United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region
134 Union Blvd, Suite 670
Lakewood, Colorado 80228-1807

IN REPLY REFER TO:
FWS/R6/ES

Project code: 2022-0050798

August 8, 2022

Stephanie Gibson
Federal Highway Administration – Colorado Division
12300 West Dakota Avenue, Suite 180
Lakewood, Colorado 80228

Dear Ms. Gibson:

The U.S. Fish and Wildlife Service (Service) received your request for formal consultation on June 1, 2022, regarding the State Highway (SH) 105 Improvements Project in El Paso County. The project proponent is El Paso County which is receiving funding from the Federal Highways Administration (FHWA) which are administered by the Colorado Department of Transportation (CDOT). The purpose of the project is to widen the roadway to accommodate two lanes of traffic in each direction and add new sidewalks, an additional acceleration lane, a roundabout at Knollwood Drive and Village Ridge point, and stormwater upgrades including a water quality pond. Your letter initiated formal consultation for the federally threatened Preble's meadow jumping mouse (*Zapus hudsonius preblei*) (Preble's mouse) and determined that the proposed project is likely to adversely affect the species. The limits of disturbance do not extend into designated critical habitat; therefore, none will be affected.

This letter transmits our biological opinion regarding the proposed project in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.) and the Interagency Cooperative Regulations (50 CFR 402).

In this biological opinion, we find that the proposed project may adversely affect the Preble's mouse and that the actions carried out pursuant to the proposed project are not expected to jeopardize the continued existence of the species or adversely modify its designated critical habitat. We base this biological opinion on the May 6, 2022, biological assessment prepared by Smith Environmental and Engineering (SMITH), as well as any additional clarifying correspondence.

Consultation History

Events relating to the consultation history for this formal consultation are as follows:

- On December 7, 2016, CDOT submitted a Threatened and Endangered Species (TES) report for this project area to Alison Deans Michael, CDOT/USFWS liaison.
- On January 10, 2017, an on-site meeting was held with representatives from the Service, CDOT, and HDR, Inc. (HDR) (lead project engineers). Following this meeting, the TES report was revised and resubmitted on January 17, 2017.
- On January 27, 2017, the Service concurred with the determination that the proposed action was not likely to adversely affect the Preble's mouse (06E24000-2017-I-0242).
- The project was not constructed as anticipated and in 2021 planning resumed.
- On November 17, 2021, another site visit was attended by representatives from the Service, CDOT, El Paso County, HDR, and SMITH, in which it was determined that formal consultation would be necessary due to project design changes.
- The Service received your biological assessment on June 1, 2022.
- The Service received a memo from SMITH revising the mitigation success criteria on July 25, 2022.

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BIOLOGICAL OPINION

1. DESCRIPTION OF THE PROPOSED ACTION

El Paso County is proposing to construct improvements along a nearly one-mile stretch of SH 105 (Figure 1). The purpose of the project is to improve safety and mobility along a vital transportation corridor in the region. This region of El Paso County has experienced significant growth in the past two decades resulting in increasing traffic congestion. The project would include the following proposed roadway improvements:

- Road widening to accommodate two lanes of traffic in each direction, new sidewalks, and an additional acceleration lane.
- A roundabout at Knollwood Drive and Village Ridge Point.
- Stormwater upgrades throughout the corridor and a water quality pond would be constructed on private property north of SH 105 in the eastern extent of the project area.

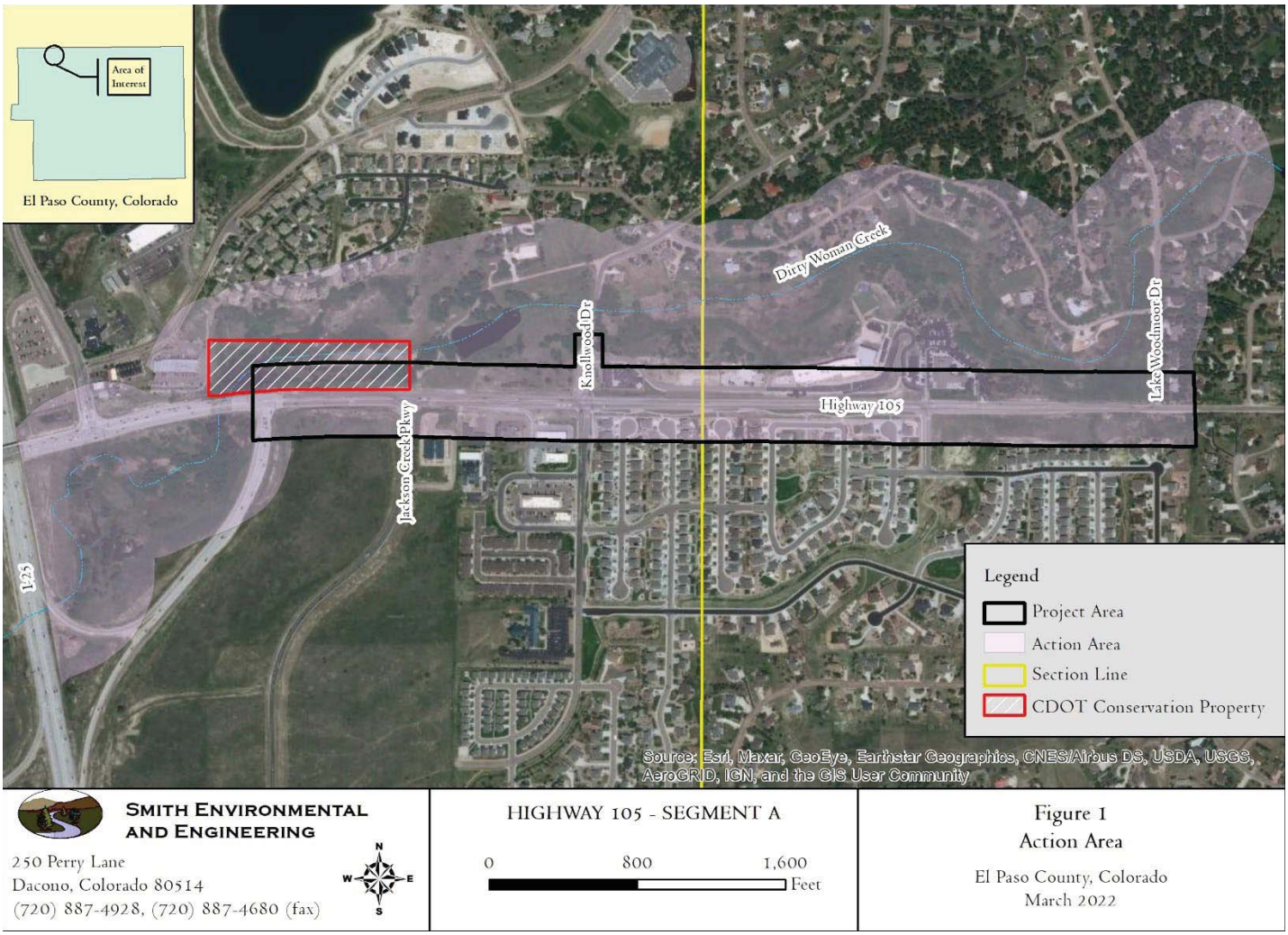

Figure 1. State Highway 105 – Segment A Action Area. Map provided by SMITH.

1.1. Mitigation

The project will mitigate for temporary impacts to Preble's habitat at a 1.5:1 ratio and permanent impacts at a 2:1 ratio. This would result in a total 6.125 acres of mitigation (Table 1). Mitigation will be achieved through a combination of restoration, enhancement, and conservation of habitat across multiple properties. All temporary impacts will be fully restored in-situ, which are estimated to encompass 1.75 acres.

The remaining 4.375 acres of required mitigation will consist of permanent habitat protection and enhancement measures conducted on a property that is currently in private ownership but will be acquired by El Paso County and protected from future development or other land uses. El Paso County has submitted a Notice of Intent to Acquire the property and the property will undergo appraisal at the end of July, 2022. El Paso County anticipates ownership of the property by December 2022. The property is located northwest of the intersection of SH 105 and Lake Woodmoor Drive and provides suitable habitat for the Preble's mouse as well as connectivity with downstream habitat areas, including the CDOT mitigation parcel along Dirty Woman Creek west of the proposed action (Figure 2). A portion of this property would be disturbed from the construction of a retaining wall and drainage network adjacent to the wetland; however, most of the property will remain untouched.

El Paso County will enhance this property by planting twenty native shrubs in the upland areas to improve upland habitat and by implementing a weed management plan. The property currently contains an informal trail that extends for the length of the parcel from the church parking lot to the west to Woodmoor Drive on the east. The proposed action will construct sidewalks along SH 105 which will eliminate the need for a trail within the property and El Paso County will install signage to inform the public that the property is a conservation area. A complete description of proposed mitigation is provided in the biological assessment (Section 5.2, p. 17 - 21).

Table 1. Preble's habitat impact categories and associated mitigation for the State Highway 105 Improvement Project.

Impact Category	Impact Quantity (acres)	Ratio	Required Mitigation (acres)	Mitigation Mechanism	Mitigation Quantity (acres)
Permanent	1.75	2:1	3.500		
Temporary	1.75	1.5:1	2.625	In-situ restoration of temporary impacts	1.75
Total	**3.50**	**--**	**6.125**		
				Conservation/enhancement of off-site mitigation property	4.375
				Total	**6.125**

Figure 2. State Highway 105 – Segment A Off-Site Mitigation Property. Map provided by SMITH.

1.2. Monitoring

Protocols for post-mitigation monitoring have been established to ensure successful establishment of the restored and enhanced habitats. It will be El Paso County's responsibility, as the project proponent, to monitor or contract a qualified biologist to monitor for successful establishment of habitat restoration, enhancement, and noxious weed control. Mitigation monitoring will occur within the following parameters:

- All mitigation areas (restoration and enhancement) will be monitored annually by a qualified ecologist until the success criteria have been achieved and approved by the Service.
- Photo points and transects will be established, and vegetative cover will be evaluated using the point-intercept method at the end of every growing season.

- Monitoring reports will be submitted to the Service annually until the mitigation success criteria have been achieved.
- If the monitoring results indicate that the mitigation areas are not on a trajectory to achieve the success criteria, adaptive management techniques will be implemented to identify the source of the failure and develop a practicable solution. Examples include replacement plantings, supplemental irrigation, and wildlife exclusionary devices.

1.3. Success Criteria for Habitat Mitigation

Results of the vegetation monitoring efforts will be assessed annually to determine the success of Preble's habitat restoration, or enhancement.

Restoration and enhancement of Preble's habitat at the onsite mitigation area will be considered successful under the following specifications.

In-Situ Habitat Restoration (temporary disturbance):

- The area obtains at least 60 percent cover by shrubs and/or grasses.
- Less than 10 percent of cover is comprised of state-listed B and C noxious weeds and 0 percent of state-listed A noxious weeds.

Habitat Enhancement (off-site mitigation area):

- The area obtains 80 percent survival of planted shrub species.
- Less than 10 percent of cover is comprised of state-listed B and C noxious weeds and 0 percent of state-listed A noxious weeds.

1.4. Conservation Measures

Conservation measures are actions outlined in the project description that the project proponent will implement to reduce the environmental impacts of the action or promote the recovery of threatened and endangered species. The Service considers the beneficial effects of these conservation measures during the jeopardy and adverse modification analyses. Conservation measures are part of the proposed action, and their implementation is required under the terms of this consultation.

Two actions were taken to avoid and minimize impacts to Preble's mouse habitat via the design of the proposed action. The outfall for the water quality pond was originally located at Dirty Woman Creek on the west end of the project area which was the site of a previous CDOT Preble's mouse mitigation activity. This outfall was relocated to avoid re-impacting this sensitive area. In addition, the retaining wall near Lake Woodmoor Drive was incorporated to substantially minimize the impacts that would have resulted from grading the slope. The wall will create a visual and noise barrier between the SH 105 roadway and the mitigation property.

Additional conservation measures specific to the Preble's mouse include:

- Riprap will be buried with soil and seeded with native riparian vegetation.

- Vegetation will be clipped or mowed to ground level one to two weeks prior to initiation of construction to discourage use by the Preble's mouse in vegetated areas that will be disturbed during the active season (approximately May 1-October 31). Shrubs that could provide hibernacula will be removed no later than October to discourage mice form hibernating in future work zones for disturbance that is anticipated during the hibernation period (approximately November 1-April 30).

- Work site lighting will be restricted to the hibernation season (November 1-April 30). Any temporary lighting installed will use downcast LED full-cutoff fixtures that comply with the International Dark-Sky Association's recommendation for outdoor illumination. Shielding and directing of lighting will be used to minimize light spill off the site.

- All work will stop, and the Service will be contacted immediately, if a Preble's mouse is found alive, dead, injured, or hibernating within the action area.

Conservation measures are thoroughly described on pages 16-17 of the biological assessment.

2. ACTION AREA

The action area is not only the immediate area involved in the action, but also includes all areas to be affected directly or indirectly by the federal action (50 CFR § 402.02). The action area contains the most far-reaching potential effects of the federal and non-federal actions on the species being discussed. The action area is defined by measurable or detectable changes in land, air, and water or to other measurable factors that would result from the proposed action. In other words, the action area is not limited to the "footprint" of the action, but rather encompasses the biotic, chemical, and physical impacts to the environment resulting directly or indirectly from the action.

We describe the action area as including not only the project area, which is defined by the limits of the project's disturbance (temporary and permanent impacts), but also the downstream reaches of the affected drainages for a distance of 3.0 miles to conservatively define the action area's downstream limit along a drainage, based on the 2.3-mile maximum recorded dispersal distance for the Preble's mouse.

3. STATUS OF THE PREBLE'S MEADOW JUMPING MOUSE

Status of the species is based on an analysis of appropriate information on the species' life history, habitat and distribution, and other data on factors related to its survival and recovery. This analysis considers the effects of past human and natural activities or events that have led to the current condition of the species. This information is usually presented in listing documents and refined in recovery plans (Service and NMFS 1998).

The Service added the Preble's meadow jumping mouse to the List of Endangered and Threatened Wildlife in 50 CFR 17.11 as a threatened species on May 13, 1998 (63 FR 26517). As discussed in more detail under the Environmental Baseline section, previous trapping surveys and habitat evaluations confirm that the species occupies the action area.

3.1. Taxonomy

The Preble's meadow jumping mouse is a member of the family Dipdidae (jumping mice) with four living genera, two of which, *Zapus* and *Napaeozapus*, are found in North America (Hall 1981). The three livig 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 limited to Colorado and Wyoming. Taxonomic authorities recognize the Preble's mouse subspecies as one of 12 subspecies of meadow jumping mouse (Hafner et al. 1981).

A September 2013 publication in *Molecular Ecology* further evaluated the genetic relationship between jumping mice, including the Preble's mouse. This study broadly evaluated the entire *Zapus* genus, including all 12 subspecies of meadow jumping mice (*Z. hudsonius*) and confirmed that the Preble's mouse is distinct from neighboring subspecies that were previously proposed to be taxonomically synonymized (*Z. h. campestris* and *Z. h. intermedius*). However, the study concludes that Preble's mouse is closely related to two meadow jumping mouse subspecies that are found in Alaska and Canada (*Z. h. tenellus* and *Z. h. alascensis*), which the study refers to as the "northern lineage" of meadow jumping mice (Malaney and Cook 2013).

Although the study suggests that the Preble's meadow jumping mouse is genetically similar to two subspecies of jumping mice found in Alaska and Canada, it does not propose to revise the formal taxonomy of Preble's mouse or any of the other subspecies of jumping mice. Specifically, the study conclude, "additional tests will be required before hypotheses of infraspecific taxonomic synonymy can be implemented…[and that] a revised taxonomy of the group is needed but is outside the context of this study" (Malaney and Cook 2013).

Although the Preble's mouse may be genetically similar to two other subspecies found more than 800 miles away in Alaska and Canada, the study confirms that the Preble's mouse is genetically isolated from its neighbors found in Wyoming and New Mexico (Malaney and Cook 2013). Therefore, even if the Preble's mouse were to be taxonomically synonymized into a "northern lineage," the Preble's mouse appears to be both (1) distinct, due to the significant geographic separation from the two other subspecies of the "northern lineage" and (2) significant, because the loss of this southernmost population along the Front Range would represent a range retraction of more than seven latitudinal degrees to the north, likely resulting in a significant gap in the range of the taxon. Therefore, the best available information continues to indicate that the Preble's mouse is a valid subspecies of meadow jumping mice (SEI 2006).

3.2. Physical Description

The Preble's mouse is a small mouse with an extremely long tail, large hind feet, and long hind legs, which enable jumping mice to make prodigious leaps (Figure 3). The long tail is bicolored, lightly furred, and twice as long as the body. The large hind feet are three times as large as those of other mice of similar body size. Preble's mice have a distinct, dark, broad stripe on its back that runs from head to tail and is bordered on either side by grey to rusty, orange-brown fur. The hair on the back of all jumping mice appears coarse compared to other mice. White hairs on the underside are finer.

Figure 3. The Preble's meadow jumping mouse, or Preble's, has an extremely long tail, large hind feet, and a distinctive dark stripe running along its back. Unlike deer mice or voles, the Preble's makes incredible jumps to escape predators. Left photo: The Preble's is in "torpor," or cold-induced hibernation/sleep. (USFWS)

Adult Preble's mice are approximately seven to 10 inches long and the tail is four to six inches long (Krutzsch 1954; Fitzgerald et al. 1994; Fitzgerald et al. 2011). The average weight of 120 adult Preble's mice captured early in their active season prior to June 18 was 0.6 ounces; included were 10 pregnant females weighing more than 0.8 ounces (Meaney et al. 2002).

3.3. Preble's meadow jumping mouse Life History

3.3.1. Habitat

Preble's meadow jumping mice live in well-developed, plains riparian vegetation with adjacent, relatively undisturbed grassland communities and a nearby water source (Figure 4). The well-developed, plains riparian vegetation typically includes a dense combination of grasses, forbs, and shrubs; a taller shrub and tree canopy may be present (Bakeman 1997). When a taller canopy is present, the shrub canopy is often willow (*Salix* spp.), although other shrub species, including snowberry (*Symphoricarpos* spp.), chokecherry (*Prunus virginiana*), hawthorn (*Crataegus* spp.), Gambel's oak (*Quercus gambelli*), alder (*Alnus incana*), river birch (*Betula fontinalis*), skunkbrush (*Rhus trilobata*), wild plum (*P. americana*), lead plant (*Amorpha fruticose*), dogwood (*Cornus sericea*) and others may also occur (Bakeman 1997, Shenk and Eussen 1998).

Figure 4. Preble's habitats feature dense riparian vegetation, such as willows and cottonwoods, and adjacent grassy uplands within 300 feet of the 100-year floodplain, with an open water source nearby. (USFWS)

Preble's mice have rarely been trapped in uplands adjacent to riparian areas (Dharman 2001; Hansen 2006). However, Preble's mice feed and rest in adjacent uplands (Shenk and Sivert 1999a; Schorr 2001) as far out as 328 feet beyond the 100-year floodplain (Ryon 1999; Shenk and Sivert 1999a; Schorr 2001). Adjacent uplands used by the Preble's mouse are extremely variable ranging from open grasslands to ponderosa pine (*Pinus ponderosa*) woodlands (Corn et al. 1995; Pague and Grunau 2000).

Riparian shrub cover, tree cover, and the amount of open water nearby are good predictors of Preble's mouse densities. Based on habitat quality, estimates of Preble's mouse abundance range from six to 110 mice per mile with an average of 53 mice per mile of stream (White and Shenk 2000). A comparison of habitats at capture locations on the Department of Energy's Rocky Flats Site in Jefferson County, Colorado, and the U.S. Air Force Academy (Academy) in El Paso County, Colorado, revealed that Academy sites had lower plant species richness at capture locations but considerably greater numbers of Preble's mice (Schorr 2001). However, the Academy sites also had higher densities of both grasses and shrubs. Preble's mouse abundance is likely driven by the density of riparian vegetation rather than the diversity of plant species.

During the active season, Preble's mice construct day nests composed of grasses, forbs, sedges, rushes, and other available plant material. Day nests may be globular in shape or simply raised mats of litter, and are most commonly above ground but may also be below ground. Day nests are typically located under debris at the base of shrubs and trees, or in open grasslands (Ryon 2001). Mice may have multiple day nests in both riparian and grassland communities (Shenk and Sivert 1999b) and may abandon a nest after approximately one week of use (Ryon 2001).

Hydrologic regimes that support Preble's mouse habitat range from large perennial rivers such as the South Platte River to small ephemeral drainages only three to 10 feet wide, as at Rocky Flats and in montane habitats at higher elevations. Flooding is a common and natural event in the riparian systems along the Front Range of Colorado. This periodic flooding helps create a dense vegetative community by stimulating sprouting from willow shrubs and the growth of herbs and grasses in freshly deposited soil.

3.3.2. Hibernation

The Preble's mouse is a true hibernator, usually entering hibernation in September or October and emerging the following May, after a long hibernation period of seven to eight months. Adults enter hibernation first before young of the year because they accumulate the necessary fat stores more quickly. Similar to other subspecies of meadow jumping mouse, Preble's mice do not store food for hibernation. Instead, while hibernating, the Preble's mouse persists on fat stores accumulated prior to hibernation (Whitaker 1963).

Hibernacula (hibernation nests) of Preble's mouse have been located both within and outside of the 100-year floodplain of streams (Shenk and Sivert 1999b; Ryon 2001; Schorr 2001). Those hibernating outside of the 100-year floodplain would likely be less vulnerable to flood-related mortality. Fifteen apparent Preble's mouse hibernacula have been located through radio telemetry, all within 260 feet of a perennial streambed or intermittent tributary (Bakeman and Deans 1997; Shenk and Sivert 1999b; Schorr 2001).

Hibernacula have been located under willow, chokecherry, snowberry, skunkbush, sumac (*Rhus* spp.), clematis (*Clematis* spp.), cottonwoods (*Populus* spp.), Gambel's oak, thistle (*Cirsium* spp.), and alyssum (*Alyssum* spp.) (Shenk and Sivert 1999b). At the Academy near Colorado Springs, four of six likely hibernacula found by radio-telemetry were located in close proximity to coyote willow (*Salix exigua*) (Schorr 2001). The one excavated hibernaculum at Rocky Flats south of Boulder, was found 30 feet (9.1 meters) above the streambed, in a dense patch of chokecherry and snowberry (Bakeman and Deans 1997). The nest was constructed of leaf litter 12 inches below the surface in coarse textured soil.

3.3.3. Movements and Home Range

Radio telemetry and mark-recapture data provide insight into the Preble's mouse home ranges and dispersal capabilities. At Plum Creek in Douglas County, Colorado, the Preble's mouse home ranges averaged 1.24 acres based on radio-telemetry (Trainor et al. 2012). In the Pike National Forest of Colorado, travel distances averaged 1,357 feet with an approximate home range size of 1.02 acres (Hansen 2006). At the Academy in El Paso County, Colorado, home ranges were between 0.42 to 9.49 acres, with an average home range of 3.48 acres. During this study, the farthest distance moved by individual Preble's mouse ranged from 43 to 3,176 feet, with an average maximum travel distance of 1,188 feet (Schorr 2003). An earlier study documented a Preble's mouse moving as far as 0.7 miles in 24 hours (Ryon 1999). However, compared to radio telemetry data, mark-recapture data suggest that the Preble's mouse may have longer dispersal capabilities. Mark-recapture data between active seasons identified mice traveling more than 4 kilometers (2.3 miles) along a linear riparian system (Schorr 2003; Schorr 2012).

3.3.4. Reproduction and Lifespan Habitat

Preble's mice have two litters per year, but may have up to three litters per year. An average of five young are born, but the size of a litter can range from two to eight young (Quimby 1951; Whitaker 1963). Preble's mice are long-lived for a small mammal, surviving up to three years, in comparison with many species of mice and voles that seldom live a full year. Along South Boulder Creek in Boulder County, Colorado, seven individuals originally captured as adults were still alive two years later, having attained at least three years of age (Meaney et al. 2002).

Although Preble's mice are long-lived compared to other small rodents, the annual survival rate is low. Preble's survival rates appear to be lower over the summer than over the winter. Over-summer survival rates ranged from 22 to 78 percent and over-winter survival rates ranged from 56 to 97 percent (Shenk and Sivert 1999a; Schorr 2001; Meaney et al. 2002). Higher overwintering survival rates indicate that predation or other factors impact Preble's mice during the active season.

3.3.5. Causes of Mortality

Known predators of the Preble's mouse include garter snakes (*Thamnophis* spp.), prairie rattlesnake (*Crotalus viridus*), bullfrog (*Rana catesbiana*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), house cat (*Felis catus*), long-tailed weasel (*Mustela frenata*), and red-tailed hawk (*Buteo jamaicensis*). Drowning and vehicle collisions also kill Preble's mice (Shenk and Sivert 1999b; Schorr 2001). Other causes of death include starvation, exposure, disease, and insufficient fat stores for hibernation (Whitaker 1963).

3.3.6. Diet

Although fecal analyses provide the best data on Preble's mouse diet, they overestimate the components of the diet that are less digestible. Preble's mouse diets shift seasonally, consisting primarily of insects and fungi after emerging from hibernation, and shifting to fungi, moss, seeds, and pollen during mid-summer (July through August), with insects again added in September. The shift in diet along with shifts in mouse movements suggests that Preble's mouse may require specific seasonal diets, perhaps related to the physiological constraints imposed by hibernation (Shenk and Sivert 1999b).

3.4. Preble's Abundance and Trends

Due to the difficulty of implementing long-term trapping studies needed to assess population sizes, quantitative studies designed to estimate Preble's mouse populations have occurred at only a few sites in Colorado. As a result, we lack a reliable regional, statewide, or rangewide population estimate for the Preble's mouse.

In Colorado, we have several population estimates, but little trend information from Preble's mouse populations. In addition, because jumping mouse population sizes in a given area vary significantly from year to year (Quimby 1951; Whitaker 19724), short-term studies may not accurately characterize abundance. In one ongoing trapping study, population highs of 24 and 69 Preble's mice per site were estimated for two control sites in 1999; a subsequent trapping in

2002, during regional drought conditions, found no Preble's mice at either site (Bakeman 2006). Over four years, Preble's mouse populations varied widely and were absent at certain sites during some seasons, suggesting that 10 or more years of study might be necessary to assess the full extent of variation in Preble's mouse populations (Meaney et al. 2003).

Because the Preble's mouse occupied linear riparian communities, researchers estimate abundance as the number of mice per kilometer (or mile) of riparian corridor. Estimates of linear abundance range widely, from three to 107 mice per mile (two to 67 mice per kilometer) with a mean of approximately 44 nice per mile (27 mice per kilometer) (Shenk 2004). These above abundance estimates, coupled with sufficient knowledge of occupied stream miles, may provide a rough indicator of Preble's mouse numbers within a stream reach or drainage, but may overestimate actual population size (Hayward 2002). The Recovery Team used the 44 mice per mile (27 mice per kilometer) population estimate (Shenk 2004) to approximate the number of stream miles required to support varying sized populations of Preble's mice (Service 2003).

As with abundance estimates, the difficulty of implementing long-term trapping studies limits the availability of population trend data for the Preble's mouse. Since 1998, there have been few attempts to characterize changes in Preble's mouse populations over time. One long-term study at the Academy in El Paso County, Colorado, provides the most thorough estimate of population trends for the subspecies. Mark-recapture data over seven years at the Academy suggested that populations were declining (Schorr 2012).

3.5. Preble's Status and Distribution

The Preble's mouse lives 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; Fitzgerald et al. 2011). Knowledge about the current distribution of the Preble's mouse comes from collected specimens, and live-trapping locations from both rangewide survey efforts and numerous site-specific survey efforts conducted in Wyoming and Colorado since the mid-1990s. The Denver Museum of Nature and Science houses recently collected specimens. Trappers file survey reports with the Service's Field Offices in Colorado in Wyoming.

In Wyoming, capture locations of mice confirmed as the Preble's mouse, and location of mice identified in the field as Preble's mice 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. The Preble's mouse does not likely extend west past the crest of the Laramie Range in Wyoming (Bowe and Beavais 2012). 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 County, and north-central El Paso County.

The Preble's mouse is likely an Ice Age relict (Hafner et al. 1981; Fitzgerald et al. 1994; Fitzgerald et al. 2011). Once the glaciers receded from the Front Range of Colorado and the foothills of Wyoming and the climate became drier, the Preble's mouse was confined to the riparian systems where moisture was more plentiful. The semi-arid climate in southeastern Wyoming and eastern Colorado limits the eastern extent of riparian corridors and restricts the

range of the Preble's mouse. The Preble's mouse has not been found east of Cheyenne in Wyoming or on the extreme eastern plains in Colorado. The dry shortgrass prairie defines the eastern boundary for the subspecies and may present a barrier to eastward expansion (Beauvais 2001).

Higher elevations along the Laramie Range and the Front Range likely impose the western boundary of the Preble's mouse. The Service has used 7,600 feet (2,300 meters) in elevation as the general upward limit of Preble's mouse habitat in Colorado (Service 1998). Recent morphological examination of specimens has confirmed Preble's to an elevation of approximately 7,600 feet (2,300 meters) in Colorado (Meaney et al. 2001). In a modeling study of habitat associations in Wyoming, Keinath (2001) found suitable habitat predicted in the Laramie Basin and Snowy Range Mountains (west of known Preble's captures) but very little suitable habitat predicted on the plains of Goshen, Niobrara, and eastern Laramie counties (east of known Preble's mouse captures).

The Preble's mouse is closely associated with riparian ecosystems that are linear in nature and represent a small percentage of the landscape. If Preble's mouse habitat is destroyed or modified, populations in those areas may decline or be extirpated. The main factor threatening the subspecies is the decline in the extent and quality of Preble's mouse habitat (Service 1998; Hafner et al. 1998; Shenk 1998). Habitat alteration, degradation, loss, and fragmentation resulting from urban development, flood control, water development, intensive agricultural activities, and other human land uses have adversely affected Preble's mouse populations. Habitat destruction may impact individual Preble's mice directly or by destroying nest sites, food resources, and hibernation sites, by disrupting behavior, fragmenting habitats, or by creating a barrier to movement.

Although there is little information on historic distribution and abundance of the Preble's mouse, surveys identified various locations where the subspecies was historically present but is now absent (Ryon 1996). Despite numerous surveys, the Preble's mouse has not recently been found in the Denver or Colorado Springs metropolitan areas and is believed to be extirpated from these areas because of extensive urban development. Since at least 1991, the Preble's mouse has not been found in Denver, Adams, or Arapahoe counties in Colorado. Its absence in these counties is likely due to urban development, which has altered, reduced, or eliminated riparian habitat (Compton and Hugie 1993; Ryon 1996).

3.5.1. Preble's Occupied Range in Colorado

A map layer, "Preble's mouse occupied range," developed by Colorado Parks and Wildlife (CPW 2007), estimates the acres of habitats occupied by the Preble's mouse in Colorado. CPW developed this occupied range layer by drawing habitat polygons around points where trappers have captured Preble's mice. Based on the trapping records, CPW estimated that Colorado supports approximately 89,771.7 acres of occupied Preble's mouse habitats.

However, CPW's mapping effort underestimates the actual acres of potentially occupied habitats in Colorado because it incorporates only habitats where mouse trapping has occurred. The point data used to draw the *occupied range* polygons records only Preble's mouse captures, but

trappers have not trapped all the potential or likely occupied Preble's mouse habitats in Colorado. Although CPW's occupied range map is an estimate, it is the best available estimate of acres of occupied habitat for the Preble's mouse in Colorado. The layer overestimates potential habitats elsewhere, by including areas of non-habitat.

3.6. Threats to the Preble's

Below we summarize threats to the Preble's mouse. Our most recent 12-month status review for the Preble's published in the **Federal Register** on May 23, 2013, provides more detail and analysis regarding threats (78 FR 31679; https://federalregister.gov/a/2013-12387).

3.6.1. Agricultural Land Conversions

Conversion of native riparian ecosystems to commercial croplands and grazed rangelands was identified as the major threat to the Preble's mouse in Wyoming (Clark and Stromberg 1987; Compton and Hugie 1993). Certain grazing and haying management scenarios maintain what appears to be good habitat for the Preble's. However, intensive grazing and haying operations may negatively impact Preble's mice by removing food and shelter. While some Preble's mouse populations coexist with livestock operations, overgrazing can decimate riparian communities on which the subspecies depends. Similarly, haying operations and the associated water development that allow significant riparian vegetation to remain in place appear to be compatible with persistence of Preble's mouse populations. In fact, large populations of Preble's mice occur in grazed and hayed areas along Cottonwood Creek, Chugwater Creek, and Horse Creek in Wyoming.

3.6.2. Recreational Trails

Recreational trail systems frequently parallel or intersect riparian communities and thus are common throughout Preble's mouse habitat. Trail development can alter natural communities and may impact the Preble's meadow jumping mouse by: Modifying nest sites, food resources, and hibernation sites; fragmenting habitat; and increasing predation. Humans and pets using these trails may alter behavior patterns of the Preble's mouse and cause a decrease in survival and reproductive success.

3.6.3. Habitat Fragmentation

Habitat fragmentation limits the range and abundance of the Preble's mouse. In general, as animal populations become more fragmented and isolated, it becomes more difficult for them to persist. Small, isolated patches of habitat are unable to support as many Preble's mice as larger patches of habitat. When threats to persistence are similar, larger populations are more secure from extirpation than smaller ones.

3.6.4. Hydrologic Changes

Hydrology of a waterway influences the structure and function of the corresponding riparian ecosystems. Water development and management may facilitate development of lush riparian vegetation by maintaining more moisture in the riparian areas for longer periods, particularly during drought. However, changes in timing and abundance of water may also alter the channel

structure, riparian vegetation, and the adjacent floodplain, which may be detrimental to the persistence of Preble's mice. Increased development and impervious surface within a drainage can result in more frequent and severe flood events and prevent the maintenance of riparian communities. Bank stabilization, channelization, and other measures to address flooding and storm water runoff have increased the rate of stream flow, straightened riparian channels, and narrowed riparian areas (Pague and Grunau 2000). Riprap and other stabilization structures designed to reduce erosion can destroy riparian vegetation, while preventing or prolonging its reestablishment. Erosion control measures can adversely alter the hydrologic processes and riparian plant communities such that Preble's mouse populations can no longer persist.

3.6.5. Aggregate Mining

Alluvial aggregate extraction may produce long-term changes to Preble's mouse habitat by altering hydrology and removing riparian vegetation. Extraction removes and often precludes reestablishment of habitat components required by Preble's mice, such as vegetation for feeding and sheltering and deposits of alluvial sands and gravels that may be important hibernation locations for hibernation.

3.6.6. Transportation Corridors

Transportation and utility corridors frequently cross Preble's meadow jumping mouse habitat and may negatively affect populations. Road construction and maintenance degrades, destroys, and fragments Preble's mouse habitats. Roads and bridges also may act as barriers to dispersal. Accidents within or near riparian areas may spill chemicals, fuels and other substances into wetlands and waterways that may impact the Preble's mouse and its habitat. Sewer, water, communications, gas, and electric lines cross Preble's mouse and contribute to habitat disturbance and fragmentation through new construction and periodic maintenance. Impacts related to construction are often temporary if adequate rehabilitation and reclamation actions are implemented.

3.6.7. Noxious Weeds

Invasive, noxious plants can encroach upon a landscape and displace native plant species. This change reduces the abundance and diversity of native plants and may negatively impact cover and food sources for the Preble's mouse. The control of noxious weeds may also impact Preble's mice where large-scale removal of vegetation occurs through chemical treatments and mechanical mowing operations.

3.6.8. Pesticides and Herbicides

Pesticides and herbicides are used within the range of the Preble's mouse. Inappropriate use of these chemicals may harm the Preble's mouse directly or when ingested with food or water. Overall, an integrated pest management approach (use of biological, chemical, and mechanical control) may help reduce the threat of chemicals but allow for the control of target species.

3.6.9. Floods

Floods occur throughout the Preble's mouse range in the Wyoming and Colorado foothills and plains. Preble's mice and their streamside habitats evolved under historic flood regimes, so populations and habitats naturally respond to floods. While floods may affect Preble's mouse populations by killing individuals and destroying riparian and adjacent upland habitats, the effects to vegetation are usually temporary. Vegetation typically reestablishes quickly after floods, although larger floods may delay recovery. Routine flooding may help maintain the vegetative communities that provide suitable habitat for the Preble's mouse. Preble's mice that hibernate outside the 100-year floodplain are less likely to drown in a flood.

However, manmade increases in impervious surfaces and the loss of vegetation caused by human activities or catastrophic wildfire can result in an increased frequency and severity of flood events. Flooding is often a byproduct of wildfires and may act synergistically to alter the composition and structure of riparian ecosystems for many years (Ellis 2001). Therefore, extreme floods may prevent the re-establishment of the Preble's favored riparian vegetation, forcing mice to disperse until habitats recover. Although an extreme flood can eliminate an entire Preble's mouse population in an affected stream reach, floods are less likely to eliminate the Preble's from an entire drainage system if populations extend into side tributaries or headwaters unaffected by the flood. Therefore, maintaining the connectivity of riparian habitats between stream reaches is crucial to maintaining the security of Preble's mouse populations faced with an increased incidence of flooding.

In September 2013, heavy rains in Colorado flooded streams and inundated many riparian and upland habitats occupied by the Preble's in Larimer, El Paso, Boulder, and Weld Counties. By drowning Preble's mice, scouring vegetation, removing topsoil, and depositing debris, early estimates suggest that the flood disaster affected approximately 60 percent of the Preble's mouse occupied range and approximately 70 percent of its designated critical habitat in Colorado.

Many Preble's mice may have drowned where the flash floods were large, unpredictable, or destructive. Throughout the flood disaster zone, especially in more mountainous (montane) habitats of the Front Range foothills, the flash floods completely inundated the Preble's mouse habitats, with the fast-moving floodwaters often extending far beyond the limits of the floodplain. Many Preble's mice in these high intensity flash flood areas may not have been able to escape the floodwaters and washed downstream or drowned. Preble's mouse densities were low before the flood disaster, especially in the montane habitats at the westernmost extent of the Preble's mouse range, so the floods may have significantly reduced range wide population numbers.

Trapping surveys, habitat evaluations, and remote imagery will be necessary to gauge the full effect of the flood disaster on the Preble's mouse. Although population and habitat losses were likely significant across approximately 60 percent of the Preble's occupied range, some Preble's mice may have survived. Survivors will be critical to the Preble's mouse recovery in the flood disaster zone.

3.6.10. Wildfire

Fire, particularly catastrophic fires, can alter habitat dramatically and change the structure and composition of the vegetation communities such that the Preble's mouse may no longer persist.

In addition, precipitation falling in a burned area may degrade Preble's mouse habitat by causing greater levels of erosion and sedimentation. Controlled use of fire may be one method to maintain appropriate riparian floodplain, and upland vegetation within Preble's mouse habitat. However, over the past several decades, as human presence has increased throughout the Preble's mouse range, significant effort has been made to suppress fires. Long periods of fire suppression may result in a build-up of fuel and result in a catastrophic fire that significantly impacts Preble's mouse habitats by burning vegetation or increasing catastrophic floods.

3.6.11. Predation

The increasing presence of humans near Preble's mouse habitats may result in increased level of predation that may pose a threat to the mouse. The striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), red fox, and the domestic and feral cat are found in greater densities in and around areas of human activity; all four of these species feed opportunistically on small mammals. Introduction of species such as the bullfrog into waters within the Preble's range may result in additional predation. The fact that summer mortality is higher than overwinter mortality underscores the impact that predators can have on Preble's mice.

3.6.12. Climate Change

Climate change may negatively affect the Preble's meadow jumping mouse and its habitat, primarily by causing changes in stream flows resulting in reduced quality and quantity of riparian habitats. Trends of warming in the mountains of western North America could decrease snowpack, hasten spring runoff, and reduce summer flows. While fewer cold days and nights could result in increased plant biomass yield in colder environments, increased summer heat may increase the frequency and intensity of wildfires, decrease the productivity of riparian vegetation, and increase the frequency and duration of droughts (IPCC 2007). Stream-flow reductions or seasonal changes in flow due to climate change will probably cause a greater disruption in watersheds with a high level of human development (Hurd et al. 1999) where human demands for water resource are greatest.

4. ENVIRONMENTAL BASELINE

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The project area is in the Town of Monument, Colorado in El Paso County at the intersection of the Rocky Mountains and the Great Plains. The topography within the action area rises from west to east as SH 105 approaches the northern extent of the pine forests of the Black Forest area. The elevation ranges from a low point of approximately 7,000 feet near Dirty Woman

Creek to 7,160 feet. Dirty Woman Creek flows beneath SH 105 near Interstate 25, but otherwise flows primarily north of the project area. No other drainages are located within the action area.

The action area consists primarily of SH 105, the associated ROW, and developed areas, including private homes, businesses, a church, and a school. Vegetated areas consist of turf grasses that are frequently mowed, and ornamental coniferous and deciduous trees. Roadside areas consist of upland grasses including smooth brome (*Bromus inermis*) and blue grama (*Bouteloua gracilis*) and forbs. There are a few areas where wetlands consist almost exclusively of cattails (*Typha spp*.).

The vegetation within the undeveloped parcels is influenced by the presence or absence of a water source. Wetland and riparian vegetation along Dirty Woman Creek is characterized as Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested (PFO). Species identified include narrowleaf cottonwood (*Populus angustifolia*), sandbar willow (*Salix exigua*), Nebraska sedge (*Carex nebrascensis*), Canada thistle (*Cirsium arvense*), fringed willowherb (*Epilobium ciliatum*), arctic rush (*Juncus arcticus*), wild mint (*Mentha arvensis*), knotweed (*Polygonum persicaria*), and cattails. Upland zones are primarily grasslands with some interspersed patches of Gambel oak (*Quercus gambelii*).

For the purposes of assessing the condition of Preble's mouse habitat within the action area, it was divided into four categories based on current and proposed land use: 1) the road ROW, 2) the private parcel where the water quality pond is proposed, 3) the overall action area, and 4) the mitigation property. El Paso County used a habitat scorecard to qualify Preble's mouse habitat within these areas for comparison purposes. The ROW area encompasses designated ROW and adjacent areas where disturbance would occur related to sidewalk and roadway expansion. Sufficient vegetative cover was observed in this area, but a significant portion is nonnative or invasive. The water quality pond is proposed on a property that is currently in private ownership and includes a mowed grass understory with spaced pine trees and minimal shrubs. It is entirely within the upland habitat zone and does not include any riparian habitat. The impact areas including the ROW and the pond were both rated as "Fair" while the overall action and the mitigation property to the east both received a "Fair to Good" habitat rating. Additional details about the habitat conditions within the action area are in section 3.1 (p. 8-9) of the biological assessment.

4.1. Status of the Preble's meadow jumping mouse within the Proposed Project and Action Areas

The project area is within known occupied habitat for the species and is directly east of mapped critical habitat (Unit 11); however, no impacts are anticipated to critical habitat as a result of the proposed action. The Preble's mouse was captured in five locations along Dirty Woman Creek east of I-25 and south of SH 105 to the west of the project area between 1997 (800 feet from the project area), two trappings in 1998 (1,200 and 1,650 feet from the project area), 2003 (immediately west of the project area), and 2015 (1,500 feet from the project area).

Dirty Woman Creek is within the Monument Creek watershed which is part of the Arkansas River Basin. Preble's mouse populations along drainages in the Arkansas River Basin have likely decreased over time. A 1996 study determined that Preble's mice were no longer present at many

historical sites that had previously been trapped, including at Monument Valley Park in Colorado Springs, approximately 20 miles south of Monument. The project area occurs within the Fountain hydrologic unit code within the South Recovery Unit as defined in the Preble's mouse recovery plan which has a medium-sized potential recovery population (Service 2018).

At this time, we lack a concise population estimate (mice per acre or mice per stream mile) for the Preble's mouse in the project area; therefore, we will rely on work conducted in a similar riparian system located along Monument Creek and its tributaries approximately 5 miles south of the project area. The U.S. Air Force Academy (Academy) calculated a Preble's meadow jumping mouse population on site ranging from 1,513 to 4,864 individuals based on trapping surveys for the April 2000 Conservation Agreement. In addition, the conservation boundary, measured as 300 feet from the 100-year floodplain of Monument Creek and its tributaries, totals approximately 3,245 acres. Using the high end of the range (4,864 mice) to derive the likely maximum number of mice exposed to project activities, we calculate a population estimate of approximately 1.5 mice/acre with high quality habitat on Monument Creek and its tributaries. Based on this estimate, the 3.5 acres of total (temporary and permanent) impacts may support approximately 6 mice.

4.2. Regulatory Actions under the ESA Completed by the Service for the Preble's Meadow Jumping Mouse

Since listing the Preble's meadow jumping mouse in May 1998, we have conducted 229 formal consultations pursuant to section 7 of the ESA and issued 22 incidental take permits pursuant to section 10(a)(1)(B) if the ESA for the Preble's in Colorado. In Wyoming, we have completed 13 formal consultations under section 7 of the ESA but have not issued any incidental take permits under section 10(a)(1)(B) if the ESA.

Tables 2 through 5 below summarize the total acres of habitat loss exempted of incidental take permitted by the Service through these actions in Colorado and Wyoming. Throughout the Preble's range, we have permitted take of approximately 4.5 percent of CPW's occupied range for Colorado. We provided this take to a variety of projects, including residential and commercial developments, transportation projects, recreational facilities, and water supply projects.

Table 2. Number of Preble's mouse habitat loss exemptions or incidental take permits issued by the Service under the ESA between May 1998 and August 2022 in Colorado and Wyoming.

Regulatory Authority of the ESA	Colorado	Wyoming
Section 7 (federal consultations)	229	13
Section 10 (non-federal consultations)	22	0
STATEWIDE TOTAL	**251**	**13**
RANGEWIDE TOTAL =	**264**	

Table 3. Total acres of permanent Preble's mouse habitat loss permitted by the Service under the ESA between May 1998 and August 2022 in Colorado and Wyoming.

Regulatory Authority of the ESA	Colorado	Wyoming
Section 7 (federal consultations)	947.17	70.97
Section 10 (non-federal consultations)	426.32*	0.00
STATEWIDE TOTAL	**1,373.49***	**70.97**
RANGEWIDE TOTAL =	**1,444.46**	

*The total acres of permanent take exempted under section 10 does not include the Livermore Habitat Conservation Plan (HCP) in Larimer County, Colorado, completed in January 2004, which exempts up to 3,357 acres of permanent habitat loss. As of June 2020, there are no enrollments in the Livermore HCP and the Service has not completed any section 10 consultations in Wyoming.

Table 4. Total acres of temporary‡ Preble's mouse habitat loss allowed by the Service under the ESA between May 1998 and August 2022 in Colorado and Wyoming.

Regulatory Authority of the ESA	Colorado	Wyoming
Section 7 (federal consultations)	2,281.40	42.69
Section 10 (non-federal consultations)	270.00*	0.00
STATEWIDE TOTAL	**2,551.40***	**42.69**
RANGEWIDE TOTAL =	**2,594.09**	

‡ Project proponents completely restore, and often enhance, habitats that they temporarily impact.
*As of June 2020, the Service has not completed any section 10 consultations in Wyoming.

Table 5. Percent of Preble's mouse occupied range (CPW layer‡) in Colorado affected by habitat loss exemption or incidental take permits issued by the Service under the ESA between May 1998 and August 2022 in Colorado and Wyoming.

Percent Habitat Loss	Colorado
Permanent	1.61%
Temporary	2.89%
STATEWIDE TOTAL	**4.50%**

‡ Colorado Parks and Wildlife (CPW) created their occupied range data layer for Preble's by buffering upstream and downstream habitats around positive capture locations, thereby estimating that there are 89,771.70 acres of occupied Preble's range in Colorado. We lack a similar estimate for Wyoming, so we use the estimate for Colorado as a conservative rangewide estimate.

5. EFFECTS OF THE ACTION

The effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR § 402.17).

The proposed project would disturb a total of 3.5 acres of Preble's mouse habitat, of which 1.75 acres would be permanent impacts and 1.75 acres would be temporary impacts. Permanent and temporary ground disturbance in riparian areas and adjacent upland areas would adversely affect the Preble's mouse by removing hibernation, nesting, and foraging habitat. Permanent and temporary habitat impacts would result from construction of the water quality pond and access road, the overflow channel and outfall, the Knollwood round-about, and Lake Woodmoor Drive retaining wall and road widening at the east end of the project area. Temporary impacts would also result from SH 105 roadway widening and sidewalk construction.

Mitigation actions have been developed as part of the proposed action and include restoration actions in Preble's riparian and upland habitat within the project area and enhancement and preservation actions in an off-site conservation easement property. These mitigation actions would ensure that the remaining Preble's habitats are of equal or better quality than those present before construction. Mitigation actions would offset the project's impacts at a mitigation ratio of 2:1 for permanent impacts (3.5 acre of mitigation to 1.75 acre of impact) and 1.5:1 for temporary impacts (2.625 acres of mitigation to 1.75 acre if impact). Mitigation activities within the project area include the in-situ restoration of temporary impacts with native grasses, forbs, and shrubs, with hydrologic conditions suitable to Preble's mouse, riparian and upland seeding with native grasses, forbs, and shrubs, and weed management. Weed management will occur in the spring and fall of each year following project completion until the revegetation criteria are met. The remaining 4.375 acres of required mitigation will consist of permanent habitat protection and enhancement measures conducted on a property that is currently in private ownership but will be acquired by El Paso County and protected from future development or other land uses. More details about mitigation actions can be found in Section 1.1 of this biological opinion and in the biological assessment (pp. 17-21).

5.1. Effects to the Preble's meadow jumping mouse

Effects of the project's activities occurring during the Preble's mouse active season could include disruption of foraging, breeding, and dispersal due to loss and alteration of habitats, as well as from noise and disturbance. Direct impacts in addition to removal of suitable habitat could include mortality of individual mice if trampled or run over by construction equipment or vehicles. Individuals could also be crushed if grading activities remove hibernacula. Temporary impacts would occur in those areas that would be restored to their pre-construction conditions upon completion of the construction activities. The interim loss of existing vegetation and the time when the revegetated areas become established would result in a temporary decrease in available habitat. Enhancement activities are anticipated to have minimal impacts to Preble's habitat as surface disturbances should be minimal. Restoration activities are also anticipated to result in minimal surface disturbance of Preble's habitat.

This project would also result in indirect impacts to Preble's mouse and its habitat. Indirect impacts to individual mice could occur from noise caused by project activities, erosion and sedimentation of soils, dust from construction activities, and potential introduction or spread of noxious weeds. During and after construction, opportunistic weeds may colonize disturbed soils, degrading habitat and hindering the establishment of native species. However, monitoring and weed management should minimize any habitat loss associated with invasive plants.

A common indirect effect with transportation projects can be the facilitation of and access to new areas for land use change and development. This is not a significant concern along this segment of SH 105 as nearly all developable land has already been developed. CDOT owns and maintains one of the larger undeveloped parcels specifically for Preble's mouse conservation and the regulatory floodplain associated with Dirty Woman Creek prevents development of many of the higher quality Preble's mouse habitat areas upstream. The proposed action would remove some areas from the pool of potentially developable space, with the construction of the water quality pond west of Knollwood Drive and the establishment of the off-site Preble's mouse mitigation area at Lake Woodmoor Drive.

The most significant potential for indirect effects from the proposed action would result from an increase in impervious surface from widened roadways and sidewalk installations. Increased stormwater runoff can degrade downstream water bodies by carrying pollutants and sediment and by elevating water temperatures due to heat transfer from warmer surfaces. Stormwater flows, if not managed properly, can lead to "flash" flows when runoff that historically would have infiltrated into the soil or spread throughout a floodplain is channeled into drains that ultimately outfall into natural features. Such flows, especially if they have high loads of sediment, contribute to stream channel erosion and subsequent degradation of the riparian habitats upon which the Preble's mouse relies. The water quality pond, which is part of the proposed action, is designed to slow these "flash" events and allow for sediment settling that should significantly reduce downstream scour and erosion. The overflow channel that outfalls to Dirty Woman Creek would only convey flows during the 100-year flow events and is lined with riprap to reduce the erosive force of the conveyed flows. The outfall of the culvert at the east end of the project area is similarly designed to reduce the energy of the flow and potential erosion prior to its entry into Dirty Woman Creek. El Paso County would also follow Best Management Practices for stormwater management during construction which would prevent degradation of downstream habitat for the Preble's mouse. Additional details about impacts are in Section 4.0 (pp. 10-15) of the biological assessment.

Because of the short duration of the proposed project (approximately six months), we do not think that climate change will affect the species.

Using the methods provided above in the *Status of the Preble's Meadow Jumping Mouse within the Action Area* section, we anticipate that up to 6 individual Preble's mice would be taken by completion of the project (3.5 acres of cumulative impact x 1.5 mice/acre). Given the amount and type of habitat, we believe that this is a reasonable estimate.

5.2. Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action will be subject to the consultation requirements established in section 7 of the ESA and, therefore, are not considered cumulative to the proposed action. Projects that have undergone prior consultation with the Service are considered in the Environmental Baseline section.

Cumulative effects within the action area include ongoing and future urban development within upland areas within and surrounding the action area which would potentially impact Preble's habitat integrity, connectivity, or quality, and include state, local, and private actions. The Town of Monument has a land use plan that limits development in Preble's habitat, which is predominantly designated as Parks, Trails, and Open Space (Town of Monument 2017) and while some areas of Preble's habitat face encroachment from other land uses (e.g., mixed use, commercial center, light industrial, single-family units) and recreational purposes, many of these areas have already undergone their designated development. Additionally, Preble's critical habitat is associated with riparian areas and therefore, development in these areas (i.e., floodplains) is already limited by national and local floodplain regulations. The restoration of habitat on the project area and the enhancement of the off-site property to the east of the project area would function to alleviate potential future cumulative impacts to the Preble's mouse.

6. CONCLUSION

The Service defines "jeopardize the continued existence of" as to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

Recovery calls for improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria identified in section 4(a)(1) of the ESA (50 CFR § 402.02).

After reviewing the current status of the affected species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the action, as proposed is not likely to jeopardize the continued existence of the Preble's meadow jumping mouse. We base our conclusion on the following:

- The action area constitutes a small portion of the species' entire range. Although take of the Preble's meadow jumping mouse from project construction is likely to occur, the anticipated level is small in proportion to the size of the population. The restoration of the project area and conservation and enhancement of the offsite conservation easement at Lake Woodmoor Drive will maintain long-term protected riparian and upland habitat for Preble's mouse.

- The likelihood of the survival and recovery of the Preble's meadow jumping mouse will not be precluded through implementation of the proposed action.

INCIDENTAL TAKE STATEMENT

1. INTRODUCTION

Section 9 of the ESA and Federal regulations pursuant to 4(d) of the ESA prohibit the take of endangered and threatened animals, respectively, without special exemption. Take is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. The Service further defines "harm" to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The Service defines "harass" as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns, which include but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be undertaken by FHWA so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If FHWA (1) fails to assume and implement the terms and conditions, or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the applicant must report the progress of the action and its impact on the species or subspecies to the Service as specified in the incidental take statement. [50 CFR § 402.14(i)(3)]

2. AMOUNT OR EXTENT OF TAKE

The Service anticipates that FHWA's proposed action will result in incidental take of 3.5 acres of Preble's meadow jumping oust habitat, of which 1.75 acres are permanent and 1.75 acres are temporary, and the incidental take, in the form of *harm*, of no more than six individual mice. This take will be difficult to detect because of the species' small size, solitary nature, and hibernation underground. However, we estimate the amount of take by considering the loss of food, cover, and other essential habitat elements, and disturbance associated with the proposed action.

In the above biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the species.

2.1. Reasonable and Prudent Measures

The reasonable and prudent measures, and implementing terms and conditions, minimize the effects of incidental take that might otherwise result from the action. In addition to the Conservation Measures already proposed as part of the project description, the Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the Preble's meadow jumping mouse:

1. The FHWA, through El Paso County, will monitor the extent of habitat impacted to ensure that it does not exceed the authorized area or the authorized take limits.

2. The FHWA, through El Paso County, will monitor all aspects of restoration to assure its completion and success.

3. The FHWA, through El Paso County, will ensure that best management practices and conservation measures designed to minimize take are implemented and successful.

2.2. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring. These terms and conditions are non-discretionary.

The following terms and conditions implement reasonable and prudent measures:

1. The FHWA, through El Paso County, shall ensure that proposed conservation measures (outlined above and in the biological assessment), are formally adopted and implemented.

2. The FHWA, through El Paso County, or their agent will designate a qualified environmental manager or management team to be onsite to inform workers of permit conditions, monitor construction, and assure that habitat avoidance and conservation measures are implemented.

3. The FHWA, through El Paso County, will ensure that implementation of Preble's meadow jumping mouse habitat restoration will be supervised by a qualified ecologist experienced in habitat restoration. This includes implementation of an approved integrated weed management plan.

4. The FHWA, through El Paso County, will include as a binding condition of project approval that annual monitoring of onsite restoration and offsite conservation and enhancement efforts, and management of noxious weeds be conducted. Monitoring will extend for at least three growing seasons (or until such a time as FHWA and the Service determine that proposed revegetation has been successfully completed. Success criteria were described previously in Section 1.3, ***Success Criteria for Habitat Mitigation*** section on page 9 as well as in the as well as in the memo from SMITH on July 25, 2022.

5. In the unlikely event a Preble's meadow jumping mouse or any other federally listed species is killed or injured during project activities, notify the Service's Colorado Field Office in Lakewood ((303) 236-4773) within ten (10) days.

The Service believes that the proposed action would adversely affect no more than 3.5 acres of Preble's meadow jumping mouse habitat, resulting in incidental take of no more than six Preble's meadow jumping mice. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action.

If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The FHWA must immediately provide an explanation of the causes of the increased level of taking and review with the Service the need for possible modification of the reasonable and prudent measures.

3. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We have no conservation recommendations at this time.

4. REINITIATION NOTICE

This concludes formal consultation on proposed federal actions related to construction of the SH 105 Improvements Project in El Paso County, Colorado. Reinitiation of this consultation may be required if:

1. The amount or extent of incidental take is exceeded;
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;
3. The agency action is subsequently modified in a manner that causes an adverse effect to the listed species or critical habitat that was not considered in this opinion; or
4. A new species is listed or critical habitat designated that may be affected by the action.

If, at any time, incidental take exceeds the take authorized by this biological opinion, any operations causing such take must cease pending reinitiation. If the Service can be of any additional assistance, please contact Kristin Salamack of the Colorado Field Office by telephone at (303) 236-4748 or by email to kristin_salamack@fws.gov.

Sincerely,

Liisa Niva
Eastern Colorado Supervisor
Colorado Ecological Services Office

cc: FHWA (Jeff Bellen)
CDOT, Region 2 (Gabriel Cosyleon)
CDOT, HQ (Jeff Peterson)

Reference: I:\Salamack\CDOT\Consultations_2022\Region 2\SH 105 Project A\BO

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