United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
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IN REPLY REFER TO:
ES/CO: ES/LK-6-CO-2013-F-024
Preble's / USACE / Chatfield Reservoir Storage Reallocation Project
TAILS: 06E24000-2013-F-0403

AUG 8 2013

Eric Laux, CENWO-PM-AC
U.S. Army Corps of Engineers, Omaha District
Planning Branch
1616 Capitol Avenue
Omaha, Nebraska 68102–4901

Re: Biological Opinion on Impacts to the Federally Threatened Preble's Meadow Jumping Mouse from the Chatfield Reservoir Storage Reallocation Project

Dear Mr. Laux:

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), this document transmits the U.S. Fish and Wildlife Service's (Service's) final biological opinion on impacts to the federally threatened Preble's meadow jumping mouse, or Preble's (*Zapus hudsonius preblei*), from the U.S. Army Corps of Engineers' (Corps') proposed **Chatfield Reservoir Storage Reallocation Project** in Douglas and Jefferson Counties, Colorado. We received your March 18 request for formal consultation on March 21, 2013.

The Corps' proposed project would reallocate a maximum of 20,600 acre-feet of water into the Chatfield Reservoir, which will raise the elevation of the permanent pool a maximum of 12 feet as measured at mean sea level. The proposed increase of the pool would affect 454 acres of Preble's habitats, including a total of 155.2 acres of federally designated critical habitat for the Preble's in the Upper South Platte and West Plum Creek Critical Habitat Units. The relocation of recreational facilities would affect 104.5 acres of Preble's habitats, including affects to 0.48 acre of designated critical habitat within the Preble's West Plum Creek Critical Habitat Unit 9. Finally, the proposed Sugar Creek Mitigation Project would affect 20.86 acres of Preble's habitats. As a result, you request concurrence with your determination that the proposed project may affect, and is likely to adversely affect, the Preble's and its designated critical habitat.

You also request concurrence with your determination that the proposed project may affect, but is not likely to adversely affect the federally endangered interior least tern (*Stema antillarum athalossos*), and the federally threatened piping plover (*Charadrius melodius circumcenctus*) when they occur within the proposed project area in Colorado. You also request concurrence with your determination that the proposed project will not affect other federally listed species in

Colorado, including the federally threatened Pawnee montane skipper (*Hesperia leonardus montana*).

We base this biological opinion on the project description and Tetra Tech's biological assessment (BA) dated February 2013, as well as any subsequent clarifying correspondence. The BA addresses the proposed project's potential direct, indirect, and cumulative impacts to federally listed species and subspecies that occur in Colorado. You evaluated the proposed project's potential adverse effects to federally listed species and their designated critical habitat along the Platte River in Nebraska in a supplemental BA prepared under the Platte River Recovery Implementation Program (PRRIP). We responded to your request for formal consultation regarding the Platte River species in Nebraska in a separate biological opinion (Biological Opinion: ES/LK 6-CO-2013-F-022).

Based on the information that you provided, the Service concurs with your determination that the proposed project is likely to adversely affect the Preble's and its designated critical habitat. Our attached biological opinion addresses the anticipated adverse effects to the Preble's and its designated critical habitat. Following our review of the current status of the Preble's, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Preble's or adversely modify its designated critical habitat.

Not Likely To Adversely Affect Determinations for Federally Listed Species in Colorado

Interior Least Tern and Piping Plover:

You request concurrence with your determination that the proposed project may affect, but is not likely to adversely affect, the federally endangered interior least tern (*Stema antillarum athalossos*), and the federally threatened piping plover (*Charadrius melodius circumcenctus*) when they occur within the proposed project area in Colorado. These birds migrate through Colorado and were each observed only once at Chatfield Reservoir during 10 years of surveys. Although extremely rare, the birds may use Chatfield Reservoir's sandy or gravelly shorelines as stopover sites to feed or shelter when migrating. The birds are not known to nest at Chatfield Reservoir.

During wet years with more precipitation, the proposed project would raise Chatfield Reservoir's pool level above target elevations, which may affect the interior least tern and the piping plover by reducing the availability of the birds' preferred sparsely vegetated shorelines. However, during dry years, pool level drops may provide more exposed shorelines around Chatfield Reservoir for the migrating interior least terns and piping plovers.

Due to the rarity of the interior least tern and piping plover at Chatfield Reservoir, it is extremely unlikely that fluctuating pool levels and the corresponding loss or gain of exposed shorelines would adversely affect these birds. Potential affects would likely be discountable, insignificant, and not likely to result in take. Therefore, based on the information that you provided, we concur with your determination that the proposed project may affect, but is not likely to adversely affect, the interior least tern or the piping plover.

Pawnee Montane Skipper:

You also request concurrence with your determination that the proposed project will not affect the federally threatened Pawnee montane skipper, or skipper (*Hesperia leonardus montana*), a small, ochre-colored butterfly endemic to dry, open ponderosa pine (*Pinus ponderosa*) woodlands in Douglas, Jefferson, Teller, and Park Counties, Colorado. As explained below, we do not agree with your effects determination for the skipper based on the information that you provided.

The skipper lives only on the Pike Peak Granite Formation of the South Platte River drainage near Deckers, Colorado, with a highly restricted range of approximately 37.9 square miles (24,256 acres; 9,816 hectares). The geographic overlap of the skipper's primary food plants restricts its distribution. The skipper does not occupy the Chatfield Reservoir action area due to its restricted distribution and the lack of habitat. However, the Sugar Creek Mitigation Project action area in the Pike National Forest provides known-occupied skipper habitats. Habitat mapping and long-term monitoring surveys confirm that skippers occupy the Pondersoa pine forests above Sugar Creek's riparian habitats.

The proposed Sugar Creek Mitigation Project in Douglas County aims to improve Sugar Creek's riparian and aquatic habitats for the Preble's by reducing erosion and sedimentation caused by erosive slopes and a dirt road that parallels the creek. Along a 4.5-mile stretch of Sugar Creek, crews would replace and install 55 culverts, construct 6 drop structures, and install 5 small mammal passage culverts. Additionally, crews would thin trees by hand on approximately 5.0 acres, or 2,800 linear feet (0.5 mile; 853 meters), of the forested slopes above Sugar Creek. Tree thinning aims to decrease shading of Sugar Creek's riparian vegetation and promote the growth and expansion of riparian shrubs to benefit the Preble's.

Thinning the ponderosa pine forests above Sugar Creek would temporarily disturb approximately 5.0 acres of known-occupied skipper habitat and may affect the skipper. Workers and machinery could collide with flying adults or crush skipper eggs or larvae. Workers and machinery may trample or crush food plants, making them unavailable to skipper adults or larvae. Additionally, increased noise and activity from machinery or workers when installing the culverts, constructing the drop structures, or thinning trees could temporarily disturb skippers that may be feeding, breeding, sheltering, or flying through the project area.

However, long-term monitoring surveys suggest that skippers occur in very low densities, with approximately 0.67 to 1.67 skippers per acre (CNHP 2007). Low population densities throughout their range suggest that impacts to skipper adults, eggs, or larvae within the proposed project's 5.0-acre disturbance area are extremely unlikely, or discountable. Temporary disturbance to 5.0 acres represents an insignificant decrease, less than 0.02 percent, in the estimated 24,256 acres (9,816 hectares) of available skipper habitats. Increased noise and activity would be temporary and there are suitable habitats nearby available for dispersal. The proposed tree thinning may improve the condition of skipper habitats at Sugar Creek by decreasing shading to promote the growth of the skipper's preferred larval and adult food plants. Therefore, it is extremely unlikely that take would occur because of the proposed project, so we determine that the proposed project is not likely to adversely affect the skipper.

No Effect Determinations for Federally Listed Species in Colorado

Finally, you request concurrence with your determination that the proposed project will not affect the following federally listed species in Colorado:

- The federally threatened Canada lynx (*Lynx canadensis*);
- The federally threatened Mexican spotted owl (*Strix occidentalis lucida*);
- The federally endangered Whooping crane (*Grus americana*) when it occurs within the proposed project area;
- The federally threatened Greenback cutthroat trout (*Oncorhynchus clarki stomias*);
- The federally threatened Colorado butterfly plant (*Guara neomexicana* spp. *coloradensis*);
- The federally threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*); and
- The Gunnison's prairie dog (*Cynomys gunnisoni*), a candidate for listing under the ESA.

The Service does not provide regulatory concurrence under the ESA when a project proponent determines that a proposed project will not affect a federally listed species. Instead, it remains the project proponent's responsibility to carefully and thoroughly analyze, document, and ensure that the project will not affect these species under their "no effect" determination. However, based on the information that you provided, we agree that the proposed project is not likely to impact the seven aforementioned species, due primarily to the lack of suitable or occupied habitats within or near the proposed project area.

Table 1 summarizes the Corps' effects determinations for federally listed and candidate species in Colorado for the proposed project, a summary of the supporting biological rationale, and the Service's corresponding determination regarding the potential impacts.

Table 1. Summary of the U.S. Army Corps of Engineers' effects determinations for federally listed and candidate species resulting from the proposed Chatfield Reservoir Storage Reallocation Project. Adapted from the BA (pp. 26–28). * T = Threatened; E=Endangered; C=Candidate; CH=Designated critical habitat in Colorado.

Federally Listed Species	Status under the ESA*	U.S. Army Corps of Engineers' Effect Determination under section 7 of the ESA (16 U.S.C. 1531 *et seq.*) & 50 CFR 402	Summary of Biological Rationale for the Effects Determination	U.S. Fish & Wildlife Service's Determination
Canada lynx	T	No effect	No suitable or known occupied habitat within entire project area.	Agree
Mexican spotted owl	T CH	No effect	No habitat within Chatfield Reservoir project area. Unlikely to be present or disturbed by activities at the Sugar Creek project area in the Pike National Forest. No CH present.	Agree
Pawnee montane skipper	T	No effect	No habitat within the Chatfield Reservoir project area. Forested slopes along Sugar Creek in the Pike National Forest provide known occupied, suitable habitats. Activities may affect the skipper directly or by temporarily impacting 5.0 acres of habitat. However, effects are extremely unlikely to occur due to small skipper densities.	Not likely to adversely affect
Greenback cutthroat trout	T	No effect	Not found within the project area.	Agree
Colorado butterfly plant	T	No effect	No documented occurrence within the project area.	Agree
Ute ladies'-tresses orchid	T	No effect	No documented occurrence within the project area.	Agree
Gunnison's prairie dog	C	No effect	No known populations within the Chatfield Reservoir project area. Population in the Pike National Forest approximately 3.3 linear miles to the south of the Sugar Creek Mitigation Project, but no suitable or occupied habitat within the project area.	Agree
Whopping crane in Colorado	E	No effect	Last seen in Colorado in 2002, but no documented occurrence within the project area.	Agree
Interior least tern in Colorado	E	May affect, but is not likely to adversely affect	May occupy gravelly or sandy shores at the Chatfield Reservoir when migrating. During dry years, the proposed project may benefit the species by increasing the availability of exposed shorelines. Due to the rarity of species at Chatfield Reservoir, adverse effects are extremely unlikely to occur.	Concur
Piping plover in Colorado	T	May affect, but is not likely to adversely affect	May occupy gravelly or sandy shores at the Chatfield Reservoir when migrating. During dry years, the proposed project may benefit the species by increasing the availability of exposed shorelines. Due to the rarity of the species at Chatfield Reservoir, adverse effects are extremely unlikely to occur.	Concur
Preble's meadow jumping mouse	T CH	May affect, and is likely to adversely affect the species and its critical habitat	The proposed project would inundate approximately 454 acres of Preble's mouse habitat, which includes 155.2 acres of designated critical habitat. May adversely affect the Preble's mouse directly as water rises or through the loss and alteration of riparian and upland habitats.	Concur *Evaluated in Biological Opinion*

CONSULTATION HISTORY:

Table 2 summarizes our consultation history for the proposed project.

Table 2. Summary of the Service's consultation history for the proposed Chatfield Reservoir Storage Reallocation Project between November 10, 2003, and February 7, 2013. Adapted from the BA (p. 43) and the Service's administrative record.

DATE	WHAT	WHO	SUMMARY
November 10, 2003	Meeting	Service, Corps, Tetra Tech	Early coordination.
March 17, 2004	Meeting	Service, Colorado State Parks, Colorado Water Conservation Board, Colorado Parks and Wildlife, Corps, Tetra Tech	Early coordination.
February 10, 2005	Meeting	Service, Corps, Tetra Tech, Ottertail Environmental	Early coordination.
May 10, 2006	Meeting	Service, Corps, Tetra Tech	Discussion regarding the deliniation of Preble's habitats within project area.
May 14, 2007	Meeting	Service, Tetra Tech, Ottertail Environmental	South Platte Water Related Activities Program (SPWRAP) discussion.
July 30, 2007	Meeting	Service, Tetra Tech, Ottertail Environmental	Preble's mitigation discussion.
September 12, 2007	Call	Service, Corps, Tetra Tech	ESA compliance discussion.
November 2, 2007	Meeting	Service, U.S. Forest Service (USFS), Ottertail Environmental	Field trip to critical habitat and potential mitigation sites on Upper South Platte.
November 20, 2007	Meeting	Service, Corps	Mitigation and conservation measures discussion.
February 5, 2009	Meeting	Service, Corps	Update meeting.
March 6, 2009	Call	Service, Corps, Tetra Tech, Ottertail Environmental	ESA coordination discussion.
September 30, 2009	Meeting	Service, USFS, Corps, Tetra Tech, ERO	Preble's mitigation sites on USFS property on Sugar Creek, Upper South Platte.
April 10, 2012	Meeting	Service, Corps, ERO, Tetra Tech	Project status and mitigation plan updates.
June 14, 2012	Meeting	Service, Corps, Tetra Tech	Discussion regarding Service comments on Draft Platte River Recovery Program Implementation (PRRIP) BA.
October 2, 2012	Meeting	Service, Corps, ERO, Tetra Tech	Discussion regarding Service comments on Draft FR/EIS, BA, and Compensatory Mitigation Plan (CMP).
October 19, 2012	Call	Service, Corps, ERO, Tetra Tech	Discusson regarding Service comments on Draft PRRIP BA.
February 7, 2013	Meeting	Service, Corps, ERO, Tetra Tech	Updates, revised BA, revised CMP, and schedule discussion.

BIOLOGICAL OPINION
FOR THE FEDERALLY THREATENED
PREBLE'S MEADOW JUMPING MOUSE

DESCRIPTION OF THE PROPOSED ACTION:

The Corps' proposed action would grant the reallocation of flood storage at Chatfield Reservoir in order to increase the Reservoir's water storage capacity. The proposed action would allow a maximum reallocation of 20,600 acre-feet of water, or a maximum 12-foot increase in the elevation of Chatfield Reservoir's permanent pool, from 5,432 feet above mean sea level (msl) to 5,444 feet msl. The reallocation of storage would enable 12 water providers to capture and store water in Chatfield Reservoir that currently flows downstream. Reallocated waters stored in Chatfield Reservoir would help the local water providers satisfy a rapidly increasing demand for water in the Denver metropolitan area.

Following reallocation of the flood storage at Chatfield Reservoir, the predicted pool level, or elevation, would average 5,440 feet msl, with a maximum target pool level of 5,444 feet msl and a minimum of 5,423 feet msl. The reallocated storage will not fill completely every year due to variations in precipitation. If the reallocated storage does fill completely, it will not remain full at the maximum elevation due to water use and demand. The maximum pool elevation would likely be achieved once every three to four years, but minimum levels would likely be reached more frequently, one out of every three years for at least some part of a year.

Specifically, the proposed project would reallocate water storage from Chatfield Reservoir's flood control pool to its joint flood control-conservation pool. The Corps and the Chatfield Water Providers would fill the joint flood control-conservation pool's reallocated storage space with water from existing or new water rights, including wastewater return flows and other decreed water rights belonging to a consortium of water providers. The water providers would use their existing delivery infrastructure to divert their portion of the stored water into their water systems for municipal, industrial, and agricultural uses.

Specific activities related to the proposed reallocation of water storage at Chatfield Reservoir are: (1) The inundation of lands surrounding Chatfield Reservoir as pool levels rise to the target elevation; (2) the construction of new recreational facilities and infrastructure to replace those lost to inundation; (3) the removal of trees before inundation; (4) changes to reservoir operations; and (5) the Compensatory Mitigation Plan to offset environmental impacts.

1. Inundation

Increasing the base elevation of the pool level at Chatfield Reservoir by 12 feet to the target elevation of 5,444 feet msl would inundate approximately 586 acres (237 hectares) of wetlands, mature cottonwoods, other trees, shrubs, upland grasslands, and woodlands that currently surround the reservoir. Inundation would flood these areas, converting terrestrial habitats to aquatic or semi-aquatic habitats and converting wetlands to deepwater habitats.

The maximum proposed increase of the pool would permanently inundate 454 acres of Preble's habitats, including 75 acres in the West Plum Creek Critical Habitat Unit 9, and 80 acres in the Upper South Platte Critical Habitat Unit 10. Figure 1 illustrates the Preble's habitats surrounding Chatfield Reservoir that would be inundated by the Corps' proposed reallocation of storage to the target elevation of 5,444 feet msl.

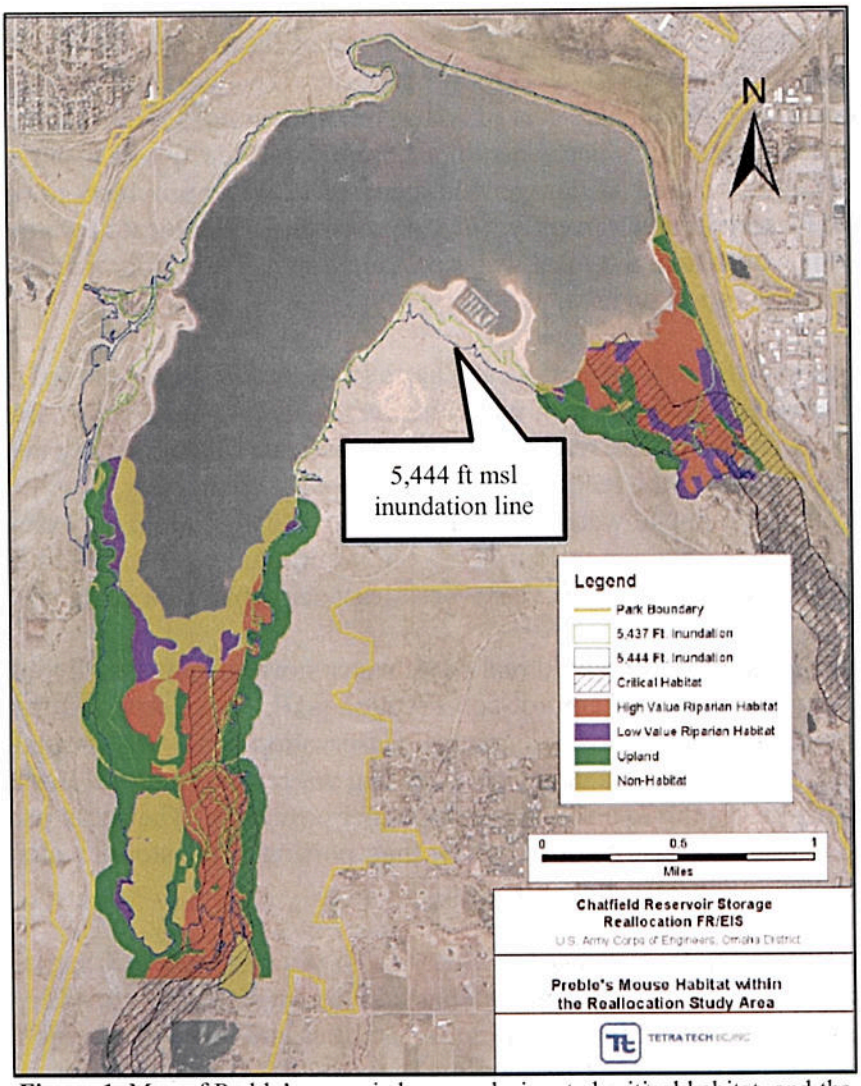

Figure 1. Map of Preble's occupied range, designated critical habitat, and the inundation zone resulting from the reallocated storage at Chatfield Reservoir. Copied from Figure 3 of the BA (p. 48).

2. Relocation of Recreational Infrastructure

The reallocation of storage would inundate existing recreational and transportation infrastructure, such as parks, picnic areas, trails, and roads that surround Chatfield Reservoir. As a result, the proposed project would require the construction of replacement recreational infrastructure and the relocation of some existing roads and facilities that rising water levels would inundate. New or relocated facilities would be constructed on lands immediately surrounding Chatfield

Reservoir. Construction of the new roads and facilities would require workers, machinery, borrow areas for dirt, and temporary access roads.

Most of the construction would occur in upland areas surrounding Chatfield Reservoir that likely do not provide suitable Preble's habitat due to their previously disturbed nature. However, the relocation of recreational facilities would temporarily affect 102 acres of Preble's riparian and upland habitats. The relocation of the recreational trail at the Plum Creek Day Use Area would permanently affect approximately 2.5 acres of riparian habitats used by the Preble's, including 0.25 acres within the Preble's West Plum Creek Critical Habitat Unit.

3. Tree Removal

Before reallocating water storage and inundating lands, the Corps proposes to remove most of the trees currently growing along Chatfield Reservoir's shoreline between elevations of 5,432 to 5,439 feet msl, or approximately 296.3 acres of trees. The Corps may remove up to 357.4 acres of trees if those growing above 5,432 feet msl do not survive. Inundation would kill most trees, and dead trees left in place would be a potential hazard to boaters, visitors, and to dam operations. Trees would also be difficult to remove after inundation. Tree species slated for removal are plains cottonwoods (*Populus deltoides*), narrowleaf cottonwoods (*Populus angustifolia*), cottonwood seedlings, and sandbar willows (*Salix exigua*). The Corps would haul and dispose cut trees, mulch, and debris offsite. Tree removal would not begin until the Corps completed mitigation milestones. The Corps would complete the tree removal in approximately one to three months.

The Corps anticipates that trees growing above 5,439 feet msl are less likely to be killed by the inundation than trees growing at lower elevations below 5,439 feet msl. Trees or other vegetation above 5,439 feet may continue to grow and could possibly encourage the growth of more water-tolerant wetland plants. However, the Corps will adaptively monitor trees above 5,439 feet msl and remove them as needed for safety reasons, particularly when pool levels reach the 5,444-foot msl target. Trees in this zone may be hazardous to boaters and other recreationists. Complete removal below the 5,444-foot target would remove 357.4 acres of trees.

The Corps would leave select trees in place and move some cut trees to elevations outside the maximum 5,444 feet msl pool level to provide habitat for fisheries and wildlife. The Corps' Tree Management Plan (Appendix Z in the FR/EIS) describes the removal and adaptive monitoring of the cut and inundated trees. This plan intends to minimize potential impacts to the Preble's from the preemptive removal of trees.

4. Reservoir Operations: Pool Levels

Following reallocation, the Corps predicts that Chatfield Reservoir's pool levels could fluctuate more widely in the future, with corresponding fluctuations in the flooding or drying of habitats surrounding the pool. Currently, Chatfield Reservoir is managed so that its pool levels do not fluctuate more than 9 feet annually. However, demand for the additional storage space in Chatfield Reservoir could change the volume and pattern of the discharge from current conditions, effectively resulting in greater pool level fluctuations. Under worst-case flood and

drought scenarios, the average annual pool level could fluctuate seasonally by as much as 21 feet, although models predict annual fluctuations averaging 6 to 7 feet for most years.

During years of average precipitation, Chatfield Reservoir's pool levels would rise prior to the onset of the growing season (approximately April 25 to October 11) and peak soon after the start of the growing season in early May (Figure 2). Pool levels would average 5,440 feet msl during a typical growing season for approximately 80 percent of the season. After peaking early in the growing season, the pool levels would recede slowly, by approximately 2 to 3 feet, eventually stabilizing to 5,436 feet msl toward the end of the growing season (October 11) and for the rest of the year (Figure 2). Management of the Chatfield Reservoir may mediate annual pool level fluctuations, as pool level fluctuations would be restricted to maintain levels for recreational purposes during most of the growing season.

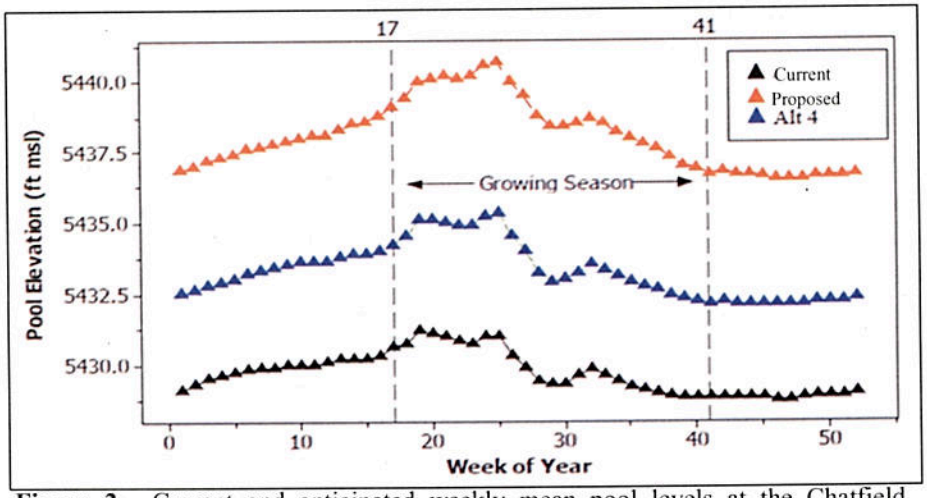

Figure 2. Current and anticipated weekly mean pool levels at the Chatfield Reservoir following reallocation. A typical growing season begins during Week 17 (April 25) and ends by Week 41 (October 11). Adapted from Figure 4 of the BA (p. 49).

During years of average precipitation, Chatfield Reservoir's pool levels would decrease to the low elevation of 5,436 feet msl after the growing season, from October 11 to April 25 (Figure 2). During average years, the target pool elevation of 5,444 feet msl may not always be attained, so inundation of lands surrounding the Chatfield Reservoir may not occur every year. However, if pool levels are successfully maintained at the 5,440-foot msl during the growing season, habitats growing above the target elevation of 5,444 feet msl would stabilize and establish permanently, thereby providing consistent habitats within a range of 4 feet (plus or minus 2 feet) around 5,444 feet msl. During late spring and early summer, models predict an annual peak fluctuation of 3 feet.

During years with more precipitation and floods, Chatfield Reservoir's pool levels could exceed the target pool elevation of 5,444 feet msl. During flood events, pool elevations would flood a larger area of land and impact more vegetation and habitats. Conversely, during dry years with less precipitation, pool levels could drop below the predicted average pool level of 5,440 feet msl. During wet years or dry years, pool levels could fluctuate seasonally by as much as 21 feet. However, flood and drought events typically occur during 6 out of 59 years at Chatfield Reservoir, or only 10 percent of the time. Therefore, floods, droughts, and the corresponding

rise or fall of pool levels would be unpredictable and relatively rare. Additionally, upstream reservoirs along the South Platte River and diversions along Plum Creek may reduce the intensity of flood events. Climate change may increase the frequency and duration of droughts, which when coupled with increasing demand for water, may increase the frequency that minimum pool levels fall below the 5,440-foot msl average.

To summarize, following inundation, pool levels at Chatfield Reservoir may fluctuate more widely around the average and target elevations, up to 21 feet under worst-case scenarios. Dry and wet years would influence the magnitude of the pool level fluctuation, although these events historically occurred relatively infrequently. More droughts and increased demand for water may increase the frequency that pool levels drop below the 5,440-foot msl average. However, overall management of the pool levels, management for recreation during the growing season, and upstream reservoirs, should maintain average 6 to 7-foot yearly fluctuations of the pool levels and the flooding or drying of adjacent shorelines.

5. *Compensatory Mitigation Plan (CMP)*

The Corps proposes to implement its Compensatory Mitigation Plan (CMP) to address and mitigate the proposed project's impacts to the Preble's mouse and other natural resources (Appendix K of the FR/EIS). The CMP details the Corps' proposed mitigation activities to fully offset the proposed impacts to the Preble's and designated Preble's critical habitats. The Corps proposes that the implementation of the CMP would offset adverse impacts to the Preble's from the proposed project. Implementation of the CMP would also maintain the functional conservation role of the Upper South Platte and West Plum Creek critical habitat units for the Preble's.

The CMP assumes that all of the Preble's habitats below 5,444 feet msl would be permanently lost following inundation. The CMP conservatively assumes that only 15 percent of the private lands targeted for offsite mitigation and permanent protection would be available for the protection and enhancement of Preble's habitats. Additionally, the CMP assumes that the Corps and its designated representatives would be able to fund the proposed implementation, management, and monitoring of the mitigation.

The Corps' proposed mitigation to offset impacts to the Preble's and its critical habitat detailed in the CMP include:

- Creating or improving Preble's habitats onsite at Chatfield Reservoir;
- Securing and improving Preble's habitats offsite along the South Platte River and Plum Creek;
- Permanently conserving Preble's habitats on private lands along Plum Creek within the West Plum Creek Critical Habitat Unit; and
- Controlling erosion and sedimentation within Preble's habitats at Sugar Creek within the Upper South Platte Critical Habitat Unit.

The Corps proposes that the implementation of the CMP will fully compensate for adverse effects to the Preble's and its habitats from the proposed project.

The CMP provides specific details regarding the type, location, timing, scope, and success criteria for the proposed mitigation activities. The CMP also provides overarching guidelines for the mitigation activities. For example, the CMP directs the Corps to permanently protect, enhance, and manage onsite and offsite mitigation areas to benefit the Preble's mouse. The CMP also establishes quantifiable mitigation objectives and requires monitoring, reporting, and adaptive management to ensure successful mitigation. The CMP also specifies that onsite mitigation be prioritized on Corps lands closest to the Chatfield Reservoir before the Corps incorporates offsite mitigation.

To mitigate impacts to the West Plum Creek Critical Habitat Unit 9, the Corps identified approximately 5,917 acres (2,395 hectares) of offsite, private lands within the Chatfield Reservoir watershed that could be permanently protected and managed in a way to benefit habitat for Preble's. Offsite mitigation would occur primarily on private lands within the West Plum Creek Critical Habitat Unit 9, immediately upstream from the Chatfield Reservoir. Offsite mitigation will consist of land conservation by either acquisition or easements to protect Preble's habitats. The Corps will protect, manage, and enhance these properties or easements along Plum Creek to maintain or improve current habitat conditions.

Mitigation opportunities to offset impacts to the Preble's Upper South Platte Critical Habitat Unit 10 are limited near Chatfield Reservoir. There are not sufficient opportunities to mitigate all of the impacts onsite within Chatfield State Park. As a result, the CMP describes the Corps' proposal to mitigate Preble's habitats within Unit 10 by improving habitats along 4.5 miles of Sugar Creek in the Pike National Forest. This proposed Sugar Creek Mitigation Project aims to return Sugar Creek to a functioning aquatic and riparian system by reducing the sedimentation of gravel from County Road 67 (Sugar Creek Road) into Preble's riparian habitats. Proposed activities include: Replacing or installing 55 culverts, extending culverts, and installing stilling basins; installing five small mammal passage culverts to promote connectivity; constructing six drop structures; thinning trees over 2,800 linear feet (0.5 mile; 853 meters) to promote the growth and expansion of riparian shrubs. The Sugar Creek Sediment Mitigation Project would permanently impact 0.59 acres and temporarily impact 20.27 acres of Preble's habitats within Unit 10.

The CMP uses a "currency" of ecological functional units (EFUs) to quantify and track onsite and offsite habitat mitigation. The Corps calculates EFUs by rating different habitat types according to their quality. Each habitat type receives an ecological functioning index (EFI) on a unitless scale of 0 to 1. Multiplying the acres of impacted habitats by the EFI for that habitat type yields the number of EFUs lost and required to be mitigated. For example, if a particular 12-acre patch of medium-quality Preble's habitat received an EFI "ranking" of 0.5, 6 Preble's EFUs would be lost following inundation. The total number of EFUs impacted is the sum of EFUs for the entire impact area.

Ecological differences between montane and prairie habitat types prevent the use of EFUs in the Preble's Upper South Platte Critical Habitat Unit 10. The Chatfield Subunit of Unit 10 is a prairie system, with a broad, flat floodplain, but the Sugar Creek Mitigation Project area is a narrow, montane system with riparian habitats confined by steep, mountainous slopes. Therefore, the Corps uses acres and stream miles, instead of EFUs, to track the required mitigation for impacts to the Upper South Platte Critical Habitat Unit 10 from inundation.

Overall, the Corps estimates that a maximum of 789 acres, or 1,180 EFUs, of Preble's, migratory bird, and wetland target environmental resources would be impacted by the inundation and the relocation of recreational facilities. This total consists of 775 EFUs in permanent impacts from inundation, 21 EFUs in permanent impacts from relocating recreational facilities, and 384 EFUs in temporary impacts from activities associated with the construction or modifications to utilities, roads, and recreational facilities. This maximum impact estimate assumes that all of the target environmental resources below 5,444 feet msl in elevation will be lost, but some of the maximum estimated impacts are unlikely to occur. The actual impacts, EFUs lost, and mitigation requirements will be reviewed and verified through monitoring and reporting.

The Corps estimates that reallocating storage at the Chatfield Reservoir would inundate 454 acres, or 275 EFUs, of Preble's habitats along Plum Creek and the South Platte River. The 454-acre total includes approximately 298.6 acres (210 EFUs) of non-critical habitat and approximately 75 acres (65 EFUs) in the West Plum Creek critical habitat unit, and 80 acres in the Upper South Platte critical habitat unit. The relocation of recreational facilities would permanently impact 2 acres (1 EFU) and temporarily impact 102 acres (50 EFUs) of Preble's habitats.

Table 3 summarizes the acres and EFUs of impacts to Preble's habitats from the proposed inundation and recreational facility relocation, and the proposed onsite and offsite mitigation for these impacts.

Table 3. Total acres and ecological functional units (EFUs) of temporary and permanent impacts to Preble's mouse habitats resulting from the inundation and the relocation of recreational facilities, with the corresponding onsite and offsite mitigation required by the proposed Compensatory Mitigation Plan (CMP). Acres for offsite mitigation are unknown until project areas are located and assessed. Adapted from Tables 6 and 7 of the CMP (pp. 89–91, Appendix K of the FR/EIS).

NA* EFUs are not used for impacts to the Upper South Platte critical habitat unit due to differing habitat types.

† Offsite EFUs must be mitigated for within the West Plum Creek critical habitat unit.

‡ The proposed project will improve 4.5 miles of Sugar Creek within the Upper South Platte critical habitat unit.

IMPACT TYPE	PREBLE'S RESOURCE	PERMANENT IMPACTS		TEMPORARY IMPACTS		ESTIMATED MITIGATION			
						ONSITE (est. available)		OFFSITE (max. needed)	
		ACRES	EFUs	ACRES	EFUs	ACRES	EFUs	ACRES	EFUs
Innundation	Non-Critical Habitat	298	210	-	-	111	43	Unknown	167
	West Plum Creek Critical Habitat Unit	75	65	-	-	6	3	Unknown	62†
	Upper South Platte Critical Habitat Unit	80	NA*	-	-	17	NA*	73 acres / 1.3 stream miles‡	NA*
INUNDATION SUBTOTAL		454	275	-	-	134	46	Unknown	229
Recreational Facility Relocation	Non-Critical Habitat	2	1	95	46	100	48	0	1
	West Plum Creek Critical Habitat Unit	0.48	0	6	4	6	4	0	0
	Upper South Platte Critical Habitat Unit	0	NA*	1	NA*	1	NA*	0	0
RECREATION PROJECT SUBTOTAL		2.48	1	102	50	107	52	0	1
PROJECT TOTAL		**456**	**276**	**102**	**50**	**241**	**98**	**Unknown**	**230**

Following project approval, the Corps and the Chatfield Water Providers would immediately begin implementing the CMP so that some onsite mitigation would occur before inundation. Three years following project approval, there would be 100 percent successful implementation of the onsite and offsite mitigation for impacts to Preble's critical habitat. The Corps anticipates that it will take 6 years to implement the entire CMP.

The Corps and the Chatfield Water Providers will develop detailed plans for each offsite mitigation activity in the Upper South Platte and West Plum Creek Critical Habitat Units. These specific plans will be reviewed by the Service and the U.S. Forest Service (USFS) and may require approval under applicable Federal regulations prior to implementation. The Corps' BA evaluates potential permanent impacts to 0.59 acres and temporary impacts to 20.27 acres of designated Preble's critical habitat from the offsite Sugar Creek Sediment Mitigation Project. It does not evaluate potential impacts from future onsite or offsite mitigation projects.

The Corps, the Colorado Department of Natural Resources, and the Chatfield Water Providers would each have complementary responsibilities for ensuring the successful completion of the CMP. Mitigation milestones specified in the CMP are linked to the Chatfield Water Provider's use of the reallocated storage, thereby ensuring that mitigation is accomplished as a prerequisite to proportionate use. The Chatfield Water Providers would provide annual monitoring reports to the Project Coordination Team and the Technical Advisory Committee. A Service representative will participate on the Technical Advisory Committee. The Chatfield Water Providers will also provide annual reports to the Service addressing impacts and mitigation to the Preble's mouse and its habitats and compliance with the terms and conditions specified in this biological opinion.

The Project Coordination Team will be responsible for determining when the defined CMP objectives are satisfied and impacts to the target environmental resources are fully mitigated. The Project Coordination Team can adjust the environmental mitigation requirements if it is determined that the actual impacts to the target environmental resources are less than the maximum impact estimate. The Project Coordination Team and Technical Advisory Committee would coordinate adaptive management according to the Adaptive Management Plan (Appendix GG of the FR/EIS).

CONSERVATION MEASURES:

Conservation measures are actions pledged in the project description that the project proponents implement to further the recovery of a species or subspecies.

Conservation measures proposed by the Corps that will be implemented as part of the project to further the recovery of the Preble's include:

- Implementing the Compensatory Mitigation Plan (CMP) (Appendix K of the FR/EIS);
  - Enhancing and permanently protecting Preble's habits onsite and offsite at Chatfield Reservoir upstream along the South Platte River and Plum Creek prior to inundation and construction;
  - Adaptively monitoring all protected and enhanced mitigation areas as detailed in the CMP;
- Implementing the Tree Management Plan (Appendix Z of the FR/EIS);
- Avoiding and minimizing impacts to the Preble's and its habitats whenever possible;
- Enforcing best management practices (BMPs) to limit construction related disturbance, reduce erosion, prevent sedimentation, and prevent the spread of invasive species.

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 will 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.

The action area exist within the Upper South Platte Watershed, identified by eight-digit Hydrologic Unit Code (HUC) 10190002 (Figure 3). This Watershed includes portions of Arapahoe, Clear Creek, Denver, Douglas, El Paso, Jefferson, Park, Summit, and Teller Counties, Colorado (EPA 2013, p. 1). Both the Preble's West Plum Creek Critical Habitat Unit 9 and the Upper South Platte Critical Habitat Unit 10 occur within HUC 10190002. The HUC contains approximately 26,083.4 acres (10,555 hectares) of occupied Preble's habitat according to the Colorado Parks and Wildlife's (CPW's) occupied range layer (CPW 2007). However, this estimate accounts for only trapped habitats so likely underestimates the actual amount of occupied Preble's habitats within the HUC.

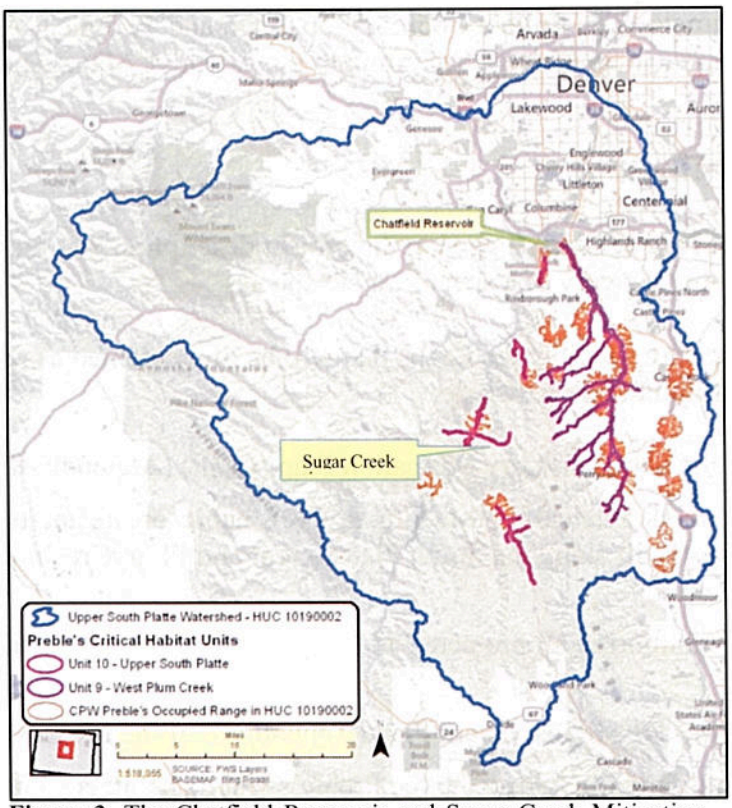

Figure 3. The Chatfield Reservoir and Sugar Creek Mitigation Project action areas exist within the Upper South Platte Watershed, Hydrological Unit Code (HUC) 101900021.

We divide the action area into the Chatfield Reservoir and Sugar Creek Mitigation Project action areas. The Chatfield Reservoir action area includes habitats impacted by inundation, tree removal, relocation of recreational facilities, and compensatory mitigation along the South Platte River and Plum Creek. The Sugar Creek Mitigation Project action area includes 4.5 miles of

Sugar Creek upstream from its confluence with the South Platte River in the Pike National Forest. We describe these action areas in more detail below.

Chatfield Reservoir Action Area

Chatfield Reservoir is located at the confluence of the South Platte River and Plum Creek, southwest of the City of Denver in Douglas, Jefferson, and Arapahoe Counties, Colorado (Latitude: 39.549986°; Longitude: -105.070238°). The Chatfield Reservoir is within the South Platte River Basin, which originates at the headwaters of the South Platte River in Park County and encompasses 3,018 square miles (1,931,520 acres; 781,658 hectares). The USFS manages most of the land along the main stem of the South Platte River upstream from the Reservoir. Plum Creek is the second largest tributary flowing into Chatfield Reservoir.

The Chatfield Reservoir action area includes Chatfield Reservoir and approximately 5,300 acres (2,145 hectares) of Corps' property and Chatfield State Park. The action area extends downstream along the South Platte River to the Adams and Weld County line. The action area also includes portions of the South Platte River, Plum Creek, Deer Creek, Willow Creek, and Massey Draw where they enter Corps' property to their confluence with Chatfield Reservoir. The Chatfield Reservoir action area includes 75.2 acres of designated critical habitat for the Preble's along Plum Creek (West Plum Creek Critical Habitat Unit 9) and 80.0 acres of Preble's designated critical habitat along the South Platte River (Upper South Platte Critical Habitat Unit 10).

Sugar Creek Mitigation Project Action Area

Sugar Creek flows east to west into the South Platte River in the Pike National Forest (Latitude: 39.297675 °; Longitude: -105.160684 °). Sugar Creek's riparian habitats occur within the South Platte Subunit of the Upper South Platte Critical Habitat Unit 10 for the Preble's (Figure 4). The dirt County Road 67 parallels Sugar Creek within the action area. Steep, highly erosive slopes of decomposing granite and mixed-conifer forests surround Sugar Creek and County Road 67. The USFS manages Sugar Creek and its resources that occur within the Pike National Forest. Douglas County maintains County Road 67 within Douglas County pursuant to a written agreement with the USFS.

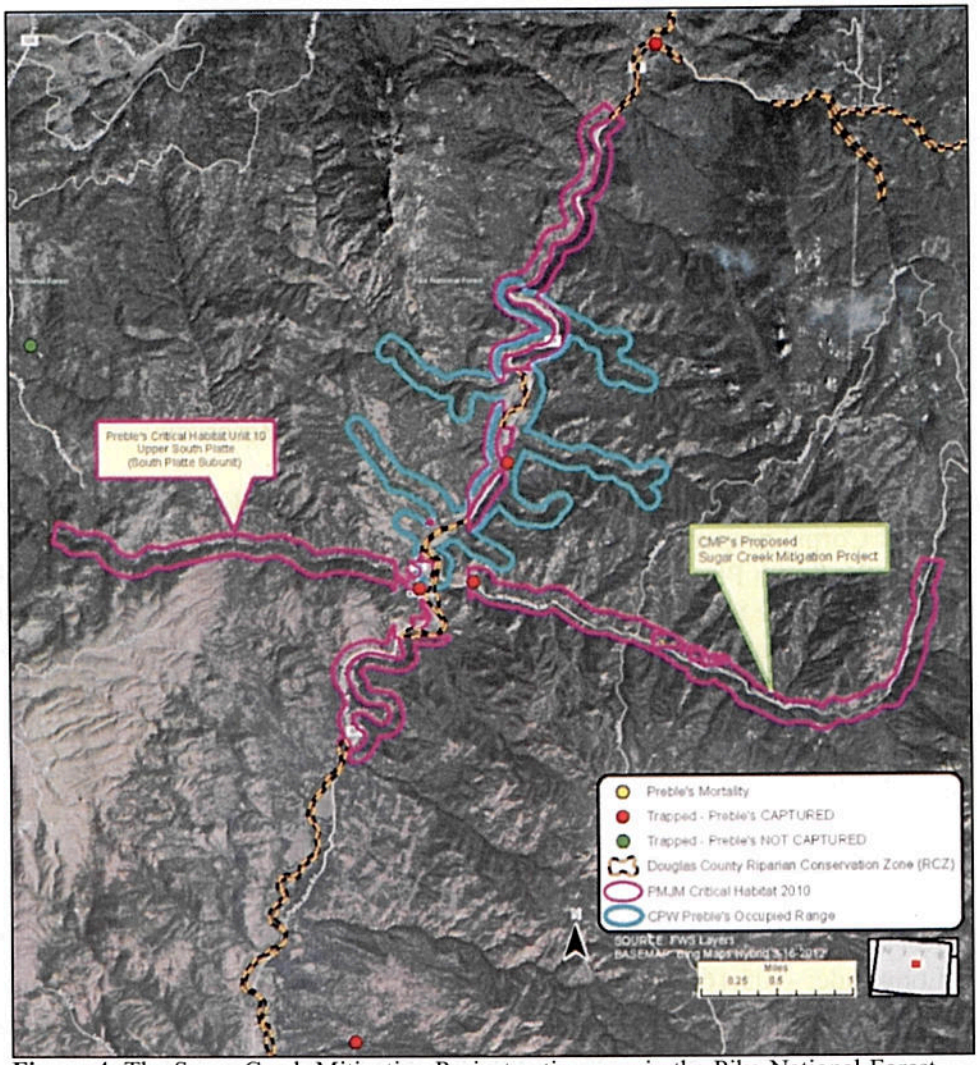

Figure 4. The Sugar Creek Mitigation Project action area in the Pike National Forest with Preble's Critical Habitat Unit 10, Upper South Platte, and the Preble's trapping database.

STATUS OF THE PREBLE'S MEADOW JUMPING MOUSE:

The Service added the Preble's to the List of Endangered and Threatened Wildlife in 50 CFR 17.11 as a threatened species on May 13, 1998 (63 FR 26517). Previous trapping surveys and habitat evaluations confirm that Preble's occupy the Chatfield Reservoir action area upstream from the Chatfield Dam. However, negative trapping results suggest that Preble's do not occupy the Chatfield Reservoir action area north of the Chatfield Dam downstream along the South Platte River, including South Platte Park south to Colorado State Highway C-470. Due to habitat loss associated with human development, the Preble's is not likely to occur along 34 miles (55 kilometers) of the South Platte River downstream from Chatfield Reservoir through Denver to Brighton. The Service block-cleared the Chatfield Reservoir action area north of Colorado State Highway C-470 from the consultation requirements of the ESA for Preble's. Preble's do no likely occur within these downstream portions of the Chatfield Reservoir action area.

Previous trapping surveys and habitat evaluations confirm that Preble's occupy the Sugar Creek Mitigation Project action area.

Taxonomy

The Preble's is a member of the family Dipodidae (jumping mice) with four living genera, two of which, *Zapus* and *Napaeozapus*, are found in North America (Hall 1981). The three living species within the genus *Zapus* are *Z. hudsonius* (the meadow jumping mouse), *Z. princeps* (the western jumping mouse), and *Z. trinotatus* (the Pacific jumping mouse). Edward A. Preble (1899) first documented the meadow jumping mouse from Colorado. Krutzsch (1954) described the Preble's as a separate subspecies of meadow jumping mouse limited to Colorado and Wyoming. Taxonomic authorities recognize the Preble's subspecies of meadow jumping as 1 of 12 subspecies of meadow jumping mouse (Hafner *et al.* 1981). The best available scientific and commercial information indicates that the Preble's is a valid subspecies of the meadow jumping mouse (SEI 2006a, p. 44).

Physical Description

The Preble's mouse is a small rodent with an extremely long tail, large hind feet, and long hind legs, which enable jumping mice to make prodigious leaps (Figure 5). 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 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 5. Adult Preble's meadow jumping mouse, or Preble's (*Zapus hudsonius preblei*), captured at the U.S. Air Force Academy in El Paso County, Colorado. Mouse is in torpor (sleep) due to cold overnight temperatures. (Photo by Craig Hansen, USFWS).

Adult Preble's are approximately 7 to 10 inches (18 to 25 centimeters) long and the tail is 4 to 6 inches (10 to 15 centimeters) long (Krutzsch 1954; Fitzgerald *et. al.* 1994; Fitzgerald *et al.* 2011). The average weight of 120 adult Preble's captured early in their active season prior to June 18 was 0.6 ounces (17 grams); included were 10 pregnant females weighing more than 0.8 ounces (20 grams) (Meaney *et al.*, 2002).

Preble's Life History

Habitat

Preble's live in well-developed, plains riparian vegetation with adjacent, relatively undisturbed grassland communities and a nearby water source. 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 (*Prunus americana*), lead plant (*Amorpha fruticosa*), dogwood *(Cornus sericea*) and others may also occur (Bakeman 1997, Shenk and Eussen 1998).

Preble's have rarely been trapped in uplands adjacent to riparian areas (Dharman 2001; Hansen 2006). However, Preble's feed and rest in adjacent uplands (Shenk and Sivert 1999b; Schorr 2001) as far out as 328 feet beyond the 100-year floodplain (Ryon 1999; Tanya Shenk-Colorado Division of Wildlife, 2002). Adjacent uplands used by the Preble's 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 densities (White and Shenk 2000). Based on habitat quality, estimates of Preble's abundance range from 6 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 (Schorr 2001). However, the Academy sites also had higher densities of both grasses and shrubs. Preble's abundance is likely driven by the density of riparian vegetation rather than the diversity of plant species.

During the active season, Preble's 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 1999a), and may abandon a nest after approximately one week of use (Ryon 2001).

Hydrologic regimes that support Preble's habitat range from large perennial rivers such as the South Platte River to small ephemeral drainages only 3 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.

Hibernation:

Preble's is a true hibernator, usually entering hibernation in September or October and emerging the following May, after a hibernation period of seven or eight months. Adults enter hibernation first before than young of the year because they accumulate the necessary fat stores. Similar to other subspecies of meadow jumping mouse, Preble's do not store food for hibernation. Instead, the Preble's metabolizes fat stores accumulated prior to hibernation (Whitaker 1963). Hibernacula (hibernation nests) of Preble's have been located both within and outside of the 100-year floodplain of streams (Shenk and Sivert 1999a; 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 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 1999a; Schorr 2001).

Hibernacula have been located under willow, chokecherry, snowberry, skunkbrush, sumac (*Rhus* spp.), clematis (*Clematis* spp.), cottonwoods (*Populus* spp.), Gamble's oak, thistle (*Cirsium* spp.), and alyssum (*Alyssum* spp.) (Shenk and Sivert 1999a). At the Air Force Academy near Colorado Springs, 4 of 6 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 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.

Movements and Home Range:

Radio telemetry and mark-recapture data provide insight into the Preble's home ranges and dispersal capabilities. At Plum Creek in Douglas County, Colorado, the Preble's home ranges averaged 1.24 acres (0.50 hectares) based on radio-telemetry (Trainor *et al.* 2012, p. 432). In the Pike National Forest of Colorado, travel distances averaged 1,357 feet (413.9 meters) with an approximate home range size of 1.02 acres (Hansen 2006, p. 158). At the Air Force Academy in El Paso County, Colorado, home ranges were between 0.42 to 9.49 acres (0.17 to 3.84 hectares), with an average home range of 3.48 acres (1.41 hectares) (Schorr 2003, p. 9). During this study, the farthest distance moved by individual Preble's ranged from 43 to 3,176 feet (13 to 968 meters), with an average maximum travel distance of 1,188 feet (362 meters) (Schorr 2003, p. 9). An earlier study documented a Preble's moving as far as 1.1 kilometers (0.7 mile) in 24 hours (Ryon 1999, p. 12). However, compared to radio telemetry data, mark-recapture data suggest that the Preble's 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, p. 10; Schorr 2012b, pp. 1274, 1278).

Reproduction and Lifespan:

Preble's have two litters per year, but may have up to three litters per year. An average of five young is born, but the size of a litter can range from two to eight young (Quimby 1951; Whitaker 1963). Preble's 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, 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 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 1999b; Schorr 2001; Meaney *et al.* 2002). Higher overwintering survival rates indicate that predation or other factors impact Preble's during the active season.

Predation:

Known predators of the Preble's 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*) (Shenk and Sivert 1999a; Schorr 2001). Drowning and vehicle collisions also kill Preble's (Schorr 2001; Shenk and Sivert 1999a). Other causes of death include starvation, exposure, disease, and insufficient fat stores for hibernation (Whitaker 1963).

Diet:

Although fecal analyses provide the best data on Preble's diet, they overestimate the components of the diet that are less digestible. Preble's 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-August), with insects again added in September (Shenk and Sivert 1999a). The shift in diet along with shifts in mouse movements suggests that Preble's may require specific seasonal diets, perhaps related to the physiological constraints imposed by hibernation (Shenk and Sivert 1999a).

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 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. Without long-term trapping studies, our understanding of population densities is limited for the Preble's in Wyoming (WGFD 2005, p. 36; WGFD 2010, p. IV-2-66). In Colorado, we have several population estimates, but little trend information for Preble's populations. In addition, because jumping mouse population sizes in a given area vary significantly from year to year (Quimby 1951, pp. 91–93; Whitaker 1972, p. 4), short-term studies may not accurately characterize abundance. In one ongoing trapping study, population highs of 24 and 69 Preble's per site were estimated for two control sites in 1999; subsequent

trapping in 2002, during regional drought conditions, found no Preble's at either site (Bakeman 2006, p. 11). Over 4 years, Preble's 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 populations (Meaney *et al.* 2003, p. 620).

Because the Preble's occupies 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 2 to 67 mice per kilometer (3 to 107 mice per mile) with a mean of approximately 27 mice per kilometer (44 mice per mile) (Shenk 2004). These above abundance estimates, coupled with sufficient knowledge of occupied stream miles, may provide a rough indicator of Preble's numbers within a stream reach or drainage, but may overestimate actual population size (Hayward 2002). The Recovery Team used the 27 mice per km (44 mice per mi) population estimate (Shenk 2004) to approximate the number of stream miles required to support varying sized populations of the Preble's (USFWS 2003, p. 25).

As with abundance estimates, the difficulty of implementing long-term trapping studies limits the availability of population trend data for the Preble's. Since 1998, there have been few attempts to characterize changes in Preble's populations over time. One long-term study at the Air Force Academy (Academy) in El Paso County, Colorado, provides the most thorough estimate of population trends for the subspecies. Mark-recapture data over 7 years at the Academy suggested that populations were declining (Schorr 2012b, p. 1277).

Preble's Status and Distribution

The Preble's 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 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 (DMNS) houses recently collected specimens. Trappers file survey reports with the Service's Field Offices in Colorado and Wyoming.

In Wyoming, capture locations of mice confirmed as the Preble's, and locations of mice identified in the field as Preble's and released, extend in a band from the town of Douglas southward along the Laramie Range to the Colorado border, with captures east to eastern Platte County and Cheyenne, Laramie County. The Preble's does not likely extend west past the crest of the Laramie Range in Wyoming (Bowe and Beauvais 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 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 was confined to the riparian (river) 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.

The Preble's 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. The Service has used 2,300 meters (7,600 feet) in elevation as the general upward limit of Preble's habitat in Colorado (USFWS 1998). Recent morphological examination of specimens has confirmed Preble's to an elevation of approximately 7,600 feet in Colorado (Meaney *et al.* 2001) and to 7,750 feet in southeastern Wyoming (DMNS, 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 captures).

The Preble's is closely associated with riparian ecosystems that are linear in nature and represent a small percentage of the landscape. If Preble's 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 habitat (USFWS 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 populations. Habitat destruction may impact individual Preble's 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, surveys identified various locations where the subspecies was historically present but is now absent (Ryon 1996). Despite numerous surveys, the Preble's 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 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).

Preble's Occupied Range in Colorado:

A map layer, "Preble's occupied range," developed by Colorado Parks and Wildlife (CPW 2007) estimates the acres of habitats occupied by the Preble's in Colorado. CPW developed this occupied range layer by drawing habitat polygons around points where trappers have captured Preble's. Based on the trapping records, CPW estimated that Colorado supports approximately 89,771.7 acres (36,329.3 hectares) of occupied Preble's habitats.

However, CPW's mapping effort underestimates the actual acres of occupied habitats in Colorado because it incorporates only trapped habitats. The point data used to draw the occupied range polygons records only Preble's captures, but trappers have not trapped all the potential or likely occupied Preble's habitats in Colorado. Although CPW's occupied range map is an underestimate, it is the best available estimate of acres of occupied habitat for the Preble's in Colorado.

Threats to the Preble's

Below we summarize threats to the Preble's. 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).

Agricultural Land Conversions:

Conversion of native riparian ecosystems to commercial croplands and grazed rangelands was identified as the major threat to the Preble's 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 by removing food and shelter. While some Preble's 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 populations. In fact, the large populations of Preble's occur in grazed and hayed areas along Cottonwood Creek, Chugwater Creek, and Horse Creek in Wyoming.

Recreational Trails:

Recreational trail systems frequently parallel or intersect riparian communities and thus are common throughout Preble's. 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 Preble's and cause a decrease in survival and reproductive success.

Habitat Fragmentation:

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

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. 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 populations can no longer persist.

Aggregate mining:

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

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 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 and its habitat. Sewer, water, communications, gas, and electric lines cross Preble's 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.

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 Preble's. The control of noxious weeds may also impact Preble's where large-scale removal of vegetation occurs through chemical treatments and mechanical mowing operations.

Pesticides and Herbicides:

Pesticides and herbicides are used within the range of the Preble's. Inappropriate use of these chemicals may harm the Preble's 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.

Floods:

Floods occur throughout the Preble's range in the Wyoming and Colorado foothills and plains. Preble's and their streamside habitats evolved under historic flood regimes, so populations and habitats naturally respond to floods. While floods may affect Preble's 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. Preble's 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, p. 159). 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 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 populations faced with an increased incidence of flooding.

Wildfire:

Fire, particularly catastrophic fires, can alter habitat dramatically and change the structure and composition of the vegetation communities such that the Preble's may no longer persist. In addition, precipitation falling in a burned area may degrade Preble's 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 habitat. However, over the past several decades, as human presence has increased throughout the Preble's 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 habitats by burning vegetation or increasing catastrophic floods.

Predation:

The increasing presence of humans near Preble's 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.

Preble's Critical Habitat

The Service designated critical habitat for the Preble's mouse in 50 CFR 17.68 on June 23, 2003 (68 FR 37275) and revised critical habitat for the subspecies on December 15, 2010 (74 FR 52066). Critical habitat for the Preble's mouse includes approximately 411 miles of rivers and streams and 34,935 acres (14,138 hectares) of lands in Colorado. Lands designated as critical habitat are under Federal, State, local government, and private ownership. No lands designated as critical habitat are under Tribal ownership.

This biological opinion does not rely on the regulatory definition of destruction or adverse modification of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete our analysis with respect to critical habitat.

Primary constituent elements are physical and biological features essential to the conservation of the species and that may require special management considerations and protection. Primary constituent elements for the Preble's include those habitat components essential for the biological needs of reproducing, rearing of young, foraging, sheltering, hibernation, dispersal, and genetic exchange are:

> (1) Riparian corridors: formed and maintained by normal, dynamic, geomorphological, and hydrological processes that create and maintain river and stream channels, floodplains, and floodplain benches and that promote patterns of vegetation favorable to the Preble's; containing dense, riparian vegetation consisting of grasses, forbs, or shrubs, or any combination thereof, in areas along rivers and streams that normally provide open water through the Preble's active season; and including specific movement corridors that provide connectivity between and within populations. This may include river and stream reaches with minimal vegetative cover or that are armored for erosion control; travel ways beneath bridges, through culverts, along canals and ditches; and other areas that have experienced substantial human alteration or disturbance.
>
> (2) Additional adjacent floodplain and upland habitat with limited human disturbance (including hayed fields, grazed pasture, other agricultural lands that are not plowed or disked regularly, areas that have been restored after past aggregate extraction, areas supporting recreational trails, and urban–wildland interfaces).

Existing human-created features and structures within the boundaries of the mapped critical habitat units, such as buildings, roads, parking lots, other paved areas, manicured lawns, other urban and suburban landscaped areas, regularly plowed or disked agricultural areas, and other features not containing any of the PCEs that support the Preble's are not considered critical habitat.

Designated critical habitat units include only river and stream reaches, and adjacent floodplains and uplands that are within the known geographic and elevational range of the Preble's have at least one of the primary constituent elements present, and, based on the best scientific data available, are believed to currently support the Preble's.

We considered several qualitative criteria to judge the current status and probable persistence of Preble's populations in the selection and designation of specific areas as critical habitat. These include:

- The quality, continuity, and extent of habitat components present;
- The state of natural hydrological processes that maintain and rejuvenate suitable habitat components;

- The presence of lands devoted to conservation, either public lands such as parks, wildlife management areas, and dedicated open space, or private lands under conservation easements; and
- The landscape context of the site, including the overall degree of current human disturbance and presence, and likelihood of future development based on local planning and zoning.

Activities with the potential to alter the primary constituent elements are those that result in development or alteration of the landscape within a unit, including land clearing activities associated with construction for urban and industrial development; some agricultural activities; activities resulting in changes in the hydrology of a unit; activities that detrimentally alter natural processes in a unit, and; activities that could lead to the introduction, expansion, or increased density of exotic plant or animal species detrimental to Preble's and its habitat.

We used the Preliminary Draft Recovery Plan (Draft Plan) for the Preble's (USFWS 2003) and its concepts as a source of the best scientific and commercial data available on the Preble's, and as a springboard to identify areas that are essential for the conservation of Preble's. To recover Preble's to the point where it can be delisted, the Draft Plan identifies the need for a specified number, size, and distribution of wild, self-sustaining Preble's populations across its known range.

The Draft Plan identifies recovery criteria for two Recovery Units where the Preble's occurs: The North Recovery Unit and the South Recovery Unit. The Denver metropolitan area roughly separates the two recovery units. The Draft Plan uses 8-digit HUC boundaries to define subdrainages, and identifies 13 HUCs as occupied or potentially occupied. Of these, six are located in the North Recovery Unit, and seven are located in the South Recovery Unit. Furthermore, the Draft Plan defines large populations as maintaining 2,500 mice and usually including at least 50 miles of rivers and streams. Medium populations maintain 500 mice over at least 10 miles of rivers and streams, and small populations maintain 150 mice over 3 miles of stream. In addition, the Draft Plan calls for one large and two medium populations in three separate HUCs, as well as three small populations within each of the remaining three HUCs within the North Recovery Unit, and one large population and two medium populations in three separate HUCs, as well as three small populations in each of the remaining four HUCs within the South Recovery Unit. We are currently in the process of updating the Draft Plan.

ENVIRONMENTAL BASELINE:

The environmental baseline is the past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal actions in the action area that have already undergone formal or early section 7 consultation, and the effects of State or private actions that are contemporaneous with the consultation in progress.

The proposed project area is located on Colorado's Front Range immediately to the south of the Denver metropolitan area. The proposed project will affect wetlands, riparian, and upland habitats associated with the South Platte River, Plum Creek, and the Chatfield Reservoir.

Status of the Preble's within the Chatfield Reservoir action area

In 1998, multiple trapping surveys captured Preble's along the South Platte River and Plum Creek upstream from the Chatfield Reservoir on the Corps' property (Figure 6). These trapping data, coupled with the availability of contiguous riparian and upland habitats, indicate that Preble's occupy the action area upstream from Colorado State Highway C-470. These trapping surveys were not designed to develop population estimates, so current densities within the Chatfield Reservoir area are unknown.

However, an eight-year trapping study conducted at a control site in high-quality riparian habitats along East Plum Creek, approximately 13.0 miles to the south of the proposed project area, recorded an average population of roughly 25 Preble's per 0.2 mile of stream (Bakeman 2006, pp. 11–12). GIS analysis of these trapping transects yielded a population estimate of approximately two Preble's per acre within high-quality riparian habitats along East Plum Creek. CPW's occupied range layer (2007) estimates that there are 1,764.1 acres of occupied Preble's habitats within the Chatfield Reservoir action area. Therefore, based on the best available information regarding population sizes at East Plum Creek and occupied habitats in Colorado, the Chatfield Reservoir action area potentially supports a population of approximately 3,528 Preble's. However, this is likely an overestimate because it assumes that Preble's are evenly distributed throughout the riparian and upland habitats and that all habitats are high quality.

Trapping surveys have not captured Preble's below Chatfield Reservoir or along Deer Creek. The action area along the South Platte downstream from South Platte Park and Colorado State Highway C-470 do not likely support the Preble's due to urban development and other impacts. As a result, the Service blocked cleared the Denver metropolitan area from the consultation requirements of the ESA for the Preble's.

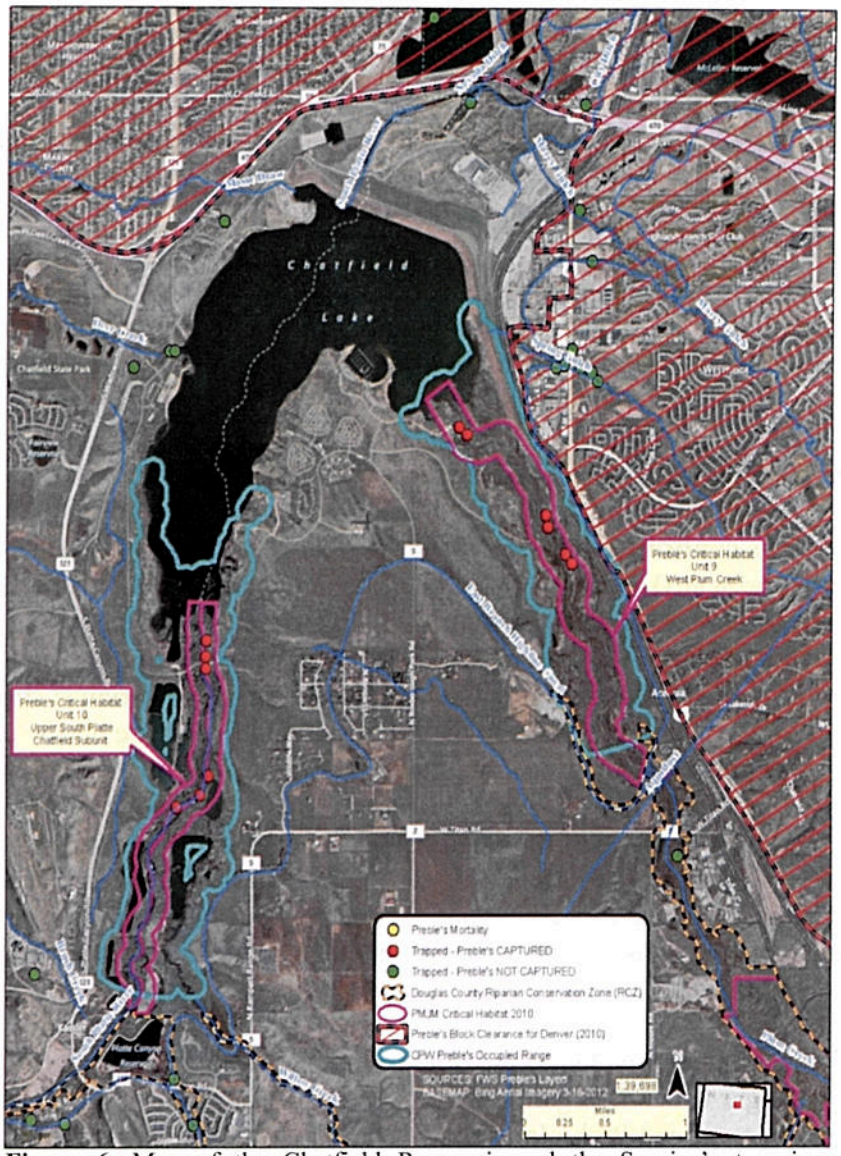

Figure 6. Map of the Chatfield Reservoir and the Service's trapping database for the Preble's, including occupied, designated critical habitat, and the block-clearance zone.

The Corps categorized Preble's habitats within the Chatfield Reservoir action area Creek as:

- **"High Value Riparian":** Riparian habitats along streams and within the floodplain that feature dense stands of multi-storied vegetation, such as herbaceous ground cover, riparian shrub canopies, and multi-age-class tree layers;
- **"Low Value Riparian":** Riparian habitats along streams with limited vegetative cover, such as mid-successional riparian forests with sparse or absent understories, or recently inundated areas that may support vegetation, but not enough to provide dense cover; and

- **"Upland":** Upland habitats of dense, mesic (wet) grasslands, shrublands adjacent to the riparian habitats, often within the 100-year floodplain or extending up to 300 feet outside the 100-year floodplain.

The Corps categorized Preble's habitats as high or low value based on vegetation densities and included areas of non-habitat (Figure 1, above). Preble's may use riparian and upland habitats for breeding, feeding, sheltering, hibernating, or dispersing.

Under Chatfield Reservoir's current operating conditions, pool elevations fluctuate an average of 9 feet annually. Extreme flood events may increase pool levels above target levels and flood habitats, displace active Preble's aboveground, or drown Preble's hibernating underground or in maternal nests.

Status of the Preble's within the Sugar Creek Mitigation Project action area

Previous trapping surveys confirmed that the Preble's and its congener, the western jumping mouse (*Zapus princeps princeps*), occupy the South Platte River and Sugar Creek in the Pike National Forest (Figure 4 above) (Hansen 2006, p. 23). In the Pike National Forest, the South Platte River and its tributaries provide the only contiguous expanses of riparian habitats in a landscape dominated by mountainous terrain. Compared to the broad riparian systems to the east of Colorado's Front Range, riparian habitats in the Pike National Forest are narrow, and confined by steep, forested slopes of rocky decomposing granite (Hansen 2006, pp. 6, 34–38).

Sugar Creek and the 4.5-stream miles of the Sugar Creek Mitigation Project action area occur within the South Platte Subunit of the Preble's Upper South Platte Critical Habitat Unit 10 (Figure 4 above). This subunit includes Sugar and Gunbarrel Creeks and portions of the South Platte River. Sugar Creek provides suitable riparian habitats for the Preble's composed of tall willows and a dense understory.

According to CPW's occupied range layer, the South Platte River and its tributaries immediately downstream from the Sugar Creek Mitigation Project action area support approximately 743.25 acres (300.1 hectares) of occupied Preble's habitats (2007). However, this underestimates the amount of Preble's habitats along these drainages because it includes only trapped habitats along the South Platte River and does not incorporate designated critical habitat along Sugar Creek.

Although Preble's occupy Sugar Creek, the erosion and sedimentation of gravel in the stream has severely impaired the available Preble's riparian habitats. County Road 67's dirt roadbed, highly erosive decomposing granite slopes, and routine road maintenance impaired Preble's habitats by depositing sediment. In some sections of the creek, fine and course sediments accumulated within Sugar Creek's stream channel, prohibiting the growth and expansion of Preble's riparian habitats. Due to erosion and sedimentation, Sugar Creek's aquatic and riparian habitats are the most degraded of all the drainages within Unit 10 on the Pike National Forest.

Trapping surveys at Sugar Creek were not designed to estimate population sizes, so current densities of Preble's within the action area are unknown. Trapping data from a three-year mark-recapture population study at high-quality, relatively undisturbed riparian habitats at Trout Creek in the Pike National Forest, located approximately 8.0 stream miles to the south of Sugar Creek,

estimated jumping mouse populations of less than 1 mouse per stream mile (Hansen 2006, p. 112). Based on this best available population estimate for montane habitats, the 4.5-mile stretch of Sugar Creek may support a population of approximately 5 Preble's. However, Sugar Creek's habitats are more disturbed and much narrower than habitats at Trout Creek, so Sugar Creek's Preble's population is likely smaller.

Regulatory Actions under the ESA Completed by the Service for the Preble's

Since listing the Preble's in May 1998, we have conducted 155 formal consultations pursuant to section 7 of the ESA and issued 21 incidental take permits pursuant to section 10(a)(1)(B) of 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) of the ESA. Table 4 summarizes the total acres of habitat loss exempted or incidental take permitted by the Service through these actions in Colorado and Wyoming. Throughout the Preble's range, we have permitted take of approximately 2.7 percent of CPW's occupied range for Colorado (Table 4). We provided this take to a variety of projects, including residential and commercial developments, roads, bridges, and recreational facilities.

Table 4 - Total acres of permanent and temporary Preble's habitat loss exempted or incidental take permitted by the Service under the ESA between May 1998 and July 2013, in Colorado and Wyoming.
* The total acres of permanent and temporary 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 2013, there are no enrollments in the Livermore HCP and we have not completed any section 10 consultations in Wyoming.
† 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 89,771.7 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.
‡ Project proponents completely restore, and often enhance, temporarily impacted habitats.

Regulatory Authority of the ESA	Number of Exemptions or Permits		Permanent Take (acres)		Temporary Take‡ (acres)	
	Colorado	Wyoming	Colorado	Wyoming	Colorado	Wyoming
Section 7 (Federal consultations)	155	13	377.35	70.97	1,249.06	42.69
Section 10 (non-Federal consultations)	21	0	426 *	0	270*	0
STATE TOTALS =	176	13	803.35*	70.97	1,519.06*	42.69
RANGEWIDE TOTAL =	189		874.32*		1,550.72*	
Percent of Preble's Occupied Range (CPW layer†) in Colorado			0.97%		1.73%	

In Douglas County, we permitted or exempted take for approximately 1.5 percent of CPW's occupied range estimate (Table 5). In Jefferson County, we permitted approximately 0.23 percent of CPW's occupied range estimate. In the Plum Creek watershed, including East and West Plum Creeks, we previously exempted or permitted incidental take of Preble's for approximately 0.14 percent of CPW's estimate of Preble's occupied range in Colorado. In the

South Platte River watershed, including the South Platte River and its tributaries, we previously exempted or permitted incidental take of Preble's for approximately 0.60 percent of CPW's estimate of Preble's occupied range in Colorado (Table 5).

Within the Upper South Platte Watershed (HUC 10190002, Figure 2), we previously exempted or permitted incidental take of Preble's for 87.66 acres of permanent habitat loss and 591.54 acres of temporary habitat loss, or approximately 0.76 percent of CPW's estimate of Preble's occupied range in Colorado (Table 5). We exempted or permitted take for approximately 2.60 percent of the Preble's occupied habitats within the HUC according to CPW's estimate. However, this overestimates the actual percentage of take because CPW's estimate incorporates only trapped habitats and not all potential habitats in Colorado have been trapped.

Table 5- Total acres of permanent and temporary Preble's habitat loss exempted or incidental take permitted by the Service under the ESA between May 1998 and July 2013, in Douglas and Jefferson Counties and specific watersheds.
† Colorado Parks and Wildlife (CPW) estimating that there are 89,771.7 acres of occupied Preble's range in Colorado. According to this layer, the Upper South Platte Watershed Hydrologic Unit Code (HUC) 10190002 supports approximately 26,083.4 acres of occupied Preble's habitats; however this estimate incorporates only trapped habitats and positive captures, so underestimates the actual acres of occupied habitats.
‡ Project proponents completely restore, and often enhance, temporarily impacted habitats.

County or Watershed	Permanent Take (acres)	Temporary Take‡ (acres)	Percent of Preble's Occupied Range (CPW layer†) in Colorado	Percent of Preble's Occupied Range (CPW layer†) in HUC 10190002
Douglas County, Colorado	470.16	866.84	1.5%	Not calculated Extends beyond HUC
Jefferson County, Colorado	55.2	154.32	0.23%	Not calculated Extends beyond HUC
Plum Creek and its Tributaries (Plum Creek Watershed)	54.03	70.35	0.14%	Not calculated Extends beyond HUC
South Platte River and its Tributaries (South Platte Watershed)	336.19	204.69	0.60%	Not calculated Extends beyond HUC
Upper South Platte Watershed (Hydrologic Unit 10190002)	87.66	591.54	0.76%	**2.60%**

Status of Preble's Critical Habitat within the Action Area

The action area includes portions of the West Plum Creek Critical Habitat Unit 9 and the Upper South Platte Critical Habitat Unit 10 for the Preble's (Figure 7).

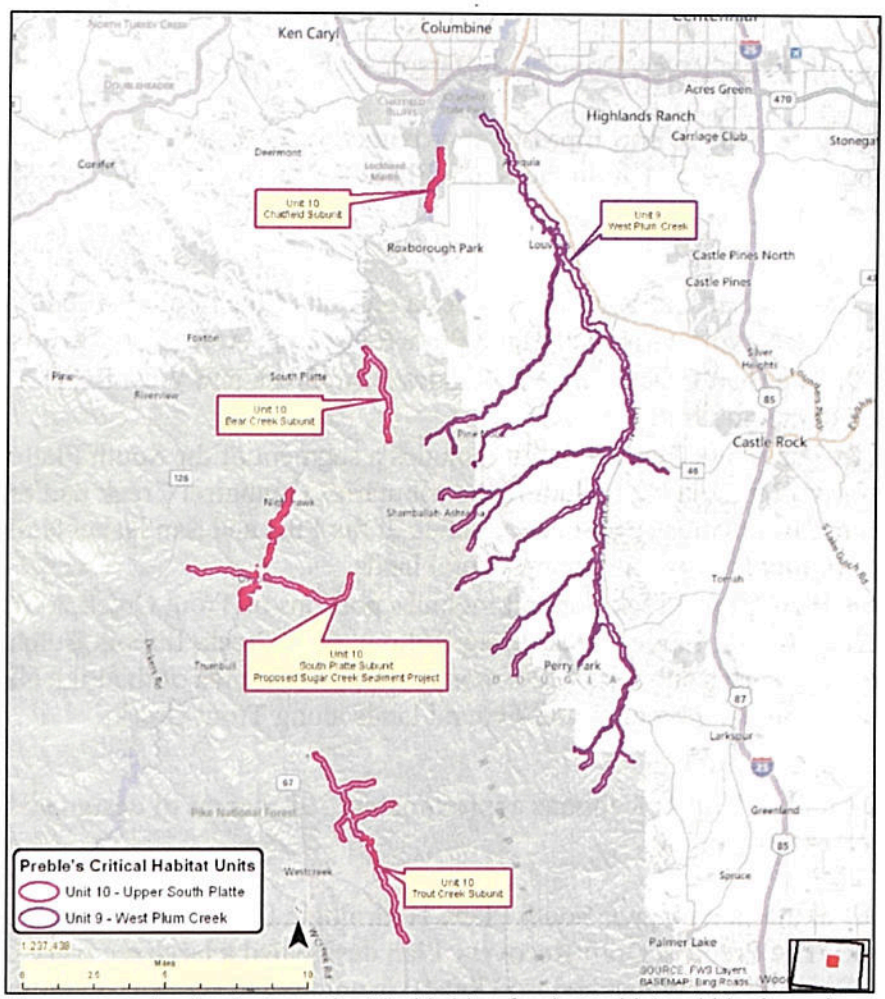

Figure 7. Federally designated critical habitat for the Preble's within the action area and upstream from Chatfield Reservoir. The Upper South Platte Critical Habitat Unit 10 is divided into four subunits.

Unit 9: West Plum Creek Critical Habitat

The West Plum Creek Critical Habitat Unit 9 encompasses approximately 5,518 acres (2,233 hectares) on 90 miles (145 kilometers) of streams within the Plum Creek watershed (75 FR 78454). It includes Plum Creek from Chatfield Reservoir upstream to the confluence with West Plum Creek, continuing upstream on West Plum Creek to its headwaters. Within Unit 9, the outward boundaries of Preble's critical habitat conform to the boundaries of Douglas County's Riparian Conservation Zone (RCZ). The critical habitat unit encompasses both public and private lands.

Critical Habitat Unit 9 is located within the Upper South Platte watershed, and it addresses the large recovery population designated for this watershed in the Preble's Draft Recovery Plan (USFWS 2003). Unit 9 provides habitat components likely to support relatively high Preble's densities and is therefore essential to the conservation of the Preble's by contributing to its redundancy and resiliency (75 FR 78454). Unit 9 continues to experience extensive and widespread suburban and rural development, which degrades and fragments Preble's habitats.

Unit 10: Upper South Platte River, Douglas, Jefferson, and Teller Counties

The Upper South Platte Unit 10 encompasses approximately 3,060 acres (1,238 hectares) on 34 miles (54 kilometers) of streams within the South Platte River watershed (75 FR 78454). Unit 10 features four subunits:

- **Subunit 1:** The Chatfield Subunit includes a section of the South Platte River upstream of Chatfield Reservoir within Chatfield State Recreation Area (Corps property).
- **Subunit 2:** The Bear Creek Subunit includes Bear Creek and West Bear Creek, tributaries to the South Platte River.
- **Subunit 3:** The South Platte Subunit includes a segment of the South Platte River upstream from Nighthawk, including the tributaries Gunbarrel Creek and Sugar Creek. This subunit occurs mostly on Federal lands of the Pike and San Isabel National Forest, but includes some intervening non-Federal lands.
- **Subunit 4:** The Trout Creek Subunit includes portions of Trout Creek, a tributary to Horse (West) Creek, Eagle Creek, Long Hollow, Fern Creek, Illinois Gulch, and Missouri Gulch. This subunit occurs mostly on Federal lands of the Pike National Forest, but includes some intervening non-Federal lands along Trout Creek.

The Chatfield Subunit of Unit 10 contains approximately 297.3 acres of designated critical habitat, or 9.7 percent of Unit 10.

Unit 10 is located in the same Upper South Platte Hydrologic Unit Code (HUC) watershed as West Plum Creek. The Preble's Draft Recovery Plan designated a large recovery population for the entire Upper South Platte Watershed, so Unit 10 is unlikely to serve as an initial recovery population on its own. However, Unit 10 in conjunction with Unit 9 contributes to the Upper South Platte Watershed's designated recovery population.

Unit 10 encompasses four areas of primarily Federal land spread through the South Platte River drainage, three within the Pike and San Isabel National Forest boundary. While requisite PCEs are present, habitat components present and the likely density of Preble's populations vary. The Trout Creek Subunit appears to have high quality Preble's habitat and may provide a continued opportunity to research relationships between the Preble's and the western jumping mouse (*Zapus princeps princeps*), both of which have been verified from the same trapping effort on Trout Creek (Hansen 2006, pp. 110–112).

The four subunits within Unit 10 should ensure that populations of the Preble's sufficient for its conservation are maintained upstream of Chatfield Reservoir on the South Platte River and its tributaries in this portion of the Upper South Platte Watershed HUC. Unit 10 is essential to the conservation of the Preble's because it contains habitat essential to populations of the subspecies that supports the conservation principles of redundancy and resiliency throughout its range in Colorado. Due to Federal ownership, residential or commercial development pressure is minimal; however, the area is subject to substantial recreational use. When designating critical habitat for the Preble's, we recognized that proposed reservoir projects could impact portions of

Unit 10. Based on these and other development pressures, Unit 10 requires special management considerations and protection.

Factors Affecting the Environment of the Preble's and its Critical Habitat within the Action Area

Human populations continue to grow along the Front Range, resulting in an expansion of residential and commercial development. Urban expansion continues to reduce and fragment Preble's habitats. Development may also result in secondary impacts to the Preble's and its habitats. For example, development increases impervious surfaces, such as roofs, roads, and parking lots, which increase stormwater runoff when improperly managed. Increased stormwaters may flood, alter hydrology, increase erosion, and deposit sediment, effectively degrading Preble's habitats. Invasive weeds, commensurate predators, and increased use of the highways, roads, and recreational areas also accompany human development and may impact the Preble's or its habitats.

Dense commercial and residential developments border the Chatfield Reservoir and Chatfield State Park to the north and south. Most development occurs to the south in Douglas County. Undeveloped parcels of private land surrounding Chatfield Reservoir could be developed in the future.

EFFECTS OF THE ACTION

By inundating, removing, or temporarily disturbing habitats, the proposed project would adversely affect a total of 579.16 acres of Preble's habitats, or 23.1 percent of the Preble's occupied habitats within the entire action area (Table 6). Within the Upper South Platte Watershed, the proposed project would permanently affect 1.8 percent and temporarily affect 0.45 percent of the Preble's occupied habitats within the watershed. Rangewide in Colorado, the proposed project would temporarily affect 0.13 percent and permanently affect 0.51 percent of the Preble's occupied range. These percentages overestimate the actual magnitude of each impact because CPW's occupied range map underestimates the actual amount of occupied Preble's habitats in Colorado.

Inundation from rising pool levels would permanently affect 454 acres of Preble's habitats, including a total of 155.2 acres of federally designated critical habitat for the Preble's in the Upper South Platte and West Plum Creek Critical Habitat Units. According to CPW's occupied range layer, inundation would affect 25.7 percent of the Preble's occupied habitats within the Chatfield Reservoir action area (Table 6). Inundation would reduce the acres of habitat provided by the West Plum Creek Critical Habitat Unit 9 by 1.4 percent, the Upper South Platte Critical Habitat Unit 10 by 2.4 percent, and the Chatfield Subunit of Unit 10 by 37 percent (Table 7).

The relocation of recreational facilities would permanently affect 2.5 acres and temporarily affect 102 acres of Preble's habitats, or approximately 5.9 percent of the Preble's occupied range within the Chatfield Reservoir action area (Table 6). Additionally, the proposed Sugar Creek Mitigation Project would permanently affect 0.59 acres and temporarily affect 20.27 acres of Preble's habitats, or approximately 2.8 percent of the Preble's occupied habitats within the Sugar Creek Mitigation Project action area (Table 6).

Table 6- Proposed permanent and temporary impacts to Preble's habitat and corresponding percentage of Preble's occupied range affected within HUC 10190002 and rangewide in Colorado.
† Colorado Parks and Wildlife (CPW) estimated that there are 89,771.7 acres of occupied Preble's range in Colorado. According to this layer, the Upper South Platte Watershed Hydrologic Unit Code (HUC) 10190002 supports approximately 26,083.4 acres of occupied Preble's habitats; however this estimate incorporates only trapped habitats and positive captures, so underestimates the actual acres of occupied habitats within these areas.
* Based on CPW's layer, the Chatfield Reservoir action area supports 1,764.1 acres of occupied Preble's habitats.
‡ Based on CPW's layer, the Sugar Creek Mitigation Project action area supports approximately 743.25 acres of occupied Preble's habitats according to the CPW layer (2007), but does not incorporate trapped or critical habitats along Sugar Creek.

Proposed Project Activity	Temporary Impact (acres)			Permanent Impact (acres)			Total Impact by Activity (acres)	Percent of Preble's Occupied Range (CPW layer†) within Activity or Action Area Affected
	High Value Riparian Habitats	Low Value Riparian Habitats	Upland Habitats	High Value Riparian Habitats	Low Value Riparian Habitats	Upland Habitats		
Inundation at South Platte River	0	0	0	139.0	42.5	95.2	276.7	28.1%
Inundation at Plum Creek	0	0	0	102.5	35.3	39.3	177.1	22.7%
Inundation Subtotal	**0**	**0**	**0**	**241.5**	**77.8**	**134.5**	**453.8**	**25.7%***
Recreation Relocation	0	0	102	0.66	1.66	0	104.5	5.9%
Sugar Creek Mitigation Project	20.27	0	0	0.59	0	0	20.86	2.8%‡
TOTAL:	**20.27**	**0**	**102**	**244.59**	**77.8**	**134.5**	**579.16**	**23.1%**
	122.27			**456.89**				
Percent of Preble's Occupied Range (CPW layer†) in HUC 10190002 Affected	**0.45%** *2.7% with Service's previous actions*			**1.8%** *2.1% with Service's previous actions*			**2.2%** *4.8% with Service's previous actions*	
Percent of Preble's Occupied Range in Colorado (CPW layer†) Affected	**0.13%** *1.9% with Service's previous actions*			**0.51%** *1.5% with Service's previous actions*			**0.65%** *3.3% with Service's previous actions*	

The proposed project may adversely affect the Preble's by drowning or crushing mice, forcing mice to disperse, disrupting normal behaviors, and by removing Preble's habitats that are required for feeding, breeding, and sheltering. Inundation and the relocation of the Plum Creek Day Use Area would adversely affect the Preble's designated critical habitat. Below, we summarize the proposed project's adverse effects to the Preble's and its critical habitat.

Effects to the Preble's

Inundation, Tree Removal, and Pool Levels:

At the target pool elevation of 5,444 feet msl, rising waters would inundate and adversely affect a total of 454 acres of Preble's riparian and upland habitats, or a maximum of 25.7 percent of the Preble's occupied habitats within the Chatfield Reservoir action area (Table 6). Of this total, rising waters would inundate 276.7 acres of Preble's habitats along the South Platte River and 177.1 acres along Plum Creek, or 28.1 percent and 22.7 percent of the occupied Preble's habitats along each stream respectively (Table 6).

The maximum 25.7 percent loss of habitats to inundation would reduce forage, protective cover, breeding sites, and hibernacula available to the Preble's. With less food and cover, reproductive rates may decline and mortality from predators may increase. Habitat loss may also expose Preble's to unsuitable habitats and adverse weather, increasing mortality. Preble's may be unable to locate suitable replacement hibernacula before winter and overwintering mortality may increase.

Rising water levels could drown Preble's or force them to disperse. If water levels rise during the inactive season (approximately November 1 to May 1), Preble's could drown while hibernating in their underground hibernacula. During the Preble's active season (approximately May 1 to November 1), rising waters may drown altricial (dependent) young in maternity nests. Rising waters could force Preble's to disperse, interrupting Preble's normal feeding, breeding, or sheltering activities. Displaced Preble's may encounter less forage, more predators, and decreased reproductive success.

As a riparian obligate, the Preble's is well adapted to its streamside habitats that flood frequently. The Preble's has evolved and persisted under various intensities and frequencies of floods. During the active season, adult Preble's should be well adapted to cope with increasing water levels at Chatfield Reservoir. Preble's swim well (Schorr 2001), so during the active season, adults and self-sufficient young should be able to swim or disperse to dry habitats to avoid drowning as water levels rise. The CMP would ensure that there are at least 241 acres, or 98 EFUs, of suitable replacement habitats available for dispersal upstream from the inundation zone along the South Platte River and Plum Creek before inundation occurs (Table 3 above). Therefore, the Preble's ability to disperse from rising waters may reduce Preble's mortality from the inundation at Chatfield Reservoir. However, hibernating Preble's and altricial young would be unable to flee and could drown.

Water levels at Chatfield Reservoir would steadily increase prior to the start of the growing season while the Preble's are hibernating underground, but Chatfield Reservoir would not achieve peak levels until after the growing season (Figure 2). Water levels would peak after April 25 in early May when most Preble's have likely emerged from hibernation and should be able to disperse to dry habitats. The peak would also occur before females have their first litters, so Preble's may establish their maternal nests outside the inundation zone. These seasonal peaks of the pool levels may reduce mortality associated with the drowning of hibernating Preble's and altricial young.

Prior to the inundation, the Corps would remove between 296.3 acres to 357.4 acres of trees around Chatfield Reservoir's shoreline. Tree removal areas would be inundated. Gradually removing the trees during the Preble's active period may discourage Preble's from establishing their hibernacula, daynests, or maternal nests within the inundation zone. Furthermore, the gradual loss of habitats, coupled with the increased noise and activity from workers and machinery removing the trees, may force Preble's to disperse away from the inundation zone into adjacent upstream habitats. Preemptive onsite mitigation of 241 acres, or 98 EFUs, would increase the amount of habitats available for upstream dispersal. Additionally, the Corps would leave select trees in place and move some cut trees to elevations outside the maximum 5,444 feet msl pool level to provide habitat for the Preble's. Therefore, the removal of trees prior to inundation may reduce Preble's mortality from the inundation. Although adults and self-sufficient young should be able to disperse away from tree removing activities, hibernating Preble's or young in maternal nests would be unable to flee and may be crushed and killed by machinery or workers removing trees. Additionally, dispersal caused by the tree removal activities may increase predation or interfere with normal behaviors.

The CMP details that the inundation of 454 acres, or 275 EFUs, of Preble's habitats will be fully offset by enhancing and conserving Preble's habitats onsite and offsite (Table 3 above). The Corps will conserve a minimum of 134 acres, or 46 EFUs, onsite at Plum Creek and the South Platte River. The remaining mitigation acres, or at least 229 EFUs, will be conserved offsite, primarily along Plum Creek. Successful implementation of the CMP, particularly the preemptive enhancement and preservation of onsite and offsite habitats closest to the inundation zone, will ensure that there are suitable onsite habitats available for dispersal. Additionally, the onsite and offsite enhancement and protection of Preble's habitats will improve the connectivity of habitats along Plum Creek.

Following the initial inundation, Chatfield Reservoir's pool levels would average 5,440 feet msl during the growing season. Pool levels maintained at this elevation would stabilize vegetation above the target elevation of 5,444 feet msl and provide consistent habitat within a margin area of plus-or-minus 2 feet. Once established, these habitats along the new shoreline would be available to the Preble's. Floods may raise the pool above or below the target level. However, Preble's currently encounter occasional flooding of habitats at Chatfield Reservoir caused by fluctuating pool levels. Preble's should be able to adapt to the new average pool level and disperse into the available suitable habitats during floods. The CMP will ensure that there are suitable habitats available for dispersal. Although occasional flooding at the new average pool level may kill hibernating Preble's or altricial young, most Preble's should be able to disperse.

The reallocation would alter flows downstream along the South Platte River. However, there are no known Preble's populations downstream from Chatfield Reservoir to the Adams-Weld County line. Therefore, altered discharge flows from would not adversely affect the Preble's.

At the target pool elevation of 5,444 feet msl, inundation would permanently impact 319.3 acres of low and high value riparian habitats along Plum Creek and the South Platte River. Based on the best available population estimate of two Preble's per acre of riparian habitats at East Plum Creek, if inundation caused the take of all the Preble's within the riparian habitats, inundation could take a maximum of 639 Preble's. Based on CPW's estimate of occupied Preble's habitats at the Chatfield Reservoir action area, this represents an 18 percent decrease from the total

estimated population size of 3,528 Preble's. Because the Preble's are likely more concentrated within the riparian habitats than the uplands, this estimate reasonably considers potential take of Preble's within upland habitats that may be disturbed, forced to disperse, or killed by predators. We believe this calculation conservatively estimates potential take from inundation and tree removal, because it assumes that all the habitats and all the Preble's will be lost. However, some riparian habitats may persist and some Preble's may survive by moving away from the inundation zone.

Despite the maximum 25.7 percent reduction of available Preble's habitats and the maximum 18 percent decrease in Preble's numbers, we conclude that the proposed conservation measures ensure that inundation will not substantially reduce Preble's populations within the Chatfield Reservoir action area. The Chatfield Reservoir action area could still support a large Preble's population. Preble's disturbed by the removal of trees and rising water levels will have the opportunity to relocate to intact, undisturbed, and protected habitats upstream. Additionally, inundation is unlikely to permanently fragment or reduce connectivity within or between populations in the Chatfield Reservoir action area. The permanent protection of mitigation habitats will improve connectivity and protect Preble's populations along the South Platte River and Plum Creek. Therefore, we anticipate that a large Preble's population will continue to persist in the Chatfield Reservoir action area following tree removal and inundation. Preble's populations should also be able to persist at the new pool elevation and adapt to its fluctuations.

The CMP dictates that permanently conserving onsite and offsite habitats to benefit the Preble's will fully mitigate the maximum 25.7 percent habitat loss from inundation. Permanently protecting habitats along the South Platte River and Plum Creek will benefit the Preble's at Chatfield Reservoir by increasing connectivity and reducing the threat of habitat loss.

Relocation of Recreational Infrastructure:

The relocation of recreational facilities and infrastructure would temporarily affect 102 acres of Preble's upland habitats and permanently affect 2.5 acres of riparian habitats, or 5.9 percent of the Preble's habitats in the Chatfield Reservoir action area.

As heavy equipment moves and disturbs ground, Preble's and its habitat may be crushed by tires or covered with soils and debris. Machinery and workers will matt and compact riparian and upland vegetation. Compacted and covered vegetation will be unavailable to the Preble's for feeding, breeding, or sheltering. Crushing by machinery and workers may kill or injure Preble's that are foraging or resting in daynests. Most Preble's should be able to disperse, but workers and machinery may crush hibernating Preble's or young in maternal nests. Vibrations or noise from machinery may force hibernating Preble's to emerge prematurely during the winter when food is scare. Additionally, construction may reduce forage, increase predation, and expose mice to adverse weather conditions.

However, disturbance associated with construction will be temporary and most Preble's should be able to disperse into suitable upstream riparian habitats. The CMP details that Preble's habitats affected by the relocation of recreational facilities will be entirely offset by enhancing and permanently protecting 107 acres, or at least 52 EFUs, onsite at Chatfield Reservoir (Table 3). These habitats would be available to the Preble's for dispersal.

During construction, opportunistic weeds may colonize disturbed soils, degrading Preble's habitat and hindering the establishment of native species. However, adaptive monitoring and weed management should alleviate any habitat loss associated with invasive plants. Furthermore, adaptive monitoring of the temporarily disturbed areas and the CMP's mitigation areas will ensure that habitats are equal or better quality and quantity as present before construction.

Based on the best available population estimate of two Preble's per acre of riparian habitats at East Plum Creek, if the relocation of recreational facilities caused the take of all the Preble's within the riparian habitats, construction could take a maximum of 5 Preble's. Because the Preble's are likely more concentrated within the riparian habitats than the uplands, this estimate reasonably considers potential take of Preble's within the uplands that may be disturbed, forced to disperse, or killed by predators.

Although the relocation of recreational facilities will affect 5.9 percent of the Preble's habitats at Chatfield Reservoir, the affects will be largely temporary and concentrated within upland habitats where Preble's spend less time. Most Preble's should be able to disperse from the construction-related disturbance. The CMP will ensure that there are suitable upstream habitats available for dispersal prior to construction. Enhanced and protected habitats will promote the recovery of the Preble's by reducing the threat of habitat loss to development. The relocation of the recreational facilities will not fragment or reduce connectivity within or between Preble's populations at Chatfield Reservoir. Therefore, we anticipate that the relocation of recreational facilities will not preclude the ability of Chatfield Reservoir to support a large Preble's recovery population.

Sugar Creek Mitigation Project:

The proposed Sugar Creek Mitigation Project would permanently affect 0.59 acres and temporarily affect 20.27 acres of Preble's habitats at Sugar Creek, or approximately 2.8 percent of the Preble's occupied habitats within the action area (Table 6). Machinery and workers installing culverts, digging stilling basins, and thinning trees, may crush and kill Preble's feeding, resting, or hibernating within the project area. Most Preble's should be able to disperse upstream or downstream into suitable riparian habitats; however, hibernating Preble's and altricial young in maternal nests may be unable to disperse and could be killed. Construction noise and activity may disturb Preble's and interfere with normal feeding, breeding, or sheltering behaviors. Effects related to disturbance will be temporary and habitats at Sugar Creek will improve following this project.

Although the Sugar Creek Mitigation Project will affect 1.3 miles of Preble's riparian habitats along Sugar Creek, it will improve and restore 4.5 miles of Preble's habitats by removing and preventing sedimentation and erosion (Table 3, above). Based on the best available population estimate of one Preble's per mile of riparian habitats at Trout Creek in the Pike National Forest, if the Sugar Creek Mitigation Project caused the take of all the Preble's within the riparian habitats, the project could take a maximum of 2 Preble's. Because the Preble's are likely more concentrated within the riparian habitats than the uplands, this estimate reasonably considers

potential take of Preble's within the uplands that may be disturbed, forced to disperse, or killed by predators.

Although the Sugar Creek Mitigation Project will affect 2.8 percent of the Preble's habitats at Sugar Creek, we conclude that the project will not substantially reduce Preble's populations within the Sugar Creek action area or within the Upper South Platte Watershed. Effects will be largely temporary, there are suitable habitats available for dispersal, and Sugar Creek could still support a Preble's population. Habitat conditions will improve and the proposed project will reduce the threats of erosion and sedimentation. Therefore, we anticipate that a Preble's population will continue to persist at Sugar Creek following the Sugar Creek Mitigation Project.

Effects to the Preble's Critical Habitat

The West Plum Creek Critical Habitat Unit 9 and the Upper South Platte Critical Habitat Unit 10 currently provide the habitat elements needed by the Preble's throughout its lifecycle. The proposed project would reduce the acres of habitat provided by the West Plum Creek Critical Habitat Unit 9 by 1.4 percent, the Upper South Platte Critical Habitat Unit 10 by 2.4 percent, and the Chatfield Subunit of Unit 10 by 27 percent (Table 7).

Loss of habitats within the Critical Habitat Units from inundation, the relocation of recreational facilities, and the Sugar Creek Mitigation Project may adversely affect the primary constituent elements (PCEs) for the Preble's provided by each Unit.

Table 7. Proposed permanent and temporary impacts to Preble's designated critical habitat in the West Plum Creek Unit 9 and the Upper South Platte Unit 10 Critical Habitat Units. The table does not include impacts to Unit 10 from the Sugar Creek Mitigation Project.

Habitat Type	Upper South Platte Critical Habitat Unit 10 (acres)	West Plum Creek Critical Habitat Unit 9 (acres)	TOTAL (acres)
High Value Riparian Habitat	79.1 *Inundation only*	45.08 *44.6 by inundation* *0.48 by recreation relocation*	124.2
Low Value Riparian Habitat	0.2	17.9	18.1
Upland Habitat	0.7	12.7	13.4
TOTAL	**80.0**	**75.7**	**155.7**
Total acres within the critical habitat unit	3,265	5,518	8,783
Percent of the Critical Habitat Unit Affected by Inundation and Recreation Relocation	**2.4%**	**1.4%**	**1.8%**

As directed by the CMP, the proposed project will fully offset the loss of critical habitat by enhancing and permanently conserving onsite and offsite Preble's habitats within both Critical Habitat Units 9 at Plum Creek and Unit 10 at the South Platte River (Table 3 above). The enhancement and permanent protection of lands will improve habitat conditions and reduce the threat of development within the Critical Habitat Units.

The Sugar Creek Mitigation Project will permanently impact 0.59 acres and temporarily impact 20.27 acres of Unit 10, or 0.02 percent and 0.62 percent of Unit 10 respectively. However, by reducing sedimentation and erosion, the Sugar Creek Mitigation Project will improve 73 acres and protect 4.3 stream miles of Preble's critical habitats along Sugar Creek. The Sugar Creek Mitigation Project will reduce the threats of erosion and sedimentation, thereby improving Preble's habitats within Unit 10. Therefore, we believe that the permanent loss of 0.02 percent of critical habitats at Sugar Creek will not reduce the Unit 10's ability to support a large Preble's population.

Inundation will permanently reduce the Chatfield Subunit of Unit 10 by 27 percent, which may reduce the Chatfield Subunit's ability to contribute a large Preble's population. However, the 80 acres of critical habitat loss represents only a 2.4 percent reduction in Unit 10 as a whole. Although the Chatfield Subunit will likely support a smaller Preble's population than it did before inundation, the overall 2.4 percent loss of critical habitats will not significantly reduce Unit 10's ability to support a population sufficient for the conservation of the Preble's upstream of Chatfield Reservoir on the South Platte River and its tributaries in the Upper South Platte Watershed. The Chatfield Subunit's remaining 217.3 acres, coupled with Unit 10's three other Subunits, will continue to support a large Preble's population. Additionally, habitat improvements along 4.5 miles of designated critical habitat at Sugar Creek will improve Unit 10's ability to support a large Preble's population. Therefore, the loss of critical habitat within the Chatfield Subunit will not impede the recovery of the Preble's within Unit 10.

The enhancement and permanent protection of onsite and offsite habitats at Plum Creek, the South Platte River, and Sugar Creek, will improve the habitats provided by Critical Habitat Units 9 and 10. Therefore, we determine that the permanent loss of 2.4 percent of Unit 10 and 1.4 percent of Unit 9 will not reduce each Unit's functionality to support large Preble's populations or impede each Unit's ability to contribute to the recovery of the Preble's within the Upper South Platte Watershed. Unit 10 and Unit 9 will continue to contribute to the redundancy and resiliency of the Preble's within the Upper South Platte Watershed and throughout the Preble's entire range. The remaining habitat in each Critical Habitat Unit sufficiently meets the recovery goals for the Preble's within the Upper South Platte Watershed. Additionally, the enhancement and permanent protection of critical habitats will contribute to the recovery of the Preble's by improving connectivity and reducing the threat of habitat loss due to development.

Summary of Effects:

Although inundation, removal of trees, relocation of recreational facilities, and the Sugar Creek Mitigation Project will permanently impact Preble's habitats within the Upper South Platte Watershed, the adverse effects from these activities on the Preble's and its habitats will be temporary. Following inundation, Preble's should adapt to the new, stabilized pool levels and

persist within the remaining and improved habitats. In total, the proposed project will adversely affect 579.16 acres of Preble's habitats, or 23.1 percent of the available habitats in the entire action area. However, the 579.16 acres of adverse impacts represents a small portion, only 2.2 percent, of the Preble's occupied range within the Upper South Platte Watershed, and only 0.65 percent of the Preble's occupied range in Colorado.

Based on the best available population and occupied range estimates, the proposed project will not likely take more than 646 Preble's. Despite this maximum potential loss, the Upper South Platte Watershed will likely continue to support a large Preble's population. The preemptive enhancement and protection of onsite habitats will reduce mortality by ensuring that habitats are available for dispersal. Additionally, the enhancement and permanent protection of onsite and offsite habitats will offset the habitat loss, improve habitats and connectivity, and reduce the threat of development. Therefore, the loss of Preble's and its habitats will not significantly reduce the ability of the Preble's to survive and recover.

The loss of 2.4 percent in the Upper South Platte Critical Habitat Unit 10 and 1.4 percent of the West Plum Creek Critical Habitat Unit 9 would not reduce the ability of each Critical Habitat Unit to support Preble's populations needed to support a large recovery population within the Upper South Platte Watershed. The 27 percent loss of the Chatfield Subunit will not impede Unit 10's ability to contribute to a large population in the Upper South Platte Watershed. Remaining habitats would continue to support the recovery goals for the Preble's in each Unit and within the Upper South Platte Watershed. Further, the enhancement and permanent protection of habitats within Units 9 and 10 would contribute to the Preble's recovery by improving connectivity and reducing the threat of habitat loss to development. Therefore, the project will not appreciably reduce the ability of the Preble's to survive and recover along the South Platte River, Plum Creek, within Critical Habitat Units 9 or 10,within the Upper South Platte Watershed, or rangewide in Colorado.

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 are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Douglas County, Jefferson County, and Colorado's entire Front Range are experiencing substantial human development as human populations grow. Commercial and residential developments are upstream and downstream from the Chatfield Reservoir action area. In Douglas County, intense development continues on lands south of Chatfield Reservoir. Non-Federal impacts from future upstream development, water diversions or withdrawals, or augmentation within or outside Preble's habitats could indirectly affect Preble's at Chatfield Reservoir by altering river flow regimes on Plum Creek, the South Platte River, or its tributaries.

Future transportation projects, residential development, and water supply projects could impact Preble's habitats within the action area. For example, the proposed Plum Creek Reservoir south of the Chatfield Reservoir in Douglas County may impact Preble's habitats within the next five to ten years by inundating habitats or altering flows. However, this project would require

Federal review. We are not aware of any future State, local, or private actions expected to occur within the action area that would not require some type of Federal permitting or review from potential impacts to waterways, wetlands or habitats of federally listed species. Therefore, at this time, we have not identified specific projects that meet the criteria for cumulative effects within the action area.

Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC 2007b), "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1,300 years (IPCC 2007b). It is very likely that over the past 50 years, cold days, cold nights, and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent (IPCC 2007b). Heat waves and drought have become more frequent over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007b).

The IPCC (2007b) predicts that changes in the global climate system during the 21st century are very likely to be larger than those observed during the 20th century. For the next two decades, a warming of about 0.2 °C per decade is projected (IPCC 2007b). Afterwards, temperature projections increasingly depend on specific emission scenarios (IPCC 2007b). Various emissions scenarios suggest that by the end of the 21st century, average global temperatures are expected to increase 0.6 to 4.0 °C with the greatest warming expected over land (IPCC 2007b). Localized projections suggest the southwest may experience the greatest temperature increase of any area in the lower 48 States (IPCC 2007b). The IPCC predicts that it is very likely hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007b). There also is high confidence that many semi-arid areas like the western United States will suffer a decrease in water resources due to climate change (IPCC 2007b). Milly *et al.* (2005) project a 10 to 30 percent decrease in precipitation in mid-latitude western North America by the year 2050 based on an ensemble of 12 climate models.

The climatic record for western North America indicates that concentrations of greenhouse gas (GHG) emissions and mean annual temperatures have increased within the Preble's range. Atmospheric levels of carbon dioxide (CO_2), the product of GHG emissions, have increased from 280 parts per million (ppm) to 390 ppm by volume since 1750, with CO_2 concentrations predicted to potentially reach 850 ppm by 2100 (IPCC 2007, p. 37; Perry *et al.* 2012, p. 824). Mean annual temperatures in western North America increased by 0.5 to 2 degrees C (32.9 to 35.6 degrees F) between 1948 and 2002 (Perry *et al.* 2012, p. 824). Winter and spring temperatures increased significantly and spring warming occurred earlier, while autumn temperatures remained relatively stable during this time (Perry *et al.* 2012, p. 824).

Precipitation predictions for western North America are less clear than the temperature predictions, with variation and uncertainty largely attributable to weather systems, such as El Nino (Perry *et al.* 2012, p. 824). However, most models agree that in the southwest, winter and spring precipitation will decline (Perry *et al.* 2012, p. 825). Over the last 50 to 100 years, the

climatic record shows that warming has reduced total snow cover and snow water equivalents over much of western North America, with continued declines in mountain snowpack (Perry *et al.* p. 825). The warming trend throughout the mountains of western North America has decreased snowpack, hastened spring runoff, and reduced summer flows (IPCC 2007, p. 11). As a result, over the last 50 to 100 years, warming and changes in precipitation increased the frequency and severity of droughts (Perry *et al.* 2012, p. 825). As precipitation decreases and warmer temperatures increase evaporation, the models predict that the frequency and magnitude of droughts will intensify during the next century (Perry *et al.* 2012, p. 825). Increased evaporation due to warming will likely offset any projected increases in precipitation, leading to greater aridity throughout western North America (Perry *et al.* 2012, p. 825).

Climate change is likely to impact the Preble's by reducing the quality and quantity of its riparian habitats. Trends of warming in the mountains of western North America could decrease snowpack, hasten spring runoff, and reduce summer flows (IPCC 2007a). Stream-flow reductions or seasonal changes in flow due to climate change will probably cause a greater disruption in those watersheds with a high level of human development (Hurd *et al.* 1999). The two major river basins that support the Preble's in Colorado have heightened vulnerability to the effects of climate change due to the degree of human development, natural variability in stream-flow, ratio of precipitation lost to evapotranspiration, and groundwater depletion (Hurd *et al.* 1999). Conflicts between human needs for water and maintenance of existing wetland and riparian habitats could increase. 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 2007a). The Preble's will likely be affected negatively by climate change, primarily by changes in stream flows and the resultant effects on its riparian habitats. Adverse impacts seem more likely in those drainages where human demands for water resources are greatest.

Although warmer temperatures and drying from climate change will impact riparian habitats throughout the Preble's range, the future effects of climate change on the Preble's and its habitats at Chatfield Reservoir are uncertain. Climate change may increase the frequency and duration of droughts in Colorado, which when coupled with increasing demand for water, may increase the frequency that minimum pool levels at Chatfield Reservoir fall below the 5,440-foot msl average. Extended durations of below-average pool levels may dry adjacent Preble's riparian habitats, reducing Preble's habitats at Chatfield Reservoir and within the Upper South Platte Watershed. However, pool operations, management of the pool's levels for recreation, and the supply of water from upstream reservoirs, may maintain pool levels and promote stability, which may prevent or slow the drying and loss of adjacent riparian habitats. Pool level drops should not exceed 21 feet under worst-case drought scenarios, which would likely allow some riparian habitats to persist at Chatfield Reservoir under extended periods of drought. Therefore, the proposed project is not likely to substantially increase or decrease the effects of climate change on the Preble's within the action area.

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. We base our conclusion on the following:

- The action area constitutes 2.2 percent of the Preble's range within the Upper South Platte Watershed and 0.65 percent of the Preble's entire range in Colorado according to the best available occupied range estimate. Although take of the Preble's from implementation of the proposed project is likely, the anticipated level is small in proportion to the size of the population as a whole. These impacts would not preclude recovery of the Preble's.

- Preble's habitats at Plum Creek, the South Platte River, and Sugar Creek will be enhanced, protected, and maintained in perpetuity to benefit the Preble's.

After reviewing the status of the Preble's, 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, will not adversely modify designated critical habitat. We base our conclusion on the following:

- Although the proposed project will affect 80 acres of the Upper South Platte Critical Habitat Unit 10 and 75.7 acres in the West Plum Creek Critical Habitat Unit 9, this constitutes 2.4 percent and 1.4 percent of each unit respectively. Sufficient riparian and upland critical habitat would remain after project implementation for each Unit to contribute to supporting a large recovery population within the Upper South Platte Watershed. The temporary and permanent loss of habitat would not have a significant effect on the persistence of the Preble's or on the function of the Critical Habitat Units as a whole.

- The enhancement and permanent protection of Preble's habitats will contribute to the recovery of the Preble's within Critical Habitat Units 9 and 10.

INCIDENTAL TAKE STATEMENT

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 the Corps 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. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (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 to the Service as specified in the incidental take statement. [50 CFR § 402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE:

The Service anticipates that the proposed project will result in incidental take of 579.16 acres of Preble's habitats and the incidental take of no more than 646 individual Preble's mice. This take will be difficult to detect because of the Preble's small size, solitary nature, and hibernation underground. However, we estimate the amount take by considering the loss of food, cover, other essential habitat elements, and disturbance.

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

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:

1. The Corps will monitor the extent of habitat impacted to ensure that it does not exceed the authorized area or the authorized take limits.

2. The Corps will monitor all aspects of onsite and offsite restoration and enhancement to assure project completion and success.

3. The Corps will ensure that best management practices and conservation measures designed to minimize take are implemented and successful.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps 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 Corps shall ensure that proposed conservation measures (outlined above and in the biological assessment and CMP), are formally adopted and implemented.

2. Monitoring reports will be provided annually to the Service by December 1.

3. In the unlikely event that a Preble's is encountered (dead, injured, or hibernating), the Colorado Field Office of the Service shall be contacted immediately at 303–236–4773.

The Service believes that the proposed action will adversely affect no more than 579.16 acres of Preble's habitat, resulting in incidental take of no more than 646 Preble's 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 Corps 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.

CONSERVATION RECOMMENDATIONS:

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act 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.

- The Service has no additional conservation recommendations at this time.

REINITIATION NOTICE:

This concludes formal consultation on the proposed reallocation of storage at Chatfield Reservoir in Colorado. As required by 50 CFR § 402.16, reinitiation of formal consultation is 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.

At any time, if incidental take exceeds the take authorized by this biological opinion, any operations causing such take must cease pending reinitiation.

We appreciate the opportunity to work with the U.S. Army Corps Engineers on the reallocation of storage at Chatfield Reservoir. If the Service can be of further assistance, please contact Craig Hansen of the Colorado Field Office at (303) 236–4749.

Sincerely,

Susan C. Linner
Colorado Field Supervisor

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