

appear similar to the Preble's. Information presented below that is specific to the Preble's is described as being relevant to this subspecies, the Preble's, but when information pertains to what is known about other subspecies of meadow jumping mouse, it will be described as relevant to the species, the meadow jumping mouse. Portions of the following have been adapted from the general biology section of the Preble's Meadow Jumping Mouse Recovery Team's (Recovery Team's) February 27, 2002, working draft of a recovery plan for the Preble's (the Draft Discussion Document referenced in the proposed rule) and the updated March 11, 2003, working draft of the recovery plan for the Preble's (Working Draft). We believe that the information provided in the Working Draft represents the best available science on the Preble's.

Taxonomy and Description

The Preble's is a member of the family Dipodidae (jumping mice) with four living genera, two of which, *Zapus* and *Napaeozapus*, are found in North America (Hall 1981). The three living species within the genus *Zapus* are *Z. hudsonius* (the meadow jumping mouse), *Z. princeps* (the western jumping mouse), and *Z. trinotatus* (the Pacific jumping mouse).

Edward A. Preble (1899) first documented the meadow jumping mouse from Colorado. Krutzsch (1954) described the Preble's as a separate subspecies of meadow jumping mouse limited to Colorado and Wyoming. The Preble's is now recognized as 1 of 12 subspecies of meadow jumping mouse (Hafner *et al.* 1981).

The Preble's is a relatively small rodent with an extremely long tail, large hind feet, and long hind legs. The tail is bicolored, lightly-furred, and typically twice as long as the body. The large hind feet can be one-third again as large as those of other mice of similar size. The Preble's has a distinct, dark, broad stripe on its back that runs from head to tail and is bordered on either side by gray to orange-brown fur. The hair on the back of all jumping mice appears coarse compared to other mice. The underside hair is white and much finer in texture. Total length of adult Preble's mice is approximately 180 to 250 millimeters (mm) (7 to 10 inches (in)), with the tail comprising 108 to 155 mm (4 to 6 in) of that length (Krutzsch 1954, Fitzgerald *et al.* 1994).

The average weight of 120 adult Preble's mice captured early in their active season (prior to June 18) was 18 grams (g) (0.6 ounce (oz)); included were 10 pregnant females weighing more than 22 g (0.8 oz) (Meaney *et al.*,

in prep.). Upon emergence from hibernation, adult Preble's mice can weigh as little as 14 g (0.5 oz). Through late August and into mid-September, Preble's adults ready for hibernation weighed 25 to 34 g (0.9 to 1.2 oz) (Meaney *et al.*, in prep.), comparable to pre-hibernation weights for the meadow jumping mouse cited by Muchlinski (1988).

While the western jumping mouse is recognized as a separate species from the Preble's, it is similar in appearance and can easily be confused with the Preble's. The range of the western jumping mouse in Wyoming and Colorado is generally west of, and at higher elevations than, the range of the Preble's. However, the two species appear to coexist over portions of their range in southeastern Wyoming and Colorado (Long 1965, Clark and Stromberg 1987, Schorr 1999, Meaney *et al.* 2001). Compared to the western jumping mouse, the Preble's is generally smaller, has a more distinctly bicolored tail, and a less obvious dorsal (back) stripe. However, field identification of the western jumping mouse and the Preble's in the range of overlap is difficult due to their similarity in size and color. Krutzsch (1954) described skull characteristics useful for differentiating the two species. Previously, studies found that the meadow jumping mouse could be distinguished from the western jumping mouse by a fold in the first lower molar (Klingener 1963, Hafner 1993). However, this molar characteristic is not always reliable due to tooth wear as animals age; specimens showing the tooth fold are presumed to be the Preble's, while specimens lacking the fold may be either species (Klingener 1963; Conner and Shenk, in prep.). A recent reevaluation of Preble's and western jumping mouse morphology showed that, by using a combination of six skull measurements and this molar characteristic, the Preble's could be distinguished from the western jumping mouse (Conner and Shenk, in prep.).

Riggs *et al.* (1997) analyzed the mitochondrial DNA from tissue samples of western and meadow jumping mice from Colorado and Wyoming and concluded that the Preble's forms "a homogenous group recognizably distinct from nearby populations and adjacent species of the genus." Hafner (1997) reviewed the Riggs study and concluded that the Preble's does in fact form a relatively homogenous group, as determined by inspection of the original sequence data. Hafner (1997) also stated that he remained convinced of the accuracy of the biogeography and taxonomic arrangement of jumping

mice. While results from the genetic study supported the taxonomic status of the Preble's, analysis of samples from jumping mice in a few Wyoming and Colorado locations produced unexpected results. In these cases, samples of assumed Preble's mice at lower elevations were later determined to be the western jumping mice and samples of assumed western jumping mice at higher elevations were later determined to be Preble's mice. Hafner (1997) suggested that limited hybridization could have affected the results of the study and Beauvais (2001) stated that zones of co-occurrence of the Preble's and the western jumping mouse in Wyoming provide the opportunity for hybridization. However, Krutzsch (1954) cited significant range overlap between the meadow jumping mouse and the western jumping mouse in North America and indicated that, based on examination of skulls from the area of range overlap, there was no evidence of interbreeding. The question of possible hybridization between the Preble's and the western jumping mouse has yet to be fully explored. Future DNA studies, including a current study being conducted at the Denver Museum of Nature and Science, may help to resolve this and other taxonomic questions regarding *Zapus*.

Geographic Range

The Preble's is found along the foothills in southeastern Wyoming, southward along the eastern edge of the Front Range of Colorado to Colorado Springs, El Paso County (Hall 1981, Clark and Stromberg 1987, Fitzgerald *et al.* 1994). Knowledge about the current distribution of the Preble's comes from collected specimens, and live-trapping locations from both range-wide survey efforts and numerous site-specific survey efforts conducted in Wyoming and Colorado since the mid-1990s. Recently collected specimens are housed at the Denver Museum of Nature and Science and survey reports are filed with the Service's Field Offices in Colorado and Wyoming.

In Wyoming, capture locations of mice confirmed as the Preble's, and locations of mice identified in the field as the Preble's and released, extend in a band from the town of Douglas southward along the Laramie Range to the Colorado border, with captures east to eastern Platte County and Cheyenne, Laramie County. In Colorado, the distribution of the Preble's forms a band along the Front Range from Wyoming southward to Colorado Springs, El Paso County, with eastern marginal captures in western Weld County, western Elbert