

## Annotated Checklist of the Mammals of the Four Canyon Preserve, Ellis County, Oklahoma

**William Caire, Lynda Samanie Loucks and Gregory M. Wilson**

University of Central Oklahoma, Department of Biology, 100 N University Drive, Edmond, OK 73034

**Brandon K. McDonald**

Cameron University, Department of Biological Sciences, 2800 West Gore Boulevard, Lawton OK 73505

**Desiree A. Early**

Humboldt State University, Department of Wildlife, 1 Harpst Street, Arcata, CA, 95521

**Toni Payne**

PO Box 178, Blanchard, OK 73010

A survey of The Nature Conservancy's Four Canyon Preserve in Ellis County, Oklahoma, was conducted from June 2005 to April 2006 to determine what species of mammals occur in the preserve. Sherman live traps were used to trap small mammals and reliable sight records documented large mammals. Mist nets and gopher traps were set to sample for bats and gophers, respectively. A literature search identified historical accounts of mammals and those species that might eventually be found to occur in the preserve. Compiled in this inventory is an annotated list of the 33 extant species of mammals that presently occur on the Four Canyon Preserve. Also listed are 4 introduced species, 9 species that probably occurred in the preserve historically and 24 species that might be found to occur. © 2010 Oklahoma Academy of Science.

### INTRODUCTION

The 1380 ha Four Canyon Preserve (FCP) is located approximately 16 km southeast of Harmon in Ellis County, Oklahoma. The southern boundary is defined by 4.8 km of the North Canadian River. Sandy river floodplain supports cottonwood (*Populus deltoides*), eastern red cedar (*Juniperus virginiana*), saltcedar (*Tamarix sp.*), sand plum (*Prunus sp.*) and sagebrush (*Artemisia filifolia*). Upland areas support mixed and shortgrass prairie communities dominated by little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*). Four wooded canyons (Cinnamon, Horse, Mulberry and Harsha) dissect the upland prairies and open upon the Canadian River floodplain. Canyon

habitats are characterized by chinquapin oak (*Quercus muhlenbergii*), American elm (*Ulmus americana*) and hackberry (*Celtis spp.*) woodlands with scattered wet meadows and prairie communities. Sandy soils of the northwest part of the preserve which was disturbed by cropland and commercial sand/gravel pits support remnant communities of sandsage shrubland, blue grama, buffalo grass prairie and small patches of shinnery oak (*Quercus havardii*).

The FCP characteristically has hot summers and short cold winters. Temperatures range from an average daytime high of 33 °C in July to an average low of -7 °C in January. Average annual precipitation is 68.6 cm. Winds, averaging 16 kph, are usually from the south to southwest (Oklahoma Climatological Survey 2009).

Although the FCP area was opened for homesteading in 1892, the rugged land led to slow rates of homesteading and fragmented ownership. During the early years of the 20th century, cattle ranchers consolidated homesteads into larger ranch parcels. In 1950, Harold and Tomalene Hutchison acquired the land that is now the FCP and maintained it as a cattle ranch until purchased by The Nature Conservancy (TNC) in conjunction with the Oklahoma Department of Wildlife Conservation in 2004.

One primary goal of TNC was to survey the biota within the FCP in order to establish a baseline inventory against which long term monitoring and conservation projects could be initiated. One such survey involved determining what species of mammals occurred in the FCP and which species might have been present prior to intensive cattle ranching. Thus, the objective of this study was to compile a species list of mammals for the FCP.

## METHODS

Sampling of small mammals occurred approximately each month from 4 June 2005 through 14 April 2006. On each trip, varying numbers of trap lines consisting of 50 Sherman live traps (H.B. Sherman Traps; Tallahassee, FL; 23.5 x 7.7 x 9.0 cm) were set in different areas and habitats across the FCP. Each trap station was about 4 m apart, set in the evening, baited with rolled oats and retrieved the following morning. Mist-nets were set at abandoned buildings and small stock tanks to capture bats. Macabee gopher traps were used to obtain gopher specimens. Sightings of large mammals and identification of mammal tracks by reliable sources were recorded through April 2006. Published literature was used to determine which species probably occurred historically and those which occur close to the FCP and might possibly be found within the preserve. The taxonomic and vernacular names follow Wilson and Reeder (2005), except as noted in some accounts.

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## RESULTS and DISCUSSION

Fourteen collecting trips resulted in 8,165 trap nights, 28 gopher sets and 12 mist net nights. A total of 534 small mammals were captured. Voucher specimens and tissues are housed in the collection of vertebrates at the University of Central Oklahoma. Figure 1 shows the general location of trap lines (GPS locations are available from the TNC FCP). Tracks, visual sightings and personal communications with local residents verified the occurrence of several species not captured. This study revealed the presence of 8 orders and 24 families. The checklist contains 33 extant species of mammals known to occur in the FCP and 24 species (designated by \*) not detected during this study that occur near the FCP and could ultimately be found in the preserve. Nine species (designated by +) are listed which probably occurred historically but have been extirpated and four introduced species (designated by #) are also listed.

## SPECIES ACCOUNTS

### ORDER DIDELPHIMORPHIA

#### Family Didelphidae (Opossums)

*Didelphis virginiana* (Virginia Opossum) has not been documented as occurring in Ellis County but tracks were seen in the sandy roads near the FCP equipment storage shed. The opossum has been verified in nearby counties (Caire et al. 1989; Lomolino and Shaughnessy 1997; Roehrs et al. 2008) and in northern portions of the Texas panhandle (Schmidly 2004). The former ranch owner indicated that he had not seen any opossums on the ranch since the 1950s and they were scarce then.

### ORDER CINGULATA

#### Family Dasypodidae (Armadillos)

*Dasypus novemcinctus* (Nine-banded Armadillo) was observed in the FCP on several occasions. Although reported to occur statewide (Caire et al. 1989), the first documented records for Ellis County were

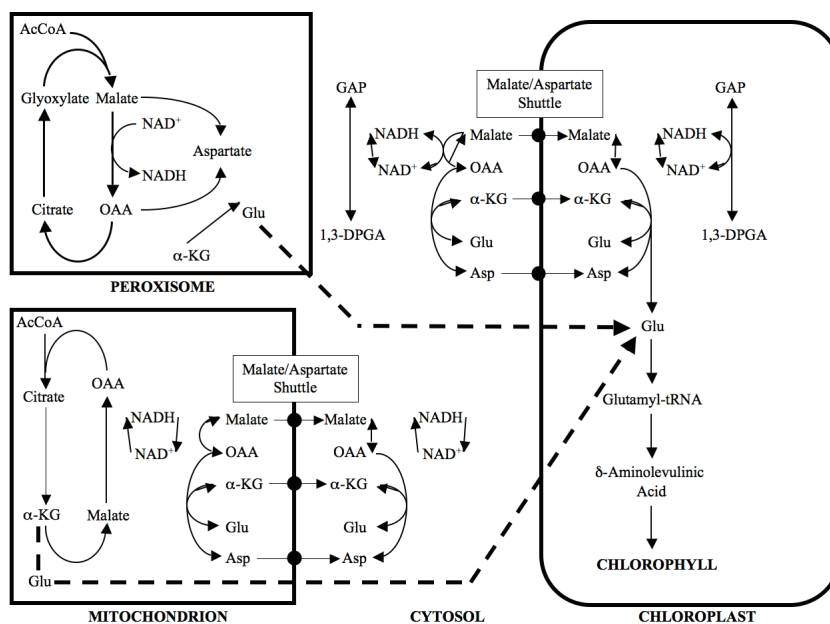


Figure 1. Map of The nature Conservancy's Four Canyon Preserve showing location of trap lines.

reported by Roehrs et al. (2008). Records of armadillo exist from Beaver, Harper and Roger Mills counties (Caire et al. 1989) and from the adjacent regions in Texas (Schmidly 2004). Armadillos were observed foraging at night near an abandoned ranch house and around wood piles during the day at the mouth of Cinnamon Canyon.

## ORDER LAGOMORPHA

### Family Leporidae (Hares and Rabbits)

*Lepus californicus* (Black-tailed Jack-rabbit) were observed in upland prairie habitats in the northeast portion of the FCP. They have been documented from many adjacent western Oklahoma counties (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004).

*Sylvilagus audubonii* (Desert Cottontail) was not documented during this study; however, several cottontails appeared to be desert cottontails. None were observed clearly enough to confirm their identity. Records exist from Harper and Woodward counties to the north (Caire et al. 1989) and from adjacent counties in the Texas Panhandle (Schmidly 2004).

*Sylvilagus floridanus* (Eastern Cottontail) was observed in most habitats in the FCP. It is common in other areas of Ellis County, in adjacent counties (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004). It is probably the most abundant cottontail in the preserve.

## ORDER RODENTIA

### Family Sciuridae (Squirrels)

*Sciurus niger* (**Eastern Fox Squirrel**) dreys were observed in trees near the mouth of Cinnamon, Horse and Harsha canyons; squirrel vocalizations were heard at the mouth of Cinnamon Canyon.

+*Cynomys ludovicianus* (**Black-tailed Prairie Dog**) has been observed by local residents in other areas of the county. The possibility exists that dog towns occurred in the FCP in former times but were extirpated as part of early control programs related to the ranching industry. They are reported from nearby counties (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004).

\**Xerospermophilus spilosoma* (**Spotted Ground Squirrel**) was not found in the FCP. They might be found to occur on the sandy floodplains of the FCP or in the intervening grassy upper areas between the canyons. Records exist from Beaver, Harper and Woodward counties to the north and from Dewey County to the east (Caire et al. 1989). It is known from adjacent counties in the Texas panhandle (Schmidly 2004). *Xerospermophilus* is used in place of *Spermophilus* as suggested by Helgen et al. (2009) in a revision of the genus.

*Ictidomys tridecemlineatus* (**Thirteen-lined Ground Squirrel**) was collected from the upland grassy area located between Mulberry and Harsha canyons. One was observed in a *Dipodomys* runway west of the old ranch house. This species is probably more common than indicated by the few we observed. *Ictidomys* is used in place of *Spermophilus* as suggested by Helgen et al. (2009) in a revision of the genus.

Family Castoridae (Beavers)

*Castor canadensis* (**American Beaver**) are common along the Canadian River. Many young cottonwood and willow trees showed signs of beaver browsing.

### Family Heteromyidae (Heteromyids)

*Dipodomys ordii* (**Ord's Kangaroo Rat**) is abundant in sandy areas of the preserve, especially on the floodplain near the Cana-

dian River. Numerous active runways connecting burrow systems were seen in sandy areas after several grass fires. Individuals were active during the winter.

*Chaetodipus hispidus* (**Hispid Pocket Mouse**) is abundant and occurs in a variety of habitats throughout the FCP. It was found in the upland grass areas between the canyons, in the canyons, on the floodplain flats and around abandoned buildings.

\**Perognathus flavescens* (**Plains Pocket Mouse**) was not recorded during this study but will probably be found in sandy areas of floodplains or on brushy slopes of canyons. It has been recorded from Ellis County (Roehrs et al. 2008) and from adjacent counties in Oklahoma (Caire et al. 1989) and Texas (Schmidly 2004).

*Perognathus flavus/merriami* (**Silky Pocket Mouse & Merriam's Pocket Mouse**) specimens were collected in grass habitats during this survey and are conservatively relegated to *P. flavus* until a clearer understanding of the taxonomy of these cryptic forms is achieved. A recent analysis of *P. flavus* and *P. merriami* specimens suggests that the two should be recognized as distinct species (Brant and Lee 2006; Van Den Bussche personal communication).

### Family Geomyidae (Pocket Gophers)

*Geomys bursarius* (**Plains Pocket Gopher**) mounds existed in many areas of the FCP. Specimens were collected from Cinnamon Canyon and on the eastern edge of the preserve on the floodplain.

### Family Cricetidae (Mice, Rats, and Voles)

\**Microtus ochrogaster* (**Prairie Vole**) will likely be found in prairie grasses, near stock tanks and in grassy disturbed areas. It is known from various counties in western Oklahoma (Caire et al. 1989; Choate 1989; Clark and Tumilson 1992; McCaffery et al. 2002; Stangle et al. 2004) and from adjacent counties in the Texas panhandle (Schmidly 2004). McDonald et al. (2006) first reported *M. ochrogaster* from Ellis County and from nearby Dewey and Custer counties in owl

pellets. Roehrs et al. (2008) reported them from Dewey County.

\**Microtus pinetorum* (Woodland Vole) was not recorded during this study but might occur in grassy areas and near stock tanks. Braun and Revelez (2005) reported it from Major County and McDonald et al. (2006) listed specimens from owl pellets from Custer and Dewey counties. Roehrs et al. (2008) reported *M. pinetorum* from Dewey County.

*Ondatra zibethicus* (Common Muskrat) probably disperse from the Canadian River to grassy areas adjacent to stock tanks. An abandoned burrow was detected near the edge of a stock tank on the Canadian River floodplain.

\**Baiomys taylori* (Northern Pygmy Mouse) is expanding its' range northward in western Oklahoma (Stangl and Dalquest 1986; Caire 1991; Tumilson et al. 1993, McDonald et al. 2006, Roehrs et al. 2008) and Texas (Schmidly 2004). It might be found in the thick grass in the FCP.

\**Neotoma floridana* (Eastern Woodrat) was first reported by Roehrs et al. (2008) in Ellis and Roger Mills counties. Other records exist from adjacent counties to the east and southeast in Oklahoma (Caire et al. 1989). It might be found in rocky habitats in the FCP.

*Neotoma micropus* (Southern Plains Woodrat) was the only species of woodrat found during the survey. This species was common in rock ledges on canyon slopes, in canyon bottoms and around abandoned buildings. In some areas of western Oklahoma, it is difficult to distinguish this species from *N. floridana* (Caire et al. 1989).

*Onychomys leucogaster* (Northern Grasshopper Mouse) was collected in sandy areas, brush and grass. It was common in areas where *Dipodomys* was found.

*Peromyscus leucopus* (White-footed Deermouse) was captured in most habitats in the FCP. It is common in areas that have numerous eastern red cedar trees. This species is sometimes difficult to separate from the deer mouse (*P. maniculatus*).

*Peromyscus maniculatus* (North American Deermouse) occurs in many habitat types in the FCP but are most common in grassy areas. It is less abundant than *P. leucopus* and sometimes difficult to distinguish from that species.

\**Peromyscus attwateri* (Texas Mouse) might exist in isolated areas of some FCP canyons which contain rocky habitats and eastern red cedars. It has been reported in Custer County (Caire et al. 1989) and from counties in the Texas Panhandle adjacent to Ellis County (Schmidly 2004).

*Reithrodontomys fulvescens* (Fulvous Harvest Mouse) was found in a variety of habitat types but was most common in grassy areas. These specimens represent additional records from Ellis County since their first report by Roehrs et al. (2008).

\**Reithrodontomys megalotis* (Western Harvest Mouse) will likely be found in weedy and grassy areas. Records exist from Ellis County (Caire et al. 1989) and the Texas panhandle (Schmidly 2004). Distinguishing this species from *R. montanus* is often difficult.

*Reithrodontomys montanus* (Plains Harvest Mouse) was collected in small numbers in grass habitats on the floodplains. This species is difficult to separate from *R. megalotis* and a good series of the two species helps in proper identification.

*Sigmodon hispidus* (Hispid Cotton Rat) was the most commonly trapped mammal in the FCP. It was frequently captured in most all grassy areas.

#### Family Muridae (Old World Rats and Mice)

#*Mus musculus* (House Mouse) was not captured during the survey although it has been reported in Ellis County (Roehrs et al. 2008). It is an introduced species typically found in association with humans and probably existed in the FCP during the times it was an active cattle ranch.

#*Rattus norvegicus* (Brown Rat) might have occurred in the FCP during its ranch days. It has not been documented in Ellis County, although it is recorded from Harper

County (Caire et al. 1989) and from owl pellets in Washita County (McDonald et al. 2006). None were found during the survey; however, Girard et al. (1990) suggested that very localized populations might exist in southwestern regions of the state.

**#*Rattus rattus* (Roof Rat)** was not found during this survey. Sometimes feral populations exist and some probably occur in urban settings in the area as well as on some of the ranches near the preserve. McDonald et al. (2006) reported *Rattus* (skull fragments – not relegated to species) from owl pellets in Roger Mills County.

#### Family Erethizontidae (Porcupine)

***Erethizon dorsatum* (North American Porcupine)** was observed several times during the survey. They were seen near the canyon mouths in the late evenings and early mornings.

### ORDER SORICOMORPHA

#### Family Soricidae (Shrews)

**\**Blarina hylophaga* (Elliot's Short-tailed Shrew)** might be found in the FCP but has not been reported from Ellis County. Specimens are reported from Dewey and Custer (McDonald et al. 2006) and Major (Braun and Revelez 2005) counties.

***Cryptotis parva* (North American Least Shrew)** was captured in Horse Canyon by Chris Hise (FCP manager) in pit fall traps. **\**Notiosorex crawfordii* (Crawford's Gray Shrew)** probably occurs in the FCP. It has not been reported from Ellis County; however, a record does exist from Woodward County (Caire et al. 1989) and counties to the west in the Texas panhandle (Schmidly 2004).

#### Family Talpidae (Moles)

***Scalopus aquaticus* (Eastern Mole)** tunnels were observed in many sandy and loose soil areas and were especially common on the floodplains near the Canadian River. One mole was caught in a live trap on the floodplain near the eastern edge of the FCP

and a skull was found near the mouth of Cinnamon Canyon.

### ORDER CHIROPTERA

#### Family Molossidae (Molossid Bats)

**\**Tadarida brasiliensis* (Brazilian Free-tailed Bat)** maternity colonies exist in gypsum caves to the north and south in Oklahoma (Caire et al. 1989) and occasionally individuals can be found roosting in buildings. Although none were documented, this migratory species has been found in most counties of the western part of Oklahoma (Caire et al. 1989) as well as the Texas panhandle (Schmidly 2004). There are no large caves in the FCP, but migrating individuals might occasionally be found at the preserve. This species is known for long distance foraging trips (often up to 80 km) which could carry them to the area in the summer (Caire et al. 1989).

#### Family Vespertilionidae (Vespertilionid Bats)

**\**Eptesicus fuscus* (Big Brown Bat)** was not found but it might frequent wooded canyons, stock tanks and the Canadian River. Records exist from Woodward County (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004).

**\**Lasiurus borealis* (Eastern Red Bat)** was not found during the study; however, it occurs in adjacent Woodward, Dewey and Custer counties (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004). This tree bat probably occurs along the Canadian River, in the forested canyons and at stock ponds.

**\**Lasiurus cinereus* (Hoary Bat)** was not found; however, it occurs in Ellis (Roehrs et al. 2008) and Beaver (Caire et al. 1989) counties and in the Texas panhandle (Schmidly 2004). Likely habitats for this tree bat include wooded canyons, stock tanks and along the Canadian River.

**\**Parastrellus hesperus* (Canyon Bat)** probably will be found in the wooded canyons, at stock tanks and along the Canadian

River. Records exist from southwestern Oklahoma (Caire et al. 1989).

\**Perimyotis subflavus* (**Eastern Pipistrelle or Tricolored Bat**) was not found; however, it occurs in Dewey (Roehrs et al. 2008), Woodward and Custer counties (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004). Most likely foraging habitats include wooded canyons, stock tanks and along the Canadian River. Roosts might include rock crevices.

*Corynorhinus townsendii* (**Townsend's Big-eared Bat**) were observed in July 2009 in a cave on the east side of the FCP (Chris Hise, personal communication). This cave might contain other bat species but was unknown to us during this survey.

\**Antrozous pallidus* (**Pallid Bat**) will likely be found roosting in crevices of rocky outcrops in canyons and near stock tanks along the Canadian River. It occurs in Woodward County (Caire et al. 1989) and in the Texas panhandle (Schmidly 2004).

\**Lasionycteris noctivagans* (**Silver-haired Bat**) occurrence across Oklahoma and the Texas panhandle is spotty and rare (Caire et al. 1989; Schmidly 2004). It has been reported from Beaver County (Caire et al. 1989). Because it roosts in trees, riparian areas and forest areas of canyons *L. noctivagans* might be found in the FCP. *Myotis velifer* (**Cave Myotis**) was documented for the first time in Ellis County by Roehrs et al. (2008). Several thousand *M. velifer* were observed in an abandoned ranch house at the FCP during the spring and early summer.

## ORDER CARNIVORA

### Family Felidae (Cats)

*Lynx rufus* (**Bobcat**) was observed at the mouth of Cinnamon Canyon. Tracks were seen near several stock tanks.

*Puma concolor* (**Cougar**) tracks and scat were seen in Cinnamon Canyon. Chris Hise (personal communication) reported two suspected deer kills in Mulberry Canyon.

### Family Canidae (Canids)

*Canis latrans* (**Coyote**) scats were observed in most areas of the FCP and in many habitats. Tracks were observed around stock tanks, on roads and on banks of the Canadian River. Howling coyotes were heard throughout the preserve.

+*Canis lupus* (**Wolf**) existed in western Oklahoma (Caire et al. 1989), the Texas panhandle (Schmidly 2004) and probably in the FCP prior to the development of the cattle ranching industry. With the decimation of bison herds in the 1870s, and the reduction in numbers of deer, the wolf's primary food sources disappeared and it began to prey on cattle for food and was quickly killed off.

\**Urocyon cinereoargenteus* (**Gray Fox**) was not documented during this study; however, it does occur in Woodward County (Caire et al. 1989) and the Texas panhandle (Schmidly 2004). This fox will be found to occur in the FCP.

\**Vulpes velox* (**Swift Fox**) might occur in the FCP. A road killed *V. velox* was reported from Ellis County by Hoagland (2000) and records of this fox exist from the Oklahoma (Caire et al. 1989; Hoagland 1995; Lomolino and Shaughnessy 1997) and Texas panhandle (Schmidly 2004).

*Vulpes vulpes* (**Red Fox**) was observed by Chris Hise (personal communication) near the tractor barn in the FCP. Records of red foxes exist from several counties in western Oklahoma (Caire et al. 1989) and the Texas panhandle (Schmidly 2004).

### Family Ursidae (Bears)

+*Ursus americanus* (**American Black Bear**) occurred historically across most of Oklahoma (Caire et al. 1989) and probably in the FCP, but it was eventually extirpated by humans. Records exist from Harper, Woods and Woodward counties (Caire et al. 1989) and in the Trans-Pecos region of Texas (Schmidly 2004).

+*Ursus arctos* (**Brown Bear**) historically existed throughout much of Oklahoma (Caire et al. 1989) and probably in the FCP. They were extirpated as the ranching industry developed.

### Family Mustelidae (Mustelids)

+*Lontra canadensis* (**North American River Otter**) occurrence has been rare to non-existent since they were extirpated in the late 1800s and early 1900s from western Oklahoma. Only one documented record exists from Woodward County (Caire et al. 1989).

\**Mustela frenata* (**Long-tailed Weasel**) is uncommon in Oklahoma and the distribution and ecology within the state are not well known (Caire et al. 1989). Only one specimen has been recorded from the Oklahoma panhandle (Caire et al. 1989) and only one in the Texas panhandle (Kramler and Ballard 2004).

+*Mustela nigripes* (**Black-footed Ferret**) occurred in many prairie dog towns in western Oklahoma (Caire et al. 1989) and the Texas panhandle (Schmidly 2004). Black-footed ferrets were extirpated during the extensive poisoning campaigns used to remove prairie dogs from cattle ranches (Caire et al. 1989).

*Taxidea taxus* (**American Badger**) burrows and tracks were observed on the banks of drained stock tanks in Harsha and Cinnamon canyons.

### Family Mephitidae (Mephitids)

*Mephitis mephitis* (**Striped Skunk**) was not observed during the study; however, the skunk odors that were noticed were probably produced by *M. mephitis*. It is the most common skunk in the general area. Records exist from adjacent counties in Oklahoma (Caire et al. 1989) and the Texas panhandle (Schmidly 2004).

\**Spilogale putorius* (**Eastern Spotted Skunk**) is uncommon in Oklahoma (Caire et al. 1989) but has been reported in riparian areas of Ellis, Harper and Woodward counties by Lomolino and Shaughnessy (1997). These nocturnal skunks might eventually be found in upland grassy areas, rocky outcrops and canyons.

### Family Procyonidae (Procyonids)

\**Bassariscus astutus* (**Ringtail**) was not found during this study. If it occurs in

the FCP, it will probably be found in rocky outcrops and forested areas of canyons. Most records of occurrence are from the southwestern part of the state; however, there is a record from Woods County (Caire et al. 1989).

*Procyon lotor* (**Raccoon**) tracks were observed in a variety of habitat types in the FCP. One was observed at night in a tree near a storage building. Although it is probably common in the county, the first reported occurrence in Ellis County was by Roehrs et al. (2008).

## ORDER ARTIODACTYLA

### Family Suidae (Pigs)

#*Sus scropha* (**Wild Boar and Domestic Pig**) were not observed during the survey. Harold Hutchison indicated that about twenty years ago forty feral hogs (including young) were seen on the ranch.

Family Cervidae (Cervids)

*Odocoileus hemionus* (**Mule Deer**) was observed in the mornings and near dusk in most habitats throughout the preserve.

*Odocoileus virginianus* (**White-tailed Deer**) was seen frequently in a variety of habitats. It was observed at all times of the day and night.

+*Cervus elaphus* (**Red Deer**) was historically common in western Oklahoma but was extirpated by 1890 (Caire et al. 1989). They probably occurred in the FCP in earlier times.

### Family Antilocapridae (Pronghorn)

+*Antilocapra americana* (**Pronghorn**) probably occurred historically in the FCP. They were extirpated about 1910 from Ellis, Beaver, Harper and Beckham counties (Caire et al. 1989).

### Family Bovidae (Bovids)

+*Bos bison* (**American Bison**) bones were found in Mulberry and Cinnamon canyons. Bison herds existed in the late 1800s in western Oklahoma before being extirpated (Caire et al. 1989).



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