

1. **Species:** New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)
2. **Status:** Table 1 summarizes the current status of this species or subspecies by various ranking entity and defines the meaning of the status.

Table 1. Current status of <i>Zapus hudsonius luteus</i>		
Entity	Status	Status Definition
NatureServe	G5 T2	Imperiled—At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors.
CNHP	S1	<i>Species is Critically Imperiled</i> At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
Colorado State List Status	SE	Tier 1
USDA Forest Service	ESA Section 7	ESA Section 7 consultation requirement for activities that may affect the species.
USDI FWS ^b	FE	Federally listed as Endangered
^a Colorado Natural Heritage Program.		
^b US Department of Interior Fish and Wildlife Service.		

The 2012 U.S. Forest Service Planning Rule defines Species of Conservation Concern (SCC) as “a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area” (36 CFR 219.9). This overview was developed to summarize information relating to this species' consideration to be listed as a SCC on the Rio Grande National Forest, and to aid in the development of plan components and monitoring objectives.

3. Distribution, abundance, and population trend on the planning unit [12.53.2,3,4]:

The New Mexico meadow jumping mouse is endemic to New Mexico, Arizona, and a small area of southern Colorado (Hafner et al. 1981, Jones 1999).

Since 2005, there have been 29 documented remaining populations spread across 8 geographic management areas (2 in Colorado, 15 in New Mexico, and 12 in Arizona). Nearly all of the current populations are isolated and widely separated. Four of the eight geographic management areas have two or more locations known to be occupied by the New Mexico meadow jumping mouse since 2005, but all are insufficient (too small) to support resilient populations. The remaining four geographic management areas have only one location of the New Mexico meadow jumping mouse known to be occupied since 2005.

Interim survey guidelines for New Mexico meadow jumping mouse (2015) recommend surveys and habitat assessments for the following are areas where the species could occur in Colorado:

- Arkansas River watershed, Colorado above 4,000 feet elevation;
- Rio Grande watershed, Colorado;
- San Juan River watershed, Colorado and New Mexico

There are currently no known occurrences of New Mexico meadow jumping mouse in the planning area (NRIS database).

4. Brief description of natural history and key ecological functions [basis for other 12.53 components]:

The jumping mouse is a habitat specialist. It nests in dry soils, but uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 feet. However, there is currently some question as to whether habitat, not elevation, should be the primary factor used to guide future surveys. The species appears to only utilize two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canarygrass alliances); and 2) scrub-shrub wetlands (i.e., riparian areas along perennial streams that are composed of willows and alders) (Frey 2005). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water.

The jumping mouse is generally nocturnal, but occasionally diurnal. It is active only during the growing season of the grasses and forbs on which it depends. During the growing season, the jumping mouse accumulates fat reserves by consuming seeds. Preparation for hibernation (weight gain, nest building) seems to be triggered by day length. The jumping mouse hibernates about 9 months out of the year, longer than most other mammals (Morrison 1990; Frey 2005).

Habitat Requirements

Riparian communities along rivers and streams, springs and wetlands, or canals and ditches that contain:

- Persistent emergent herbaceous wetlands especially characterized by presence of primarily forbs and sedges (*Carex* spp. or *Schoenoplectus pungens*); or
- Scrub-shrub riparian areas that are composed of willows (*Salix* spp.) or alders (*Alnus* spp.) with an understory of primarily forbs and sedges;
- Flowing water that provides saturated soils throughout the New Mexico meadow jumping mouse's active season that supports:
 - Tall (average stubble height of herbaceous vegetation of at least 61 cm (24 inches) and dense herbaceous riparian vegetation composed primarily of sedges (*Carex* spp. or *Schoenoplectus pungens*) and forbs, including, but not limited to one or more of the following associated species: spikerush (*Eleocharis macrostachya*), beaked sedge (*Carex rostrata*), rushes (*Juncus* spp. and *Scirpus* spp.), and numerous species of grasses such as bluegrass (*Poa* spp.), slender wheatgrass (*Elymus trachycaulus*), brome (*Bromus* spp.), foxtail barley (*Hordeum jubatum*), or Japanese brome (*Bromus japonicas*), and forbs such as water hemlock (*Circuta douglasii*), field mint (*Mentha arvensis*), asters (*Aster* spp.), or cutleaf coneflower (*Rudbeckia laciniata*);
- Sufficient areas of 9 to 24 km (5.6 to 15 mi) along a stream, ditch, or canal that contains suitable or restorable habitat to support movements of individual New Mexico meadow jumping mice; and
- Include adjacent floodplain and upland areas extending approximately 100 m (330 ft) outward from the boundary between the active water channel and the floodplain (as defined by the bankfull stage of streams) or from the top edge of the ditch or canal.

Food Habits

Upon emerging from hibernation, diets of individual jumping mice (*Zapus* spp.) are primarily insects (e.g., lepidopteran larvae and beetles), along with grass seeds (Trainor et al. 2012; Frey and Wright, 2012). Diets shift from animals to a variety of seeds as the active season progresses (Trainor et al. 2012; Frey 2012). Frey and Wright (2012; Wright and Frey 2014) observed radio-collared jumping mice on Bosque del Apache National Wildlife Refuge (NWR), adjacent to the middle Rio Grande in New Mexico, feeding on the ground and in the herbaceous “canopy” 1.6 to 3.3 ft or more above the ground eating common threesquare (*Schoenoplectus pungens*), saltgrass (*Distichlis spicata*), spikerush (*Eleocharis macrostachya*), foxtail barley (*Hordeum jubatum*), Saunder’s wildrye (*Elymus saundersii*), Japanese brome (*Bromus japonicas*), slender wheatgrass (*Elymus trachycaulus*), and knotgrass (*Paspalum distichum*).

Movement / Home Range

New Mexico meadow jumping mice are generally believed to have limited vagility (ability to move) and possibly dispersal capabilities (Morrison 1988; Frey and Wright 2012). For example, on Bosque del Apache NWR, the subspecies exhibited extreme site fidelity for daily activities (i.e., movements to and from day nesting and feeding areas) (Frey and Wright 2012). Frey and Wright (2012) reported that the typical maximum distance travelled between successive telemetry locations by jumping mice on Bosque del Apache NWR was 984 ft. In addition, most daily movements based on 95 percent of maximum straight-line distances traveled between time-independent radio telemetry locations (i.e., sufficient time has elapsed to allow the animals to redistribute throughout the home range) were 630 ft or less. Moreover, the maximum distance travelled between two successive points by all radio collared New Mexico meadow jumping mice on Bosque del Apache NWR was 2,441 ft, but most regular daily and seasonal movements were less than 328 ft (Frey and Wright 2012). One New Mexico meadow jumping mouse also moved up 3,280 ft between years (Frey and Wright 2012); however, it is unclear how frequently jumping mice are undergoing these long-distance (> 0.6 mi) movements.

Frey and Wright (2012) fitted 20 jumping mice on Bosque del Apache NWR with radio collars to evaluate habitat selection. The estimated home range size averaged 3.4 ac (range = 0.5 to 10.25 ac). Typically, male home ranges (average = 4.37 ac) were larger than those of females (2.17 ac) (Frey and Wright 2012). Beyond these data, very little is known about specific movements of the New Mexico meadow jumping mice.

Reproductive Strategy

Although little is known about the reproductive needs of the jumping mouse, the breeding season probably begins in July or August, with one litter produced each year. Jumping mice (*Zapus* spp.) breed shortly after emerging from hibernation and may give birth to 2 to 7 young after an average 17 to 21 day gestation (Quimby 1951; Frey 2011). Young are fully developed and weaned at 4 weeks after birth. Females will use maternal nests (described below) in areas outside the moist riparian areas for giving birth and rearing young. Tall, dense riparian herbaceous vegetation provides the jumping mouse with a sheltered and hospitable environment, with adequate food resources that enables the mouse to successfully raise its young. The female provides all the care for their young until they are weaned and independent. It is unlikely that juveniles breed during the same year they are born (Morrison 1988).

5. Overview of ecological conditions for recovery, conservation, and viability [12.53 7, 9?, 10, 11, 12]:

Species Requirements

- **INDIVIDUAL NEEDS**
 - Dense herbaceous vegetation of sedges and forbs (≥ 24 in. tall) along flowing streams to support feeding and sheltering.
 - Adjacent uplands to support breeding and hibernation.
- **POPULATION NEEDS:**
 - Nearly continuous suitable habitat along at least 5.6 mi with ≥ 68 ac of streams, ditches, or canals to support large, resilient populations.
- **RANGEWIDE SPECIES NEEDS:**
 - Multiple (2 or more) resilient populations are needed (for redundancy) in each of eight geographic management areas across the range (for representation).

Existing Condition

- **INDIVIDUAL CONDITIONS:**
 - Existing habitat condition is unknown, but presumed suitable.
- **POPULATION CONDITIONS:**
 - All 29 locations found since 2005 have insufficient habitat conditions with high potential for extirpation.
 - At least 11 populations have been significantly compromised since 2011.
- **RANGEWIDE CONDITIONS:**
 - 4 geographic management areas currently have 2 or more locations occupied by the mouse, but are too small and isolated to be resilient.
 - 4 geographic management areas currently have only 1 recent location occupied by the mouse, but are too small to be resilient.
 - Some diversity is maintained across the 8 geographic management areas, but no adequate resilient populations exist.
- **OVERALL SPECIES VIABILITY IS LOW.**

Future Condition (Viability) of

- **NO RESILIENCY**
 - Without active conservation (grazing management; water and vegetation management) each of the populations will continue to be too small to be resilient and are highly vulnerable to future extirpation.
 - Climate change and high impact wildfire will continue to threaten many current locations with extirpation.
- **REDUNDANCY IS LOW**
 - With no current resilient populations, the species has no redundancy (populations are too small and isolated and have a low probability of persistence).
- **REPRESENTATION IS LOW**
 - Only 4 of 8 geographic management areas have multiple populations, but none are resilient.
 - Some diversity is maintained

6. Threats and Risk Factors

MAIN STRESSOR: Habitat Loss

MAIN SOURCES:

- Grazing eliminates herbaceous vegetation.

- Lack of water (from low precipitation or diversion) results in loss of saturated soils and loss of herbaceous vegetation.
- Future climate change may make water less available to support habitat.
- Secondary sources of habitat loss include high intensity wildfire; flooding; development; road construction; recreation; and vegetation mowing.

7. Key uncertainties and information needs:

Key information needs include routine survey and monitoring in historic and known population areas to determine presence absence of species. Currently it is uncertain if this species ever occurred within the San Luis Valley historically.

8. Key literature:

Frey, J.K., and G.D. Wright. 2012. Multiple scale habitat selection by a small mammal habitat specialist (*Zapus hudsonius luteus*) in a managed floodplain landscape. Department of Fish, Wildlife and Conservation Ecology, New Mexico State University, Las Cruces, NM, 152 pp.

Frey, J.K., and G.D. Wright. 2011. Rio Grande jumping mouse ecology, annual technical progress report for 2010. Cooperative Agreement #201819J806, submitted to U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 42 pp.

Frey, J.K., and G.D. Wright. 2010. Rio Grande jumping mouse ecology, annual technical progress report for 2009. Cooperative Agreement #201819J806, submitted to U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 34 pp.

Frey, J.K. 2006. Synopsis of the New Mexico jumping mouse (*Zapus hudsonius luteus*) in the Rio Grande Valley, New Mexico. Unpublished Report, March 31 , 2006, 6 pp.

Frey, J.K. 2005. Status assessment of montane populations of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) in New Mexico. Final Report submitted to New Mexico Department of Game and Fish, Santa Fe, 74 pp. + appendices.

Hafner, D.J., K.E. Petersen, and T.L. Yates. 1981. Evolutionary relationships of jumping mice (Genus *Zapus*) of the southwestern United States. *Journal of Mammalogy*, 62:501-512.

Jones, C.A. 1999. *Zapus hudsonius* in southern Colorado. Occasional Papers, Museum of Texas Tech University, 191:1-7.

Morrison, J.L. 1988. Distribution, life history and ecology of the meadow jumping mouse, *Zapus hudsonius luteus*, at four sites along the Rio Grande Valley in New Mexico. Unpublished report to New Mexico Department of Game and Fish. February 15, 1988. 57 pp.

Quimby, D.C. 1951. The life history and ecology of the jumping mouse, *Zapus hudsonius*. *Ecological Monographs* 12(1): 61-95.

Trainor, A.M., T.M. Shenk, and K.R. Wilson. 2012. Spatial, temporal, and biological factors associated with Preble's meadow jumping mouse (*Zapus hudsonius preblei*) home range. *Journal of Mammalogy* 93:429-438.

USDI Fish and Wildlife Service. 2014. Final status review and assessment of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). Prepared by the Listing Review Team, Albuquerque, New Mexico. 148 pp.

Wright, G.D. and J.K Frey. 2014. Herbeal feeding behavior of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*). Western North American Naturalist 74(2): 231-235.

9. Map of Known Occurrences and Suitable Habitat:

No known occurrences have been reported in either the planning area or San Luis Valley. Suitable habitat for this species has not been modeled for the planning area.