DESERT TORTOISE COUNCIL
4654 East Avenue S #257B
Palmdale, California 93552
www.deserttortoise.org
eac@deserttortoise.org

Via email only

7 March 2022

Attn: Kenny Kendrick, Supervisory Resource Management Specialist
BLM Las Vegas Field Office
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130
BLM_NV_LVFO_Logandale_RAMP@blm.gov, kkendrick@blm.gov, jasselin@blm.gov, tstone-manning@blm.gov, jraby@blm.gov

RE: Logandale Trails Planning Criteria

Dear Mr. Kendrick,

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 occupied by Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments pertain to enhancing protection of this species during activities funded, authorized, or carried out by the Bureau of Land Management (BLM), which we assume will be added to the Decision Record for this project as needed. Please accept, carefully review, and include in the relevant project file the Council's following comments and attachments for the proposed project.

Mojave 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 Mojave desert tortoise to be Critically Endangered (Berry et al. 2021). As such, it is a "species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90 percent over the previous 10 years (or three generations), a current population size of fewer than 50 individuals, or other factors." It is one of three turtle and tortoise species in the United States to be critically endangered.

The Council provided scoping comments on this project in December 2021, which are incorporated by reference and footnoted below[1]. For board members endorsing this letter and for non-board members who review it at a later date, the following information is cut-and-pasted from the BLM's eplanning website for this project (dated 2/3/2022):

"The Bureau of Land Management (BLM) Las Vegas Field Office is seeking the public's input for the planning criteria for the Logandale Trails Resource Management Plan Amendment, Environmental Assessment, Recreation Area Management Plan, and Travel Management Plan. The public will be able to provide their input during a 30-day period from February 4, 2022, through March 7, 2022.

"The planning criteria will help the BLM establish the scope of the land use plan amendment and set the framework for the decisions to be made. The planning criteria are the standards, rules, and other factors developed by managers and interdisciplinary team members for use in forming judgements about decision making, analysis, and data collection during the planning process.

"The BLM has preliminarily identified a summary list, but we are seeking the public's input to guide the development of the resource management plan amendment, to avoid unnecessary data collection and analysis, and to ensure the resource management plan amendment is tailored to the issues."

The eplanning website then provides the following information, including the identified criteria, which we assume are the criteria on which BLM wishes members of the public to provide feedback. In order to register our input, we have cut-and-pasted *the preliminary statement and each criteria in italics*, followed by our input on each criterion in regular font. Therefore, please consider the regular-font wording that follows the italicized criteria in the next few subsections to represent our formal input.

"The following preliminary planning criteria will help guide the planning process and may be modified, and/or other criteria may be identified during this public input process."

*"**Criteria 1**: The planning process will comply with the NEPA* [National Environmental Policy Act] *standards. Impacts from the management alternatives considered in the RMPA will be analyzed in accordance with planning and CEQ regulations at 43 CFR 1610, 40 CFR 1500, and in the Department Manual (DM 516 DM 1-8)."*

[1] https://www.dropbox.com/s/n89ksfg7z53cgs5/Logandale%20Trails%20Scoping%20Comments.12-3-2021.pdf?dl=0

For purposes of the following discussion, it is our understanding that "RMPA" refers to amending the BLM's Las Vegas Resource Management Plan of 1998 (herein "RMP"). We are concerned that BLM, with this and other recent management planning actions (e.g., Harris Springs Resource Management Plan[2] and Gold Butte Implementation Plan[3]), is predicating these decisions on an outdated, largely obsolete, RMP that is 24 years old. Given these concerns, we question the BLM's use of a 1998 plan as the baseline information on which the current action is being developed. We note, as only two examples, that the distance sampling effort to census Mojave desert tortoises and assess status and trends did not begin until 2000 and the Recovery Implementation Teams (RITS) were not formulated until well after the revised recovery plan of 2011 (USFWS 2011). The baseline RMP needs to be significantly revised and updated to ensure that the BLM uses the last 24 years of information on the tortoise, its habitat, and other resource issues that affect the tortoise to reconsider its management direction relative to this and numerous other actions.

In most of BLM's recent planning documents where tortoises would be affected, BLM has failed to adequately document declines of adult and juvenile desert tortoise numbers and densities throughout most recovery units encompassing the listed population (USFWS 1994a, 1994b). Appendix A is provided as baseline information that BLM must consider in addressing Criterion 1 (see below). In addition to documenting tortoise occurrence within the planning area, we believe that the BLM is required in either the Affected Environment and/or Environmental Consequences section(s) of the draft environmental assessment (DEA) to document the current declining status of tortoises throughout most of the listed range. We note that in the Northeastern Mojave Recovery Unit, the USFWS rangewide sampling data (USFWS 2018, 2019, 2022) indicate that in the Gold Butte Critical Habitat Unit there has been a decline in densities of adult tortoise since 2014. We have attached Appendix A to this letter to assist the BLM in its tortoise population trends analysis, and suggest that you rely on the latest status and trend information that occurs in, at least, the following documents: Allison and McLuckie (2018) and USFWS (2016, 2018, 2019, 2020, 2022a, and 2022b). Note that Appendix A has an independent literature cited section for references given in that appendix.

*"**Criteria 2**: The BLM will utilize and interdisciplinary approach to integrate recreation, biological, socio-economics, and other sciences."*

*"**Criteria 3**: Public involvement, participation and collaboration will be an integral part of the planning process."*

*"**Criteria 4**: The BLM will work with cooperating agencies, tribal governments, and other interested groups, agencies, and individuals."*

The following concerns apply to Criteria 2, 3, and 4. We have expressed persisting concern with BLM that in dozens of formal comment letters over the past 10 years, we have consistently asked BLM to identify the Desert Tortoise Council as an affected interest. Yet, with few exceptions, third parties invariably inform us of projects that the BLM is authorizing, funding, or carrying out on public lands occupied by tortoises. BLM informs other non-governmental organizations but not the Desert Tortoise Council.

[2] https://www.dropbox.com/s/f32god89ppmvf5h/Harris%20Springs%20Recreation%20Area%20Management%20Plan.2-16-2022.pdf?dl=0

[3] https://www.dropbox.com/s/w5ddi0tucc6y0hm/Gold%20Butte%20National%20Monument%20Implementation%20Plan.3-3-2022.pdf?dl=0

Perhaps most noteworthy, this is a sentence from our December 3, 2021 scoping comments to the BLM (i.e., Attn: John Asselin, Kirsten Cannon) on *this very same, Logandale Trails project*: "Herein, we reiterate that the Desert Tortoise Council wants to 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." Yet, but for a Utah member alerting us to the project, we would not have heard about this opportunity. So, please explain the lack of communication from BLM to the Desert Tortoise Council.

We have seen one or two BLM projects where there is an appendix of Affected Parties listed, so we know that BLM inconsistently solicits input, but even on those few lists, we have not found the Council listed among the Affected Parties. We ask that the BLM clarify its mandated responsibilities to inform interested parties of projects, including this one, and take this opportunity to resubmit a letter submitted to BLM in November 2019[4]. Despite a persisting lack of response, we reiterate our request to be considered an Affected Party on BLM projects affecting tortoises and expect to be contacted by BLM, unless you can explain no requirement to contact us.

Assuming there is a formal biological opinion written for the Las Vegas RMP of 1998, which is not included among the documents referenced or provided in the BLM's eplanning website, we assume that the biological opinion is as outdated as the 1998 RMP is. We understand that U.S. Fish and Wildlife Service (USFWS) is a cooperating agency, and ask that BLM formally consult with USFWS on this action and the need to update the outdated RMP. We fully expect that the incidental take limit(s) identified in any existing, pertinent biological opinion(s) be reanalyzed and revised in the amended biological opinion written for this project and, hopefully, an updated, revised amendment for the RMP.

We suggest adding another criterion, which is compliance with the Endangered Species Act, specifically section 7(a)(1). Section 7(a)(1) of the Endangered Species Act (ESA) states that all federal agencies "…shall… utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to Section 4 of this Act." In Section 3 of the Federal Endangered Species Act (FESA), "conserve," "conserving," and "conservation" mean "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition…"

We request that BLM show how in this Plan amendment it will be successfully implementing section 7(a)(1) of the ESA with respect to the tortoise and any other listed species in the SRMA boundary and monitoring this implementation to demonstrate the extent of its effectiveness as required in the BLM NEPA Handbook (2008).

*"**Criteria 5**: The plan Amendment will address only the BLM managed lands within the proposed Logandale Trails Special Recreation Management Area boundary."*

[4] https://www.dropbox.com/s/xx5wmxcae1c1cju/BLM%20Southern%20Nevada%20District%20Managers%20Council%20as%20an%20Affected%20Interest.11-7-2019.pdf?dl=0

*"**Criteria 6**: Designations for off-road vehicles for public lands within the proposed Logandale Trails SRMA will be completed in accordance with the regulations at 43 CFR 8342."*

The following concerns apply to both Criteria 5 and 6. It is our understanding from the October 2021 FAQ provided by the BLM on the eplanning site that the Logandale Trails planning area is currently designated as an "Extensive Recreation Management Area" (ERMA), not a "Special Recreation Management Area" (SRMA), as cited above in Criteria 5 and 6. So, it is premature to call the area an SRMA until that decision has been codified in a Record of Decision.

When we first encountered the acronyms ERMA and SRMA in the Desert Renewable Energy Management Plan (DRECP, BLM 2016), it was our assumption that the word, "Extensive" implied more intensive vehicle use than the word, "Special" would. However, there are several recent examples that suggest to us that the reverse may be true. For example, within three years of designating critical habitat in the West Mojave as an SRMA (BLM 2016), three BLM-designated vehicle open areas (e.g., Johnson Valley, El Mirage, and Spangler Hills) were expanded into designated tortoise critical habitat (USFWS 1994a) and redesignated as National Off Highway Vehicle (OHV) Recreation Areas with passage of the Dingell Act of 2019. Similarly, the West Mojave Route Designation Project (BLM 2019) redesignated Cuddeback Lake and Coyote Lake, both technically within tortoise critical habitat, to allow for unrestricted vehicle use on those lakebeds. There was insufficient analysis, and no valid response to our comments on this concern between draft and final documents, as to how those actions would affect vegetated critical habitats in adjacent areas.

Given these concerns, we ask that the BLM provide a clear description of the differences between current management in an ERMA versus future management if the area is redesignated as an SRMA. Specifically, would the SRMA designation, for example, allow for more open routes than under the ERMA? Are there relatively more Special Recreation Permits (SRPs) in SRMAs compared to ERMAs? Like we observed in the West Mojave, does this new designation provide for relatively fewer obstacles to eventually redesignate conservation areas in such a way that heightened OHV activities could occur? These are a few examples. We ask that the BLM provide a table that includes all pertinent variables likely to be affected, with a column that shows current management under the ERMA designation compared to future management under an SRMA designation. It concerns us that Criteria 5 and 6 are already referring to this area as an SRMA, as if the decision has already been made, which is pre-decisional to the analysis that is required by NEPA and to be documented in the DEA.

The DEA needs to rigorously document how private lands would be directly and indirectly affected by BLM's decisions in the planning area, particularly as they would relate to the new SRMA designation. For example, when BLM in California opened the two dry lakebeds mentioned above to unrestricted vehicle use, we pointed out that there were 516 acres of private land on Cuddeback Lake and 2.6 square miles of private land on Coyote Lake that would be indistinguishable from public lands managed by BLM. But for that 2019 decision, those private lands would not be exposed to relatively more vehicle impacts than before the decision. Similarly, given the checkerboard pattern between private lands and BLM-managed public lands, there are absolutely no BLM-designated open routes that are not facilitating trespass on private lands. Creating route maps that show designated routes ending at the western boundary of a parcel and reappearing at the eastern boundary, for example, is counterintuitive and facilitates vehicle use on private lands, all of which is effectively illegal.

Given these concerns and the assumption that a new Travel Management Plan (TMP) would ensue from this action as per the 10/21/2021 eplanning notice, we ask that there be both tables and maps in the DEA that show all land ownership, and specifically, how much private land is within the planning area that may be affected by the BLM's ultimate decisions. There need to be designated route maps showing both open and closed routes as identified by the TMP.

We ask that BLM provide maps of tortoise distributions, if not densities, that show suitable and occupied desert tortoise habitats within the planning area. If BLM considers such maps to remain confidential to better protect tortoises (i.e., not provide information for poachers), they should still be developed in-house for consultation purposes. The TMP must rely on existing or updated data based on tortoise surveys (preferred) or modeling (next best) to inform decisions. Similarly, these data and maps should be available and referenced on a case-by-case basis when SRPs are considered. No SRPs should be issued in tortoise concentration areas once they are identified and mapped.

This information and tortoise distribution maps will allow BLM to analyze the resulting potential impacts to tortoises associated with varying action alternatives. Although the Council tends to support alternatives with the fewest routes because of the myriad of impacts to the tortoise/tortoise habitat from vehicle use (please see LaRue 1992; Nafus et al. 2013; von Seckendorff Hoff and Marlow 2002), it is vital that the decisionmaker, the agencies directed to conserve the tortoise, and the public know what percentages and spatial arrangement of routes designated as open under the action alternatives are inside versus outside tortoise-occupied/tortoise-linkage habitats. Once this information is available, future environmental documents need to show the percentages of open versus closed routes occurring in suitable versus unsuitable tortoise habitats, at a minimum. In the footnote below, we provide the BLM with a bibliography of impacts associated with OHV use and expect a reasonable impacts analysis in the DEA based on, at least, this information[5].

*"**Criteria 7**: The Geographic Information System (GIS) data and metadata will meet Federal Geographic Data Committee (FGDC) standards, as required by Executive Order 12906."*

First, please describe in sufficient detail in the DEA what these standards and the executive order are and their implications. For example, would they include the types of data described above for desert tortoise densities and concentration areas? Or the numbers and locations of BLM-designated open versus closed vehicle routes? We ask that conservation areas [e.g., Areas of Critical Environmental Concern (ACECs), Tortoise Conservation Areas (TCAs), critical habitat], multiple use areas (e.g., cattle allotments, mineral extraction areas, transportation corridors), and similarly designated areas be included in the GIS data base, to be depicted and tabulated, as appropriate, in the DEA and future plans, including the TMP and Recreation Area Management Plan (RAMP) as described in the BLM's 2/3/2022 eplanning notice.

*"**Criteria 8**: The BLM will consider the present and potential uses of public lands, and where the existing 1998 Las Vegas Resource Management Plan remains in effect, those decisions will remain unchanged and be incorporated into the new Plan Amendment/RAMP/TMP."*

[5] https://www.dropbox.com/s/vcfxz7qs5bo0w2m/%23Road%20Impacts%20Bibliography.pdf?dl=0

Many of the concerns expressed above are not reiterated here, except to say, we believe that any decisions based on the 1998 RMP will likely be flawed because environmental documents from the late 1990's are insufficient to reflect current conditions. Based on these observations, the Council believes that the entire Logandale Trails planning process should be tabled until which time BLM has reconsidered and revised the 1998 RMP to document current statuses and trends as they pertain to tortoises, among other things including habitat degradation, loss, and fragmentation from human activities (e.g., extensive development of solar facilities and translocations of desert tortoises within the RMP occurring since 1998 and adjacent lands).

Please see G*rand Canyon Trust* v. *F.A.A.,* 290 F.3d 339, 345-46 (D.C. Cir. 2002) in which the court decided that agencies must analyze the cumulative impacts of actions in environmental assessments. In the cumulative effects analysis of the DEA, please ensure that the CEQs "Considering Cumulative Effects under the National Environmental Policy Act" (1997) is followed, including the eight principles, when analyzing cumulative effects of the proposed action to the tortoise and its habitats. CEQ states, "Determining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems, and human communities of concern. The range of actions that must be considered includes not only the project proposal but all connected and similar actions that could contribute to cumulative effects." The analysis "must describe the response of the resource to this environmental change." Cumulative impact analysis should "address the sustainability of resources, ecosystems, and human communities."

CEQs guidance on how to analyze cumulative environmental consequences, which contains eight principles listed below:

1. Cumulative effects are caused by the aggregate of past, present, and reasonable future actions.
The effects of a proposed action on a given resource, ecosystem, and human community, include the present and future effects added to the effects that have taken place in the past. Such cumulative effects must also be added to the effects (past, present, and future) caused by all other actions that affect the same resource.

2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, non-federal, or private) has taken the actions.
Individual effects from disparate activities may add up or interact to cause additional effects not apparent when looking at the individual effect at one time. The additional effects contributed by actions unrelated to the proposed action must be included in the analysis of cumulative effects.

3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
Environmental effects are often evaluated from the perspective of the proposed action. Analyzing cumulative effects requires focusing on the resources, ecosystem, and human community that may be affected and developing an adequate understanding of how the resources are susceptible to effects.

4. It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
For cumulative effects analysis to help the decision maker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to the affected parties.

5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
Resources are typically demarcated according to agency responsibilities, county lines, grazing allotments, or other administrative boundaries. Because natural and sociocultural resources are not usually so aligned, each political entity actually manages only a piece of the affected resource or ecosystem. Cumulative effects analysis on natural systems must use natural ecological boundaries and analysis of human communities must use actual sociocultural boundaries to ensure including all effects.

6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
Repeated actions may cause effects to build up through simple addition (more and more of the same type of effect), and the same or different actions may produce effects that interact to produce cumulative effects greater than the sum of the effects.

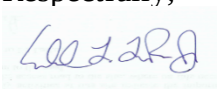
7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
Some actions cause damage lasting far longer than the life of the action itself (e.g., acid mine damage, radioactive waste contamination, species extinctions). Cumulative effects analysis need to apply the best science and forecasting techniques to assess potential catastrophic consequences in the future.

8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.

Analysts tend to think in terms of how the resource, ecosystem, and human community will be modified given the action's development needs. The most effective cumulative effects analysis focuses on what is needed to ensure long-term productivity or sustainability of the resource.

We appreciate this opportunity to provide comments on this project and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the Desert Tortoise Council wants to be identified as an Affected Interest for this and all other projects funded, authorized, or carried out by the BLM 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. 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.

Respectfully,



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

Cc: Director, Bureau of Land Management, tstone-manning@blm.gov
Nevada State Director, Bureau of Land Management, jraby@blm.gov

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

To assist the Agencies with their analysis of the direct, indirect, and cumulative impacts of the Proposed Project on the Mojave desert tortoise, we provide the following information on its status and trend.

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.

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 mile^2 (3.9 adult tortoises per km^2). 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 density 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 the 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 tortoises 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 km^2 (USFWS 2015). The Fremont-Kramer population is near the Proposed Project and has a population below the minimum viable density, and an 11-year declining trend (–50.6%)(USFWS 2015).

Population Data on Mojave Desert Tortoise: The Mojave desert tortoise was listed as threatened under the 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 (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 the Mojave desert tortoise, *Gopherus agassizii* (=Agassiz's 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/km^2 and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 adults/km^2 (10 adults per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (Allison and McLuckie 2018, 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 tortoise densities through 2014 have left the Western Mojave adult numbers at 49% (a 51% decline of their 2004 levels) (Allison and McLuckie 2018, USFWS 2015). Such steep declines in the density of adults are only sustainable if there are 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 Mojave Recovery Unit the proportion of juveniles in 2014 declined to 91% (a 9 % decline) of their representation since 2004 (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 tortoise 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 km^2 so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires (e.g., 576.2 km^2 of critical habitat that burned in 2005), development of utility-scale solar facilities (as of 2015, 194 km^2 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.

Table 3 provides an update on the data collected on rangewide tortoise densities since 2015.

Table 3. Summary of trend data for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise).from 2005 to present for 5 Recovery Units and 17 Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA). The table includes the area of each Recovery Unit and CHU/TCA, percent of total habitat for each Recovery Unit and CHU/TCA, density (number of breeding adults/km^2 and standard errors = SE), and percent change in population density between 2004-2014 (USFWS 2015). Populations below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) (USFWS 1994, 2015) and showing a decline from 2004 to 2014 or are below the population viable level are in **red.**

Recovery Unit: Designated CHU/TCA &	**% of total habitat area in Recovery Unit & CHU/TCA**	**2005 density/ km^2**	**2014 density/ km^2 (SE)**	**% 10-year change (2004–2014)**	**2015 density/ km^2**	**2016 density/ km^2**	**2017 density/ km^2**	**2018 density/ km^2**	**2019 density/ km^2**	**2020 density/ km^2**	**2021 density/ km^2**
Western Mojave, CA	**24.51**		**2.8 (1.0)**	**–50.7 decline**							
Fremont-Kramer	9.14		2.6 (1.0)	–50.6 decline	4.5	No data	4.1	No data	2.7	1.7	No data
Ord-Rodman	3.32		3.6 (1.4)	–56.5 decline	No data	No data	3.9	2.5/3.4*	2.1/2.5*	No data	1.9/2.5*
Superior-Cronese	12.05		2.4 (0.9)	–61.5 decline	2.6	3.6	1.7	No data	1.9	No data	No data
Colorado Desert, CA	**45.42**		**4.0 (1.4)**	**–36.25 decline**							
Chocolate Mtn AGR, CA	2.78		7.2 (2.8)	–29.77 decline	10.3	8.5	9.4	7.6	7.0	7.1	3.9
Chuckwalla, CA	10.97		3.3 (1.3)	–37.43 decline	No data	No data	4.3	No data	1.8	4.6	2.6
Chemehuevi, CA	14.65		2.8 (1.1)	–64.70 decline	No data	1.7	No data	2.9	No data	4.0	No data
Fenner, CA	6.94		4.8 (1.9)	–52.86 decline	No data	5.5	No data	6.0	2.8	No data	5.3
Joshua Tree, CA	4.49		3.7 (1.5)	+178.62 increase	No data	2.6	3.6	No data	3.1	3.9	No data

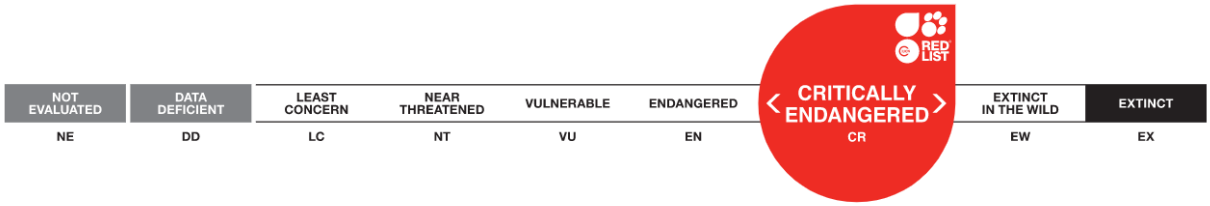
Recovery Unit: Designated CHU/TCA	% of total habitat area in Recovery Unit & CHU/TCA	2005 density/ km²	2014 density/km² (SE)	% 10-year change (2004–2014)	2015	2016	2017	2018	2019	2020	2021
Pinto Mtn, CA	1.98		2.4 (1.0)	–60.30 decline	No data	2.1	2.3	No data	1.7	2.9	No data
Piute Valley, NV	3.61		5.3 (2.1)	+162.36 increase	No data	4.0	5.9	No data	No data	No data	3.9
Northeastern Mojave AZ, NV, & UT	**16.2**		**4.5 (1.9)**	**+325.62 increase**							
Beaver Dam Slope, NV, UT, & AZ	2.92		6.2 (2.4)	+370.33 increase	No data	5.6	1.3	5.1	2.0	No data	No data
Coyote Spring, NV	3.74		4.0 (1.6)	+ 265.06 increase	No data	4.2	No data	No data	3.2	No data	No data
Gold Butte, NV & AZ	6.26		2.7 (1.0)	+ 384.37 increase	No data	No data	1.9	2.3	No data	No data	2.4
Mormon Mesa, NV	3.29		6.4 (2.5)	+ 217.80 increase	No data	2.1	No data	3.6	No data	5.2	5.2
Eastern Mojave, NV & CA	**13.42**		**1.9 (0.7)**	**–67.26 decline**							
El Dorado Valley, NV	3.89		1.5 (0.6)	–61.14 decline	No data	2.7	5.6	No data	2.3	No data	No data
Ivanpah Valley, CA	9.53		2.3 (0.9)	–56.05 decline	1.9	No data	No data	3.7	2.6	No data	1.8
Recovery Unit: Designated CHU/TCA	**% of total habitat area in Recovery**	**2005 density/ km²**	**2014 density/km² (SE)**	**% 10-year change (2004–2014)**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**

	Unit & CHU/TCA										
Upper Virgin River, UT & AZ	**0.45**		**15.3 (6.0)**	**–26.57 decline**							
Red Cliffs Desert**	0.45	29.1 (21.4-39.6)	15.3 (6.0)	–26.57 decline	15.0	No data	19.1	No data	17.2	No data	
Range-wide Area of CHUs - TCAs/Range-wide Change in Population Status	**100.00**			**–32.18 decline**							

*This density includes the adult tortoises translocated from the expansion of the MCAGCC in 2017, that is resident adult tortoises and translocated adult tortoises.

**Methodology for collecting density data initiated in 1999.

IUCN Species Survival Commission: The Mojave 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 Mojave desert tortoise to be Critically Endangered (Berry et al. 2021). As such, it is a "species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90 percent over the previous 10 years (or three generations), a current population size of fewer than 50 individuals, or other factors." It is one of three turtle and tortoise species in the United States to be critically endangered. This designation is more grave than endangered.



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