



DESERT TORTOISE COUNCIL

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Via email only

8 September 2020, 16:45 Pacific Daylight Time

Mr. Rick Baxter, Project Manager
Bureau of Reclamation
302 East Lakeview Parkway
Provo, Utah 84606
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rbaxter@usbr.gov

RE: Lake Powell Pipeline Project Draft Environmental Impact Statement/Draft Resource Management Plan Amendment; Coconino and Mohave Counties, Arizona and Washington and Kane Counties, Utah

Dear Mr. Baxter,

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 Mojave desert tortoise (*Gopherus agassizii*) (synonymous with "Agassiz's desert tortoise"), our comments pertain to enhancing protection of this species during activities authorized by the Bureau of Reclamation (BOR) and Bureau of Land Management (BLM). Please accept, carefully review, and include in the relevant project file the Council's following comments on the Project. Additionally, we ask that you respond in an email that you have received this comment letter so we can be sure our concerns have been registered with the appropriate personnel and office for this project.

Unless otherwise noted, all page numbers pertain to the Draft Environmental Impact Statement (DEIS), dated June 2020. We are also resubmitting our scoping comments, dated January 9, 2020 (Desert Tortoise Council 2020; attached as Appendix C), because most of those comments have not been addressed in the DEIS and remain relevant to our current comments.

As a Cooperating Agency (page 1 in Appendix A to the DEIS) and a Stakeholder (page 2), we see that prior to scoping, BLM was requested to participate, but there is no evidence that BLM was asked to review the document for completeness. We have commented extensively on documents prepared in support of many projects and other actions on public lands managed by the BLM, and we are familiar with BLM standards for environmental documentation. Our assessment is that this DEIS fails to meet those standards. Because the DEIS fails to adequately address the Affected Environment, Environmental Consequences, or Cumulative Effects of the proposed Project, we believe that BLM was not asked to review the DEIS or to provide input before it was released to the public. Perhaps BLM has no responsibility in drafting or reviewing the document, but we ask BOR to specifically ask BLM for input and guidance to correct important deficiencies in the DEIS so that the Final EIS may function in its requirement to provide meaningful analyses.

The following comment is made on page 189 of the DEIS: “There would be *no effects* to designated critical habitat or lands managed under the Red Cliffs Desert Reserve [*emphasis added*].” The Council believes that there may be both *indirect effects* and *cumulative effects* as the result of the project. The introduction of water into Washington County will have a growth-inducing effect, predictably resulting in more people in the region that will place increased pressures on desert tortoise habitat and conservation areas. As we saw in July 2020 when some 12,000 acres of the Red Cliffs Desert Reserve (Reserve) burned in the Turkey Farm Road fire, that fire was reportedly caused by children playing with fireworks in the Reserve. The increased human population and related uses in the area that result from this new pipeline have both direct and indirect impacts on tortoise habitats, including USFWS-designated critical habitat within the Reserve. We therefore ask that the Final EIS provide a more rigorous impacts analysis to determine Project effect.

We recommend that the following indirect effects to tortoises and their habitats that will be affected by growth of the human population in Washington County be discussed in detail in the Final EIS: mortality and injury from vehicle collisions; increases in wildlife road-kill that subsidizes raven populations, leading to increased predation pressure on local tortoise populations; increased spread of nonnative plant species and potential spread into the Reserve; increase in unleashed pet dogs in the Reserve that are known to attack and injure tortoises; and increasing occurrence of fires in desert tortoise habitat because of the increase presence of vehicles and people. In addition, transmission line construction would provide new subsidies of nesting substrate for ravens in/near desert tortoise habitat that would contribute to increased mortality of tortoises. Effective mitigation should be described in the Final EIS and implemented to offset these impacts to the tortoise.

Page 189 refers to results of tortoise surveys; we find the presentation of data and descriptions of the surveys to be inadequate. Furthermore, our previous comments on the deficiency of the Project surveys were ignored. We specifically asked in six bulleted items in our scoping

comments (page 3 of Desert Tortoise Council 2020) that updated surveys of the current tortoise status be performed, that they be by qualified biologists, that they follow current U.S. Fish and Wildlife Service survey protocol (USFWS 2019), that tortoise densities and distribution be mapped, and that critical habitat be mapped relative to the Project alternatives. None of this is given in the DEIS. The information given on Page 189 does not state when the surveys were performed, by whom, or which methodologies were implemented. None of our six scoping comments relative to surveys or reporting is addressed in the DEIS, which must be supplemented in the Final EIS. We also require that all biological resource inventories be added to Appendix C, or other pertinent appendix.

We experienced difficulty in accessing the Project documents from the website; however, we opened the eight volumes associated with the four appendices, including Appendix C, which refers to “supplemental reports,” and no biological inventory report(s) were provided. Our understanding of scoping comments is that the public is given the opportunity to identify specific components to be presented in draft environmental documents and that proponents are obligated to provide requested studies or at least respond to the requested items. Because none of our scoping comments pertaining to tortoise surveys was considered, we find the DEIS is deficient in this respect. We assert that the Final EIS must report this specific survey information, that all comments given by the Council on January 9, 2020 remain in effect and must be addressed. If the BOR does not address these comments, the Final EIS will perpetuate the deficiencies that are prevalent throughout the DEIS.

We find the three paragraphs and one table on pages 188 and 189, which are intended to address direct and indirect impacts to tortoises, to be inadequate. Our primary concern is that the water delivered by this pipeline to Washington County will have significant, unmitigable impacts to tortoises and loss of habitat, which is not considered in this section. The Environmental Consequences Section 3.15.2 in the Draft EIS must be revised in the Final EIS to fully describe and analyze the direct and indirect impacts associated with the Project, including those resulting from pipeline construction and resulting from the growth-inducing impacts in Washington County. The status of the desert tortoise throughout the listed range and regionally in Utah has not been discussed in the DEIS, which we request be corrected in the Final EIS (see Appendix A to this letter, which we expect to appear in the Final EIS).

The following specific comments relate to identified protective measures in Appendix E, which presents the Applicant’s Environmental Protection Measures (EPM) (Note: These comprise Appendix B, which is a component of Appendix E to the DEIS, pages B-2 to B-31):

B.1.5. We request that all measures identified in the USFWS’ 2009 Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*) be added to the bulleted list given on page B-4. Similarly, there should be a stated commitment to adhere to and implement all protective measures that will be identified in the USFWS’ biological opinion, the BLM’s right-of-way grant for the proposed project, and any additional requirements by the National Park Service.

B.1.24. It is standard practice within the range of Mojave desert tortoise to enforce a **15** miles per hour speed limit or less, rather than the 20 mph figure given on page B-7, so we suggest that this be changed. This would also apply to Measure **B.2.1** on page B-14.

B.5.22. With regards to the following statement, “If construction or modification of access routes is needed, desert tortoise monitor(s) approved to conduct protocol level surveys (*USFWS 2010*) [*emphasis added*] will survey these routes plus a 100-meter (328 feet) zone of influence.” Please note that these survey guidelines were revised in 2019 (*USFWS 2019*) and that this survey protocol, not the 2010 protocol, should be implemented (see references section for complete citation).

B.5.24. With regards to the following statement, “Surface occupancy or other surface disturbing activities will be avoided as feasible within 600 meters (1,969 feet) of *occupied desert tortoise habitat*, [*emphasis added*]” we suggest that this statement be clarified. How will “occupied desert tortoise habitat” be defined? By fresh scat, active burrows, or tortoises, only?

B.5.26. With regards to the following statement, “Use of firearms by contractor personnel *for target practice* will be prohibited from the construction site and access routes,” the proponent will likely find that Terms and Conditions given in the biological opinion or Stipulations identified by the BLM will very likely be more stringent than qualifying the prohibition to target practice. The standard measure is that no firearms are allowed on the Project site for any reason, except those carried by law enforcement personnel.

Given this observation, the Proponent must inform all construction personnel that where there are varying protective measures, the measure that proves to be most conservative or restrictive (e.g., no firearms versus firearms intended for target practice) must prevail. As such, even if the Proponent opts to identify a 20 mile per hour speed limit in tortoise habitats, if that limit is set as 15 mph or lower by BLM, USFWS, and/or Utah Department of Wildlife Resources (UDWR), the lower speed limit must prevail.

B.5.27. Similarly, although the following EPM is given on page B-20, “Contractor personnel will be prohibited from bringing *unrestrained* domestic dogs to the construction site” [*emphasis added*], the standard agency mitigation measure requires that no domestic dogs (restrained or not) be allowed on construction sites.

B.5.31. We have a problem with the implications of the following statement and suggest that it be modified as given below (emphasis found in original text): “*For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30) – Unless UDWR elects fencing in lieu of desert tortoise monitors, desert tortoise monitors will be on site during all LPP activities for the protection of desert tortoises. These monitors will be responsible for determining compliance with measures as defined in the biological opinion.*”

The implication here is that a biological monitor may not be needed in the “inactive season,” between December 1 and February 14. Although fulltime biological monitoring will likely be required by BLM and/or USFWS, it is essential that biological monitors be present for all aspects of the project throughout the year. Whereas avoiding tortoise harm and mortality is the top priority of biological monitoring, the biologists are also there to observe and enforce other protective measures, like reduced speed limits, identifying hazardous spills, maintaining clean work areas, etc., which are issues that require year-round vigilance, not seasonally based on heightened tortoise activity. Besides, tortoises may be active throughout the year, even during periods of so-called “lowered activity.”

Given this concern, we request that the clause and qualifier - “*For occupied or high quality desert tortoise habitat in the active season (February 15 – November 30)*” be removed from Measures B.5.31 through B.5.40.

B.5.37. With regards to this subpart of Measure B.5.37, “Temporary tortoise-proof fencing consists of barrier fence buried at least 15 centimeters or 6 inches (leaving 1 meter or 3.3 feet aboveground) and supported by stakes,” we recommend that the fencing specifications, which include mesh sizes, given in the USFWS 2009 Manual be used to clarify specifications.

We previously stated our concerns relative to Measure B.5.31, particularly the implications of qualifying protective measures with seasonal restrictions. We are therefore very concerned to see that Measure B.5.41 stipulates that during the inactivity period the proponent is proposing that NO biological monitors be required, and that field contact representatives, whose lower experience levels are identified in Measure B.5.16, can implement those measures.

For reasons given herein (tortoises being active throughout the year including during lowered activity periods, more protective measures by BLM and USFWS, and need to enforce all protective measures), we believe this section of the DEIS needs to be rewritten to include a requirement that qualified personnel be present for all activities, and that seasonal restrictions be removed. This is a high-profile, controversial project that warrants heightened environmental protection. Identifying measures relative to some perceived seasonality will not effectively or sufficiently protect tortoises and their habitats. All protective measures are more likely to be enforced if biologists are onsite throughout the year, not just seasonally.

Furthermore, the proponent’s commitment to implementing these measures in only “occupied or high quality desert tortoise habitat” is problematic, particularly because Page 189 of the DEIS states: “Within the survey area, 1,012 acres was determined to be low quality habitat, 517 acres was high quality habitat, and 165 acres was unsuitable.” As we previously stated, we are concerned with the use of the qualifying word, “occupied,” which may be variously interpreted and lead to inferior protection. Tortoises are mobile, and habitats that may not be “occupied” one day will be “occupied” on a subsequent day when an animal shows up. Rather than introduce this “occupied habitat” concept, we affirm that protective measures be applied to all 1,012 acres of low quality habitat and all 517 acres high quality habitat, and pending input from the agencies, may be curtailed on the 165 acres of unsuitable habitat.

B.5.43 through **B.5.50**, introduces the nonstandard, undefined concept of “medium desert tortoise habitat.” As given above, all of these qualifiers should be eliminated. It is apparent from the DEIS that either BOR or its consultants are unfamiliar with current standards, that no such qualifiers are implemented in other portions of the listed range of the tortoise, and that these qualifiers both undermine needed protection and will all become extraneous relative to more stringent measures that will predictably be identified in BLM Stipulations and USFWS Terms and Conditions. This section, in particular, would have benefitted from BLM’s input, and still may. We strongly encourage the proponents to seek review and input from BLM, USFWS, and UDWR on this section and rewrite it to conform to acceptable standards. Otherwise, the EPMs will be meaningless in their relation to agency-required protective measures.

If BOR opts to ignore this advice, at the very least the Final EIS needs to provide definitions, photographs, and maps that show what BOR means by terms like “high quality,” “occupied,” and “medium” habitats. It must also demonstrate how results of tortoise surveys were used (or not) to qualify these designations. We strongly recommend that results of tortoise surveys be added to “Appendix A,” which appears in “Appendix E,” with the following title: “Appendix A. Mapbook of the LPP Alignment and Facilities,” and that these various habitat designations like *high quality*, *occupied*, and *medium* be mapped.

B.5.51. states that “A formal Reclamation Plan for all desert tortoise habitat will be developed and submitted to the BLM per BLM requirements.” We provide in Appendix B recently completed guidance from the Council (Abella and Berry 2016), which may help in restoration efforts.

We appreciate this opportunity to provide input and trust that our comments will help protect tortoises during any authorized project activities. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other BOR and BLM projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this particular project is provided to us at the contact information listed above. We also ask that you acknowledge receipt of this letter as soon as possible so we can be sure our concerns have been received by the appropriate parties.

Regards,



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

Literature Cited

Desert Tortoise Council. 2020. Notice of Intent to Prepare a Draft Environmental Impact Statement and Public Scoping Period for the Lake Powell Pipeline Project. Unpublished comments dated January 9, 2020. Palmdale, CA.

U.S. Fish and Wildlife Service. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). Region 8, Sacramento, California.

U.S. Fish and Wildlife Service. 2019. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). USFWS Desert Tortoise Recovery Office. Reno, NV.

APPENDICES

Appendix A. Status of the Mojave Desert Tortoise (*Gopherus agassizii*)

Appendix B. Abella S.R. and K.H. Berry. 2016. Enhancing and restoring habitat for the desert tortoise (*Gopherus agassizii*). Journal of Fish and Wildlife Management 7(1):xx–xx; e1944-687X. doi: 10.3996/052015-JFWM-046.

Appendix A. Status of the Mojave Desert Tortoise (*Gopherus agassizii*)

The Desert Tortoise Council (Council) has serious concerns about direct, indirect, and cumulative sources of human mortality for the Mojave desert tortoise given the status and trend of the species range-wide, within each of the five recovery units, within the Tortoise Conservation Areas (TCAs) that comprise each recovery unit. We find that none of this information is included in the DEIS for the proposed Lake Powell Pipeline, and offer it here as supplemental information to be included in the Final EIS.

Densities of Adult Mojave Desert Tortoises: A few years after listing the Mojave desert tortoise under the Federal Endangered Species Act (FESA), the U.S. Fish and Wildlife Service (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).

Range-wide, 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). The Chuckwalla population is near the proposed Project and has a population below the minimum viable density, and an 11-year declining trend (-37.4%)(USFWS 2015). We are concerned that the proposed Project would bring additional indirect and cumulative impacts to this population and its density and trend would further decline.

Population Data on Mojave Desert Tortoise: The Mojave desert tortoise was listed as threatened under the Federal Endangered Species Act (FESA) 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 in most of the recovery units and populations (please see Table 1).

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 (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 of 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.

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).

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 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 possibly 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 receive reserve level of management 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: In 2011, Murphy et al. stated that the “recognition of *G. morafkai* reduces the range of *G. agassizii* to occupying about 30% of its former range.” Given

this reduction in species distribution and numbers and the “...drastic population declines in *G. agassizii* during the past few decades, it might be endangered.”

In 2018, Agassiz’s desert tortoise was added to 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 on the status of the Mojave desert tortoise and the federal definition of an endangered species, the Council believes the status of the Mojave desert tortoise is that of an endangered species.

Literature Cited

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Appendix B. Abella S.R. and K.H. Berry. 2016. Enhancing and restoring habitat for the desert tortoise (*Gopherus agassizii*). Journal of Fish and Wildlife Management 7(1):xx-xx; e1944-687X. doi: 10.3996/052015-JFWM-046.

Note: This appendix is being submitted as a separate PDF file, and is a part of our formal comments on the June 2020 DEIS.