

**BEFORE THE SECRETARY OF THE INTERIOR**

**Petition to List the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) as a Distinct Population Segment under the Endangered Species Act**



**November 9, 2017**

**Petitioners:**

Center for Biological Diversity  
Rocky Mountain Wild

**Acknowledgment:** Conservation Intern Shane O'Neal substantially contributed to drafting of this petition.



November 9, 2017

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CC: Ms. Noreen Walsh  
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Dear Mr. Zinke,

Pursuant to Section 4(b) of the Endangered Species Act (“ESA”), 16 U.S.C. §1533(b), Section 553(3) of the Administrative Procedures Act, 5 U.S.C. § 553(e), and 50 C.F.R. §424.14(a), the Center for Biological Diversity and Rocky Mountain Wild hereby formally petitions the Secretary of the Interior, through the United States Fish and Wildlife Service (“FWS”, “the Service”) to list the Preble’s meadow jumping mouse (*Zapus hudsonius preblei*) as a distinct population segment. Although the Preble’s meadow jumping mouse is already currently listed as a subspecies, this petition is necessary because of a petition seeking to de-list the Preble’s meadow jumping mouse (“jumping mouse”, “Preble’s”), filed by the Pacific Legal Foundation on behalf of their clients (PLF 2017), arguing that the jumping mouse no longer qualifies as a subspecies. Should FWS find this petition warrants further consideration (e.g. a positive 90-day finding), we are submitting this petition to ensure that the agency simultaneously considers listing the Preble’s as a distinct population segment of the meadow jumping mouse.

U.S. Fish and Wildlife Service has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on FWS. Specifically, FWS must issue an initial finding as to whether the petition “presents substantial scientific or commercial information indicating that the petitioned action may be warranted.” 16 U.S.C §1533(b)(3)(A). FWS must make this initial finding “[t]o the maximum extent practicable, within 90 days after receiving the petition.” *Id.* Petitioners need not demonstrate that listing *is* warranted, but instead petitioners must only present information demonstrating that such listing *may* be warranted. While the petitioners believe that the best scientific information demonstrates that maintaining the Threatened subspecies status of the Preble’s meadow jumping mouse *is* in fact warranted, it is clear based on the available information that listing the subspecies or DPS as threatened or endangered *may* be warranted. As such, FWS must promptly make an initial finding on the petition and commence a status review as required by 16 U.S.C §1533(b)(3)(B).

The Preble’s meadow jumping mouse faces a number of serious threats, and with a population that is difficult to measure but undoubtedly in decline, deserves the full protections of the Endangered Species Act. Based on the best available science and the previous findings of the Service, their status as a subspecies and/or Distinct Population Segment has not changed, and therefore neither should their listing status.



## **PETITIONERS:**

**The Center for Biological Diversity** is a national, nonprofit conservation organization with more than 1.3 million members and online activists dedicated to the protection of endangered species and wild places. <http://www.biologicaldiversity.org>

Failure to grant the requested petition will adversely affect the aesthetic, recreational, commercial, research, and scientific interests of the petitioning organization's members and of the citizens of the United States. Morally, aesthetically, recreationally, and commercially, the public shows increasing concern for wild ecosystems and for biodiversity in general.

**Rocky Mountain Wild** is a Colorado non-profit organization created by the merger of two of Colorado's trusted and effective conservation organizations, Center for Native Ecosystems and Colorado Wild. Recognizing the need to stem dramatic losses of native species and habitat, these organizations joined forces to protect, connect and restore wildlife and wild lands throughout the Southern Rocky Mountain region of Colorado, southern Wyoming, eastern Utah, and northern New Mexico. Rocky Mountain Wild, and its predecessor organizations, work to conserve at-risk species through research, advocacy and collaboration. Rocky Mountain Wild has a history of advocating for Endangered Species Act protection and protection of habitat for Preble's meadow jumping mouse and continues to work to ensure the conservation of the species.

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## EXECUTIVE SUMMARY

The Preble's meadow jumping mouse (*Zapus hudsonius preblei*) is a small mammal that uses its six inch tail and powerful hind legs to escape from predators with massive leaps of more than a foot and a half in the air. It is limited to streamside habitats of the Rocky Mountain Front Range in Eastern Colorado and Wyoming. Preble's is currently listed as a "Threatened" subspecies under the Endangered Species Act due to habitat loss and fragmentation from urban sprawl, livestock grazing, climate change and other factors.

This petition is filed as a response to a de-listing petition filed on March 29, 2017 requesting that the U.S. Fish & Wildlife Service ("the Service") remove the threatened status of Preble's meadow jumping mouse based on the argument that it is not a valid subspecies (PLF 2017). The petition was filed by Damien Schiff of Pacific Legal Foundation (PLF), an extreme private-property rights organization, on behalf of Dr. Rob Roy Ramey, the Center for Environmental Science, Accuracy and Reliability (CESAR), and several organizations and associations representing the livestock and home building industries. PLF's petition is entirely based on one genetic study that found that Preble's is "part of a single lineage that is ecologically indistinct and extends to the far north" (Malaney and Cook 2013).

What the petition fails to mention is that the referenced study explicitly states that "[a]dditional tests will be required before hypotheses of intraspecific taxonomic synonymy can be implemented," and that a revised taxonomy of the group "is outside the context of this study" (Malaney and Cook 2013). The petition also fails to mention that the U.S. Fish and Wildlife Service has already reviewed the status of Preble's taking into account this new study in a five year review completed in 2014, determining the "best available information indicates that the Preble's is a genetically and geographically distinct subspecies of jumping mouse" (USFWS 2014).

These omissions are fundamentally dishonest and severely undermine the credibility of PLF's petition, which should be rejected by the Fish and Wildlife Service without delay. If, however, the Service should accept their petition, and reverse course to find Preble's no longer qualifies as a subspecies, we are filing this petition to ensure it is alternately considered for protection as a distinct population segment (DPS). In its 2014 five year review, the Service conducted a preliminary analysis of whether Preble's qualifies as a DPS, determining that "[i]f a formal taxonomic change did ever occur and lump the Preble's with a larger 'northern lineage,' the Preble's would appear to meet the distinctness and significance criteria of our DPS policy and warrant listing as a DPS" (USFWS 2014). PLF's petition similarly failed to mention this finding since it indicates protection continues to be warranted.

This is not the first time the jumping mouse has been petitioned for delisting. In 2003, the state of Wyoming petitioned for Preble's to be stripped of protection based on a draft report by Dr. Ramey, who was then at the Denver Museum of Nature and Science and under contract for the state. The report, which was later published in the journal *Animal Conservation*, purported to show that Preble's was not distinct from other geographically proximal subspecies of jumping mouse based on genetic and morphometric analyses (Ramey et al. 2005). Based on this study, U.S. Fish and Wildlife Service proposed delisting of Preble's in 2005.

Before the Service finalized delisting, however, a new genetics study of Preble's and its close neighbors was published that reached the opposite conclusion of Ramey et al. (2005). Utilizing microsatellite and mitochondrial DNA markers, King et al. (2006ab) found that "each *Z. hudsonius* subspecies is genetically distinct," and that the "magnitude of the observed differentiation was considerable and supported by significant findings for nearly every statistical comparison made." Remarkably, the analysis conducted by King et al. (2006) included the same samples utilized by Dr. Ramey, but with the opposite finding, leading the authors to conclude that there was a "systemic error" in the data reported by Dr. Ramey that could have been caused by "contamination, mislabeling of samples, or other procedural incongruity."

PLF and Dr. Ramey are again relying on erroneous information in an effort to remove protections for the Preble's meadow jumping mouse. This petition is filed to ensure this doesn't happen.

## INTRODUCTION

The Preble's meadow jumping mouse ("jumping mouse" or "Preble's") (*Zapus hudsonius preblei*) is about 3 inches long, and has long, powerful rear legs with disproportionately large feet that allow it to perform incredible feats of aerial acrobatics. When threatened by predators they can leap into the air, using their tails (which are often longer than their bodies) to change direction in mid-air and avoid capture. These adaptations are terrific for avoiding predators, but unfortunately are not enough to avoid the onslaught of development the jumping mouse currently faces.

The Preble's has a complicated regulatory history under the Endangered Species Act. It was listed as threatened in 1998. Following efforts by the Pacific Legal Foundation, Dr. Ramey and others, it was proposed for delisting in 2005 and delisted in Wyoming, but not Colorado in 2008 (Federal Register 73: 39790). This delisting was later overturned by a federal court, which found that the Service cannot protect species in part, and protection of Preble's was restored across its range in 2011. Listing of Preble's has since been reaffirmed by the Service in a 12-month finding denying delisting and a 2014 five year review (USFWS 2013 and 2104).

Preble's meadow jumping mouse is not the only species that the Pacific Legal Foundation has attempted to strip of protections based on an argument that it is not a valid subspecies. Working with a scientist that does not believe there are subspecies of birds, including Darwin's finches, PLF filed delisting petitions for both the coastal California gnatcatcher and southwestern willow flycatcher (PLF 2010, PLF 2015). The former has been rejected and the latter is pending. As with PLF's petition for Preble's, these delisting efforts are based on genetics studies utilizing methods that are not considered appropriate for determining subspecific status (Haig et al. 2006, Zink 2015, McCormack and Maley 2015, Theimer et al. 2016, USFWS 2016).

This petition is not a typical request for the listing of a species, as Preble's is already listed as a subspecies. Should the Service find that Preble's continues to warrant protection as a subspecies, this petition can be denied. If, however, the Service finds Preble's no longer warrants protection as a subspecies, it must respond to this petition and protect Preble's as a distinct population

segment (DPS) in accordance with the conclusion of their 2014 five-Year review that Preble's "would satisfy the criterion of the DPS policy." (USFWS 2014, p. 6).

## NATURAL HISTORY & ECOLOGY

### Description

Preble's meadow jumping mouse is a small rodent distinguished by its long tail, which can make up more than 60% of its body length, and by its large hind feet. The mouse's body is typically about 3 inches long, with the tail measuring up to 6 inches. These large feet allow the mouse to escape from predators with massive leaps, and allow for differentiation of meadow jumping mice from other species of small rodent (Hansen 2006, pp. 11). When making their leaps to freedom, which have been recorded at between 1 to 2 meters horizontally, the jumping mice can use their long tails as a rudder in the air to change direction rapidly (Hansen 2006, pp. 11-12). The Preble's fur is coarse and shiny, and ranges from a rusty orange-brown to gray in color, with a dark stripe on its back that runs from head to tail. The long tail of the Preble's is bicolored and lightly furred, and can be twice as long as the mouse's body (Fitzgerald *et al.* 2011, pp. 188-189).

### Taxonomy

The Preble's is a member of the family Dipodidae (jumping mice), of which there are two living genera found in North America (Wilson and Reeder 1993, p. 499). These are the *Zapus* (jumping mice) and *Napaeozapus* (woodland jumping mice) (Wilson and Ruff 1999, pp. 665-667). The Preble's is one of 12 currently recognized subspecies of meadow jumping mice (*Z. hudsonius*) that are found across North America.

The U.S. Fish & Wildlife Service's latest 12-Month Finding (78 FR 31679; May 24, 2013) includes a very detailed history of the taxonomy of the jumping mouse. Some of the most important points are summarized here, and recent discoveries are addressed as well.

Much of the foundational work to classify and assign taxonomy to the jumping mice of North America was done by Krutzsch in his pioneering 1954 study of the mice and their closest relatives. Krutzsch described three species within the *Zapus* genus, namely *Z. hudsonius* (meadow jumping mouse), *Z. princeps* (western jumping mouse), and *Z. trinotatus* (Pacific jumping mouse). He described 11 subspecies of meadow jumping mouse that lived across North America, including Preble's (*Z. h. preblei*). This classification was based on geographic isolation and morphological differences with other nearby subspecies of meadow jumping mice (Krutzsch 1954, pp. 452-453). This work was largely confirmed by Hafner in 1981, who added a subspecies of previously unrecognized meadow jumping mouse from New Mexico, bringing the total number of subspecies to 12 (Hafner *et al.* 1981, p. 501). This has been the generally accepted taxonomy by biologists for several decades now.

A study published in 2005 by Ramey *et al.* suggested that the PMJM may not be a unique subspecies after all, based on genetic analysis. However, a number of issues were raised with this

paper, and the Service felt that “delisting the PMJM based on the conclusions of Ramey *et al.* alone might be premature.” (78 FR 31684; 2013).

In an attempt to further verify the results, the Service commissioned an independent genetic analysis by scientists with the U.S. Geological Survey of a number of meadow jumping mouse subspecies (USGS 2005, pp. 1-4). The results of this study did not corroborate Ramey *et al.*'s claims, and instead suggested that Preble's was properly classified as a subspecies of meadow jumping mouse, and therefore should not be synonymized with its neighboring subspecies (King *et al.* 2006a, pp. 2, 29). These results were then published in *Molecular Ecology* in an expanded format (King *et al.* 2006b).

The study by USGS and King *et al.* analyzed much more genetic material than the Ramey *et al.* study, and concluded “that these data suggested strong, significant genetic differentiation among the five subspecies of meadow jumping mice surveyed.” (78 FR 31684; 2013).

In an attempt to weigh and evaluate the discrepancies between the two studies, an outside panel was contracted through Sustainable Ecosystems Institute (SEI) (USFWS 2006). The panel analyzed the data and methodology from both studies and came to a consensus that King *et al.*'s study presented more accurate and representative results, and that therefore there was no reason to revise the current taxonomic classification of Preble's as a valid subspecies and genetically distinct unit (SEI 2006a, pp. 4, 43). The panel evaluated four different factors, including the genetic analyses conducted by each study. They concluded, based on the cumulative data of both studies, that no reliable evidence existed for Preble's sharing mtDNA haplotypes with their neighboring jumping mouse subspecies (SEI 2006a, p. 42), and that when taken in context with the available microsatellite data, the two datasets support the idea of Preble's as a distinct subspecies (SEI 2006a, p. 43). Based on these results, the Service published a Final Rule in 2008 (73 FR 39790) that formally concluded the Preble's remained a valid subspecies.

In 2013, a new Service-funded study was published examining the genetic relationships of jumping mice in the *Zapus* genus, including all 12 subspecies of (*Z. hudsonius*) (Malaney and Cook 2013). This is in contrast to the prior studies by Ramey *et al.* (2005) and King *et al.* (2006), which only looked at 5 neighboring subspecies in the Wyoming-Colorado region. This study concurred with the prior FWS conclusion that Preble's is genetically distinct from other geographically adjacent subspecies. Where the study differed though was in its conclusion that Preble's is actually most closely related to two subspecies of meadow jumping mouse that are found in Alaska and Canada (*Z. h. tenellus* and *Z. h. alascensis*). The authors conclude that Preble's is genetically most similar to this “northern lineage” (Malaney and Cook 2013, p. 8, 10). Malaney and Cook (2013), however, did not propose to revise the currently accepted taxonomy of jumping mice, saying that “additional tests will be required” and “a revised taxonomy of the group is needed but is outside the context of this study” (p. 10).

Despite the fact that Malaney and Cook expressly state that determining the subspecific status of Preble's is outside the scope of their analysis, this study provides nearly the entire basis for PLF and Rob Roy Ramey's petition to delist and their assertion that it is not a valid subspecies. Strangely, the petition wrongly implies that FWS has not considered this study, but this is incorrect. In a 2014 5-Year Review of the jumping mouse, FWS reviewed Malaney and Cook



(2013) and concluded: “this new information is not sufficient to formally change the taxonomy of the Preble’s” (USFWS 2014, p. 5). This oversight or perhaps purposeful misrepresentation of the record should be a basis for rejecting PLF and Ramey’s petition at the 90-day stage for not reflecting the best available information.

### **Status as a Distinct Population Segment (DPS)**

Despite all this, if the Service should change their views on this study and remove the designation of a subspecies, we believe that Preble’s clearly constitutes a distinct population segment (DPS) and should continue to be protected as such.

In the same 5-Year Review (2014) where the Service determined Preble’s to be a subspecies, they also conducted a preliminary assessment of the Preble’s status as a DPS, anticipating exactly the sort of challenge that the subspecies currently faces using Malaney and Cook’s 2013 paper.

After considering both the discreteness and significance of the potential population segment, the Service ended their analysis by saying, “we believe Preble’s would satisfy the criterion of the DPS policy, should such a formal application ever be necessary. However, we conducted this preliminary, hypothetical DPS analysis out of an abundance of caution only, as the Preble’s continues to be considered a valid subspecies based on the best scientific and commercial information available” (USFWS 2014, p. 6).

In this petition, we formally apply and make the case for recognition of Preble’s as a distinct population segment of meadow jumping mouse. As defined by the ESA, listable entities include species, subspecies, and distinct population segments. The criteria for interpreting the definition of a DPS for vertebrate species was outlined in a policy produced by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (61 FR 4722, February 7, 1996). The two key factors that define a valid DPS are: 1) discreteness of the population segment in relation to the remainder of the taxon, and 2) the significance of the population segment to the taxon to which it belongs. Preble’s meets both of these criteria.

#### **1. Discreteness**

A population segment may qualify as discrete if it satisfies at least one of two conditions: 1) a marked separation from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (this includes quantitative measures of genetic difference); or 2) separation by international governmental boundaries, with differing regulation regimes or management status. The jumping mouse meets the first of these conditions.

Preble’s has been shown by multiple recent studies to be genetically distinct from the other neighboring species of jumping mouse in Colorado and Wyoming, including both meadow jumping mice and western jumping mice (73 FR 39790, July 10, 2008; 78 FR 31679, 2013; Malaney and Cook 2013, p. 10). It is genetically unique in the part of the country where it is found, forming a discrete group unto itself.

Malaney and Cook's finding that Preble's is part of a larger "northern lineage" of meadow jumping mice (2013, p. 8, 10) also contributes to its level of distinctness. The other subspecies that it is most closely related to live in Alaska and western Canada, more than 800 miles away (USFWS 2014, p. 6). There are no known populations in between that would realistically connect these discrete population units, as the dispersal capabilities of meadow jumping mice are limited to 2.3 miles or less (Schorr 2003, p. 10; Schorr 2012, pp. 1274, 1278; 78 FR 31682, 2013). This makes them both genetically distinct from neighboring jumping mouse populations, and geographically distinct from their closest relatives. Accordingly, Preble's clearly meets the criterion for discreteness.

## 2. Significance

A population is considered significant based on, but not limited to, the following factors: 1) "persistence of the discrete population segment in an ecological setting unusual or unique for the taxon" 2) "loss of the discrete population segment would result in a significant gap in the range;" 3) the population "represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range ;" or 4) the population "differs markedly from other populations of the species in its genetic characteristics" (Federal Register V. 61, No. 26, February 7, 1996).

The Preble's meadow jumping mouse is significant based on both that its loss would create a significant gap in range and that its genetic characteristics differ markedly from other populations.

The loss of Preble's from its current range in Colorado and Wyoming would create a sizeable gap and drastically reduce the southern extent of the species' range, representing "a range retraction of more than seven latitudinal degrees to the north" (USFWS 2014).

The Preble's clearly differs markedly in its genetic characteristics. King et al. (2006) determined that based on a survey of 21 microsatellite DNA loci and 1380 base pairs from two mitochondrial DNA regions that "each *Z. hudsonius* subspecies is genetically distinct" and further that the "magnitude of the observed differentiation was considerable and supported by significant findings for nearly every statistical comparison made, regardless of the genome or the taxa under consideration."

Later results from Malaney and Cook (2013) that Preble's is part of a northern lineage do not diminish the distinctiveness of Preble's from its nearest neighbors, as it's loss would mean the loss of the only similar population in the lower 48 states.

Therefore, based on these two criteria, we believe that Preble's meets all of the criteria to be listed as a DPS and therefore continue to be listed as Threatened under the ESA.

## Range

The Preble's geographic distribution lies along a series of river basins in Colorado and Wyoming. These include the North Platte, the South Platte, and the Arkansas River Basins (78

FR 31686; 2013). It roughly covers a narrow North-South band along the Front Range foothills of the Rocky Mountains, extending from southeastern Wyoming to Colorado Springs, CO in the South. After initially being listed in 1998, a series of trapping studies over the next 15 years established with greater accuracy where the mice reside (Bowe and Beauvais 2012, p. 11). They are still found in both Wyoming and Colorado, although they are almost entirely absent from areas of human development, meaning that they have likely been eliminated from densely developed areas, particularly around Denver. They are limited geographically to the West by the Rockies, and to the East by the semi-arid grasslands of Colorado and Wyoming. The 12-Month Finding (78 FR 31686-31689; 2013) provides a detailed account of the most recent range data as determined by trapping studies across the historic range of the jumping mouse.

### **Habitat**

Within this geographic range, the jumping mouse is restricted to areas of riparian vegetation along streams and other bodies of water. As defined in the 2013 12-Month Finding (78 FR 31681):

Streams and other watercourses with well-developed riparian vegetation, adjacent relatively undisturbed grasslands, and a nearby water source define typical PMJM habitat (Bakeman 1997, pp. 22–31; Fitzgerald et al. 2011, p. 190; Trainor et al. 2012, p. 429). [...] Willow species (*Salix* spp.) typically dominate the shrub canopy, although other shrub species may occur (Shenk and Eussen 1998, pp. 9–11). High-use areas for the PMJM tend to be close to creeks and are associated with a high percentage of shrubs, grasses, and woody debris (Trainor et al. 2007, pp. 471–472).

The Preble's will feed and shelter in this vegetation throughout the summer, and hibernates in underground burrows for up to eight months over the winter, longer than most hibernating mammals (Hansen 2006, p. 15). They have also been known to travel at least 100 meters out beyond the 100-year floodplain into neighboring grasslands or uplands (USFWS 2003b, p. 26). This very narrow band of potential shelter and habitat for foraging is one of the factors that makes Preble's at such a high risk of endangerment. Loss of any small area of habitat can completely disconnect populations, and they are not able to survive well if they are forced to spread into less ideal upland areas.

### **Population Status**

There remain questions about the exact population size and density of the jumping mouse, due to the difficulty inherent in trapping them and a lack of thorough studies in the Wyoming portion of their range. Preble's lives in a roughly linear habitat along riparian corridors, and so estimates of its abundance are typically given by researchers as the number of mice per mile.

Abundance estimates have ranged from 3 to 107 mice per mile, with a mean of 44 mice per mile (Shenk 2004). However, these numbers should be used with caution when estimating populations at any given site, as other studies have found that jumping mouse populations can fluctuate significantly from year to year.

The 2013 FWS 12-Month Finding (78 FR 31689) cites an ongoing trapping study where two control site populations were measured at maximum counts of 24 and 69 mice in 1999, but upon re-measurement in 2002 during drought conditions, no mice were found at either location (Bakeman 2006, p.11). Surveyed populations tend to vary greatly annually and can appear to be entirely absent some years, and so a study may need to last for at least 10 years in order to fully capture the dynamics of jumping mouse populations at a certain site (Meaney *et al.* 2003, p. 620).

Trapping efforts were generally far more successful at lower elevation sites, and at higher elevation sites the low capture rate was compounded by the fact that western jumping mice also live in these habitats and may have been included in the population counts (Meaney *et al.* 2003, p. 616). This indicates that high elevation, montane streams likely have a lower density of Preble's and may be at a higher risk of loss than their plains counterparts (78 FR 31690; 2013).

Most recently, a survey conducted at the U.S. Air Force Academy, which was known to have a stable and well-protected population, found that they had declined steadily over a period of seven years (Schorr 2012, p. 1277). Although jumping mouse population numbers are difficult to measure, it is clear that the population of Preble's has not increased in recent years, and the continued decline in its already limited habitat has certainly lead to a decline in jumping mouse populations.

## **PREBLE'S WARRANTS CONTINUED LISTING UNDER THE ESA AS A SUBSPECIES OR DPS**

Whether a subspecies or DPS, the Preble's is in danger of extinction in all or a significant portion of its range and thus warrants listing. The FWS has already made the determination that the Preble's meets all necessary threat factors to qualify for listing, and upheld this reasoning in their 2014 5-Year Review. They analyzed its status in light of the five following statutory listing factors:

- (A) the present or threatened destruction, modification, or curtailment of habitat or range;
  - (B) overutilization for commercial, recreational, scientific, or educational purposes;
  - (C) disease or predation;
  - (D) the inadequacy of existing regulatory mechanisms;
  - (E) other natural or manmade factors affecting its continued existence.
- 16 U.S.C. § 1533(a)(1)(A-E); 50 C.F.R. § 424.11(c)(1) - (5).

Preble's is threatened to at least some degree by all five of these factors, but particularly so by factors A, D, and E. Human urbanization and population growth have greatly reduced and altered available habitat for the jumping mouse, in addition to the impacts of a number of other human land-use driven changes. Current regulatory mechanisms outside the protections of the ESA are inadequate, and additional threats from floods, wildfire, drought, and global climate change combine to threaten the existence of Preble's meadow jumping mouse.

## THREATS

### A. Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

In denying delisting in 2013, FWS identified the decline in “the extent and quality of Preble’s habitat due to land-use changes associated with human development” as the number one factor threatening this subspecies (FWS 2013). FWS goes on to review specific examples and locations that have experienced development, and the resulting declines in observed Preble’s abundances. The main types of habitat destruction that pose a threat to the Preble’s in the region are briefly discussed below.

#### 1. Residential & Commercial Development

In a 2002 study, Clippinger looked at the effects of residential development on the Preble’s, and found that it has a highly negative effect on the likelihood of trapping the mice. At sites within what is considered to be Preble’s historical range, capture rates were significantly lower when human developments were located within 210 meters of the site (Clippinger 2002, p. 94). This suggests that nearby developments can lead to the extirpation of the jumping mouse from sites they previously occupied.

The nature of the riparian habitat that the Preble’s inhabits makes it highly susceptible to fragmentation, as a single development can isolate populations that were formerly connected along a narrow stretch of river. This reduction in connectivity can have huge impacts on a species such as Preble’s that already has a highly variable population.

The Service discusses future population trends and development projects for Colorado and Wyoming in great detail in their delisting denial (78 FR 31692-31694; 2013), and generally concludes that “residential and commercial development constitutes a substantial threat to the Preble’s, now and into the future.”

#### 2. Transportation, recreation, and other rights-of-way through jumping mouse habitat

As the population continues to grow, road construction and maintenance will increase in concert and inevitably lead to further disruption and destruction of jumping mouse habitat. Without the protections of the ESA, these projects will not have to consider their impact on the Preble’s habitat, and thus will continue to adversely affect Preble’s into the future. The same can be said for an increase in the amount of recreational spaces, such as trails, which can impact jumping mouse behavior and habitat (Meaney *et al.* 2002, pp. 11, 131-132). Threats from increased utility service crossings of jumping mouse habitat (i.e. telephone poles, water pipelines) will similarly increase without ESA protection.

#### 3. Hydrologic changes associated with human development

Preble’s is highly dependent upon the riparian zone for all of its food and shelter, and so “changes in the timing and abundance of water can be detrimental to the persistence of the

PMJM in these riparian habitats due to the resultant changes in vegetation (Bakeman 1997, p. 79)” (78 FR 31695; 2013).

The two main ways in which the local water flow can change is through the exaggerated runoff cycles in watersheds with high amounts of impervious surfaces, and the addition of dams to disrupt downstream flow. The amount of urbanization already discussed leads to an inevitable increase in impervious surfaces, and will lead to a similar increase in reservoirs and other manipulations for water management (78 FR 31695; 2013). These in turn will harm the jumping mouse.

#### 4. Aggregate mining

The process of aggregate mining requires the removal of vast quantities of rock and minerals from the ground, and this typically takes place in floodplains that provide important hibernation ground for Preble’s (63 FR 26517; May 13, 1998). These mines still exist in the Preble’s habitat, and will continue to be a threat for as long as they are permitted in these areas.

### **B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes**

Collection of jumping mouse specimens occurs for scientific and educational purposes, primarily through trapping for research or development purposes. However, these collections are mostly regulated and managed by the ESA already and so do not present a risk to the subspecies as a whole.

### **C. Disease or Predation**

Disease is not considered a threat to Preble’s at this time. However, there are several concerns regarding predation that may pose threats to the jumping mouse if they are not properly accounted for. Namely, generalist predators that often accompany human development, such as striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), and the domestic cat (*Felis catus*) (63 FR 26517; 1998). As the jumping mouse faces the additional pressures put on by proximity to human development (discussed under Threat A), these accompanying predators may push already vulnerable populations into a decline that they cannot recover from. Because of this, predation in conjunction with other threats poses a serious risk to the survival of Preble’s.

### **D. Inadequacy of Existing Regulatory Mechanisms**

The ESA requires that the Service consider existing regulatory mechanisms that may already protect the species, but in this case there are few meaningful protections from other Federal laws beyond the ESA. This has been the case since the initial listing of Preble’s, and continues to be true today. The jumping mouse is conserved under sections 7, 9, and 10 of the ESA, and its official Threatened status has led to consultations and coordination among many federal agencies and private corporations to minimize impact on Preble’s and its habitat. Here we briefly examine whether those protections would be preserved without ESA protection, based on other regulatory mechanisms.

## 1. National Environmental Policy Act (NEPA)

NEPA requires a full consideration by Federal agencies of the environmental impact of any project they undertake. They must discuss all negative impacts and possible alternatives to the projects. This does not directly protect the jumping mouse, however, as the agencies are not required to alter their actions to minimize damages, and any mitigation activities are purely voluntary.

## 2. Clean Water Act (CWA)

While the CWA may protect the quality of water within Preble's habitats, it does not have any specific protections for the general riparian corridors or upland habitat that the jumping mouse relies on. Outside of jurisdictional wetlands, the CWA therefore does not provide adequate protection for the habitat of the jumping mouse, and none at all for most other aspects of the subspecies' life.

## 3. National Forest Management Act (NFMA)

There are three National Forests that fall within Preble's range, but only one of these (Medicine Bow-Routt National Forest) has incorporated conservation guidelines for the jumping mouse into its management plan. Without the requirements of the ESA, there is no guarantee that this would continue, or that other Forests would create new protections if it is no longer listed.

## 4. Sikes Act Improvement Act (Sikes Act)

The Sikes Act requires the Department of Defense to coordinate with the Departments of Agriculture and the Interior to prepare Integrated Natural Resource Management Plans (INRMPs) to provide for conservation of resources at DoD facilities and installations. These plans currently exist for two facilities that may be home to Preble's, namely the Air Force Academy in El Paso County, CO and Warren Air Force Base in Laramie County, WY. These INRMPs currently provide protections for the jumping mouse, but there is no guarantee that these would continue if Preble's is delisted.

## 5. National Wildlife Refuge System Improvement Act

The only National Wildlife Refuge (NWR) with documented occurrence of Preble's is Rocky Flats NWR near Boulder, CO. The Service therefore currently manages the NWR with conservation of the jumping mouse in its plan, and this is likely to continue even if Preble's is delisted. This only covers a very small portion of its range, however, and would provide limited protection.

## 6. Fish and Wildlife Coordination Act (FWCA)

The FWCA requires that any Federal water development project consider their impact on fish and other wildlife resources, and provide mitigation measures. This provides some very limited

protection to the jumping mouse and its habitat that is immediately adjacent to waterways. These minor benefits and protections would continue in the event that Preble's is delisted.

## 7. State Protections

Currently, Preble's is listed as a non-game species in both Colorado and Wyoming, which limits the take of the subspecies to only scientific or educational purposes. However, as discussed under Threat C, this is not likely to pose a threat to the species, and the more serious threats due to habitat loss are not addressed under these state laws. There may be some protection afforded by State lands in the event of delisting, but it is likely to be more general and not specific management of the jumping mouse itself.

## 8. Local Protections

Many local or county-level environmental regulations include provisions that site plans should "consider" or "encourage" conservation of wildlife and habitat (78 FR 31702; 2013), but these requirements are highly flexible and do not explicitly protect the jumping mouse. Local development projects have been subject to extensive review since Preble's has been listed under the Act, but there is no guarantee that this would continue if it were delisted. Management priorities of local governments and businesses would likely change to no longer include such specific measures to protect the jumping mouse, leading to an increase in habitat destruction and fragmentation.

If Preble's were to be delisted, these existing regulatory mechanisms would not provide adequate protection for the species or its habitat. It would be protected mostly on Federal lands or from Federal water-related projects, but habitat destruction on private land is currently the leading threat to their survival as a subspecies. Therefore, the protections of the ESA are crucial for ensuring the continued survival of the jumping mouse.

## **E. Other Natural or Manmade Factors Affecting the Subspecies' Continued Existence**

### 1. Floods

Flooding occurs frequently in the foothills and Front Range habitat of the jumping mouse, and has been a part of their natural cycles for as long as Preble's has lived in the area. However, the system has been drastically altered by the presence of people, and this has resulted in an increasingly serious threat from severe floods. The increase in manmade impervious surfaces and the removal of vegetation by humans both contribute to an increase in the frequency and severity of floods, as does the general warming trend of climate change (Milly *et al.* 2002, p. 514). These extreme floods may prevent the normal growth and establishment of vegetation that Preble's depends on for habitat, as well as drowning individual mice and decreasing habitat connectivity through these adverse impacts on the vegetation.

This previously theoretical impact has already begun to appear, as a series of disastrous flash floods in September 2013 affected huge portions of the Preble's habitat in Colorado. The floods destroyed vegetation, removed soil, and deposited large amounts of eroded land and debris into



jumping mouse habitat in Larimer, Boulder, Jefferson, Weld, and El Paso Counties in CO. This was estimated to affect 60% of the Preble's overall range, and nearly 70% of its designated critical habitat in Colorado. These floods likely destroyed entire populations of mice and further fragmented their already divided habitat in the state, isolating surviving mice in pockets trapped upriver and upslope from the flooded areas (USFWS 2014, p. 11). Recovery of the jumping mouse populations and of the vegetation they depend on could take years, and shows how the risk of flooding is becoming more and more of a threat to the survival of Preble's.

## 2. Wildfire

Wildfires present another set of risks for the jumping mouse, and similarly to floods, they are likely to continue to increase in the coming years (Kahn 2015). Wildfires have increased across the West over the last several decades, and they can have a serious impact on jumping mouse habitat. Although fires in riparian habitats may be less severe than those in drier, upland zones (Busch 1995, p. 259), they will still burn a substantial amount of vegetation that represents key Preble's habitat. Wildfires drive jumping mice away from their natural habitat, and may keep them away for several years (Hansen 2006, pp. 163-164). This is likely due to the unsuitable composition of vegetation that occurs during the early successional period, including many invasive species that displace the native plant community (Fornwalt *et al.* 2003, p. 515).

A recent analysis showed that approximately 17% of designated jumping mouse critical habitat in Colorado fell within the perimeter of wildfires observed since 2000 (USFS 2013, p. 1). As the number of wildfires increases in the coming years, the amount of Preble's habitat affected will only increase, and will further displace them from their already dwindling habitat. Therefore, wildfires remain a threat to the jumping mouse.

## 3. Drought

Drought is another naturally occurring factor that will likely increase under climate change and could have disastrous impacts on the jumping mouse. As previously described, when conducting a study during a severe drought in 2002 Bakeman failed to find any Preble's at sites where there had previously been sizable, well-documented populations (2006, p. 11). The negative effects of drought (less vegetation in their habitat) are more keenly felt by small and isolated populations, which are already at an increased risk of extinction. This all shows how drought remains a threat to Preble's.

## 4. Global Climate Change

The idea that the Earth's climate is changing has been accepted across the world, reaching a scientific consensus and encouraging serious measures to stave off its worst effects. The Paris Agreement of 2016, within the U.N. Framework Convention on Climate Change, pledges 197 countries of the world to combat the causes and effects of climate change. The global climate system is expected to warm, with drastic changes in precipitation and weather patterns likely in many places (see IPCC 2014 for more specific examples and projections). For the purposes of studying threats to the jumping mouse, we will consider the effects of climate change only for

the region where Preble's lives. This was also considered in great detail by the U.S. FWS in their 2013 12-Month Finding (78 FR 31706-31708).

The overall trend for Colorado, Wyoming, and the Western U.S. in general is for continued warming, with "hotter summers, warmer winters, decreased snowpack, earlier spring melts, increased evaporation, more droughts, and reduced summer flows throughout the PMJM's range" (78 FR 31707; 2013).

This will result in a dramatically altered species composition for the flora in Preble's habitat, as species move upslope to cooler refugia and a lower water table shrinks riparian corridors (Perry *et al.* 2012, pp. 828-830). The decrease in riparian corridor size and the changes in vegetation will drastically shrink Preble's habitat, especially as more drought-tolerant plants supplant those that they have evolved to feed upon. This reduction in water availability will be a major threat to the survival of the jumping mouse, given their limited and highly specific habitat.

The 2007 IPCC report highlights the stresses that will be placed on riparian ecosystems, as they are especially sensitive to water levels and timing, and how this could result in a loss of biodiversity (IPCC 2007, p. 234). These threats are considered in addition to the negative impacts already described from climate-change associated increases in wildfires, floods, and droughts, demonstrating the full scale of the threat posed by climate change to the Preble's.

## **CONCLUSION**

The Preble's meadow jumping mouse is deserving of continued listing under the Endangered Species Act, regardless of whether it is classified as a subspecies or a Distinct Population Segment. Preble's was deemed a Threatened subspecies in the USFWS 5-Year Review (2014), which included a review of the Malaney & Cook (2013) paper that has the most up-to-date genetic information on the species. The Service also declared that, should any new information come out, they were prepared to recognize Preble's as a DPS. The threats that they face, primarily from human development and destruction of their habitat along with the impacts of climate change, have not lessened at all, and in fact have only worsened. With their population and habitat in decline, now is not the time to remove the safeguards of the ESA from the Preble's, as they would have few defenses against extinction without its regulatory protections.

### **On behalf of petitioners:**

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**Appendix A.** Copies of email and letter providing 30 days notice to Colorado and Wyoming of this petition.



## Tierra Curry

---

**From:** Tierra Curry <tcurry@biologicaldiversity.org>  
**Sent:** Wednesday, September 27, 2017 12:43 PM  
**To:** bob.broscheid@state.co.us; scott.talbott@wyo.gov  
**Cc:** Noah Greenwald; michael\_thabault@fws.gov; nicole\_alt@fws.gov; gary\_frazer@fws.gov; Sarah\_Quamme@fws.gov; bridget\_fahey@fws.gov; tcurry@biologicaldiversity.org  
**Subject:** Preble's Meadow Jumping Mouse 30-Day ESA Petition Notice  
**Attachments:** Prebles Meadow Jumping Mouse 30 Day Notice.pdf

Dear Colorado Parks and Wildlife, Wyoming Game and Fish Department, and U.S. Fish and Wildlife Service:

Pursuant to 50 C.F.R. § 424.14(b), we hereby provide notice that the Center for Biological Diversity intends to file a petition under the federal Endangered Species Act to protect the Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*) as a Distinct Population Segment no sooner than 30 days from the date that this notice is provided.

Although the Preble's meadow jumping mouse is currently listed as a subspecies, a petition has been filed by the Pacific Legal Foundation seeking to de-list the mouse arguing that it no longer qualifies as a subspecies. Should the Service find that the delisting petition warrants further consideration (e.g. a positive 90-day finding), we are submitting this petition to ensure that the agency simultaneously considers listing the Preble's Meadow Jumping Mouse as a Distinct Population Segment. The jumping mouse faces a number of serious threats and deserves the continued protections of the Endangered Species Act.

Sincerely,  
Tierra Curry

Tierra Curry  
Senior Scientist  
Center for Biological Diversity  
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September 27, 2017

To: Bob Broscheid, Director  
Colorado Parks and Wildlife  
bob.broscheid@state.co.us

Scott Talbott, Director  
Wyoming Game and Fish Department  
scott.talbott@wyo.gov

CC: [michael\\_thabault@fws.gov](mailto:michael_thabault@fws.gov)  
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[Sarah\\_Quamme@fws.gov](mailto:Sarah_Quamme@fws.gov)  
[bridget\\_fahey@fws.gov](mailto:bridget_fahey@fws.gov)

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Sincerely,

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