



DESERT TORTOISE COUNCIL

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Via email only

21 October 2019

Bureau of Land Management
Ridgecrest Field Office
300 South Richmond Road
Ridgecrest, CA 93555

Attn: Pablo Rodriguez

Via email: prodriq@blm.gov

Via eplanning: [https://eplanning.blm.gov/epl-front-](https://eplanning.blm.gov/epl-front-office/eplanning/comments/commentSubmission.do?commentPeriodId=8000365)

[office/eplanning/comments/commentSubmission.do?commentPeriodId=8000365](https://eplanning.blm.gov/epl-front-office/eplanning/comments/commentSubmission.do?commentPeriodId=8000365)

Mojave Public Utility District

15844 K Street

Mojave, CA 93501

Attn: Bee Coy, Jr., General Manager

Via email: beepud@sbcglobal.net

RE: Comment Letter on the Joint CEQA/NEPA Document - Cache Creek Pipeline Replacement/Relocation Project Initial Study (CEQA) and Environmental Assessment (NEPA), Kern County, California (DPI-BLM-CA-050-2019-0018-EA)

Dear Mr. Rodriguez and Mr. Coy:

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats likely occupied by Agassiz's desert tortoise (*Gopherus agassizii*) (synonymous with "Mojave desert tortoise"), which is a species listed as threatened under the Federal Endangered Species Act (FESA) and California Endangered Species Act (CESA), our comments pertain to enhancing protection of this species during actions conducted on Project Area lands authorized by the Bureau of Land Management (BLM).

Description of Proposed Project: The BLM and Mojave Public Utilities District (MPUD) (collectively, “Agencies”) have jointly prepared the Cache Creek Pipeline Replacement Project Initial Study and Environmental Assessment (Document) to analyze the impacts of MPUD’s proposed relocation of a segment of an existing water line and future operation and maintenance of that line (Proposed Project). The existing pipeline is the only supplier of potable water to the community of Cache Creek and a California Highway Patrol station. The Proposed Project is to relocate and bury this pipeline segment away from the railroad right-of-way and Cache Creek streambed, as washouts have damaged or exposed the pipeline. Up to six miles of proposed pipeline replacement/relocation would occur; two miles would be located on BLM-managed land. The Proposed Project includes appurtenances such as shut-off valves (Mitigation Measure GEO-3) along the pipeline, pumping stations, and pressure-reducing stations. Construction activities associated with relocation of the waterline would take about one year with ongoing operations and maintenance activities continuing for several decades as needed/scheduled. Consequently, MPUD has requested that BLM grant it a right-of-way for the Proposed Project. The Proposed Project would be located near California Highway 58 north-northwest of Mojave, Kern County, California.

Two action alternatives and a No Action alternative are described. The Preferred Action alternative appears to be the Conceptual Alignment, while an Alternate Conceptual Alignment is also presented. The Conceptual Alignment would impact about 31.1 acres, of which 22.6 acres is undisturbed habitat, while the Alternative Conceptual Alignment would impact about 8.2 acres, of which 7.5 acres is undisturbed habitat.

Selection of an Alternative: Of the two action alternatives described, the Council would prefer the implementation of the Alternate Conceptual Alignment rather than the Conceptual Alignment, because it would impact less habitat for special status species including the Mojave desert tortoise and possibly the Mohave ground squirrel (*Xerospermophilus mohavensis*). The Alternate Conceptual Alignment has a western section while the Conceptual Alignment has both a western and eastern section. The Document says, “there is an increased chance of encountering these species [Mojave desert tortoise and Mohave ground squirrel] as the conceptual alignment progresses to the east.”

Pre-project Surveys: We note that the Proposed Project would occur near the northwest extent of the range of the Federally- and State-threatened Mojave desert tortoise and at elevations of about 3,530 feet to 4,050 feet. The Mojave desert tortoise occurs and abundant tortoise sign has been found at 3,900 to 4,200 feet in elevation at other locations in its range (Rautenstrauch and O’Farrell 1998). We conclude that the entire Proposed Project is within the known elevation of the occurrence of the tortoise. Given this information, we note that the Document did not include the results of a pre-project survey for the tortoise as described in the U.S. Fish and Wildlife Service’s (USFWS) (2009) *Desert Tortoise (Mojave Population) Field Manual* and USFWS’s (2018) *Preparing for Any Action that May Occur within the Range of the Mojave Desert Tortoise (Gopherus agassizii)*. Rather it included the results of a biological resources reconnaissance survey and vegetation community assessment (Appendix D). We contend that a protocol-level survey, as outlined by the USFWS, rather than the reconnaissance survey performed, should be required for this and for all projects in potential tortoise habitats. The Agencies need to ensure that these pre-project surveys are conducted and by qualified personnel who are following current USFWS protocol and the results should be included in the Document. Therefore, the Council requests that acceptable protocol-level surveys be performed by qualified biologists prior to any ground disturbance, and that the Agencies use this information to supplement, as needed, the information given in the Document.

We have similar comments for the State-threatened Mohave ground squirrel. The Proposed Project is within the range of this species, yet we were unable to find information on the results of conducting the CDFW's protocol surveys or consultation with that agency, as CDFW requires special survey protocols be developed through its consultation with the project proponent for linear projects greater than 5 miles (CDFG 2010).

Assessing Habitat Conditions in the Action Area: The Document did provide information that demonstrated that it followed the USFWS's guidance for assessing the habitat conditions in the action area as described by the USFWS (2018). We request that this information on habitat conditions be included in the Document so that an accurate assessment of the direct impacts to the tortoise from habitat alteration/loss are presented.

Compliance with the California Endangered Species Act: Section 1.5 of the Document provides a list of the approvals needed prior to project implementation. We note that this list includes Section 7 consultation with the USFWS under the FESA, but does not include obtaining a section 2081 incidental take permit from the CDFW under CESA. We remind the Agencies that if the Proposed Project is likely to result in take of either a Mojave desert tortoise or Mohave ground squirrel, including handling a tortoise, a 2081 permit is required. Because the Document discusses removal of entrapped wildlife from inside pipe infrastructure, which would include any trapped desert tortoises or Mohave ground squirrels, we understand that a 2081 permit is required to authorize this take under CESA. Please include information in the Document about the need to comply with CESA and actions that would be implemented.

Unclear Project Description: We were unable to find information in the Document that describes the final dimensions of the right-of-way that BLM is proposing to grant. Construction equipment staging areas, material storage areas, and temporary and permanent construction easement are mentioned, but it is unclear if they would always be located within the 40-foot wide work area or outside it. Please clarify this. In addition, please provide information on the difference between a temporary and permanent construction easement and how this land use information is incorporated into the calculations for acres affected by the Proposed Project.

The Document mentions "the installation of one to two pressure reducing stations along the alignment between the pipeline high point and the point of connection with the Cache Creek water system." We were unable to locate information in the Document that 1) describes the size of these pressure reducing stations or their approximate locations; 2) analyzes their direct, indirect, and cumulative impacts; and 3) describes mitigation for the Mojave desert tortoise and Mohave ground squirrel and their habitats as a result of the Proposed Project. We request that this information be included in the Document.

We note that much of the proposed pipeline route will occur in existing dirt roadways, which would reduce direct impacts to tortoise habitats. We appreciate the Agencies siting the action alternatives to reduce the area of new habitat disturbance. However, we are concerned about the development of new routes around the construction area and the loss of habitat and other indirect and cumulative effects. If an existing dirt roadway is 15 feet wide and the daily work area is 40-foot wide, we presume the road area would be encompassed in the daily work area. It would not be available for public use. Therefore, we presume a new road outside the work area would be

provided. If so, this would result in an additional loss of acres/habitat for the Mojave desert tortoise and other special status species. Please provide additional information in the Document to clarify the location of the work area with respect to existing roads, how the Proposed Project would maintain the normal access through the area to the public, and how the Agencies intend to restore those portions of the work area that would not be used as a road following completion of construction. We request this information be shown in the calculations for the acres of surface disturbance from the Proposed Project.

Adequacy of Mitigation: Appendix D of the Document, Biological Resources Reconnaissance Survey Report, discusses the mitigation fee BLM would collect as required by the West Mojave Plan. This fee is calculated from the acres of suitable habitat lost from implementation of an authorized action for the species (i.e., the project footprint). This mitigation fee considers direct impacts; it does not consider or provide mitigation for indirect or cumulative impacts.

Although the footprint of the Proposed Project is small and occurs outside designated critical habitat for the Mojave desert tortoise, the biological status and trend of the tortoise indicates that BLM's implementation of the West Mojave Plan (2006) with provisions to mitigate for direct impacts is not working to halt the declining population trend. Results of research described in Allison and McLuckie (2018) reported that between 2004 and 2014: 1) an ongoing downward trend in tortoise population numbers; 2) adult tortoise densities below the population viability level; 3) increased juvenile mortality; and 4) large amounts of adult mortality for much of the range of the Mojave desert tortoise. This tortoise mortality is not accounted for by authorized take (e.g., biological opinions and permits) especially in the Western Mojave Recovery Unit (please see Attachment 1). It indicates that indirect and cumulative impacts, for which BLM is not requiring mitigation, are likely causing/contributing to the decade-long decline of tortoise numbers, densities, reproduction/recruitment, and increased mortality. Because of the biological status and trend of the Mojave desert tortoise, the Council believes the Mojave desert tortoise cannot afford additional indirect and cumulative impacts from authorized actions, even small ones.

We note that the National Environmental Policy Act (NEPA) requires that indirect and cumulative impacts be analyzed (40 Code of Federal Regulations 1502.16, 40 CFR 1508.7, 1508.25, 1508.27) and mitigation be included (40 Code of Federal Regulations 1502.14, 1502.16, 1508.20). The Council requests that the BLM require that direct, indirect, and cumulative impacts of the Proposed Project for construction and operation and maintenance be mitigated and monitored for the life of the Project. For example, such mitigation should include the degradation/loss of habitat from invasive plants [e.g., Sahara mustard (*Brassica tournefortii*)], from fire (should it be caused by MPUD), or hazardous materials; human activity attracting or subsidizing predators of the tortoise; and impacts to tortoises and tortoise habitat from increased use of roads or new access created. The BLM should require that management and monitoring plans are developed and implemented for these impacts for the life of the Project; and, specifically, that an exotic and invasive weed management plan be developed for this Project. In addition, if lands are acquired as compensation for direct impacts, they should be managed for the benefit of the Mojave desert tortoise and the ecosystem in perpetuity and not be subject to multiple use. The Council is available to work with the BLM and MPUD to develop appropriate mitigation for direct, indirect, and cumulative impacts commensurate with the amount and degree of this impact, after the analyses of these impacts is added to the Document.

Appendix D of the Document describes disturbed and ruderal areas of vegetation in the project footprint as unsuitable habitat for the tortoise. While the Council agrees that disturbed/ruderal areas would not support all the life requisites of the tortoise, we note that such areas are used by the species, especially when the areas are located near habitats that provide one or more of the life requisites for these species, as a tortoise may use more than 1.5 square miles of habitat and may make periodic forays of more than seven miles (Berry 1986). The *Desert Tortoise Field Manual* (USFWS 2009) says “desert tortoise habitat is defined as: 1) areas with presence of desert tortoises or desert tortoise sign (*e.g.*, shells, bones, scutes, scats, shelter sites, tracks, egg shell fragments, courtship rings, drinking sites, etc.) that are likely to be part or all of a lifetime home range, 2) dispersal areas (*i.e.*, habitat corridors), or 3) areas suitable for desert tortoises as identified by the USFWS or in the most recent recovery plan for the Mojave population of the desert tortoise.” Depending on the location of these disturbed/ruderal areas of vegetation, they may be important areas used by desert tortoises. These areas should not be dismissed from the acreage calculations for mitigation without additional evaluation of their value to the tortoise.

Common ravens (*Corvus corax*) are known predators of the Mojave desert tortoise and their numbers have increased substantially because of human subsidies of food, water, and sites for nesting, roosting, and perching to hunt (Boarman 2003). Ravens are able to fly at least 30 miles in search of food and water on a daily basis (Boarman et al. 2006) and coyotes (*Canis latrans*) can travel an average of 7.5 miles or more daily (Servin et al. 2003). Thus, providing human subsidies for coyotes of food or water and for common ravens of food, water, and sites for nesting, roosting, or perching means their availability to prey on the desert tortoise extends up to 7.5 to 30 miles from the Proposed Project, respectively. The Fremont-Kramer Tortoise Conservation Area is within 30 miles of the Proposed Project and the daily flight of ravens.

Any surface disturbance or increased human activity (such as described in the Proposed Project) will provide food subsidies for the common raven and coyote. These subsidies occur when invertebrates and small vertebrate animals are exposed, injured, or killed during construction and operation and maintenance activities and when workers bring food to and produce trash at a project site. In addition, the Document says, “Dust control of access roads and disturbed areas [will occur] via watering.” While watering suppresses the production of dust, watering that forms puddles unintentionally provides a water subsidy for common ravens and coyotes. Please ensure that all standard measures to mitigate the local, regional, and cumulative impacts of raven predation on the tortoise are included in this Document, including developing a raven management plan for this specific project. USFWS (2010) provides a template for a project-specific management plan for common ravens. This template includes sections on construction, operation and maintenance, and decommissioning/removal (including restoration) with monitoring and adaptive management to ensure the measures are successful (USFWS 2010). BLM should require MPUD to contribute to the National Fish and Wildlife Foundation fund for the indirect and cumulative impacts of the Proposed Project, including demolition of existing booster stations and other surface disturbance areas.

Specific Comments

Table Bio-7 states that the prairie falcon is a CDFW Watch List species, but it is protected under Fish and Game Code Section 3503.5, which states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by FGC or any regulation adopted pursuant thereto.

Mitigation measures BIO-9 states “All equipment will be clean and free of mud/debris prior to entering the Project area to prevent the spread of invasive plants.” This measure should include all vehicles associated with the construction, operation and maintenance, and demolition activities for the Proposed Project.

Mitigation Measure BIO-11 says, “Within 72 hours of the construction start, a qualified biologist will perform a preconstruction survey to identify any potential special-status wildlife along the alignment. If the Mojave desert tortoise or Mohave ground squirrel are detected along the corridor, then avoidance measures including buffers will be implemented to protect these species. Additionally, these observations will be reported to the Agencies within 24 hours so that appropriate mitigation can be implemented.” We found the wording of this mitigation measure might be interpreted two ways. As currently worded, the surveys could occur as much as 72 hours after the start of construction. Therefore, we request this mitigation measure be reworded to state that “Within 72 hours **before** the construction start...” In addition, any observations of Mojave desert tortoise or Mohave ground squirrel should be reported to the USFWS and CDFW (including a formal California Natural Diversity Data Base report), respectively, in addition to the BLM, and as indicated above, will likely require issuance of a State 2081 incidental take permit, pending input from CDFW.

In the Section under Environmental Effects/Impacts, Special-status Species, Desert Tortoise and Mohave ground squirrel, it describes that these species are more likely to be encountered in eastern locations of the Project area. However, when considering the effects from predicted climate change and warming, they may be found further west than expected.

Mitigation Measure BIO-14 says “All trenches that will be left open overnight will be either fenced, covered, or have the ends sloped at a 3-to-1 ratio and an earthen bridge/ramp installed...” to prevent the entrapment of wildlife. We are not sure how the trenches will be covered or fenced to prevent entrapment of all wildlife species. Many species of wildlife can climb fences or are sufficiently small (e.g., hatchling tortoises) that they would seek shelter under a trench cover that was not flush with the ground and fall into the trench. While this is an unlikely occurrence, we believe that implementation of this mitigation measure as written may be difficult to achieve.

In addition, Mitigation Measure BIO-14 says, “All trench entrapped wildlife will be removed if safe to do so or allowed to escape voluntarily via escape ramps prior to construction resuming.” We remind the Agencies that any individual of a species listed under the FESA or CESA cannot be handled (including removed) without first obtaining authorization from the USFWS and CDFW. We have the same comment for Mitigation Measure BIO-15. Although not stated in BIO-14, we suggest adding to this mitigation measure that this removal would be implemented by an appropriately permitted, Authorized Biologist for these species.

In Appendix D – West Mojave Plan, it states the plan provides a streamlined program for complying with the requirements of the CESA and FESA. We believe this is incorrect, as CDFW never signed on to the West Mojave Plan. Also, since this project has both NEPA and California Environmental Quality Act (CEQA) components with their attendant considerations, it must be routed through the State Clearing House process to ensure it is distributed for proper review by interested parties, including the Council, before it can be legally constructed.

In the Cumulative Impacts section, the Document says, “Biological Resources – Conducting ground disturbance and the introduction of noise and human presence to the area may result in temporary project related impacts to sensitive species.” The Council contends that many of these impacts are permanent impacts. The presence of new above ground facilities provides locations for common ravens to nest, hunt, and roost. Use of access roads for operation and maintenance activities in an area previously not used for these purposes will be new and ongoing. These activities are likely to result in injury or death of wildlife (e.g., road mortality, etc.) and provide food subsidies for the common raven and coyote. To mitigate these impacts, MPUD should implement mitigation for these cumulative impacts. We suggest working with the USFWS, CDFW, and the Council to develop either standard mitigation measures or a standard mitigation fee.

We appreciate this opportunity to provide input and trust that our comments will further protect tortoises if this Proposed Project is authorized. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other BLM projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this Project is provided to us at the contact information listed above.

Regards,



Edward L. LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

Attachment 1: Status of Mojave Desert Tortoise

Literature Cited

Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433–452.

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- U.S. Fish and Wildlife Service. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). Region 8, Sacramento, California. https://www.fws.gov/nevada/desert_tortoise/documents/field_manual/Desert-Tortoise-Field-Manual.pdf
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- U.S. Fish and Wildlife Service. 2018. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). Chapter 4 in Desert Tortoise (Mojave Population) Field Manual. https://www.fws.gov/nevada/desert_tortoise/documents/manuals/Mojave%20Desert%20Tortoise_Pre-project%20Survey%20Protocol_2018.pdf

Attachment 1. Status of Mojave Desert Tortoise

The Mojave desert tortoise was listed as threatened under the federal Endangered Species Act in 1990. The listing was warranted because of ongoing population declines throughout the range of the tortoise from multiple human-caused activities. Since the listing, the status of the species has changed. Population numbers (abundance) and densities continue to decline substantially (see Table 1).

Allison and McLuckie's (2018) analyses provide the first estimates of regional and range-wide population trends for the Mojave desert tortoise in the scientific literature. A summary of the trend data is provided in the table below.

Densities of Adult Mojave Desert Tortoises: A few years after listing the Mojave desert tortoise under the federal Endangered Species Act (FESA), the USFWS published a Recovery Plan for the Mojave desert tortoise (USFWS 1994a). It contained a detailed population viability analysis. In this analysis, the minimum viable density of a Mojave desert tortoise population is 10 adult tortoises per mile² (3.9 adult tortoises per km²). This assumed a male-female ratio of 1:1 (USFWS 1994a, page C25) and certain areas of habitat with most of these areas geographically linked by adjacent borders or corridors of suitable tortoise habitat. Populations of Mojave desert tortoises with densities below this amount are in danger of extinction (USFWS 1994a, page 32). The Revised Recovery Plan (USFWS 2011) designated five recovery units for the Mojave desert tortoise that are intended to conserve genetic, behavioral, and morphological diversity necessary for the recovery of the entire listed species (Allison and McLuckie 2018).

Rangewide, densities of adult Mojave desert tortoises declined more than 32% between 2004 and 2014 (Table 1) (USFWS 2015). At the recovery unit level, between 2004 and 2014, densities of adult desert tortoise declined, on average, in every recovery unit except the Northeastern Mojave (Table 1). Adult densities in the Northeastern Mojave Recovery Unit increased 3.1% per year (SE = 4.3%), while the other four recovery units declined at different annual rates: Colorado Desert (4.5%, SE = 2.8%), Upper Virgin River (3.2%, SE = 2.0%), Eastern Mojave (11.2%, SE = 5.0%), and Western Mojave (7.1%, SE = 3.3%) (Allison and McLuckie 2018). However, the small area and low starting density of the tortoises in the Northeastern Mojave Recovery Unit (lowest density of all Recovery Units) resulted in a small overall increase in the number of adult tortoises by 2014 (Allison and McLuckie 2018). In contrast, the much larger areas of the Eastern Mojave, Western Mojave, and Colorado Desert recovery units, plus the higher estimated initial densities in these areas, explained much of the estimated total loss of adult tortoises since 2004 (Allison and McLuckie 2018).

At the population level, represented by tortoises in the TCAs, densities of 10 of 17 monitored populations of the Mojave desert tortoise declined from 26% to 64% and 11 have a density that is less than 3.9 adult tortoises per km² (USFWS 2015). Of the two populations of Mojave desert tortoises that are near the Proposed Action, the Beaver Dam Slope and Mormon Mesa populations are above the minimum viable density (Allison and McLuckie 2018), but they only comprise 6.2% of the total habitat area in the Recovery Units. While the data analyses indicate that these populations are increasing, tortoises cannot afford additional impacts that would slow or reverse this trend (Allison and McLuckie 2018).

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA) for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise). The table includes the area of each Recovery Unit and Critical Habitat Unit (CHU)/Tortoise Conservation Area (TCA), percent of total habitat for each Recovery Unit and Critical Habitat Unit/Tortoise Conservation Areas, density (number of breeding adults/km² and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 breeding individuals/km² (10 breeding individuals per mi²) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (from Allison and McLuckie 2018 and USFWS 2015).

Recovery Unit Designated Critical Habitat Unit/Tortoise Conservation Area	Surveyed area (km ²)	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km ² (SE)	% 10-year change (2004–2014)
Western Mojave, CA	6,294	24.51	2.8 (1.0)	-50.7 decline
Fremont-Kramer	2,347	9.14	2.6 (1.0)	-50.6 decline
Ord-Rodman	852	3.32	3.6 (1.4)	-56.5 decline
Superior-Cronese	3,094	12.05	2.4 (0.9)	-61.5 decline
Colorado Desert, CA	11,663	45.42	4.0 (1.4)	-36.25 decline
Chocolate Mtn AGR, CA	713	2.78	7.2 (2.8)	-29.77 decline
Chuckwalla, CA	2,818	10.97	3.3 (1.3)	-37.43 decline
Chemehuevi, CA	3,763	14.65	2.8 (1.1)	-64.70 decline
Fenner, CA	1,782	6.94	4.8 (1.9)	-52.86 decline
Joshua Tree, CA	1,152	4.49	3.7 (1.5)	+178.62 increase
Pinto Mtn, CA	508	1.98	2.4 (1.0)	-60.30 decline
Piute Valley, NV	927	3.61	5.3 (2.1)	+162.36 increase
Northeastern Mojave	4,160	16.2	4.5 (1.9)	+325.62 increase
Beaver Dam Slope, NV, UT, AZ	750	2.92	6.2 (2.4)	+370.33 increase
Coyote Spring, NV	960	3.74	4.0 (1.6)	+ 265.06 increase
Gold Butte, NV & AZ	1,607	6.26	2.7 (1.0)	+ 384.37 increase
Mormon Mesa, NV	844	3.29	6.4 (2.5)	+ 217.80 increase
Eastern Mojave, NV & CA	3,446	13.42	1.9 (0.7)	-67.26 decline
El Dorado Valley, NV	999	3.89	1.5 (0.6)	-61.14 decline
Ivanpah, CA	2,447	9.53	2.3 (0.9)	-56.05 decline
Upper Virgin River	115	0.45	15.3 (6.0)	-26.57 decline
Red Cliffs Desert	115	0.45	15.3 (6.0)	-26.57 decline
Total amount of land	25,678	100.00		-32.18 decline

Density Juvenile Mojave Desert Tortoises: Survey results indicate that the proportion of juvenile desert tortoises has been decreasing in all five recovery units since 2007 (Allison and McLuckie 2018). The probability of encountering a juvenile tortoise was consistently lowest in the Western

Mojave Recovery Unit. Allison and McLuckie (2018) provided reasons for the decline in juvenile desert tortoises in all recovery units. These included decreased food availability for adult female tortoises resulting in reduced clutch size, decreased food availability resulting in increased mortality of juvenile tortoises, prey switching by coyotes from mammals to tortoises, and increased abundance of common ravens that typically prey on smaller desert tortoises.

Declining adult densities through 2014 have left the Western Mojave adult numbers at 49% (a 51% decline) and in the Eastern Mojave at 33% (a 67% decline) of their 2004 levels (Allison and McLuckie 2018, USFWS 2015). Such steep declines in the density of adults are only sustainable if there were suitably large improvements in reproduction and juvenile growth and survival. However, the proportion of juveniles has not increased anywhere in the range of the Mojave desert tortoise since 2007, and in the Western and Eastern Mojave recovery units the proportion of juveniles in 2014 declined to 91% (a 9% decline) and 77% (a 23% decline) of their representation in 2004, respectively (Allison and McLuckie 2018).

Abundance of Mojave Desert Tortoises: Allison and McLuckie (2018) noted that because the area available to tortoises (i.e., tortoise habitat and linkage areas between habitats) is decreasing, trends in tortoise density no longer capture the magnitude of decreases in abundance. Hence, they reported on the change in abundance or numbers of the Mojave desert tortoises in each recovery unit (Table 2). They noted that these estimates in abundance are likely higher than actual numbers of tortoises and the changes in abundance (i.e., decrease in numbers) are likely lower than actual numbers because of their habitat calculation method. They used area estimates that removed only impervious surfaces created by development as cities in the desert expanded. They did not consider degradation and loss of habitat from other sources, such as the recent expansion of military operations (753.4 km² so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires (e.g., 576.2 km² of critical habitat that burned in 2005), development of utility-scale solar facilities (so far 194 km² have been permitted) (USFWS 2016), or other sources of degradation or loss of habitat (e.g., recreation, mining, grazing, infrastructure, etc.). Thus, the declines in abundance of Mojave desert tortoise are likely greater than those reported in Table 2.

Table 2. Estimated change in abundance of adult Mojave desert tortoises in each recovery unit between 2004 and 2014 (Allison and McLuckie 2018). Decreases in abundance are in red.

Recovery Unit	Modeled Habitat (km ²)	2004 Abundance	2014 Abundance	Change in Abundance	Percent Change in Abundance
Western Mojave	23,139	131,540	64,871	-66,668	-51%
Colorado Desert	18,024	103,675	66,097	-37,578	-36%
Northeastern Mojave	10,664	12,610	46,701	34,091	270%
Eastern Mojave	16,061	75,342	24,664	-50,679	-67%
Upper Virgin River	613	13,226	10,010	-3,216	-24%
Total	68,501	336,393	212,343	-124,050	-37%

Habitat Availability: Data on population density or abundance does not indicate population viability. The area of protected habitat or reserves for the subject species is a crucial part of the viability analysis along with data on density, abundance, and other population parameters. In the Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994a), the analysis of population viability included population density and size of reserves (i.e., areas managed for the desert tortoise) and population numbers (abundance) and size of reserves. The USFWS' Recovery Plan reported that as population densities for the Mojave desert tortoise decline, reserve sizes must increase, and as population numbers (abundance) for the Mojave desert tortoise decline, reserve sizes must increase (USFWS 1994a). In 1994, reserve design (USFWS 1994a) and designation of critical habitat (USFWS 1994b) were based on the population viability analysis from numbers (abundance) and densities of populations of the Mojave desert tortoise in the early 1990s. Inherent in this analysis is that the lands be managed with reserve level protection (USFWS 1994a, page 36) or ecosystem protection as described in section 2(b) of the FESA, and that sources of mortality be reduced so recruitment exceeds mortality (that is, $\lambda > 1$) (USFWS 1994a, page C46).

Habitat loss would also disrupt the prevailing population structure of this widely distributed species with geographically limited dispersal (isolation by distance; Murphy et al. 2007; Hagerty and Tracy 2010). Allison and McLuckie (2018) anticipate an additional impact of this habitat loss/degradation is decreasing resilience of local tortoise populations by reducing demographic connections to neighboring populations (Fahrig 2007). Military and commercial operations and infrastructure projects that reduce tortoise habitat in the desert are anticipated to continue (Allison and McLuckie 2018) as are other sources of habitat loss/degradation.

Allison and McLuckie (2018) reported that the life history of the Mojave desert tortoise puts it at greater risk from even slightly elevated adult mortality (Congdon et al. 1993; Doak et al. 1994), and recovery from population declines will require more than enhancing adult survivorship (Spencer et al. 2017). The negative population trends in most of the TCAs for the Mojave desert tortoise indicate that this species is on the path to extinction under current conditions (Allison and McLuckie 2018). They state that their results are a call to action to remove ongoing threats to tortoises from TCAs, and to contemplate the role of human activities outside TCAs and their impact on tortoise populations inside them.

Densities, numbers, and habitat for the Mojave desert tortoise declined between 2004 and 2014. As reported in the population viability analysis, to improve the status of the Mojave desert tortoise, reserves (area of protected habitat) must be established and managed. When densities of tortoises decline, the area of protected habitat must increase. When the abundance of tortoises declines, the area of protected habitat must increase. We note that the Desert Tortoise (Mojave Population) Recovery Plan was released in 1994 and its report on population viability and reserve design was reiterated in the 2011 Revised Recovery Plan as needing to be updated with current population data (USFWS 2011, p. 83). With lower population densities and abundance, a revised population viability analysis would show the need for greater areas of habitat to be protected for the Mojave desert tortoise. In addition, we note that none of the recovery actions that are fundamental tenets of conservation biology has been implemented throughout most or all of the range of the Mojave desert tortoise.

Definition of an Endangered Species: Agassiz's desert tortoise is now on the list of the world's most endangered tortoises and freshwater turtles. It is in the top 50 species. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers Agassiz's desert tortoise to be Critically Endangered (Turtle Conservation Coalition 2018).

The IUCN places a taxon in the Critically Endangered category when the best available evidence indicates that it meets one or more of the criteria for Critically Endangered. These criteria are: 1) population decline - a substantial (>80 percent) reduction in population size in the last 10 years; 2) geographic decline - a substantial reduction in extent of occurrence, area of occupancy, area/extent, or quality of habitat, and severe fragmentation of occurrences; 3) small population size with continued declines; 4) very small population size; and 5) analysis showing the probability of extinction in the wild is at least 50 percent within 10 years or three generations.

In the FESA, Congress defined an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range..." Given the information above under the Status of the Mojave Desert Tortoise and the definition of an endangered species, the Council believes the status of the Mojave desert tortoise is that of an endangered species.

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