense shrub cover. Sharp-tailed grouse inhabit open grassland and steppe habitats with scattered trees and shrubs. The scattering of trees and shrubs plays an important role in their life cycle for food and cover and this species is known to occur in the project area in low numbers. Upland game birds designated as migratory that are confirmed or potentially present in the project area include mourning dove (*Zenaida macroura*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), and Wilson's snipe (*Gallinago delicata*). Mourning doves occupy a wide variety of habitats including sagebrush, grasslands, shrubland, and riparian areas. Sora and Virginia rail typically occupy areas near wetlands and snipe are frequently found in flooded fields and ditches.

Waterfowl

During spring and fall migration, some waterfowl species may utilize the area for feeding, nesting, or resting, specifically those areas along the Niobrara River which occur within the 2.5-mile buffer of the MEPA, but little open water exists within the project area. Box Butte Reservoir is likely used heavily during migration; however, this waterway is just outside the project area buffer. The baseline study in 1982 documented 24 species of waterfowl (Crow Butte Resources, 2010). A complete list of waterfowl species that may potentially occur in the project area are included in **Appendix A-2**.

REPTILES AND AMPHIBIANS

The baseline study in 1982 documented 13 species of reptiles and amphibians (Crow Butte Resources, 2010). Though formal surveys were not conducted for the MEPA, several species of herptiles were documented opportunistically, including: plains spadefoot toad (larval stage) (*Spea bombifrons*), northern leopard frog (*Rana pipiens*), and common snapping turtle (*Chelydra serpentina*). Only the spadefoot toads were found within the project area; the other two species were found along the Niobrara River corridor near the project area. The spadefoot toad tadpoles were found in a small ephemeral wetland in NW section 13, T29N:R51W (**Figure 10**). Identification of the tadpoles to species was aided by D. Ferraro, Extension Associate Professor and Herpetologist, School of Natural Resources, University of Nebraska-Lincoln (pers. comm. June 10, 2011). A complete list of known or expected herptiles for Dawes and Box Butte counties can be found in **Appendix A-3** (Fogell 2010).

Figure 10. Ephemeral wetland (top) used for breeding by plains spadefoot toads. Numerous spadefoot in larvae form (tadpoles) (bottom) were found at this location on June 7, 2011.

AQUATIC RESOURCES

The MEPA is located within the Niobrara River Basin. Annual flows within the Niobrara River Basin are regulated mainly by snowmelt, precipitation, and ground water discharge. No other perennial streams occur within the MEPA. The Niobrara River, located just south of the project area, is the prominent drainage and flows into Box Butte Reservoir. Other small drainages include Dooley Spring, Willow Creek, and other small unnamed drainages, but all are dry and re-vegetated. All lack distinct stream channels and banks. Occasional runoff may create small pools in a few places but there was no evidence of persistant stream flows in recent times. Intensive grazing and agricultural practices are the largest factors influencing water quality in the area.

FISH

Sampling of the local fish population was conducted at three sites along the Niobrara River during early June, 2011. The goal was to collect baseline information on the species composition and general abundance upstream and downstream of the proposed project for comparison with future monitoring efforts (**Map 2**). The sampling was intended also as surveillance for the state-listed species (black-nose shiner [*Notropis heterolepis*], northern redbelly dace [*Phoxinus eos*], and finescale dace [*Phoxinus neogaeus*]) known to occur in the Niobrara tribuatary. Sampling methods involved mainly electroshocking techniques but sein nets were also used. Methods complied with the U.S. Environmental Protection Agencies *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers* (Barbour et al. 1999).

Only two species were detected during the sampling effort including northern pike (*Esox lucius*) and white sucker (*Castostomus commersoni*); green sunfish (*Lepomis cyanellus*) and red shiner (*Cyprinella lutrensis*) were also detected during the training period. Thirteen white sucker and 11 northern pike were caught among two sampling locations. The white suckers ranged in length from 105-450 millimeters (mm) and averaged 294 mm (n = 13). The northern pike ranged in length from 55-362 mm and averaged 92.5 mm (n = 11). None of the state-listed species was detected. However, several other expected species were not detected either, and it was decided the high stream level and high water turbidity were unsuitable for dependable sampling (**Figure 11**). Thus re-sampling of the river areas will be conducted during the late summer or fall, 2011, the results of which will be provided as an addendum to this report.

WETLANDS

The MEPA was surveyed for areas that qualify as wetlands as defined by the U.S. Army Corps of Engineers (U.S. Army Corps of Engineers 2008). All locations within the MEPA identified in the National Wetlands Inventory (NWI) as wetlands or potential mesic sites were assessed as well (USFWS 2010b). Because ground-disturbing activity is not planned for wetland areas, we only surveyed for and delineated wetland habitat. All drainages and low-lying areas were surveyed by all-terrain vehicle (ATV) or on foot. Three types of indicators were used for

Figure 11. Fish sampling on the Niobrara River using electro-shocking (top) during spring of 2011. Northern pike captured by electro-shocking (bottom) at sampling location near railroad bridge south of Marsland, Nebraska.

assessing whether a site qualified as a wetland, including soil, vegetation, and hydrology. Sites containing all three indicators of hydric conditions were classified and delineated as wetlands.

A total of four sites were evaluated as potential wetlands within the MEPA (**Map 1**):

- Site #1 – location identified in the NWI as "freshwater emergent wetland." Low lying depression in grassy field with ephemeral open water created by run-off and rainwater. Tadpoles present. Location had appropriate hydric soil, vegetation, and hydrology. Qualifies as wetland (see **Appendix B-1** for wetland determination data field form)
- Site #2 – representative location in bottom of dry drainage. Wetland-like conditions not present, but location assessed in order to compare dry drainages to mesic locations. Does not qualify as wetland or mesic.
- Site #3 – location identified in the NWI as "freshwater emergent wetland." Site satisfied the vegetation and hydrology indicators for a wetland, but hydric soils were absent. Does not qualify as wetland, but mesic conditions exist.
- Site #4 – location not identified in the NWI, but rather found during ground surveys. Site satisfied the vegetation and hydrology indicators for a wetland, but hydric soils were absent. Does not qualify as wetland, but mesic conditions exist.

AQUATIC ECOLOGY

The baseline study for the Crow Butte Mine recorded 15 species of fish throughout various streams and the White River (Crow Butte Resources 2010). Game fish collected included rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and white sucker. Minnow species included longnose dace (*Rhinichthys cataractae*), common shiner (*Luxilus cornutus*), fathead minnow (*Pimephales promelas*), and creek chub (*Semotilus atromaculatus*). Many of the same species are thought to occur, or formerly occurred, in the Niobrara tributary. According to a local landowner (pers comm. B. Troester, June 2011), trout previously occurred in the Niobrara River just south of the MEPA. However, a combination of drought and northern pike becoming more numerous upstream from Box Butte Reservoir during the past 10 years may have altered the fish community dramatically since pike are major predators of minnows and small trout.

Macroinvertebrates were also sampled during the baseline study in 1982 and results suggested that streams in the Crow Butte area were stressed with lower water quality and degraded stream habitats (Crow Butte Resources 2010). Aquatic conditions within the Marsland Expansion Project Area may be similar, but macroinvertebrates were not sampled directly, although crayfish (unknown species) were commonly found during the fish sampling in the Niobrara River.

THREATENED, ENDANGERED, OR CANDIDATE SPECIES

Under the Federal Endangered Species Act (ESA) of 1973 and the Nongame and Endangered Species Conservation Act (Neb. Rev. Stat. §37-430 *et seq*.) several species receive unique

Table 4. Potential occurrence of Threatened and Endangered Species within the Marsland Expansion Project Area, based on species listed for Dawes County on state or federal lists.

Species	Scientific Name	Potential Occurence[2]	Status
Mammals			
Black-footed Ferret	*Mustela nigripes*	U	Endangered - Federally
Gray Wolf	*Canis lupis*	U	Threatened - Federally
Swift Fox	*Vulpes velox*	L	Endangered - State
Birds			
Whooping Crane	*Grus americana*	U	Endangered - Federally
Fish			
Blacknose shiner[1]	*Notropis heterolepis*	P, PAD	Endangered - State
Northern redbelly dace[1]	*Phoxinus eos*	P, PAD	Threatened - State
Finescale dace[1]	*Phoxinus neogaeus*	P, PAD	Threatened - State

[1] *Presence in the Niobrara River system downstream of the project area.*

[2] *Potential Occurrence: likely (L), possible (P), unlikely (U), and potentially affected downstream (PAD)*

protections due largely to their rarity, population declines, and/or habitat loss. A summary of potentially occurring threatened and endangered species within the MEPA is presented in **Table 4 (**also see **Appendix B-2** for range maps in Nebraska**).**

Black-footed Ferret

The black-footed ferret (*Mustela nigripes*) is listed by the USFWS as endangered and is considered the most endangered mammal species in the United States. Several factors have contributed to declines in ferret populations including eradication of prairie dogs by humans, and disease outbreaks (i.e., sylvatic plague and canine distemper). Distributions of black-footed ferret closely correspond to that of prairie dogs. Black-footed ferrets depend heavily on prairie dogs for food and they also use prairie dog burrows for shelter, parturition, and raising young. Black-tailed prairie dog colonies occur in the project area. However, no known ferret populations occur in Nebraska (NNHP 2009 [abstract]), so the likelihood of black-footed ferrets occurring within the project area is minimal.

Whooping Crane

The whooping crane (*Grus americana*) is North America's tallest bird with males close to five feet tall. The species is listed as endangered by USFWS and NGPC, and according to USFWS they have the potential to occur in Dawes County (USFWSa 2010). One record exists for Dawes County—a single adult whooping crane was recorded in Dawes County in July 1991 (pers. comm.. J. Lackey, USFWS, July 28, 2011). Whooping cranes primarily occur along the Platte Valley in central Nebraska and migrate through the center part of the state, according to NNHP (2009). Cranes use a variety of habitats during the nonbreeding season including wetland mosaics, cropland, and riverine habitat in Nebraska. Seasonally and semi permanently flooded wetlands are depended on for roosting. Such habitat is limited or absent in the MEPA. Therefore it is unlikely whooping cranes would occur near the project area.

Gray Wolf

Gray wolves were first listed as endangered in the lower 48 states in 1967. After decades of intensive management, including reintroductions in Idaho and Wyoming, the species was delisted in the Northern Rocky Mountain Distinct Population Segment (DPS) except Wyoming on May 5, 2011. There are no known populations of wolves in Nebraska. However dispersing individuals from either Montana or Wyoming into the state would be afforded full protection under the ESA as an endangered species. Wolves are capable of dispersing significant distances but it is extremely unlikely that wolves would occur in or near the project area.

Swift Fox

The swift fox (*Vulpes velox*) is a state-listed endangered species and inhabits short-grass and mixed-grass prairies over most of the Great Plains. Several factors that affect swift fox

populations include habitat loss (conversion from agriculture and industrial development) and prey availability. Swift fox are highly mobile and use multiple dens in different locations throughout the year. They prefer relatively flat topography (slopes <20%), arid regions, and in Nebraska can be found in grasslands and prairie.

Swift fox have been confirmed by NGPC in Dawes, Box Butte and Sioux counties, and potentially suitable habitat occurs in and around the project area, thus the presence of swift fox within the MEPA is certainly possible. Though the habitat within the project area, specifically, appears marginal, and previous site-specific surveys in the area have failed to detect the species. Grass height in particular appears to create unsuitable conditions throughout the majority of the project site, where dense fields of cheatgrass exceeded 14 inches in many areas during summer.

As general surveillance for carnivore species in the project area, and with a focus on sampling areas most suitable for swift fox, we deployed remote infrared trail cameras throughout mixed-grassland portions of the project area in 2011. Cameras were used instead of the conventional track station methods because of time and budget constraints. We used Reconyx© HyperFire™ HC600 passive infrared (no glow illuminator) remote trail cameras for the monitoring. A total of four cameras were deployed simultaneously among eight locations throughout the southern half of the project area. Cameras were deployed continuously from June 6-July 7, 2011. Number of sampling days per location was largely determined by the timing of other field surveys, but cameras were deployed for 9-22 days/location. Cameras were positioned along fencelines and other likely travel corridors and baited with a combination of skunk scent to act as a long-distance lure, and fish oil. Camera locations were deliberately selected based on quality of habitat, proximity to prairie dog colonies, and presence of cattle (to protect cameras).

No swift fox were detected using the remote cameras during 2011. Only two species of carnivores were detected, including coyote and badger. Other species detected using the cameras included: pronghorn, white-tailed deer, elk, cottontail *sp.*, jackrabbit *sp.*, cattle, and a lark bunting.

Fish

Three species of state-listed fish are found in the Niobrara River system and may potentially be impacted by a reduction in river flow or impairment of stream quality (**Table 4**).

The blacknose shiner, a state-listed endangered species that was once commonly distributed throughout the state, is now restricted to three main areas along the Niobrara and Snake rivers (NGPC 2011b, NNHP 2009, NNHP 2011). This species typically inhabits undisturbed streams with high oxygen levels. Reductions in stream flows and/or quality are important considerations for this species as it resides downstream from the project area.

The northern redbelly dace and finescale dace are state-listed threatened species. These species are regularly found together in the headwaters of high quality streams. Both of these species are

downstream residents from the project area and could be impacted by reductions in water quantity and/or quality.

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Appendices A-1 through A-3:
Species Lists for Mammals, Birds, and Herps

Appendix A-1. Mammal species list for Dawes County, Nebraska based on known or expected occurrence.

Common Name	Scientific Name	Status
Raccoon	*Procyon lotor*	D
Long-tailed Weasel	*Mustela frenata*	D
Mink	*Mustela vison*	D
Black-footed Ferret	*Mustela nigripes*	E*
Badger	*Taxidea taxus*	C
Eastern Spotted Skunk	*Spilogale putorius*	E
Striped Skunk	*Mephitis mephitis*	D
Coyote	*Canis latrans*	C
Swift Fox	*Vulpes velox*	R
Red Fox	*Vulpes vulpes*	D
Bobcat	*Lynx rufus*	D
Mountain Lion	*Puma concolor*	R
Mule Deer	*Odocoileus hemionus*	C
White-tailed Deer	*Odocoileus virginianus*	C
Pronghorn	*Antilocapra americana*	C
Elk	*Cervus elaphus*	C
Bighorn Sheep	*Ovis canadensis*	D
Bison	*Bison bison*	D
Moose	*Alces Alces*	R
Keen Myotis	Myotis keenii	E
Little Brown Myotis	*Myotis lucifugus*	E
Fringe-tailed Myotis	*Myotis thysanodes*	E
Long-eared Myotis	*Myotis evotis*	E
Long-legged Myotis	*Myotis volans*	E
Western Small-footed Myotis	*Myotis ciliolabrum*	E
Silver-haired Bat	*Lasionycteris noctivagans*	E
Eastern Red Bat	*Lasiurus borealis*	E
Big Brown Bat	*Eptesicus fuscus*	E
Hoary Bat	*Lasiurus cinereus*	E
Townsend's Big-eared Bat	*Corynorhinus townsendii*	E
Masked Shrew	*Sorex cinereus*	E
Dwarf Shrew	*Sorex nanus*	E
Merriam Shrew	*Sorex merriami*	E
North American Least Shrew	*Cryptotis parva*	E
Eastern Mole	*Scalopus aquaticus*	D
White-tailed Jackrabbit	*Lepus townsendii*	C
Black-tailed Jackrabbit	*Lepus californicus*	D
Eastern Cottontail	*Sylvilagus floridanus*	D
Desert Cottontail	*Sylvilagus auduboni*	D
Black-tailed Prairie Dog	*Cynomys ludovicianus*	C

Appendix A-1. Continued

Common Name	Scientific Name	Status
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	C
Spotted Ground Squirrel	*Spermophilus spilosoma*	D
Least Chipmunk	*Tamias minimus*	D
Eastern Fox Squirrel	*Sciurus niger*	C
Northern Pocket Gopher	*Thomomys talpoides*	E
Plains Pocket Gopher	*Geomys bursarius*	E
Olive-backed Pocket Mouse	*Perognathus fasciatus*	E
Silky Pocket Mouse	*Perognathus flavus*	E
Hispid Pocket Mouse	*Chaetodipus hispidus*	E
Ord Kangaroo Rat	*Dipodomys ordii*	D
Beaver	*Castor canadensis*	C
Plains Harvest Mouse	*Reithrodontomys montanus*	E
Western Harvest Mouse	*Reithrodontomys megalotis*	E
White-footed Mouse	*Peromyscus leucopus*	D
Deer Mouse	*Peromyscus maniculatus*	D
Northern Grasshopper Mouse	*Onychomys leucogaster*	E
Eastern Woodrat	*Neotoma floridana*	E
Bushy-tailed Woodrat	*Neotoma cinerea*	E
Norway Rat	*Rattus norvegicus*	E
House Mouse	*Mus musculus*	D
Meadow Vole	*Microtus pennsylvanicus*	D
Prairie Vole	*Microtus ochrogaster*	D
Muskrat	*Ondatra zibethicus*	D
Meadow Jumping Mouse	*Zapus hudsonius*	D
Porcupine	*Erethizon dorsatum*	C

C = Confirmed during field surveys in 2011.

D = Documented during 1982 baseline study for Crow Butte Mine.

E = Expected to occur - historical or recent evidence.

R = Reported by knowledgable individual(s).

** = Extirpated previously; historical records only*

Appendix A-2. Bird species list for Dawes County, Nebraska based on known or expected occurrence according to the Nebraska Ornithological Union.

Common Name	Scientific Name	Status
Greater White-fronted Goose	*Anser albifrons*	D
Snow Goose	*Chen caerulescens*	D
Ross's Goose	*Chen rossii*	E
Canada Goose	*Branta canadensis*	C
Brant	*Branta bernicla*	R
Trumpeter Swan	*Cygnus buccinator*	D
Tundra Swan	*Cygnus columbianus*	R
Wood Duck	*Aix sponsa*	C
Gadwall	*Anas strepera*	D
American Wigeon	*Anas americana*	D
Eurasian Wigeon	*Anas penelope*	E
American Black Duck	*Anas rubripes*	R
Mallard	*Anas platyrhynchos*	C
Blue-winged Teal	*Anas discors*	C
Cinnamon Teal	*Anas cyanoptera*	D
Northern Shoveler	*Anas clypeata*	D
Northern Pintail	*Anas acuta*	D
Green-winged Teal	*Anas crecca*	D
Canvasback	*Aythya valisineria*	D
Redhead	*Aythya americana*	D
Ring-necked Duck	*Aythya collaris*	D
Lesser Scaup	*Aythya affinis*	D
Surf Scoter	*Melanitta perspicillata*	R
White-winged Scoter	*Melanitta fusca*	R
Black Scoter	*Melanitta nigra*	R
Long-tailed Duck	*Clangula hyemalis*	R
Bufflehead	*Bucephala albeola*	D
Common Goldeneye	*Bucephala clangula*	D
Barrow's Goldeneye	*Bucephala islandica*	R
Hooded Merganser	*Lophodytes cucullatus*	D
Common Merganser	*Mergus merganser*	D
Red-breasted Merganser	*Mergus serrator*	R
Ruddy Duck	*Oxyura jamaicensis*	D
Ring-necked Pheasant	*Phasianus colchicus*	C
Sharp-tailed Grouse	*Tympanuchus phasianellus*	D
Wild Turkey	*Meleagris gallopavo*	C
Gray Partridge	*Perdix perdix*	D
Northern Bobwhite	*Colinus virginianus*	R

Appendix A-2. Continued

Common Name	Scientific Name	Status
Arctic Loon	*Gavia artica*	R
Pacific Loon	*Gavia pacifica*	E
Common Loon	*Gavia immer*	R
Pied-billed Grebe	*Podilymbus podiceps*	E
Horned Grebe	*Podiceps auritus*	D
Red-necked Grebe	*Podiceps grisegena*	R
Eared Grebe	*Podiceps nigricollis*	D
Western Grebe	*Aechmophorus occidentalis*	D
Clark's Grebe	*Aechmophorus clarkii*	E
American White Pelican	*Pelecanus erythrorhynchos*	D
Double-crested Cormorant	*Phalacrocorax auritus*	D
American Bittern	*Botaurus lentiginosus*	D
Great Blue Heron	*Ardea herodias*	C
Little Blue Heron	*Egretta caerulea*	E
Great Egret	*Ardea alba*	R
Snowy Egret	*Egretta thula*	R
Cattle Egret	*Bubulcus ibis*	R
Green Heron	*Butorides virescens*	R
Yellow-crowned Night-Heron	*Nyctanassa violacea*	R
Black-crowned Night-Heron	*Nycticorax nycticorax*	E
White-faced Ibis	*Plegadis chihi*	R
Turkey Vulture	*Cathartes aura*	C
Osprey	*Pandion haliaetus*	R
Mississippi Kite	*Ictinia mississippiensis*	E
Bald Eagle	*Haliaeetus leucocephalus*	C
Northern Harrier	*Circus cyaneus*	C
Sharp-shinned Hawk	*Accipiter striatus*	D
Cooper's Hawk	*Accipiter cooperii*	C
Northern Goshawk	*Accipiter gentilis*	D
Broad-winged Hawk	*Buteo platypterus*	R
Swainson's Hawk	*Buteo swainsoni*	C
Red-tailed Hawk	*Buteo jamaicensis*	C
Red-shouldered Hawk	*Buteo lineatus*	R
Ferruginous Hawk	*Buteo regalis*	C
Rough-legged Hawk	*Buteo lagopus*	C
Golden Eagle	*Aquila chrysaetos*	C
American Kestrel	*Falco sparverius*	C
Merlin	*Falco columbarius*	D
Peregrine Falcon	*Falco peregrinus*	C

Appendix A-2. Continued

Common Name	Scientific Name	Status
Prairie Falcon	*Falco mexicanus*	D
Gyrfalcon	*Falco rusticolus*	E
Virginia Rail	*Rallus limicola*	D
Sora	*Porzana carolina*	D
American Coot	*Fulica americana*	D
Sandhill Crane	*Grus canadensis*	D
Black-bellied Plover	*Pluvialis squatarola*	D
American Golden-Plover	*Pluvialis dominica*	R
Snowy Plover	*Charadrius alexandrinus*	R
Mountain Plover	*Charadrius montanus*	E
Semipalmated Plover	*Charadrius semipalmatus*	R
Piping Plover	*Charadrius melodus*	R
Killdeer	*Charadrius vociferus*	C
Black-necked Stilt	*Himantopus mexicanus*	E
American Avocet	*Recurvirostra americana*	D
Spotted Sandpiper	*Actitis macularius*	D
Solitary Sandpiper	*Tringa solitaria*	D
Greater Yellowlegs	*Tringa melanoleuca*	D
Willet	*Tringa semipalmata*	D
Lesser Yellowlegs	*Tringa flavipes*	D
Upland Sandpiper	*Bartramia longicauda*	C
Whimbrel	*Numenius phaeopus*	R
Long-billed Curlew	*Numenius americanus*	C
Hudsonian Godwit	*Limosa haemastica*	E
Marbled Godwit	*Limosa fedoa*	D
Red Knot	*Calidris canutus*	R
Sanderling	*Calidris alba*	D
Semipalmated Sandpiper	*Calidris pusilla*	D
Western Sandpiper	*Calidris mauri*	R
Least Sandpiper	*Calidris minutilla*	D
White-rumped Sandpiper	*Calidris fuscicollis*	R
Baird's Sandpiper	*Calidris bairdii*	D
Pectoral Sandpiper	*Calidris melanotos*	R
Dunlin	*Calidris alpina*	E
Stilt Sandpiper	*Calidris himantopus*	D
Buff-breasted Sandpiper	*Tryngites subruficollis*	R
Short-billed Dowitcher	*Limnodromus griseus*	R
Long-billed Dowitcher	*Limnodromus scolopaceus*	D
Wilson's Snipe	*Gallinago delicata*	D

Appendix A-2. Continued

Common Name	Scientific Name	Status
Wilson's Phalarope	*Phalaropus tricolor*	D
Red-necked Phalarope	*Phalaropus lobatus*	D
Parasitic Jaeger	*Stercorarius parasiticus*	R
Sabine's Gull	*Xema sabini*	E
Black-headed Gull	*Chroicocephalus ridibundus*	R
Bonaparte's Gull	*Larus philadelphia*	R
Franklin's Gull	*Larus pipixcan*	D
Ring-billed Gull	*Larus delawarensis*	D
California Gull	*Larus californicus*	R
Herring Gull	*Larus argentatus*	R
Least Tern	*Sternula antillarum*	R
Caspian Tern	*Hydroprogne caspia*	E
Black Tern	*Chlidonias niger*	D
Common Tern	*Sterna hirundo*	R
Forster's Tern	*Sterna forsteri*	D
Rock Pigeon	*Columba livia*	C
Mourning Dove	*Zenaida macroura*	C
Inca Dove	*Columbina inca*	E
Eurasian Collared Dove	*Streptopelia decaocto*	C
Yellow-billed Cuckoo	*Coccyzus americanus*	D
Black-billed Cuckoo	*Coccyzus erythropthalmus*	D
Barn Owl	*Tyto alba*	D
Eastern Screech-Owl	*Megascops asio*	D
Great Horned Owl	*Bubo virginianus*	C
Snowy Owl	*Bubo scandiacus*	R
Burrowing Owl	*Athene cunicularia*	C
Short-eared Owl	*Asio flammeus*	D
Northern Saw-whet Owl	*Aegolius acadicus*	D
Common Nighthawk	*Chordeiles minor*	C
Common Poorwill	*Phalaenoptilus nuttallii*	D
Chimney Swift	*Chaetura pelagica*	D
White-throated Swift	*Aeronautes saxatalis*	D
Broad-tailed Hummingbird	*Selasphorus platycercus*	R
Rufous Hummingbird	*Selasphorus rufus*	R
Belted Kingfisher	*Ceryle alcyon*	C
Lewis's Woodpecker	*Melanerpes lewis*	D
Red-headed Woodpecker	*Melanerpes erythrocephalus*	C
Red-bellied Woodpecker	*Melanerpes carolinus*	R
Red-naped Sapsucker	*Sphyrapicus nuchalis*	E

Appendix A-2. Continued

Common Name	Scientific Name	Status
Yellow-bellied sapsucker	*Sphyrapicus varius*	R
Downy Woodpecker	*Picoides pubescens*	D
Hairy Woodpecker	*Picoides villosus*	C
Northern Flicker	*Colaptes auratus*	C
Western Wood-Pewee	*Contopus sordidulus*	C
Eastern Wood-Pewee	*Contopus virens*	D
Olive-sided Flycatcher	*Contopus cooperi*	R
Willow Flycatcher	*Empidonax traillii*	D
Hammond's Flycatcher	*Empidonax hammondii*	R
Least Flycatcher	*Empidonax minimus*	D
Cordilleran Flycatcher	*Empidonax occidentalis*	E
Western Flycatcher	*Empidonax difficilis*	R
Eastern Phoebe	*Sayornis phoebe*	D
Say's Phoebe	*Sayornis saya*	C
Black Phoebe	*Sayornis nigricans*	D
Ash-throated Flycatcher	*Myiarchus cinerascens*	E
Great Crested Flycatcher	*Myiarchus crinitus*	D
Scissor-tailed Flycatcher	*Tyrannus forficatus*	R
Western Kingbird	*Tyrannus verticalis*	C
Cassin's Kingbird	*Tyrannus vociferans*	R
Eastern Kingbird	*Tyrannus tyrannus*	C
Loggerhead Shrike	*Lanius ludovicianus*	C
Northern Shrike	*Lanius excubitor*	D
White-eyed Vireo	*Vireo griseus*	R
Bell's Vireo	*Vireo bellii*	D
Cassin's Vireo	*Vireo cassini*	E
Yellow-throated Vireo	*Vireo flavifrons*	R
Blue-headed Vireo	*Vireo solitarius*	R
Plumbeous Vireo	*Vireo plumbeus*	E
Warbling Vireo	*Vireo gilvus*	D
Philadelphia Vireo	*Vireo philadelphicus*	R
Red-eyed Vireo	*Vireo olivaceus*	D
Purple Martin	*Progne subis*	R
Gray Jay	*Perisoreus canadensis*	R
Steller's Jay	*Cyanocitta stelleri*	R
Blue Jay	*Cyanocitta cristata*	C
Pinyon Jay	*Gymnorhinus cyanocephalus*	C
Clark's Nutcracker	*Nucifraga columbiana*	R
Black-billed Magpie	*Pica hudsonia*	D

Appendix A-2. Continued

Common Name	Scientific Name	Status
American Crow	*Corvus brachyrhynchos*	C
Horned Lark	*Eremophila alpestris*	C
Tree Swallow	*Tachycineta bicolor*	D
Violet-green Swallow	*Tachycineta thalassina*	D
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	D
Bank Swallow	*Riparia riparia*	D
Cliff Swallow	*Petrochelidon pyrrhonota*	C
Barn Swallow	*Hirundo rustica*	C
Black-capped Chickadee	*Poecile atricapillus*	C
Tufted Titmouse	*Baeolophus bicolor*	R
Red-breasted Nuthatch	*Sitta canadensis*	C
White-breasted Nuthatch	*Sitta carolinensis*	C
Pygmy Nuthatch	*Sitta pygmaea*	C
Brown Creeper	*Certhia americana*	D
American Dipper	*Cinclus mexicanus*	R
Rock Wren	*Salpinctes obsoletus*	D
Canyon Wren	*Catherpes mexicanus*	R
House Wren	*Troglodytes aedon*	C
Winter Wren	*Troglodytes troglodytes*	R
Bewick's Wren	*Thryomanes bewickii*	R
Marsh Wren	*Cistothorus palustris*	D
Golden-crowned Kinglet	*Regulus satrapa*	R
Ruby-crowned Kinglet	*Regulus calendula*	D
Blue-gray Gnatcatcher	*Polioptila caerulea*	R
Eastern Bluebird	*Sialia sialis*	C
Mountain Bluebird	*Sialia currucoides*	C
Townsend's Solitaire	*Myadestes townsendi*	D
Veery	*Catharus fuscescens*	D
Gray-cheeked Thrush	*Catharus minimus*	D
Swainson's Thrush	*Catharus ustulatus*	D
Hermit Thrush	*Catharus guttatus*	D
Wood Thrush	*Hylocichla mustelina*	D
American Robin	*Turdus migratorius*	C
Gray Catbird	*Dumetella carolinensis*	D
Northern Mockingbird	*Mimus polyglottos*	C
Sage Thrasher	*Oreoscoptes montanus*	R
Brown Thrasher	*Toxostoma rufum*	C
European Starling	*Sturnus vulgaris*	C
American Pipit	*Anthus rubescens*	E

Appendix A-2. Continued

Common Name	Scientific Name	Status
Bohemian Waxwing	*Bombycilla garrulus*	D
Cedar Waxwing	*Bombycilla cedrorum*	D
Cape May Warbler	*Dendroica tigrina*	R
Tennessee Warbler	*Vermivora peregrina*	D
Orange-crowned Warbler	*Vermivora celata*	D
Nashville Warbler	*Vermivora ruficapilla*	D
Northern Parula	*Parula americana*	R
Yellow Warbler	*Dendroica petechia*	C
Magnolia Warbler	*Dendroica magnolia*	R
Chestnut-sided Warbler	*Dendroica pensylvanica*	R
Golden-winged Warbler	*Vermivora chrysoptera*	E
Yellow-rumped Warbler	*Dendroica coronata*	D
Townsend's Warbler	*Dendroica townsendi*	R
Black-throated green warbler	*Dendroica virens*	R
Cerulean Warbler	*Dendroica cerulea*	R
Palm Warbler	*Dendroica palmarum*	R
Blackpoll Warbler	*Dendroica striata*	D
Black-and-white Warbler	*Mniotilta varia*	D
Prothonotry Warbler	*Protonotaria citrea*	R
Blackburnian Warbler	*Dendroica fusca*	R
American Redstart	*Setophaga ruticilla*	D
Ovenbird	*Seiurus aurocapilla*	D
Northern Waterthrush	*Seiurus noveboracensis*	D
Mourning Warbler	*Oporornis philadelphia*	R
MacGillivray's Warbler	*Oporornis tolmiei*	R
Common Yellowthroat	*Geothlypis trichas*	C
Wilson's Warbler	*Wilsonia pusilla*	D
Yellow-breasted Chat	*Icteria virens*	D
Hooded Warbler	*Wilsonia citrina*	R
Green-tailed Towhee	*Pipilo chlorurus*	R
Spotted Towhee	*Pipilo maculatus*	C
American Tree Sparrow	*Spizella arborea*	D
Chipping Sparrow	*Spizella passerina*	C
Clay-colored Sparrow	*Spizella pallida*	C
Brewer's Sparrow	*Spizella breweri*	D
Field Sparrow	*Spizella pusilla*	R
Vesper Sparrow	*Pooecetes gramineus*	C
Lark Sparrow	*Chondestes grammacus*	C
Lark Bunting	*Calamospiza melanocorys*	C

Appendix A-2. Continued

Common Name	Scientific Name	Status
Cassin's Finch	*Carpodacus cassinii*	R
House Finch	*Carpodacus mexicanus*	D
Red Crossbill	*Loxia curvirostra*	C
White-winged Crossbill	*Loxia leucoptera*	R
Common Redpoll	*Carduelis flammea*	R
Pine Siskin	*Carduelis pinus*	D
American Goldfinch	*Carduelis tristis*	C
Lesser Goldfinch	*Carduelis psaltria*	E
Evening Grosbeak	*Coccothraustes vespertinus*	D
House Sparrow	*Passer domesticus*	D

C = Confirmed during field surveys in 2011.

D = Documented by Nebraska Game and Parks Commision or during 1982 baseline study for Crow Butte Mine.

R = Reported by knowledgable individual(s).

E = Expected to occur - historical or recent evidence.

Appendix A-3. Herp species list for Dawes and Box Butte counties, Nebraska.

Common Name	Scientific Name	Status
AMPHIBIANS		
Barred Tiger Salamander	*Ambystoma mavortium*	D
Great Plains Toad	*Bufo cognatus*	D
Woodhouse's Toad	*Bufo woodhousii*	D
Boreal Chorus Frog	*Pseudacris maculata*	D
Plains Spadefoot Toad	*Spea bombifrons*	C
Northern Leopard Frog	*Rana pipiens*	C
American Bullfrog	*Rana catesbeiana*	D
REPTILES		
Mountain Short-horned Lizard	*Phrynosoma hernandesi*	D
Lesser Earless Lizard	*Holbrookia maculata*	
Northern Prairie Lizard	*Sceloporus undulatus garmani*	
Many-lined Skink	*Eumeces multivirgatus*	Rare
Bullsnake	*Pituophis catenifer sayi*	D
Eastern Yellow-bellied Racer	*Coluber constrictor flaviventris*	D
Plains Garter Snake	*Thamnophis radix*	D
Common Garter Snake	*Thamnophis sirtalis*	D
Western Hog-nosed Snake	*Heterodon nasicus nasicus*	D
Prairie Rattlesnake	*Crotalus viridis viridis*	D
Central Plains Milk Snake	*Lampropeltis triangulum*	Rare
Northern Water Snake	*Nerodia sipedon*	Rare
Ornate Box Turtle	*Terrapene ornata*	D
Common Snapping Turtle	*Chelydra serpentina*	C
Northern Painted Turtle	*Chrysemys picta*	D

C = Confirmed during field surveys in 2011.

D = Documented by Nebraska Game and Parks Commision or during 1982 baseline study for Crow Butte Mine.

Rare = rare but possible

Appendix B-1:
Wetland Determination Data Field Form
for Qualified Wetlands

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Marsland Site #1 City/County: Marsland Sampling Date: June 9, 201
Applicant/Owner: Carrico State: NE Sampling Point:
Investigator(s): Lisa Martin & Matt Martin Section, Township, Range: 13, T29N R51W
Landform (hillslope, terrace, etc.): rolling hills - depression Local relief (concave, convex, none): Slope (%):
Subregion (LRR): LRR G Lat: 643552.82E Long: 4706079.50 N Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation no, Soil no, or Hydrology no significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation no, Soil no, or Hydrology no naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	Is the Sampled Area within a Wetland? Yes No
Hydric Soil Present?	Yes No ✓	
Wetland Hydrology Present?	Yes ✓ No	

Remarks.

VEGETATION – Use scientific names of plants.

areal

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5' radius)			
1. Eleocharis sp	55	yes	OBL
2. Taraxacum officinale	1	no	
3. Veronica sp.	1	no	
4. Poa sp.	1	no	
5.			
6.			
7.			
8.			
9.			
10.			
	58 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 1	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
Prevalence Index is ≤3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:
Eleocharis covers entire area
Photo # 100_1127 100_1128

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SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
5	10YR 3/1						Clay	Roots Zone
5-10	10YR 2/1						Clay Loam	
0-3	7.5YR 3/1						Clay loam	2nd Sample, from Center of Slightly Pond
3-14	7.5YR 3/1		5YR 4/6	10%	C			Mucky

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- N Histosol (A1)
- N Histic Epipedon (A2)
- N Black Histic (A3)
- N Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- N 1 cm Muck (A9) (LRR F, G, H)
- N Depleted Below Dark Surface (A11)
- N Thick Dark Surface (A12)
- N Sandy Mucky Mineral (S1)
- N 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ___ 5 cm Mucky Peat or Peat (S3) (LRR F)
- N Sandy Gleyed Matrix (S4)
- N Sandy Redox (S5)
- N Stripped Matrix (S6)
- N Loamy Mucky Mineral (F1)
- N Loamy Gleyed Matrix (F2)
- N Depleted Matrix (F3)
- Y Redox Dark Surface (F6)
- N Depleted Dark Surface (F7)
- N Redox Depressions (F8)
- N High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- N 1 cm Muck (A9) (LRR I, J)
- N Coast Prairie Redox (A16) (LRR F, G, H)
- N Dark Surface (S7) (LRR G)
- ___ High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- N Reduced Vertic (F18)
- N Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- Y Surface Water (A1)
- Y High Water Table (A2)
- Y Saturation (A3)
- N Water Marks (B1)
- N Sediment Deposits (B2)
- N Drift Deposits (B3)
- N Algal Mat or Crust (B4)
- N Iron Deposits (B5)
- N Inundation Visible on Aerial Imagery (B7)
- N Water-Stained Leaves (B9)
- N Salt Crust (B11)
- N Aquatic Invertebrates (B13)
- N Hydrogen Sulfide Odor (C1)
- N Dry-Season Water Table (C2)
- N Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- N Presence of Reduced Iron (C4)
- N Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 0

Water Table Present? Yes ✓ No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Tadpoles

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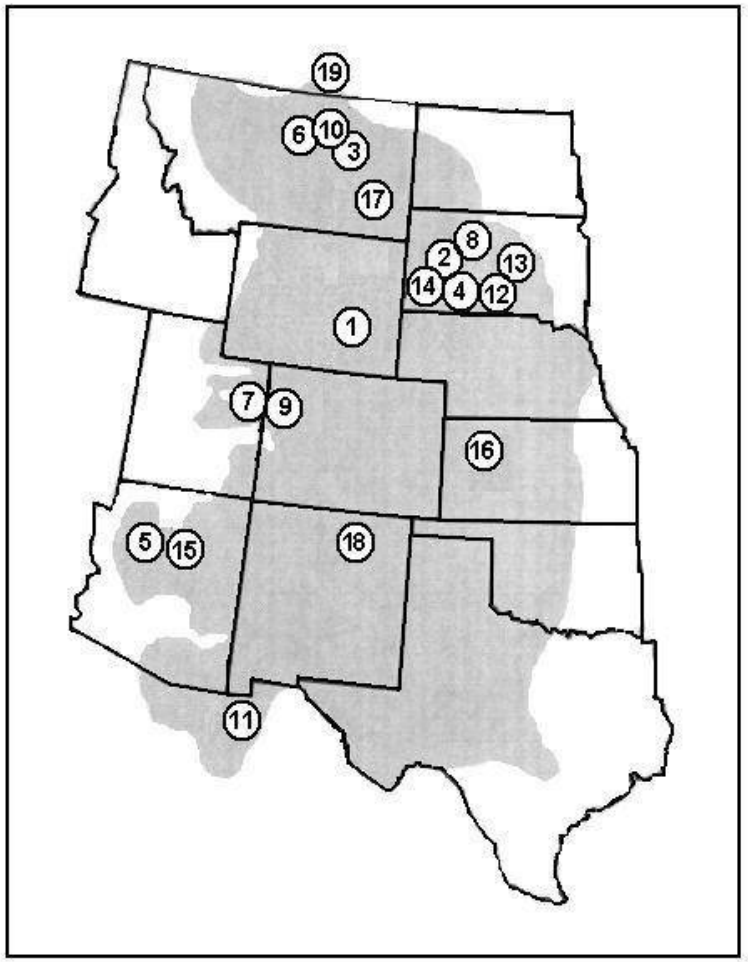
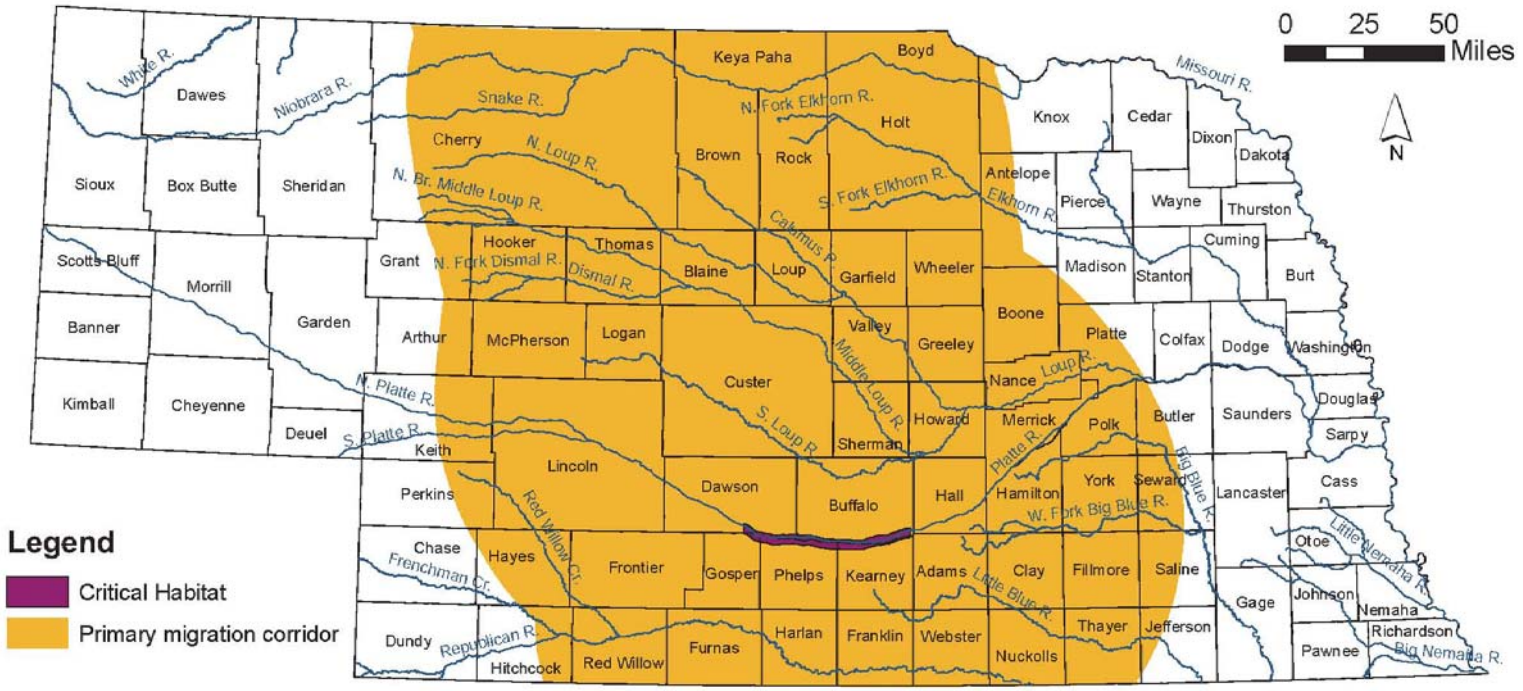
Appendix B-2:
Range Maps for State- and Federally-Listed Threatened and Endangered Species for Dawes County, Nebraska

Black-footed Ferret Reintroduction Sites



1) Shirley Basin, WY, 1991
2) Badlands NP, SD, 1994
3) UL Bend NWR, MT, 1994
4) Conata Basin, SD, 1996
5) Aubrey Valley, AZ, 1996
6) Ft. Belknap Indian Reservation, MT, 1997
7) Coyote Basin, UT, 1999
8) Cheyenne River Indian Reservation, SD, 2000
9) Wolf Creek, CO, 2001
10) BLM 40-complex, MT, 2001
11) Janos, Mexico, 2001
12) Rosebud Indian Reservation, SD, 2004
13) Lower Brule Indian Reservation, SD, 2006
14) Wind Cave NP, SD, 2007
15) Espee Ranch, AZ, 2007
16) Logan County, KS, 2007
17) Northern Cheyenne Indian Reservation, MT 2008
18) Vermejo Park Ranch, NM 2008
19) Grasslands NP, SK, Canada, 2009

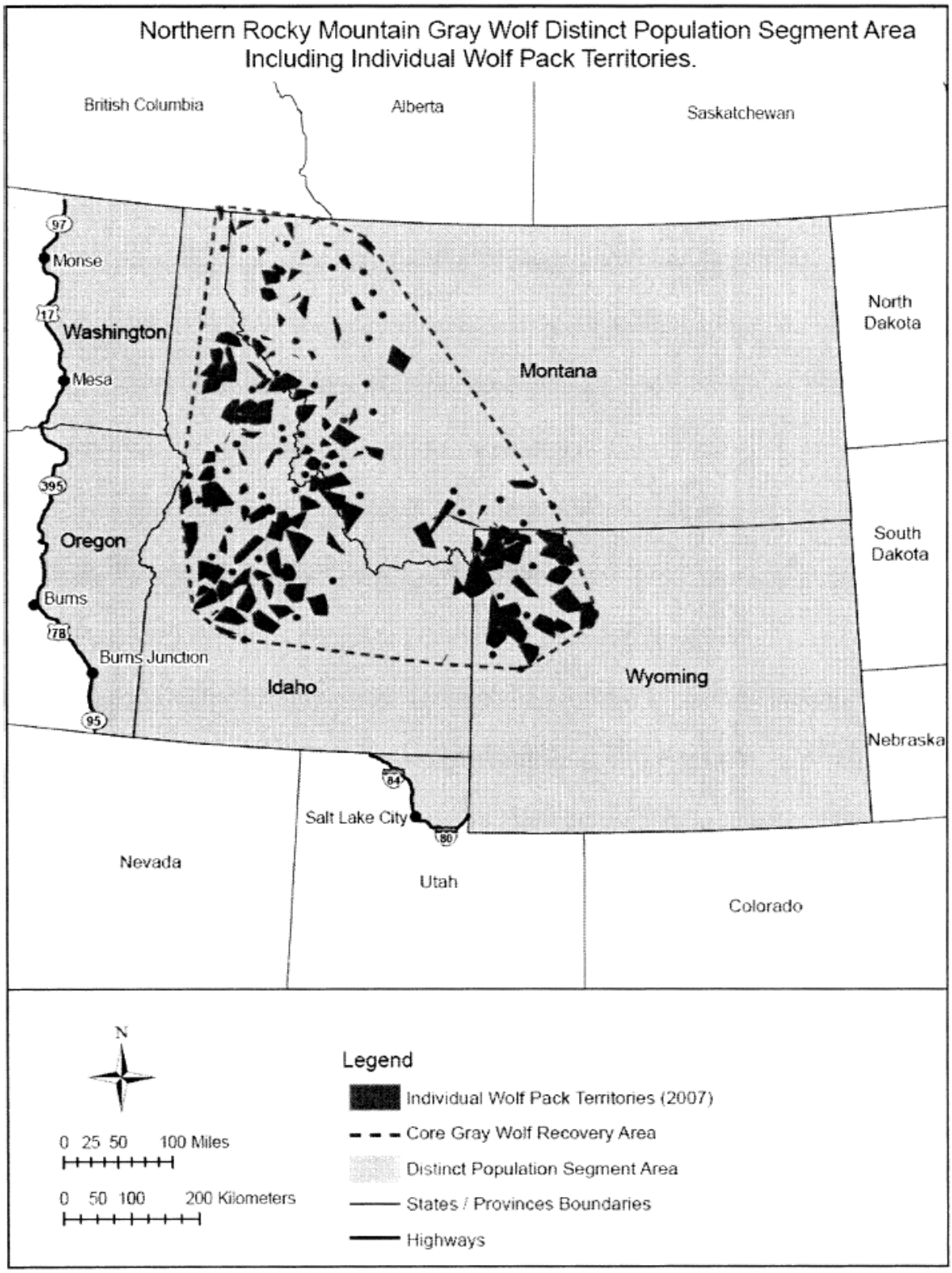
Whooping Crane (*Grus americana*): Primary migration corridor and USFWS-designated Critical Habitat



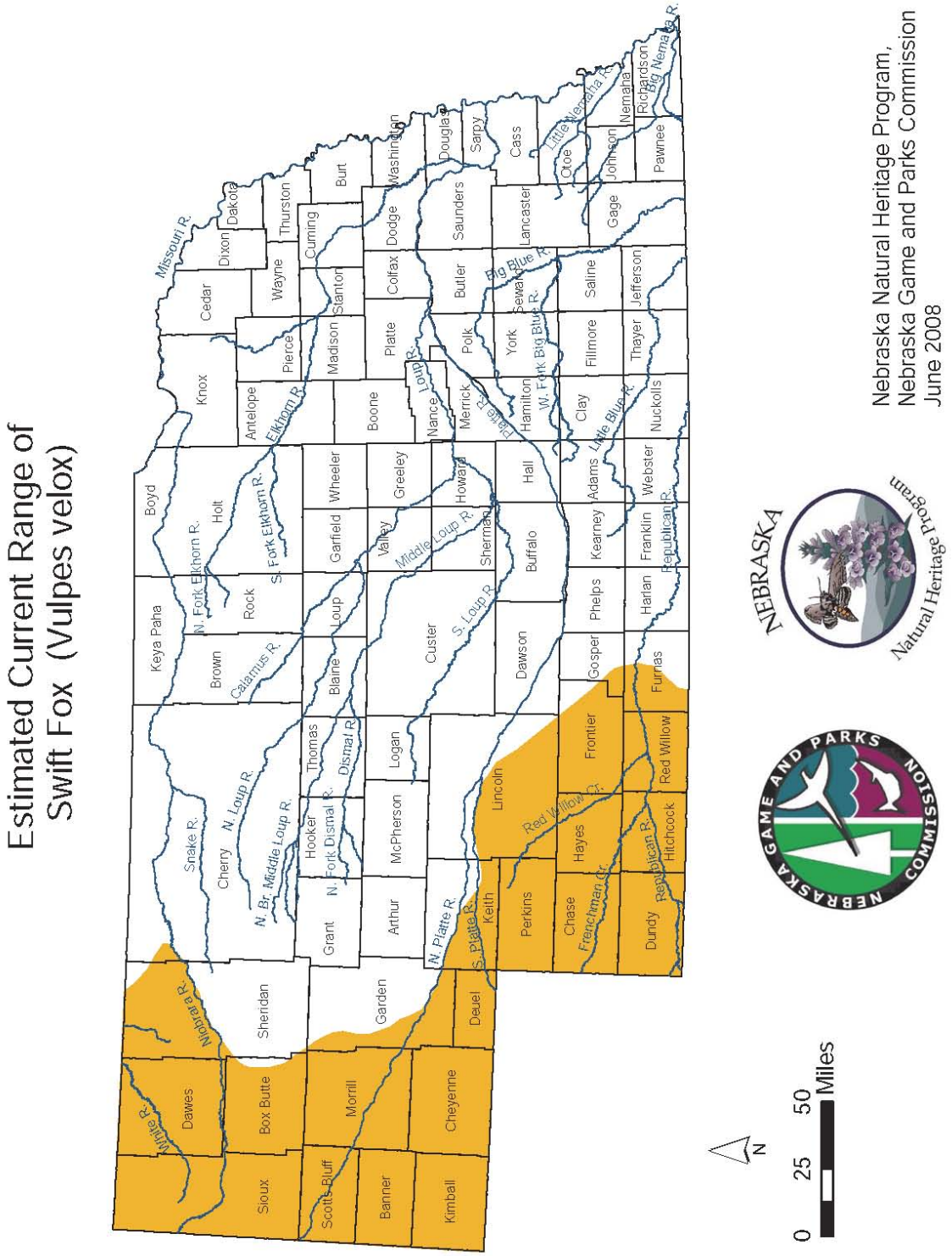
The primary migration corridor is the area identified by the U.S. Fish and Wildlife Service (USFWS) as encompassing 95% of documented Whooping Crane migratory stopovers between 1975 and 2007. Whooping Cranes have been documented far outside of this corridor in Nebraska. Data source: U.S. Fish and Wildlife Service. State-specific Nebraska flyway for Whooping Crane. Vector digital data Unpublished shapefile received October 27, 2008 from Martha Tacha, USFWS, Region 6, Grand Island, Nebraska.

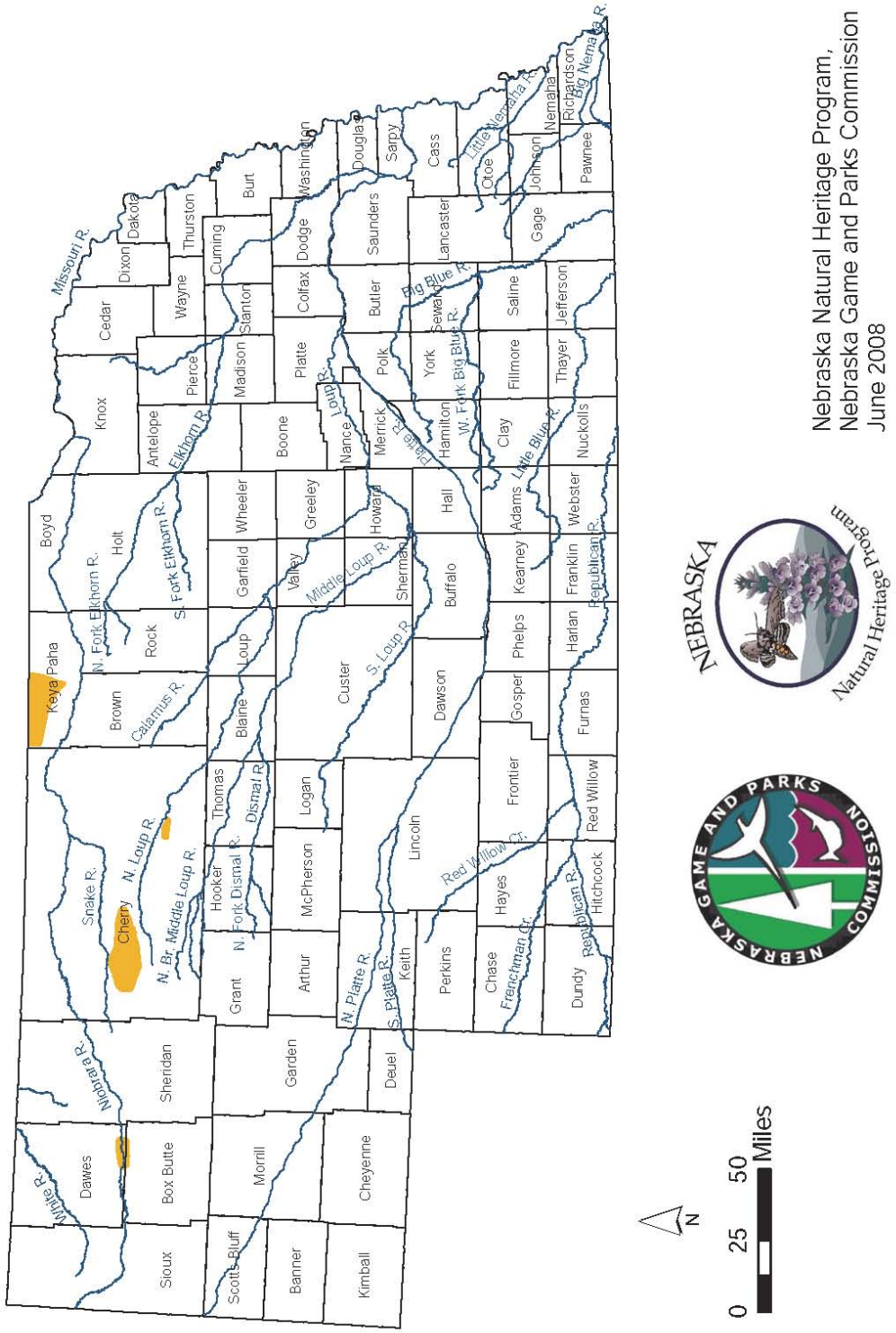
Critical Habitat areas are considered essential for the conservation of a listed species. Data source: U.S. Fish and Wildlife Service, Region 2. 2003. Whooping Crane critical habitat. Vector digital data. Downloaded October 29, 2008 from http://crithab.fws.gov.

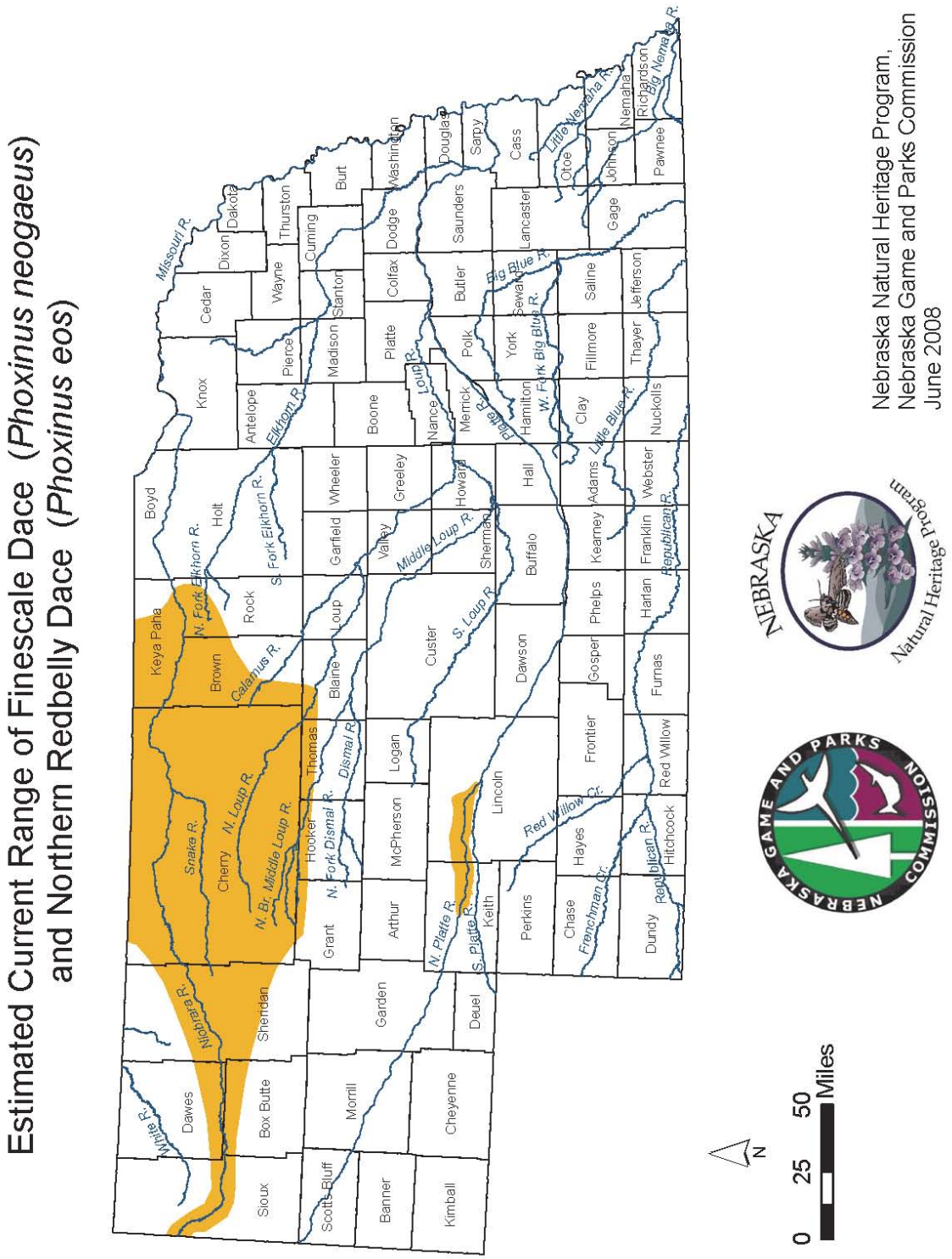
Map produced by the Nebraska Natural Heritage Program, Nebraska Game and Parks Commission, November 2008.



Source:USFWS 2011b


Estimated Current Range of
Swift Fox (Vulpes velox)
Missouri R.
Niobrara R.
White R.
Snake R.
Cherry
N. Loup R.
N. Br. Middle Loup R.
Calamus R.
N. Fork Elkhorn R.
S. Fork Elkhorn R.
Elkhorn R.
Middle Loup R.
S. Loup R.
Loup R.
Dismal R.
N. Fork Dismal R.
N. Platte R.
S. Platte R.
Red Willow Cr.
Frenchman Cr.
Republican R.
Big Blue R.
W. Fork Big Blue R.
Little Blue R.
Little Nemaha R.
Big Nemaha R.
Sioux
Dawes
Box Butte
Sheridan
Scotts Bluff
Morrill
Garden
Banner
Cheyenne
Kimball
Deuel
Keith
Perkins
Arthur
McPherson
Logan
Thomas
Hooker
Grant
Blaine
Loup
Garfield
Wheeler
Valley
Greeley
Howard
Sherman
Custer
Buffalo
Hall
Dawson
Lincoln
Chase
Hayes
Frontier
Gosper
Phelps
Kearney
Adams
Franklin
Harlan
Furnas
Red Willow
Hitchcock
Dundy
Brown
Keya Paha
Rock
Holt
Boyd
Knox
Cedar
Dixon
Dakota
Antelope
Pierce
Wayne
Thurston
Cuming
Burt
Madison
Stanton
Boone
Platte
Colfax
Dodge
Washington
Nance
Merrick
Polk
Butler
Saunders
Douglas
Sarpy
Cass
Otoe
Johnson
Nemaha
Richardson
Pawnee
Gage
Lancaster
Saline
Jefferson
York
Seward
Fillmore
Thayer
Hamilton
Clay
Nuckolls
Webster
N
0 25 50 Miles
NEBRASKA
Natural Heritage Program
Nebraska Natural Heritage Program,
Nebraska Game and Parks Commission
June 2008
NEBRASKA GAME AND PARKS COMMISSION


Estimated Current Range of
Blacknose Shiner (Notropis heterolepis)
Nebraska Natural Heritage Program,
Nebraska Game and Parks Commission
June 2008
NEBRASKA
Natural Heritage Program
NEBRASKA GAME AND PARKS COMMISSION
N
0 25 50 Miles
Missouri R.
Niobrara R.
White R.
Elkhorn R.
N. Fork Elkhorn R.
S. Fork Elkhorn R.
Loup R.
Calamus R.
N. Loup R.
Middle Loup R.
S. Loup R.
Dismal R.
N. Fork Dismal R.
N. Br. Middle Loup R.
Snake R.
Cherry
Keya Paha
Boyd
Holt
Rock
Brown
Garfield
Wheeler
Valley
Greeley
Howard
Sherman
Blaine
Loup
Thomas
Hooker
Grant
Logan
McPherson
Arthur
Custer
Buffalo
Hall
Dawson
Lincoln
Keith
Perkins
Chase
Hayes
Frontier
Gosper
Phelps
Kearney
Adams
Franklin
Harlan
Furnas
Red Willow
Hitchcock
Red Willow R.
Frenchman Cr.
Republican R.
Dundy
Sioux
Dawes
Box Butte
Sheridan
Garden
Morrill
Cheyenne
Deuel
Kimball
Banner
Scotts Bluff
N. Platte R.
S. Platte R.
Knox
Cedar
Dixon
Dakota
Thurston
Wayne
Pierce
Antelope
Madison
Stanton
Cuming
Burt
Boone
Platte
Colfax
Dodge
Washington
Nance
Merrick
Polk
Butler
Saunders
Douglas
Sarpy
Cass
Loup R.
Platte R.
Big Blue R.
W. Fork Big Blue R.
Hamilton
York
Seward
Lancaster
Little Nemaha R.
Otoe
Johnson
Nemaha
Big Nemaha R.
Richardson
Pawnee
Gage
Jefferson
Saline
Fillmore
Thayer
Clay
Little Blue R.
Nuckolls
Webster
Republican R.


Estimated Current Range of Finescale Dace (Phoxinus neogaeus)
and Northern Redbelly Dace (Phoxinus eos)
Nebraska Natural Heritage Program,
Nebraska Game and Parks Commission
June 2008
NEBRASKA
Natural Heritage Program
NEBRASKA GAME AND PARKS COMMISSION
N
0 25 50 Miles
Missouri R.
Niobrara R.
White R.
Elkhorn R.
N. Fork Elkhorn R.
S. Fork Elkhorn R.
Calamus R.
Snake R.
N. Loup R.
N. Br. Middle Loup R.
Middle Loup R.
S. Loup R.
Loup R.
Dismal R.
N. Fork Dismal R.
Platte R.
Big Blue R.
W. Fork Big Blue R.
Little Blue R.
Republican R.
Red Willow Cr.
N. Platte R.
S. Platte R.
Frenchman Cr.
Little Nemaha R.
Big Nemaha R.
Boyd
Holt
Knox
Cedar
Dixon
Dakota
Thurston
Wayne
Pierce
Antelope
Keya Paha
Brown
Rock
Cherry
Sheridan
Dawes
Sioux
Box Butte
Scotts Bluff
Banner
Kimball
Cheyenne
Morrill
Garden
Deuel
Keith
Perkins
Arthur
McPherson
Logan
Thomas
Hooker
Grant
Blaine
Loup
Garfield
Wheeler
Valley
Greeley
Howard
Sherman
Custer
Buffalo
Dawson
Lincoln
Chase
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Frontier
Gosper
Phelps
Kearney
Adams
Franklin
Harlan
Furnas
Red Willow
Hitchcock
Dundy
Burt
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Stanton
Madison
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Boone
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Merrick
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Clay
Fillmore
Webster
Nuckolls
Thayer
Jefferson
Saline
Gage
Johnson
Nemaha
Richardson
Pawnee
Otoe
Lancaster
Saunders
Butler
Polk
York
Seward
Colfax
Dodge
Washington
Douglas
Sarpy
Cass