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# Status of the Plains Harvest Mouse (*Reithrodontomys montanus griseus*) in eastern Nebraska

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## Abstract

In eastern Nebraska, current status of the Plains Harvest Mouse (*Reithrodontomys montanus griseus*) is not well understood. Infrequent captures during the last century have led to a paucity of information regarding this taxon, and some researchers postulate that its distribution has contracted in the state. In 2008, we conducted a field survey for *R. m. griseus* in eastern Nebraska, amassed prior specimen records, and examined most of the specimens for this subspecies from the state to better understand its distribution, natural history, and subspecific status. In our field efforts, we only captured a single individual despite > 8,000 trap nights in suitable habitats. Our literature review and queries for vouchers yielded 20 specimens of *R. m. griseus* from eastern Nebraska, based on published distributional limits for this subspecies. In eastern Nebraska, *R. m. griseus* has been captured in tallgrass prairies, short-grass upland pastures, roadside ditches, and open areas associated with salt flats. Observations across eastern Nebraska in the last 40 years demonstrate that this taxon still exists across the entire region and has been captured more frequently in cooler months. We suspect that some combination of low abundance, trap shyness, and trapping biases towards heavily vegetated habitats and warm seasons likely has led to infrequent captures of *R. m. griseus* in eastern Nebraska. After examination of many museum specimens of this species from across Nebraska, Kansas, and Missouri, we questioned the delineations in distribution for the two subspecies in the region. On the basis of dorsal gray fur coloration, *R. m. albescens* appears limited to the Sandhill and Panhandle regions of Nebraska, whereas all of eastern and southern Nebraska as well as Kansas and western Missouri represent *R. m. griseus*, a subspecies with brown dorsal fur coloration. Based on our proposed distributional changes for these two subspecies in Nebraska, we do not find that either subspecies requires conservation efforts. *Reithrodontomys montanus griseus* likely will persist at low densities throughout eastern Nebraska in appropriate habitats and persist at higher densities farther westward in southern parts of the state. *Reithrodontomys montanus albescens* always has been more common in the Sandhill Region of Nebraska, as individuals still are observed and captured with regularity.

**Keywords:** abundance, current status, natural history, eastern Nebraska, Plains Harvest Mouse, *Reithrodontomys montanus griseus*, *Reithrodontomys montanus albescens*, reproduction

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## Introduction

Distributions of the Plains Harvest Mouse (*Reithrodontomys montanus*) and Western Harvest Mouse (*Reithrodontomys megalotis*) overlap in most of the central Great Plains (Jones 1964, Jones et al. 1983). Where these species co-occur, they generally occupy different habitats. The Western Harvest Mouse is most abundant in dense vegetation, whereas the Plains Harvest Mouse commonly is associated with upland grasslands, especially xeric habitats with patches of bare soil (Jones 1964, Andersen and Fleharty 1967, Jones et al. 1983, Finck et al. 1986, Wilkins 1986). In general, *R. megalotis* is captured more frequently than *R. montanus* (e.g., Jones 1964, Andersen and Fleharty 1967, Finck et al. 1986, McMillan et al. 1999). In Nebraska, *R. megalotis* was the third most common species of small mammal based on individuals kept as voucher specimens (Jones 1964). In contrast, *R. montanus* generally is

uncommon and considered rare throughout much of its distribution in the central Great Plains (e.g., Andersen and Fleharty 1967, Finck et al. 1986, McMillan et al. 1999, Benedict et al. 2000, Kaufman et al. 2000).

Two subspecies of Plains Harvest Mice occur in Nebraska. *Reithrodontomys montanus albescens* is known from across the state except in southeastern parts where *R. m. griseus* occurs (Jones 1964, Hall 1981, Genoways et al. 2008). Current status of *R. m. griseus* is not well known in Nebraska (Schneider et al. 2005, Schneider et al. 2011), and it is suspected that its geographic range has contracted in recent decades (Benedict et al. 2000). The only published observation of this subspecies within or along distributional limits since Jones (1964) was from Webster County (Springer 1986). The Nebraska Game and Parks Commission currently considers *R. m. griseus* as a taxon with the greatest risk of extinction (Schneider et al. 2005, Schneider et al. 2011).

Infrequent captures during the last century have resulted in a paucity of information regarding the natural history of *R. m. griseus* in Nebraska, making it difficult to ascertain whether the subspecies requires conservation efforts. We completed a field survey in upland and sparsely vegetated habitats for *R. m. griseus* in summer 2008 as well as amassed all former records from the state to better understand its natural history in eastern Nebraska. We suspected that previous trapping efforts in eastern Nebraska inadequately sampled for *R. m. griseus*, that is, most researchers likely trapped in habitats with dense, tall vegetation, such as roadside ditches that are productive for capturing an abundance of other species of small mammals in eastern parts of the Great Plains (Kaufman and Fleharty 1974, Kirsch 1997).

## Methods

We trapped for *R. m. griseus* in eastern Nebraska from early June to early August 2008. Some trapping locations were beyond the geographic distribution of *R. m. griseus*, but such sites were in a zone with intergrades according to Jones (1964). We mainly set Sherman live traps (model type LFATDG, H.B. Sherman, Tallahassee FL), but we also occasionally set mouse traps (Museum Specials, Woodstream Corporation, Lititz, PA) in the poorest quality habitat (i.e. grazed upland pastured) with few or no rodents. Traps were placed in grazed and ungrazed upland areas comprised of mainly grasses and forbs. For ungrazed grasslands, we selected sites with the greatest area of bare ground and least amount of vegetative cover. Traps were set from one to three nights and checked daily. Captures of *R. m. griseus* have been shown to increase after the first or second night of trapping (McMillan et al. 1999), suggesting *R. montanus* is cautious of traps deployed for only a night. We recorded the species, sex, age (juvenile or adult), and reproductive condition (non-reproductive, pregnant, lactating, and scrotal) of small mammals captured in traps. Voucher specimens and associated field notes are housed in natural history collections in the Division of Zoology, University of Nebraska State Museum (UNSM), Lincoln, Nebraska, USA. Coordinates of localities were determined with hand-held global positioning units using North American Datum 1983. Research was approved by the Institutional Animal Care and Use Committee at the University of Nebraska at Kearney (IACUC proposal #040506).

We also visited regional natural history museums and conducted national searches on databases to obtain records of published and unpublished specimens of *R.*

*montanus* from eastern Nebraska. We visited natural history collections at UNSM; Hastings College, Hastings, Nebraska (HC); Hastings Museum (HM), Hastings, Nebraska; University of Nebraska at Kearney, Kearney, Nebraska (UNK); University of Kansas, Lawrence, Kansas (KU); and Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas (FHSM). Other data were obtained from records held in the following institutions and accessed through a VertNet data portal (<http://vertnet.org>): American Museum of Natural History, New York City, New York (AMNH) and United States National Museum, Smithsonian, Washington D.C. (USNM). For further details on holdings of *R. m. griseus* from Nebraska, additional requests were sent directly to curators at AMNH, USNM, and the Field Museum, Chicago, Illinois (FMNH). We also attempted to locate every specimen reported in Jones (1964).

## Results and Discussion

In eastern Nebraska, we trapped in 35 counties, accrued >8,000 trap nights, and captured 896 small mammals representing 15 species (Table 1). We only captured a single *R. montanus*, which was the least abundant species captured during our survey. An adult female was captured in a roadside right-of-way in Webster County (6.0 km N Red Cloud, 40°08.321'N, 98°31.135'W) on 23 July. The female was lactating and contained 6 small embryos that measured 6 mm in length for uterine-swelling (UNSM 29414). The individual had typical external characteristics for *R. montanus*, including a thin mid-dorsal stripe of dark coloration on the tail and a faint broad dorsal band of darkly colored hairs from the top of the head to the rump. Coloration on flanks below the broad, dark stripe were brown. At the capture site, plants consisted of small cacti, yucca (*Yucca glauca*), forbs including plantain (*Plantago*), and various grass species including cheatgrass (*Bromus tectorum*). Near the trap site, plant cover was about 85% with 15% bare ground. Other species of small mammals captured in the immediate area included the North American Deermouse (*Peromyscus maniculatus*) and *R. megalotis*.

We discovered 12 unpublished specimens (including our specimen) housed in museums from within or near the edge of the depicted distribution for *R. m. griseus* in Nebraska from 1973 to 2008 via literature and museum queries (Table 2). Most specimens represented new localities for the state, including five counties without prior records (Adams, Cedar, Hamilton, Merrick, and Otoe) based on published records in Jones (1964) and Springer (1986).

**Table 1.** Species of small mammals captured during a survey for the Plains Harvest Mouse (*Reithrodontomys montanus griseus*) and Plains Pocket Mouse (*Perognathus flavescens penniger*) in eastern Nebraska in 2008. Numbers represent individuals captured in 35 counties with > 8,000 trap nights.

Scientific name	Common name	Number of individuals
<i>Peromyscus maniculatus</i>	North American Deermouse	394
<i>Microtus ochrogaster</i>	Prairie Vole	90
<i>Chaetodipus hispidus</i>	Hispid Pocket Mouse	75
<i>Perognathus flavescens</i>	Plains Pocket Mouse	70
<i>Peromyscus leucopus</i>	White-footed Deermouse	64
<i>Dipodomys ordii</i>	Ord's Kangaroo Rat	62
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	60
<i>Microtus pennsylvanicus</i>	Meadow Vole	29
<i>Spermophilus tridecemlineatus</i>	Thirteen-lined Ground Squirrel	24
<i>Onychomys leucogaster</i>	Northern Grasshopper Mouse	10
<i>Mus musculus</i>	House Mouse	7
<i>Blarina brevicauda</i>	Northern Short-tailed Shrew	4
<i>Zapus hudsonius</i>	Meadow Jumping Mouse	4
<i>Blarina hylophaga</i>	Elliot's Short-tailed Shrew	2
<i>Reithrodontomys montanus</i>	Plains Harvest Mouse	1

### Abundance, habitat, and distribution

The eastern subspecies of the Plains Harvest Mouse, *R. m. griseus*, is rare in Nebraska and Kansas. Nowhere in these states has this taxon been considered common in recent decades (Jones 1964, Finck et al. 1986, McMillan et al. 1999, Benedict et al. 2000, this study). Trapping efforts within distributional limits have yielded consistently low trap success for this subspecies. For example, at the long-term research site in northeastern Kansas (Konza Prairie Research Natural Area) only 16 captures were reported in 130,560 trap nights from autumn 1981 to spring 1998 (McMillan et al. 1999). Besides our efforts in eastern Nebraska, only two individuals were captured in 35,000 traps in prairies and roadside areas during a 10-year period in the 1990s (Benedict et al. 2000), whereas Jones (1964) only reported a single capture in all his efforts in this region. Springer (1986) reports the only relatively recent account of several captures in Nebraska. In a mixed-grass prairie in Webster County, at least nine individuals were captured during 27 nights of consecutive trapping in April and early May in 2,700 trap nights (Springer 1986).

Former accounts in eastern Nebraska suggest that *R. m. griseus* once was captured with some regularity. Jones (1964) reported on two of these accounts from the early 1900s—one in upland situations on the southeastern edge of Lincoln and the other in dry open fields and prairies of salt flats north and west of Lincoln, Lancaster County. Such data suggest that either more suitable habitats previously existed in eastern Nebraska or those specific habitats have not been trapped adequately in recent years.

Moreover, it is unclear whether those past accounts reflect its former abundance throughout eastern Nebraska or its abundance in those unique habitats in Lancaster County. Unfortunately, many salt marshes of Lancaster and Saunders counties have been destroyed over the years (Spomer and Higley 1993), resulting in declines of species inhabiting those marshes, such as the Salt Creek Tiger Beetle (*Cicindela nevadica lincolniana*) and saltwort (*Salicornia rubra*; Schneider et al. 2005).

In eastern Nebraska and eastern Kansas, *R. m. griseus* occupies various habitats and appears to avoid areas with tall and dense vegetation. This subspecies has been observed in short-grass prairies in uplands on the flat tops of hills and limestone breaks associated with steep slopes of limestone outcrops (Finck et al. 1986, Kaufman et al. 1995, McMillan et al. 1999; Konza Prairie, Riley and Geary counties, Kansas), heavily and moderately grazed upland grasslands (Andersen and Fleharty 1967; Jewell County, Kansas), short-grass pastures (notes on specimen tag UNSM 14548; Otoe County, Nebraska), xeric roadside right-of-ways (this study; Webster County, Nebraska), upland mixed-grass prairies with both limited and moderate litter layers (Springer 1986; Webster County, Nebraska), and sparsely vegetated, dry salt flats (Jones 1964; Lancaster County, Nebraska). Another individual was recovered from the crop of a Rough-legged Hawk (*Buteo lagopus*) discovered dead along Interstate 80 in Hamilton County (UNSM 18110). We hypothesize the hawk recently captured the harvest mouse in a roadside right-of-way, likely mowed or having short

vegetation. Use of such different habitats suggests that populations likely persist at low densities across its distribution and capitalize on suitable habitats in areas where they exist.

Benedict et al. (2000) concluded that *R. m. griseus* likely exists as isolated populations in eastern Nebraska, and speculated that it does not occupy as wide of a geographic range as depicted by Jones (1964). Our interpretation of data from eastern Nebraska and Kansas in recent decades is that the subspecies has never been common anywhere and it is difficult to capture even in appropriate habitats, such as at the Konza prairie in northeastern Kansas (McMillan et al. 1999). We did not find evidence that the geographic range has contracted in Nebraska. We discovered unpublished voucher specimens during the last 35 years in natural history collections in eastern Nebraska that demonstrate the taxon still occurs over a wide geographical area from Otoe and Cedar counties along the Missouri

River to counties along its westernmost distributional limits (Table 2). We suspect that it still occurs across its entire distribution as drawn by Jones (1964), albeit at low densities and possibly more detectable in colder months (see *Comments on Seasonality*).

### Reproduction

Little information is understood regarding reproductive activity of *R. m. griseus* in eastern Nebraska, even after amassing all known records from the state due to the limited number of total captures (Tables 2 & 3). Lactation is known from 23 July and 1 November, and the only date for pregnancy is 23 July (Table 2). Similarly, only limited data on testicular length are known for males (Tables 2 & 3). Jones (1964) stated that *R. montanus* probably breeds throughout the warmer months of the year, and Jones et al. (1983) reported that in Oklahoma the species breeds from February to November.

**Table 2.** Unpublished voucher specimens of the Plains Harvest Mouse (*Reithrodontomys montanus*) in eastern Nebraska. Records include those in or along the distribution of *R. m. griseus* described by Jones (1964). Museum acronyms include UNSM (University of Nebraska State Museum), UNK (University of Nebraska at Kearney), and HC (Hastings College). The numbers following museum acronyms represent the specimen number. Standard measurements represent total length (mm), tail length (mm), hind foot length (mm), ear length (mm), and body weight (g), respectively. NR stands for measurements not recorded.

County	Specific locality	Date	Museum	Sex (Reproduction)	Standard measurements
Adams	1 mi E Hastings on 12 <sup>th</sup> Street	7 Apr 1989	HC (14 Larson)	Male (NR)	123–51–14–9≡NR
Cedar	3 mi N Laurel	10 Dec 1990	HC (10 Kruid)	Female (NR)	116–50–16–8≡NR
Hamilton	I-80, 4.7 mi W Aurora exit	11 Jan 1991	UNSM (18110)	NR	113–48–16–14≡8.3
Lancaster	3.2 mi S Denton, Spring Creek	13 Nov 1998	UNSM (25359)	Female (no embryos)	101–43–15.5–13.5≡6.7
Lancaster	3.2 mi S Denton, Spring Creek	14 Nov 1998	UNSM (25360)	Male (testes 2.5 x 2 mm)	118–51–15.5–14≡9.3
Merrick	1.75 mi S, 0.75 mi E Chapman	10 Oct 1993	UNSM (20284)	Female (no embryos)	119–39–15–11≡4.9
Merrick	2.5 mi S, 0.25 mi E Clarks	23 Oct 1993	UNSM (20098)	Female (no embryos)	123–50–15–15≡8
Otoe	1 mi E, 2.5 mi S Eagle	1 Nov 1976	UNSM (14548)	Female (lactating)	118–51–15–NR≡8
Webster	2.5 mi S, 0.25 mi W Red Cloud	22 Sep 1973	UNK (2057)	Male (NR)	112–48–16–14≡9.1
Webster	6 mi S Red Cloud	8 Apr 1976	UNK (3377)	Male (NR)	106–49–14–13≡8.4
Webster	6 km S, 0.8 km W Red Cloud	2 May 1980	UNK (3529)	Male (NR)	108–47–14–11≡6.8
Webster	3.7 mi N Red Cloud	23 July 2008	UNSM (29414)	Female (lact. & pregnant)	138–60–15–13≡14

**Table 3.** Previously published voucher specimens of the Plains Harvest Mouse (*Reithrodontomys montanus griseus*) in eastern Nebraska (Jones 1964). Museum acronyms are UNSM (University of Nebraska State Museum), KU (University of Kansas), USNM (National Museum of Natural History), FMNH (Field Museum), NGPC (Nebraska Game and Park Commission), and AMNH (American Museum of Natural History). Standard measurements represent total length (mm), tail length (mm), hind foot length (mm), ear length (mm), and body weight (g), respectively. NR stands for measurements not recorded. Numbers in brackets represent measurements recorded from specimen, but represent a notation that researchers use to demonstrate that measurements do not represent the standard length due to some reason, such as tail being docked or part of specimen missing.

County	Specific locality	Date	Museum (Number)	Sex (Reproduction)	Standard measurements
Gage	1 mi S, 1 mi W Barnston	15 Sep 1956	KU (72094)	male (NR)	[80]–[19]–15–12≡NR
Lancaster	Lincoln, Capital Beach	15 Oct 1905	UNSM (4314)	male (NR)	111–49–15–15≡NR
Lancaster	Lincoln	10 Aug 1911	AMNH (175444)	Female (immature)	119–48–14–10≡NR
Lancaster	Lincoln	20 May 1909	AMNH (175448)	Male (NR)	105–41–13–11≡NR
Lancaster	Lincoln <sup>a</sup>		NGPC		
Lancaster	Lincoln <sup>b</sup>	24 Nov 1928	FMNH (34858)	Female (NR)	115–62–16–NR≡NR
Nemaha	London	29 Apr 1893	USNM (53922)	Male (NR)	95–41–15–NR≡NR
Nemaha	London	29 Apr 1893	USNM (53923)	Male (NR)	94–42–15–NR≡NR

<sup>a</sup>Unable to locate specimen.

<sup>b</sup>Additionally, the locality states “Btw College View & Cheney” which are former railroad stops on the southeastern side of the current city limits of Lincoln.

### Seasonality

Most capture dates for *R. m. griseus* were not associated with summer months in eastern Nebraska. To date, 15 of 18 specimens were from cooler periods of the year from late September to early May, and 13 of 18 specimens were captured in April/May and October/November (Tables 2 & 3). Jones (1964) also reported that “. . . Grace Kiernan Weber trapped this mouse with some frequency . . . in the autumn and winter of 1928-29.” Although only limited observations are known from Nebraska, similar observations are reported from Kansas and Missouri. McMillan et al. (1999) showed that all 16 captures of *R. m. griseus* at their study site during almost two decades of trapping were from spring (typically March) or autumn (typically October) sampling periods, whereas not a single individual was captured during the summer (typically July) sampling period. Of note, sampling was not conducted in winter at their study site, and the summer sampling period was trapped less frequently than others, that is, six sampling periods in summer compared to 17 for both spring and autumn (McMillan et al. 1999). In southeastern Kansas, another study reported several individuals captured from 31 December to 25

March (Brecheisen and Legler 1957). Moreover, the first record of *R. montanus* from Missouri was captured on 9 October (Long 1961).

If individuals are readily captured only during cooler months, summer trapping efforts likely have led to underestimations of their occurrence in past surveys, including our recent field efforts. Increased detectability from autumn to spring possibly reflects reduced food availability during colder environmental conditions. Other studies have shown reduced capture rates for omnivorous rodents during summer (e.g., *Peromyscus pectoralis*; Geluso and Geluso 2004). *Reithrodontomys montanus* is both insectivorous and herbivorous in central Kansas (Brown 1946), likely consuming more insects during the warmer months and seeds during colder months. For our field efforts, we specifically trapped during summer to aid in our ability to also document the Plains Pocket Mouse (*Perognathus flavescens*; an objective of a concurrent study, see Geluso and Wright 2012), a species active above ground only during warmer months of the year (Monk and Jones 1996). In retrospect, an autumn to spring trapping regime might have yielded a more informative survey for detecting Plains Harvest Mice in eastern Nebraska.

### **Coloration, taxonomic status, and identification**

Coloration of *R. montanus* varied across the state and within the distribution for *R. m. griseus* in southeastern Nebraska. Four specimens of *R. m. griseus* from Lancaster and Otoe counties (UNSM 4314, 25359, 25360, and 14548) had unusually dark colorations on the dorsum compared to those from the remainder of the state. Examination of a specimen from Nemaha County (USNM 53922) and other specimens of this subspecies from eastern Kansas, which were all well within the distributional limits for this subspecies, demonstrated that not all *R. m. griseus* have such black fur on their dorsum, with most individuals having brown fur on the dorsum and flanks. In general, we observed a pattern of individuals with brown to black dorsums and flanks from across eastern Nebraska, southern Nebraska, Kansas, and western Missouri. In Nebraska, individuals examined from northeastern (Antelope, Boyd, and Knox), east-central (Merrick), south-central (Adams, Kearney, Phelps, and Webster), and southwestern (Dundy) Nebraska, as well as Nemaha County in southeastern parts of the state (USNM 53922), tended to have a more distinctive mid-dorsal band of dark hairs on the dorsum surrounded by brown fur. In contrast, individuals from the Sandhill Region of Nebraska, including those in northern Hall County, generally had the least distinctive mid-dorsal band and overall coloration of the dorsum and flanks was light gray (not brown). Jones (1964) also commented that *R. m. albescens* has upper parts that are pale grayish to pale brownish. Based on our observations of specimens from Nebraska and elsewhere, individuals from the Sandhills likely deserve their own subspecific designation based on coloration. Thus, we propose that *R. m. albescens* be limited to the Sandhill and Panhandle Region of Nebraska as well as nearby surrounding sandy substrates (e.g., northern Hall County). In contrast, we find support that *R. m. griseus* occurs throughout eastern and southern Nebraska as well as throughout Kansas. A quantitative examination of the subspecific status for *R. montanus* is recommended in Nebraska and throughout the central Great Plains. Our observation of a distinct taxon for *R. montanus* in the sandy habitats within and adjacent to the Sandhill Region of Nebraska is not surprising, as other recent studies have described new species (Genoways et al. 2008) or novel adaptive alleles (Linnen et al. 2009) in mammals in the region.

Identification of harvest mice to species, that is *R. montanus* from *R. megalotis*, can be difficult (Jones 1964) to the untrained researcher, as we observed misidentified specimens at many of the museums we visited (UNSM, KU, HC, and UNK). Identification is more difficult in the field when large series of individuals are not available for comparison. Care must be taken to identify and

properly preserve voucher specimens for future investigations. Proper care of the fur and tail are of importance, because without such care, identification based on visual characteristics of study skins is made difficult or even impossible.

### **Conclusions**

In Nebraska, *R. m. griseus* is listed as a Tier I At-Risk Species, the highest level of taxon in need of conservation (Schneider et al. 2005, Schneider et al. 2011). Our study demonstrated that the Plains Harvest Mouse is indeed rarely captured in eastern Nebraska, with only 20 total verified records reported in the state (Tables 2 & 3), based on the subspecific boundary depicted by Jones (1964). More information is needed about eastern populations in the state, and we suggest that salt marshes and xeric habitats in Lancaster County should be the next place surveyed, and that sampling should be conducted during colder months. We also predict that this mouse is more abundant in eastern Nebraska during prolonged periods of drought, which reduces overall vegetative cover. Construction of roadways and the concomitant creation of roadside ditches likely has favored *R. megalotis* because runoff from roads allows roadside right-of-ways to become mesic with denser vegetation. On the basis of dorsal coloration, we propose that designation of *R. m. albescens* should be limited to populations in the Sandhill and Panhandle Region of Nebraska, whereas *R. m. griseus* should be considered to occupy the remainder of eastern and southern parts of Nebraska. With our proposed change in the distribution throughout much of the state for *R. m. griseus*, we do not find support that this taxon is in need of conservation. *Reithrodontomys montanus griseus* likely will persist at low densities throughout eastern Nebraska in appropriate habitats and persist at higher densities farther westward in southern parts of the state. *Reithrodontomys montanus albescens* always has been more common in the Sandhill Region of Nebraska, as individuals still are observed and captured with regularity. In conclusion, *R. montanus* is a rarely captured species in eastern parts of its distribution and still little is understood about its habitat requirements and natural history throughout the state.

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