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# Mammals of Fort Leavenworth, Kansas: a 60-year followup to Brumwell (1951)

CLAY R. DAVIS, FREDERICK B. STANGL, JR.<sup>1</sup>, and LYNN W. ROBBINS

Department of Biology, Midwestern State University,  
Wichita Falls, TX 76308 (CRD, FBS)  
Department of Biology, Southwest Missouri State University,  
Springfield, MO 65804 (LWR)

**ABSTRACT** -- More than 60 years have elapsed since Brumwell's (1951) comprehensive assessment during 1939/1940 of resident terrestrial vertebrates from Fort Leavenworth Military Reservation in northeastern Kansas. Subsequent studies have been accomplished for the amphibians, reptiles, and birds. Our study is the first to assess intervening changes in the mammalian composition of this diverse local fauna. Notable observations include: the decline or extirpation of the black-tailed jackrabbit (*Lepus californicus*), Franklin's ground squirrel (*Spermophilus franklinii*), muskrat (*Ondatra zibethicus*), long-tailed weasel (*Mustela frenata*) and eastern spotted skunk (*Spilogale putorius*); the return or recovery of locally extirpated gray fox (*Urocyon cinereoargenteus*), puma (*Puma concolor*), and white-tailed deer (*Odocoileus virginianus*), the increases of the once uncommon eastern chipmunk (*Tamias striatus*) and striped skunk (*Mephitis mephitis*), the invasion and establishment of the hispid cotton rat (*Sigmodon hispidus*), and the displacement of the eastern fox squirrel (*Sciurus niger*) by the eastern gray squirrel (*S. carolinensis*) as the most common squirrel. Documented species either not mentioned by Brumwell (1951) or listed by him as hypothetically occurring on the post, included northern myotis (*Myotis septentrionalis*), eastern pipistrelle (*Pipistrellus subflavus*), evening bat (*Nycticeius humeralis*), southern bog lemming (*Synaptomys cooperi*), and meadow jumping mouse (*Zapus hudsonius*).

**Key words:** biogeography, faunal survey, Fort Leavenworth, Kansas, mammals.

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<sup>1</sup>E-mail address: frederick.stangl@mwsu.edu

The 2400-ha Fort Leavenworth Military Reservation (FLMR) is located in northeastern Kansas, overlooking the Missouri River at the Kansas/Missouri border in northeastern Leavenworth County. Archeological evidence suggested that the site had been inhabited by Native Americans, at least intermittently, over the past 10,000 years (Wagner et al. 1989, Logan and Johnson 1997).

The record of European settlement dates back to the French establishment and occupation of nearby Fort de Cavagnial as a trading outpost (1744 to 1764), and the remains of this outpost were still in evidence to members of the Lewis and Clark expedition in 1804 (Hoffhaus 1964, Stanley 1976). The present installation was founded on 8 May 1827 by Colonel Henry Leavenworth and 200 soldiers of the 3rd Infantry Regiment and is presently the oldest continuously active United States Army post west of the Mississippi River (Stanley 1976). Primary missions of the post today include the housing of military prisoners (since 1873; United States Disciplinary Barracks) and officer training (since 1881; United States Army Command and General Staff College).

The city of Leavenworth borders the post to the south, and is about 30 to 50 km northwest of the cities of Kansas City, Missouri and Kansas City, Kansas, respectively. The surrounding country is developed largely for agriculture. Ecological associations of the post are largely the same as described by Brumwell (1951), more recently expanded upon by others (Freeman et al. 1997, Aber et al. 2002), and are summarized briefly below.

Areas not cleared for use are cloaked with mixed-deciduous woodlands. The large meandering loop of the Missouri River contains bottomland forest of approximately 550 ha. This bottomland forest contains two different successional stands of floodplain cottonwood-sycamore (*Populus deltoides-Platanus occidentalis*) -- a stand of mature old-growth forest west of the river, and an early to mid-successional stand south and southwest of the Weston Bend area. Between the two stands is a high-quality pecan-sugarberry (*Carya illinoensis-Celtis laevigata*) floodplain forest, dominated by mature to old-growth pecans. Originating within a dynamic river system that floods periodically, the bottomland forests on the post are postulated by Freeman et al. (1997) to be the largest old-growth stands remaining in the lower Missouri River valley. White oak-shagbark hickory (*Quercus alba-Carya ovata*) forest covers much (about 400 ha) of the western part of the reservation, although many areas within the forest are disturbed moderately to severely. Bordering this woodland to the north and east is a stand of sugar maple-basswood (*Acer saccharum-Tilia americana*) forest, which occupies bluffs overlooking the old Sherman Army Airfield to the east, and represents a mature woodland that has existed for 150 to 200 years.

A roughly 6-ha bulrush-cattail (*Schoenoplectus validus-Typha* sp.) marsh is located on the floodplain of the Missouri River, between the Missouri Pacific

Railroad right-of-way and Chief Joseph Loop Road. Historically, many other areas probably supported similar and more extensive natural wetland communities (Brumwell 1951). A cement canal and other alterations to the drainage of the area have destroyed all but one remnant wetland (Freeman et al. 1997).

Small tracts of native and introduced prairie exist within the upland forest. Dominant native plants are big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and little bluestem (*Schizachyrium scoparium*). Characteristic herbs and graminoids include: sideoats grama (*Bouteloua curtipendula*), white prairie-clover (*Dalea candida*), flowering spurge (*Euphorbia corollata*), switchgrass (*Panicum virgatum*), gray goldenrod (*Solidago nemoralis*), and rough dropseed (*Sporobolus asper*).

Successional areas include open sites such as roadsides, ditches, and forest clearings that are dominated by non-native, cool season grasses. They have been further altered by major ecosystem disturbances, such as regular mowing practices. Parts of the abandoned United States Disciplinary Barracks prison farm that were not incorporated into the new prison facility have reverted to oldfield, with edges bounded by oak-hickory forest.

Three small tributary streams drain the post watershed: Corral, One-Mile, and Quarry creeks. Each of these waterways has low base flows and are intermittent, often ceasing to flow in late summer. Two small impoundments (Merritt and Smith lakes) form the source of One-Mile Creek. They are about equal in size and combine to cover about 3.8 ha of surface area. Land surrounding these lakes is entirely successional and disturbed heavily.

## METHODS

Collecting, field observations, and interviews with residents, hunters, and post employees were accomplished over the course of four years (2001-2004). Attempts were made to sample each major habitat throughout each of the four seasons. Most specimens were taken by kill traps (Museum specials, rat traps, Conibear traps) or live traps (Havahart traps, pitfalls), although specialized traps were employed for gophers and moles. Use of firearms was restricted to approved hunting areas. Some specimens were salvaged opportunistically (e.g., road-kills). Records for bats were accomplished by setting mist nets set over water courses or obvious flyways and by call recordings obtained with an Anabat II bat detector.

Voucher specimens and field notes comprising the basis for our report are deposited with the Collection of Recent Mammals, Midwestern State University (MWSU), Wichita Falls, Texas. Reference materials examined at the Museum of Natural History, University of Kansas at Lawrence (KU) are referred to in the text.

## SPECIES ACCOUNTS

Brumwell (1951) noted the presence of the commensal brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*), as well as the free-ranging domestic cat (*Felis silvestrius*) and domestic dog (*Canis lupus familiaris*). The situation today is probably similar. Vigilant control efforts ensure low numbers of *M. musculus* and *R. norvegicus* around human structures, and only two *M. musculus* were encountered during trapping activities. Free ranging dogs do not seem to exist on the post, although occasional stray pets might be observed. House cats wander freely, and both pets and free ranging animals probably account for sightings.

*Native species*

*Didelphis virginiana* (Virginia opossum) -- This conspicuous animal remains common, although hunters, trappers, and automobile traffic inflict regular casualties. *Specimens examined* (8) -- MWSU 21805-21812.

*Blarina hylophaga* (Elliot's short-tailed shrew) -- Fort Leavenworth occurs near the documented area of sympatry between *B. brevicauda* and *B. hylophaga* (George et al. 1981, 1982, Moncrief et al. 1982, Jones et al. 1984). Our animals were taken with snap traps set in runways of *Microtus* and *Sigmodon*. Specific identification of our material was determined by J. R. Choate (personal communication) to be *B. hylophaga*. *Specimens examined* (4) -- MWSU 22058-22061.

*Cryptotis parva* (Least shrew) -- The single specimen reported by Brumwell (1951) from the "cottonwood-elm association near Corral Creek" does not exist in the Museum of Natural History, University of Kansas. Pitfall trapping demonstrated the local abundance of this shrew. *Specimens examined* (9) -- MWSU 22048-22056.

*Scalopus aquaticus* (Eastern mole) -- The mole remains sufficiently common as to be a pest in yards and gardens. *Specimen examined* (1) -- MWSU 22067.

*Eptesicus fuscus* (Big brown bat) -- The ecology of this locally common bat in Leavenworth was detailed by Phillips (1966). The species accounted for the vast majority (149 of 184 captures) of mist-net captures and sound recordings on the post. *Specimens examined* (4) -- MWSU 21958, 22088-22090.

*Lasiurus borealis* (Red bat) -- There is some confusion in Brumwell's (1951) accounts for the genus *Lasiurus*. He stated that he obtained one specimen referred to this species, although "several bats that were flying over the river and adjoining woodland were tentatively identified" as such. The specimen to which Brumwell (1951) refers does not exist in the University of Kansas collection. However, he reported taking the three *L. cinereus* from an American elm (*Ulmus americana*) tree in July 1939 -- a female and two half-grown young. These bats (KU 13226-13228

are *L. borealis*. Sound recordings indicate that, among bats, only *E. fuscus* is more common on the post. *Specimen examined* (1) -- MWSU 22087.

*Lasiurus cinereus* (Hoary bat) -- Brumwell's (1951) account of the species seems erroneous (see above account for *L. borealis*). No vouchers were obtained during our study, although bat recordings and a capture-escape of a single animal from July 2002 verify the seasonal presence of this migrant species on Fort Leavenworth.

*Myotis lucifugus* (Little brown bat) -- This bat is known from several localities in eastern Kansas, including Leavenworth County (Jones et al. 1967, Bee et al. 1981), but it is not common in the state. Brumwell (1951) reported taking one specimen on the post, but no voucher specimen exists. He observed that "several times bats resembling this species in their manner of flight were observed feeding near the river and streams". The little brown bat was recorded at two locations in the floodplain forest during 2003.

*Myotis septentrionalis* (Northern myotis) -- Brumwell (1951) suggested that this myotis "probably occurs, at least occasionally...for it occurs in the adjoining parts of Nebraska, Iowa, and Missouri". Our single capture in July 2002, that of a lactating female, was not retained as a voucher.

*Nycticeius humeralis* (Evening bat) -- Brumwell (1951) hypothesized the occurrence of the evening bat and noted reports of it from adjoining areas in Missouri. Most of our 11 netted specimens were females and juveniles. One animal provided the first record for Kansas of an adult male evening bat (Davis and Boyles 2005). *Specimens examined* (3) -- MWSU 22086, 22121, 22122.

*Pipistrellus subflavus* (Eastern pipistrelle) -- No specimens of the eastern pipistrelle were taken during our study, and Brumwell (1951) makes no mention of this tiny bat. Nevertheless, we list the eastern pipistrelle as a post resident on the basis of bat recordings from several locations on the post, and of voucher specimens from the city of Leavenworth and vicinity that reside in the University of Kansas collection.

*Canis latrans* (Coyote) -- The coyote presently ranges freely on the post and throughout the surrounding countryside. Sightings are not uncommon, and nocturnal choruses are heard frequently. Brumwell (1951) reported that three coyotes were reported killed on the post during 1940, but none apparently were saved as specimens.

*Urocyon cinereoargenteus* (Gray fox) -- Brumwell (1951) opined that the gray fox had become extirpated. A single animal, observed at dusk on Christmas Day 2002, comprises the basis for inclusion in our report.

*Vulpes vulpes* (Red fox) -- The red fox is a conspicuous and well-known inhabitant of the fort and has increased in numbers over the past decades. *Specimen examined* (1) -- MWSU 22071.

*Lynx rufus* (Bobcat) -- The bobcat was rare or absent during Brumwell's (1951) study, but specimens exist at the University of Kansas from before and after

that time. We found no sign of this secretive carnivore, but it is reported regularly by bow-hunters on the post.

*Puma concolor* (Puma) -- The mountain lion was extirpated regionally during the early 1900's and Brumwell (1951) did not bother mentioning this cat. However, an automobile struck and killed a two-year-old male puma as it crossed I-35 in Kansas City, Missouri on 14 October 2002 (Low 2002) -- a distance of no more than 35 km from the military post. This event perhaps substantiates reports from deer hunters on the reservation and the post forester, that the puma might be an occasional transient.

*Mephitis mephitis* (Striped skunk) -- The striped skunk was found by Brumwell (1951) to be "rather rare". The species is presently a common resident on the reservation, where it is a frequent roadway casualty. Specimens examined (2) - MWSU 21939, 21940.

*Spilogale putorius* (Eastern spotted skunk) -- During Brumwell's (1951) investigation, he found *S. putorius* to be "...a common inhabitant of woodland and broken terrain about ledges, and railroad ballast". Unfortunately, he did not obtain any voucher specimens. Population declines statewide during the intervening years contributed to listing of the spotted skunk by Kansas as a threatened species. We found no evidence of the animal on Fort Leavenworth, although there are a few older records of the eastern spotted skunk from Leavenworth County. We judge it possible that this diminutive skunk has been extirpated.

*Mustela frenata* (Long-tailed weasel) -- We found no evidence of the long-tailed weasel on Fort Leavenworth, although Brumwell (1951) kept captive a female long-tailed weasel taken on the post. He also recounted having chased another into a den along the banks of the Missouri River

*Mustela vison* (Mink) -- Brumwell (1951) reported occasional sign of the mink. Our only record was a sighting from along the bank of Corral Creek, into which the animal escaped.

*Procyon lotor* (Northern raccoon) -- Brumwell (1951) frequently encountered northern raccoon sign. The animal is presently often a pest around housing areas and post businesses. Our single specimen appeared to be the first voucher of northern raccoon from Leavenworth County. Specimen examined (1) -- MWSU 22142.

*Odocoileus virginianus* (White-tailed deer) -- Free-ranging individuals of this species did not exist during Brumwell's (1951) study, but the resident herd is sufficiently large to have supported a harvest of 64 animals during the 2003-2004 deer season on Fort Leavenworth. The future of the white-tailed deer on the post is in question because a wire security fence presently is being installed around the installation. Specimen examined (1) -- MWSU 22020.

*Marmota monax* (Woodchuck) -- The woodchuck remains as common and conspicuous today on the post as during Brumwell's (1951) study. Our earliest sighting was early April, and the species remained active locally until September. Specimen examined (1) -- MWSU 21801.

*Sciurus carolinensis* (Eastern gray squirrel) -- Brumwell (1951) found the gray squirrel less common and more localized in distribution on Fort Leavenworth than the larger *S. niger*. He provided no voucher specimens. During our study, *S. carolinensis* was the more common of the two congeners. Specimens examined (4) -- MWSU 21892-21894, 22095.

*Sciurus niger* (Eastern fox squirrel) -- Brumwell (1951) related that the mast crop strongly influences population size of the eastern fox squirrel, and that the fall of 1940 experienced a severe decline in eastern fox squirrel numbers as a result of a concerted effort by post residents to harvest the pecan and walnut (*Juglans nigra*) crops. While still common, *S. niger* presently is outnumbered locally by the eastern gray squirrel. Specimen examined (1) -- MWSU 21891.

*Spermophilus franklinii* (Franklin's ground squirrel) -- Brumwell (1951) noted one colony of a dozen or fewer animals on the post, in a buckbrush-sumac (*Symphoricarpos orbiculatus-Rhus glabra*) association, although he took no vouchers. Franklin's ground squirrel seems never to have been common anywhere and it now appears to be in decline across its range (Jones et al. 1985, Johnson and Choromanski-Norris 1992, Hoffman 1999, Pergrams and Nyberg 2001). Like the eastern chipmunk (*Tamias striatus*), *S. franklinii* is considered by Kansas as a "species in need of conservation" (SINC). Our specific efforts to document the local occurrence of Franklin's ground squirrel failed, and we conclude that it is extirpated.

*Spermophilus tridecemlineatus* (Thirteen-lined ground squirrel) -- Brumwell (1951) noted the relative abundance of *S. tridecemlineatus*, and remarked on the need to control its numbers by trapping on the post golf course. This small ground squirrel is a familiar sight to local residents, although it is often referred to mistakenly as a chipmunk. Specimens examined (2) -- MWSU 21802, 22012.

*Tamias striatus* (Eastern chipmunk) -- The eastern chipmunk is considered an uncommon resident of Kansas (Bee et al. 1981). Brumwell (1951) observed a single eastern chipmunk during his study. Freeman et al. (1997) documented only a half-dozen sightings. We found this sciurid to be common and distributed widely across the fort in each of the major woodlands and riparian habitats. Our sightings for the hibernating eastern chipmunk range from as early as 25 May to as late as early October. Specimens examined (10) -- MWSU 21803, 21804, 22013-22017, 22069, 22070, 22092.

*Glaucomys volans* (Southern flying squirrel) -- This nocturnal animal probably was more common than records or sightings indicate. Twelve nest boxes set out by Freeman et al. (1997) in oak-hickory forest failed to attract any animals. Our special efforts involved placing traps in trees, but we also failed to procure a specimen until one animal became entangled in a mist net set for bats. Brumwell (1951) reported taking a specimen "killed by workmen while felling a tree". Specimen examined (1) -- MWSU 22091.



*Castor canadensis* (American beaver) -- Brumwell (1951) noted the presence of a colony a few years prior to his study, and he opined that the American beaver would again become established on the post. The species is presently a common pest. Girded tree trunks commonly are noted along all waterways, and dams on the post must be dismantled repeatedly to preclude flooding of low-lying areas. No specimens were obtained.

*Geomys bursarius* (Plains pocket gopher) -- Brumwell (1951) obtained several specimens of the pocket gopher, and its characteristic mounds continue to dot the landscape.

*Zapus hudsonius* (Meadow jumping mouse) -- Brumwell (1951) did not find the meadow jumping mouse on the military reservation. The species might be common in ideal habitat, but we did not detect it until late in our study. One specimen was retrieved from the jaws of the senior author's house cat on post housing, and the others were taken from a single locality over a period of 15 to 21 September 2003. The site was mixed successional forest dominated by cottonwood and ash (*Fraxinus* sp.), with a light herbaceous understory. Specimens examined (8) -- MWSU 22072, 22123, 22124, 22126-22130.

*Microtus ochrogaster* (Prairie vole) -- The prairie vole was locally common in some areas of dense grasses and forbs, but was sometimes absent from seemingly ideal habitat, where the more widespread hispid cotton rat (*Sigmodon hispidus*) occurred in higher numbers. Specimens examined (13) -- MWSU 21929, 21930, 21957, 22001-22007, 22038, 22074, 22079.

*Microtus pinetorum* (Woodland vole) -- Our specimens of the woodland vole always were taken in the vicinity of *M. ochrogaster*. The distinctive runways were differentiated easily from those of the larger prairie vole. Each capture was from a runway cut below leaf litter at forest edges or below the thatch of dense grasslands. Specimens examined (4) -- MWSU 22027, 22044, 22045, 22073.

*Ondatra zibethicus* (Muskrat) -- The muskrat apparently was not common during Brumwell's (1951) time, with the exception of a population observed in the sedge-willow (*Carex* sp.-*Salix* sp.) association. He took no specimens. Neither the species nor its characteristic signs were observed during our investigation, and *O. zibethicus* remains undocumented from the county.

*Synaptomys cooperi* (Southern bog lemming) -- The bog lemming was listed by Brumwell (1951) as a species that hypothetically occurred on the site, and we could find no previous voucher of this taxon from Leavenworth County. Our single specimen was captured in dense, matted grass on the slope of an oldfield in association with the hispid cotton rat and prairie vole. Specimen examined (1) -- MWSU 22043.

*Neotoma floridana* (Eastern woodrat) -- The eastern woodrat was uncommon on the post during Brumwell's (1951) time. The species remains distributed sparsely based on the scattered occurrence of characteristic nests that are constructed in woodland areas. Specimens examined (3) -- MWSU 21959, 21960, 22093.

*Peromyscus leucopus* (White-footed mouse) -- The white-footed mouse remains the most common mammal on the post. Specimens examined (51) -- MWSU 21820, 21877-21886, 21923-21928, 21951-21955, 21972-21990, 22008, 22011, 22027, 22029-22035.

*Peromyscus maniculatus* (Deer mouse) -- Brumwell (1951) found the deer mouse to be uncommon on the post and restricted largely to remnant prairie stands. Our findings were comparable. Most specimens were taken in oldfield and floodplain grasslands. Specimens examined (8) -- MWSU 21911, 22009, 22010, 22026, 22037, 22039-22041.

*Reithrodontomys megalotis* (Western harvest mouse) -- The western harvest mouse occupied a wider array of local habitats than reported by Brumwell (1951), ranging from relatively dry and open grasslands to densely vegetated fields and brushy riparian areas. Specimens examined (22) -- MWSU 21962-21971, 22036, 22042, 22057, 22062-22066, 22068, 22075, 22076, 22125.

*Sigmodon hispidus* (Hispid cotton rat) -- Brumwell (1951) made no mention of the hispid cotton rat, as the species apparently was just becoming established in northeastern Kansas at the time of his survey (Hibbard 1944). Freeman et al. (1997) listed the taxon as one of probable occurrence on the post. The species occupied grassy situations across the post, where it commonly shared runways with *M. ochrogaster*. Specimens examined (12) -- MWSU 21956, 21991, 21993-22000, 22046, 22047.

*Lepus californicus* (Black-tailed jackrabbit) -- The black-tailed jackrabbit has long been a rarity in northeastern Kansas (Hibbard 1944). Brumwell (1951) indicated that five animals were killed on the reservation during the course of his investigation, but we found no evidence of its current existence on the post.

*Sylvilagus floridanus* (Eastern cottontail) -- The eastern cottontail remained as common as during Brumwell's (1951) study and was one of the most conspicuous resident species. Specimen examined (1) -- MWSU 22141.

## DISCUSSION

Beginning with Brumwell's (1951) baseline study, a remarkable total of 43 native species of mammals have now been documented from Fort Leavenworth. Of this total, at least 38 species presently occur on the post. This level of mammalian diversity exceeds that of the more intensively studied Konza Prairie Biological Station to the west (Finck et al. 1986, McMillan et al. 1997). The difference between the two sites is likely due to the juxtaposition of the military reservation at a nexus between four faunas -- an interface where western species of the Great Plains (e.g., *S. tridecemlineatus*, *R. megalotis*) merge with those of the Eastern Deciduous Woodlands (e.g., *T. striatus*, *G. volans*) and where inroads are occurring from species of both northern boreal (e.g., *S. cooperi*, *Z. hudsonius*) and southern subtropical (e.g., *S. hispidus*) affinities.

Like most military installations, the post is essentially a wildlife refuge; employing foresters and wildlife biologists, controlling the harvest of game species, and providing protection for both habitat and native species. Even smaller posts, especially when bordered by intensively agricultural lands (as is the case with Fort Leavenworth), might serve as critical refugia. Smaller species of concern such as the locally abundant *T. striatus*, certainly benefit from this protection.

Future monitoring of Fort Leavenworth almost certainly will be rewarded by adjustments and additions to the results of our investigation. Our checklist must be treated as tentative, temporary, and soon to be outdated, given the dynamic nature of animal distributions, shifting climatic regions, and the effects of human alterations of ecological conditions. Likely candidates for inclusion in future investigations are treated below.

#### *Species of hypothetical occurrence*

Four species discussed by Brumwell (1951) escaped our detection. Possibly, the secretive and locally uncommon long-tailed weasel and spotted skunk evaded our efforts. The black-tailed jackrabbit and Franklin's ground squirrel probably no longer occur on the post or surrounding countryside.

A number of species warrant serious consideration for listing as hypothetical residents of Fort Leavenworth. These species include those that might have been overlooked due to local scarcity or seasonal availability, and other species that are experiencing either active range expansions or reclamation of their historic ranges.

Due to their volant capabilities, the potential for extralimital records for bats always exists. However, the geographic proximity of documented specimens makes at least three species likely candidates for inclusion in our list. The silver-haired bat (*Lasionycteris noctivagans*) and Brazilian free-tailed bat (*Tadarida brasiliensis*) are both powerful-flying, long-distance migrants that likely either seasonally pass through the area or are summer residents. The Indiana myotis (*Myotis sodalis*) is not known from Kansas, although records exist for this rare bat from just across the river in Missouri (Schwartz and Schwartz 2001). Continued monitoring might yet document this endangered species' presence on the post.

Two moderately large and recognizable species, which presently do not reside in the immediate vicinity of Fort Leavenworth, actively are expanding their ranges and may be present on the site within the next decade or two. The nine-banded armadillo (*Dasyurus novemcinctus*) has been advancing northward in the United States for over a century and it presently is known from as far north as parts of Nebraska (Freeman and Genoways 1998). There appear to be few natural barriers to this migration, except possibly periods of extended subfreezing weather; this tropical animal is essentially hairless and neither hibernates, caches food, nor acquires a layer of subcutaneous fat. The North American porcupine (*Erethizon*

*dorsatum*) is an uncommon resident of eastern and central Kansas and is extending its range to the south and east. Reports of “quilled” dogs usually presage procurement of specimens.

The geographic proximity of two essentially prairie grassland forms whose ranges approach the study area from the west, the hispid pocket mouse (*Chaetodipus hispidus*) and plains harvest mouse (*Reithrodontomys montanus*), warrant consideration as possible residents that escaped detection. However, negative results from our extensive trapping efforts lead us to judge each as unlikely to occur on Fort Leavenworth at the present time.

The possibility of undocumented carnivore species exists and warrants continued monitoring. The post occurs within the eastern periphery of the range of the American badger (*Taxidea taxus*) where it is uncommon, so its presence would not be unexpected. Its conspicuous appearance and characteristic diggings make it unlikely to be overlooked. The range of the least weasel (*Mustela nivalis*) has spread through Kansas and as far south as northern Oklahoma in recent decades (Frey 1992). Larger and wide-ranging species such as the northern river otter (*Lontra canadensis*) and American black bear (*Ursus americanus*) might be considered as possible transients via the Missouri River. Reintroductions have led to a resurgence of the northern river otter population in adjoining Missouri, and low numbers of the American black bear still exist in southern portions of that state (Schwartz and Schwartz 2001).

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**Table 1.** Comparison of Brumwell's (1951) survey of the mammalian fauna from Fort Leavenworth, Kansas conducted during 1939 to 1940 and the present study conducted during 2001 to 2004. Terms for relative abundance taken from McMillan et al. (1997). Basis for inclusion in table (in parentheses) for Fort Leavenworth taxa are: voucher specimens (n), visual records (V), bat call recordings (C), or other (O, e.g., reliable second-hand accounts, tracks).

Species	Brumwell (1951) 1939-1940	Present study 2001-2004
<i>Didelphis virginiana</i>	common	common (n=8, V)
<i>Blarina hylophaga</i>	uncommon	local (n=4)
<i>Cryptotis parva</i>	rare	local (n=9)
<i>Scalopus aquaticus</i>	common	common (n=1, O)
<i>Eptesicus fuscus</i>	present	common (n=4, C)
<i>Lasiurus borealis</i>	present	common (n=1, C)
<i>L. cinereus</i>	problematic	present (V, C)
<i>Myotis lucifugus</i>	present	present (C)
<i>M. septentrionalis</i>	hypothetical	present (V)
<i>Nycticeius humeralis</i>	hypothetical	present (n=3, C)
<i>Pipistrellus subflavus</i>	---	present (C)
<i>Canis latrans</i>	rare	common (V)
<i>Urocyon cinereoargenteus</i>	*- extirpated	present (V)
<i>Vulpes vulpes</i>	rare	common (n=1, V)
<i>Lynx rufus</i>	*- extirpated	present (O)
<i>Puma concolor</i>	---	occasional (O)
<i>Mephitis mephitis</i>	rare	common (n=2, V)
<i>Spilogale putorius</i>	common	rare (?)
<i>Mustela frenata</i>	rare	rare (?)
<i>M. vison</i>	present	present (V)
<i>Procyon lotor</i>	common	common (n=1, V)
<i>Odocoileus virginianus</i>	*- extirpated	common (n=1, V)
<i>Marmota monax</i>	common	common (n=1, V)

**Table 1, continued.**

Species	Brumwell (1951) 1939-1940	Present study 2001-2004
<i>Sciurus carolinensis</i>	uncommon	common (n=4, V)
<i>S. niger</i>	common	common (n=1, V)
<i>Spermophilus franklinii</i>	local	*- extirpated
<i>S. tridecemlineatus</i>	common	common (n=2, V)
<i>Tamias striatus</i>	rare	common (n=10, V)
<i>Glaucomys volans</i>	present	present (n=1)
<i>Castor canadensis</i>	local	common (V, O)
<i>Geomys bursarius</i>	common	common (V)
<i>Zapus hudsonius</i>	hypothetical	local (n=8)
<i>Microtus ochrogaster</i>	local	local (n=13)
<i>M. pinetorum</i>	local	local (n=4)
<i>Ondatra zibethicus</i>	local	rare (?)
<i>Synaptomys cooperi</i>	hypothetical	rare (n=1)
<i>Neotoma floridana</i>	uncommon	uncommon (n=3)
<i>Peromyscus leucopus</i>	common	common (n=51)
<i>P. maniculatus</i>	uncommon	uncommon (n=8)
<i>Reithrodontomys megalotis</i>	present	common (n=22)
<i>Sigmodon hispidus</i>	---	common (n=12)
<i>Lepus californicus</i>	present	*- extirpated
<i>Sylvilagus floridanus</i>	common	common (n=1, V)

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