



**DESERT TORTOISE COUNCIL**

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**Via email only**

3 March 2022

Attn: John Asselin, Tracy Stone-Manning, John Raby

Bureau of Land Management

Red Rock/Sloan Field Office; Nevada State Office, Carson City, NV; National Office,

Washington, D.C.

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RE: Proposed Implementation Plan for Management of Gold Butte National Monument

Dear Mr. Asselin,

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.

Please note, once again, that BLM failed to contact the Council as an Affected Interest for this project, which we formally requested in a November 2019 letter<sup>1</sup>, and continue to request in every letter we submit to the BLM. Despite this persisting request, a third party alerted us to this opportunity to comment. Now that we are submitting formal scoping comments, we fully expect to be alerted to the distribution of the draft environmental assessment, and anticipate the opportunity to review and comment on future associated documents.

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.

We interpret the following statement from the BLM's eplanning website to mean that the BLM is soliciting scoping comments on "The proposed Implementation Plan [that] will be developed in conformance with Presidential Order 9559, the Gold Butte National Monument Proclamation of December 28, 2016, and the Las Vegas Resource Management Plan, meeting the objective of protecting natural and cultural resources. An Environmental Assessment will be developed as part of the planning process to understand the effects of land management actions on resources found within the Monument planning area." Scoping comments are intended "...to involve the public in the early stages of a proposed management plan for the Gold Butte National Monument. The Las Vegas Field Office is in the initial stages of identifying issues for the plan and invites the public to submit input." No documents are provided for review on the BLM's eplanning site.

Before making the specific comments given below, we question the BLM's use of the Las Vegas/Clark County Resource Management Plan (RMP), which is dated 1998, as the baseline information from which this Implementation Plan (IP) is being developed. We note, as only two examples, that the distance sampling effort to census tortoises and assess status 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 to reconsider management prescriptions in the RMP.

Importantly, Dr. Michael Tuma who is one of our Board members, submitted a management plan for the Gold Butte-Pakoon Critical Habitat Unit to the national office of the BLM in 2012 (SWCA 2012). Therein, he identified numerous management prescriptions for the planning area. In Appendix A, we include all pertinent management prescriptions developed in 2012, which are pertinent to drafting the Draft Environmental Assessment (DEA)

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<sup>1</sup> <https://www.dropbox.com/s/xx5wmxcae1c1cju/BLM%20Southern%20Nevada%20District%20Managers%20Council%20as%20an%20Affected%20Interest.11-7-2019.pdf?dl=0>

We ask that the DEA include the following information:

1. Provide maps of tortoise distributions, if not densities, that show suitable and occupied desert tortoise habitats within the management 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. It is essential that BLM identify tortoise resources, including suitable habitats and tortoise concentration areas, among other things, based on surveys (preferred) or modeling (next best) in order to inform decisions. It is typical in DEAs for there to be various action alternatives. If that is to be the case for the DEA analyzing the IP, it needs to show suitable, if not occupied, tortoise habitats on maps for varying alternatives.

2. Similarly, these data and maps should be available and referenced on a case-by-case basis if/when Special Recreation Permits (SRP) are solicited. No SRPs should be issued in tortoise concentration areas once they are identified and mapped. Once BLM has identified suitable tortoise habitats, we recommend that there be pre-event surveys of the action area (see 50 Code of Federal Regulations §402.02), not limited to the project footprint, associated with each event. Post-event monitoring to see if minimization standards have been met is essential, at a minimum in tortoise concentration areas. Otherwise, BLM will be promoting unauthorized take from direct and indirect impacts in the absence of Section 7 authorization.

3. It is advisable that any conflicting use areas be identified, which may include intensive visitor-use areas like walking trails and camping areas, concentrated cattle grazing areas (e.g., piospheres centered on water sources), areas of concentrated vehicle use and routes, paved roads that may warrant tortoise fencing, etc. These conflicting use areas should be mapped and discussed relative to tortoise habitats and particularly tortoise concentration areas to inform BLM on remedial and protective measures needed to minimize if not resolve impacts to tortoises.

4. Unfortunately, due to recent events, management in the Gold Buttes area is readily associated with illegal cattle use of the area, including tortoise critical habitat, by Cliven Bundy. We ask that the DEA disclose impacts that have occurred, management actions that have been taken to resolve illegal uses, the current status, and how the IP will specifically address these and other cattle impacts on tortoises and occupied habitats.

5. It is important that the DEA map tortoise critical habitat, Areas of Critical Environmental Concern (ACECs), and all other designated conservation management areas. Similarly, we ask that cattle allotments, mining districts, transportation/utility corridors, and any other designated use/impact areas be mapped and described in the DEA. The DEA should document current management in these areas, identify persisting concerns, and formulate new management where needed that will support the conservation function of these areas.

6. Please discuss BLM's intent to manage vehicle route densities, including law enforcement. Is there an existing Travel Management Plan (TMP) or intent to develop a TMP to be a part of the proposed IP? 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 BLM and the public know what percentages and spatial arrangement of routes designated as open versus closed inside and outside tortoise-occupied/tortoise-linkage habitats. If available, this information should be documented in the DEA; if unavailable, future environmental documents need to show the percentages of open versus closed routes occurring in suitable versus unsuitable tortoise habitats, at a minimum.

7. In our experience, placing red Carsonite signs on routes intended for closure is ineffective. Although we do support remedial actions like vertical mulching, we prefer route treatments that both camouflage routes to avoid future use and create conditions that promote natural restoration. We offer for your consideration a recent publication funded by the Council that reports prudent restoration efforts in arid environments (Abella and Berry 2016<sup>2</sup>). Also, for your use and analysis of vehicle impacts in the DEA, we provide a bibliography of 148 references on how vehicle impacts degrade tortoise habitats and solutions to addressing those impacts<sup>3</sup>.

8. Does BLM intend to consult or has it already consulted formally or even informally with the U.S. Fish and Wildlife Service (USFWS) on this IP? If not, we ask that the appropriate level of consultation be completed.

9. Declines in adult and juvenile desert tortoise densities and numbers and increases in common raven abundance should be addressed in the DEA, which requires that the BLM determine what baseline tortoise distributions, numbers, and densities are and current levels of common raven use over multiple seasons. Surveys and counts of both living tortoises and carcasses should be emphasized, although burrow and scat densities and distributions are also desirable indicators. Diagnostic evidence of raven predation on juvenile tortoises should also be sought and documented. Again, these actions should be science-based, statistically rigorous, and an integral part of the DEA.

10. 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 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 Gold Butte Critical Habitat Unit is among those few Tortoise Conservation Areas where distance sampling monitoring identifies increasing tortoise populations. We have attached Appendix B to this letter to assist the BLM in 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 (2016) and USFWS (2020, 2021).

11. If baseline data for law enforcement actions exist, which is the kind of information often missing from environmental analyses, it should be documented in the DEA. These data will enable the public to determine the kinds of illegal activities characterizing the planning area, current management to address them, and provide an opportunity for us to suggest ways in which persisting impacts may be addressed.

12. Please indicate in the DEA how BLM plans to implement studies to document current baseline conditions to which future monitoring can be compared. As one of many potential examples, how will BLM know if there is more or less cross-country vehicle travel as the result of adopting a given action alternative if baseline counts are not collected before plan implementation? So, we recommend that the DEA identify specific surveys to establish baseline conditions for as many management indicators as possible so that future conditions can be compared to current conditions and necessary adaptive management prescriptions implemented. Since the Council is necessarily tortoise-centric, we ask that tortoise concentration areas, once identified, be prioritized in these efforts.

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<sup>2</sup> <https://www.dropbox.com/s/nx1b5m2b5ehya12/%23Abella%20and%20Berry%202016.pdf?dl=0>

<sup>3</sup> <https://www.dropbox.com/s/vcfxz7qs5bo0w2m/%23Road%20Impacts%20Bibliography.pdf?dl=0>

13. We ask that the DEA discuss appropriate mitigation and monitoring plans for all foreseeable direct, indirect, and cumulative effects to the tortoise and its habitats in the planning area; the mitigation and monitoring plans should use the best available science with a commitment to implement mitigation that is commensurate to impacts to the tortoise and its habitats. Please be sure that the IP includes the following monitoring plans, either as attachments, or as commitments to develop them in a timely manner: a fully-developed desert tortoise translocation plan; raven management plan; weed management plan; fire management plan; compensation plan for the degradation and loss of tortoise habitat that includes protection of the acquired, improved, and restored habitat in perpetuity for the tortoise from future development and human use; a plan to protect tortoise translocation area(s) from future development and human use in perpetuity; and habitat restoration plan to be implemented where needed.

14. These monitoring plans should include an implementation schedule that is tied to key actions of the construction, operation, maintenance, decommissioning, and restoration phases of the project so that mitigation occurs concurrently with or in advance of the impacts. The plans should specify success criteria, include a monitoring plan to collect data to determine whether success criteria have been met, and identify actions that would be required if the mitigation measures do not meet the success criteria.

15. Climate change should be addressed in the DEA in terms of anticipated changes in vegetation and wildlife use, including by tortoises. Please indicate in the DEA how the IP may result in more or less greenhouse gas emissions than previously authorized.

16. Please see *Grand 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

### 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.
- Berry, K.H., L.J. Allison, A.M. McLuckie, M. Vaughn, and R.W. Murphy. 2021. *Gopherus agassizii*. The IUCN Red List of Threatened Species 2021: e.T97246272A3150871. <https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T97246272A3150871.en>
- LaRue, E. 1992. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Proceedings of the 1992 Symposium of the Desert Tortoise Council.
- Nafus, M.G., T.D. Tuberville, K.A. Buhlmann, and B.D. Todd. 2013. Relative abundance and demographic structure of Agassiz's desert tortoise (*Gopherus agassizii*) along roads of varying size and traffic volume. *Biological Conservation* 162:100-106.
- SWCA 2012. Conservation Plan for the Gold Butte-Pakoon Desert Tortoise Management Area. Report submitted to the Bureau of Land Management, National Office, Washington, DC.
- [USFWS] U.S. Fish and Wildlife Service. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pp.
- [USFWS] U.S. Fish and Wildlife Service. 2020. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2019 Annual Reporting DRAFT. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. 42 pages.
- [USFWS] U.S. Fish and Wildlife Service. 2021. Status of the desert tortoise and its critical habitat. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. Dated 8 March 2021. 27 pages.
- von Seckendorff Hoff, K., and R. Marlow. 2002. Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. *Chelonian Conservation and Biology* 4:449-456.

## **Appendix A. Management Prescriptions for Gold Butte-Pakoon Critical Habitat (2012)**

### 1.1 Priority and Management of Threats

Based upon the population modeling effort (presented in Appendix C [of the original document]), the rank of importance of threats to desert tortoise populations are as follows:

- 1) Livestock and feral burros
- 2) Human Presence
- 3) Subsidized predators
- 4) Wildfire

The following discussion details how the threats affect desert tortoise populations and their habitat within the Gold Butte-Pakoon plan area, and provides recommendations for managing them.

#### 1.1.1 Livestock and Feral Burros

Livestock grazing has historically been an important land use in the Gold Butte-Pakoon plan area since the late 1800s, and continues to be an important land use, both legally and illegally. Feral burro populations became established in the plan area during the 1800s as well. Grazing allotments are closed over much of the plan area, except for open allotments on the Arizona portion of the Virgin Slope. Grazing trespass occurs on the Virgin Slope in Nevada, in the Wechech Basin in Nevada, and most significantly in the Pakoon Basin in Arizona.

#### Recommendations

- § Implement Recovery Actions 2.15 (minimize impacts to tortoises from horses and burrows) and 2.16 (minimize impacts to tortoises from grazing livestock) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § A habitat restoration plan should be developed for the Pakoon Basin that includes assessing the distribution of areas within the plan area that have been impacted by livestock and feral burro grazing, as well as localized areas associated with grazing infrastructure; application of habitat restoration to areas characterized by compacted soils and degraded vegetation communities, as well as wash banks and caliche caves impacted by burro trampling; and monitoring/reporting of restoration efforts.
- § Environmental education within local communities, especially those with ties to ranching, may be a method of improving attitudes that contribute to the trespass situations in both Nevada and Arizona.
- § Termination of grazing allotments should be enforced.



§ Additionally, currently open grazing allotments on the Virgin Slope ACEC in Arizona should be closed in future management considerations.

### 1.1.2 Human Presence

#### Roads

Roads are the most important development that allows human access to areas supporting desert tortoise populations. Thus, roads should be managed to limit or control this access.

#### Recommendations

§ Implement Recovery Action 2.5 (restrict, designate, close, and fence roads) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).

§ Road density studies should be performed to determine whether redundancies exist, and to recommend closure of roads that would balance the need for low road density with public access desires. Road closures should prioritize redundancies, particularly adjacent to urbanized areas, roads that service former mineral extraction sites, and roads that were constructed for livestock management purposes to access allotments that are now closed. Road closure efforts should seek to: 1) make access difficult or impossible, 2) restore habitat to natural conditions, and 3) be successfully enforced by BLM patrols.

§ Routes that act as byways should be patrolled regularly to enforce speed limits and check for appropriate uses and activities within the plan area. Less travelled routes should be patrolled, but less often than the byways. Speed limits should be set to 25 miles per hour throughout the plan area.

§ Closed routes should be restored and monitored to ensure that they are not being used. Plans should be developed for restoring closed routes that include monitoring/reporting of restoration efforts.

§ Establishment of new roads in the plan area should be avoided.

§ Signage should be installed along roads that enter the plan area through Scenic and Littlefield. There are additional opportunities for signage in both Arizona and Nevada, particularly along well-travelled routes such as Gold Butte Backcountry Byway, around Whitney Pocket, and along routes in Backcountry TMAs. Recreationists could be reminded that they are in Critical Habitat for desert tortoises, perhaps accompanied by interpretive signage. Any additional signage in the plan area should be low-statured, no more than 6-ft in height, in order to prevent the signs from being used by ravens for nesting or perching in desert tortoise habitat.

§ Routes should be periodically monitored or studied to determine whether they are causing “detriment or exclusion of the protection of resources.” Routes that are characterized by wildlife-vehicle strikes (particularly desert tortoise strikes) should be closed.

#### OHV Use

OHV use has become a popular recreational activity within the plan area over the past 20 years, and recreationists from the region seek out the views and trails there, particularly at Whitney Pockets. Though routes have been designated for OHV use and others closed, there remains a considerable amount of illegal OHV use in off-road locations adjacent to Whitney Pockets and in areas along the Gold Butte Backcountry Byway. The BLM's Las Vegas District Office has restored areas that were degraded from illegal OHV use; in many instances restored areas have been used illegally by OHV recreationists, returning them to a degraded state. OHV recreationists who ride irresponsibly have degraded desert tortoise habitat in both upland (hillsides, bajadas, and ridge tops) and lowland (washes) situations. OHV use appears to be more concentrated on the Virgin Slope and in the Wechech Basin.

#### Recommendations

- § The BLM has already implemented controlled vehicular access to the ACECs and Pakoon WHA through route and limited use area designations.
- § The ACECs and Pakoon WHA should be patrolled regularly to enforce OHV regulations within the Conservation Area. Level of patrols should be proportional to the intensity of use by OHV recreationists.
- § Closed trails and washes should be restored and monitored to ensure that they are not being used. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.
- § Closed segments of roads and routes, as well as illegal incursions, that are visible from points along nearby open routes should be rendered obscure from view.
- § Sensitive areas that are subject to repeated illegal OHV use should be fenced and posted with signs.
- § OHV events should be prohibited.
- § Environmental education within communities in the region may be a method of improving attitudes of illegal OHV recreationists in both Nevada and Arizona. Interpretive signage may be another method of informing recreationists of the consequences of illegal OHV use.
- § Tortoise populations in the Whitney Pockets area be continually monitored to determine whether human recreational use of the area is affecting desert tortoise populations negatively there.

#### Mineral Extraction

Historically, mining has been most prevalent on the Nevada side of the Conservation Area, though most mineral extraction activities were located in Gold Butte ACEC, Part B. Mining has been largely absent from the Virgin Slope and Pakoon Basin. Mining has likely only been a factor to local tortoise populations at scattered locations. Mining rights have been removed from the Nevada portion of the plan area.

## Recommendations

- § Surface mining should be prohibited in desert tortoise habitat.
- § For mining projects that result in ground disturbance, the BLM should enforce the implementation of measures to ensure that desert tortoises and their habitat are not impacted.
- § Disturbances caused by mineral extraction activities should be restored. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.

## Utility Development

Utilities are largely absent from desert tortoise habitat within the ACECs and Pakoon WHA, and only three communications sites occur in Gold Butte ACEC, Part B. Roads accessing the communications sites cross through the ACECs in Nevada. The effects of utility development on tortoises in the plan area are currently miniscule, though future utility developments along the Virgin Slope could lead to a proliferation of roads and an increase in human use of the area.

## Recommendations

- § Utility developments should be prohibited within desert tortoise habitat, particularly if they require the construction of new access roads.
- § If utility projects that result in ground disturbance are authorized within the plan area, the BLM should enforce the implementation of measures to ensure that desert tortoises and their habitat are not impacted.
- § Disturbances caused by the development of utilities should be restored. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.

## Urbanization

Urbanized areas in the vicinity of the Gold Butte-Pakoon plan area are primarily located outside of, but adjacent to, the plan area boundaries. These include the communities of Mesquite, Bunkerville, Littlefield, and Scenic. Though most of these communities are buffered by BLM lands outside of the plan area, Scenic abuts the plan area boundaries. Human populations have grown considerably since 1990, particularly in Mesquite. Scenic is a fairly new community. This growth in population and development has likely added stressors and other threats to the adjacent plan area. This may especially be the case where Scenic borders the plan area, where there is no buffer of public lands to ‘soften’ the urban/wildland interface. Some of the highest density tortoise populations exist on the lower Virgin Slope just outside of Bunkerville, where the effects of the adjacent community are apparent (trash dumps, OHV use) despite the buffer of public lands between the plan area boundary and the community.

The Mojave Amendment of the 1992 ASDRMP authorized the BLM to acquire land in-holdings within the ACEC boundaries. Likewise, the SNPLMA and MSHCP allowed for the

purchase of land in-holdings within the ACECs. Acquiring land in-holdings would prevent them from being developed.

#### Recommendations

- § Implement Recovery Action 2.3 (establish/continue environmental training programs) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § Routes leading into the plan area from the communities of Mesquite, Bunkerville, Littlefield, and Scenic should be patrolled regularly to enforce speed limits and check for appropriate uses and activities within the plan area.
- § Surface disturbances at the urban/wildland interface should be restored. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.
- § Environmental education within communities at the urban/wildland interface may be a method of informing the public about the status of the desert tortoise and land designations near their communities.
- § The urban/wildland interface at the Scenic/Virgin Slope ACEC boundary should be fenced with tortoise-proof fencing to prevent dispersal of tortoises into this quickly developing urbanized area. Where possible, a buffer of BLM-managed lands should be maintained between the plan area boundaries and private property in Scenic and other communities that may urbanize in the future, including Mesquite and Bunkerville. This buffer will lower and possibly prevent many of the effects of urbanization from affecting tortoise populations in the plan area. Future land exchanges implemented through the SNPLMA should be directed at securing as large a buffer as possible.
- § Additional signage should be installed at the urban/wildland interface. Development of an education kiosk or interpretive center should also be considered.

#### Toxin and Pollutant Deposition

Toxin and pollutant deposition is likely limited to areas around mines and along roads and trails leading into the plan area from urbanized areas.

#### Recommendations

- § Routes leading into the plan area from the communities of Mesquite, Bunkerville, Littlefield, and Scenic should be patrolled regularly to check for appropriate uses and activities within the plan area, as well as locate new dump sites.
- § If discovered, dump sites should be restored, and toxins and pollutants removed. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.

#### Litter and Illegal Dumping

Litter and illegal dumping is likely limited to areas along roads and trails leading into the plan area from urbanized areas, as well as at camp sites frequented by recreationists.

## Recommendations

- § Routes leading into the plan area from the communities of Mesquite, Bunkerville, Littlefield, and Scenic should be patrolled regularly to check for appropriate uses and activities within the plan area, as well as to locate new dump sites. Laws pertaining to dumping, camping, and other illegal activities in desert tortoise habitat should be enforced.
- § If discovered, illegal dump sites should be restored. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.
- § The BLM should work with community groups to organize desert clean-ups.
- § Environmental education within communities in the region may be a method of informing the public about the illegality and morality of dumping in both Nevada and Arizona.

## Collection and Poaching by Humans

Collection and poaching of tortoises – as well as other human behaviors that contribute to killing tortoises –likely occurs in areas that provide the easiest opportunities for human access within the ACECs and Pakoan WHA, particularly along roads, near urban areas, and in areas frequented by OHV users and recreationists.

## Recommendations

- § Implement Recovery Action 2.3 (establish/continue environmental training programs) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § The ACECs and Pakoan WHA should be patrolled regularly to enforce regulations pertaining to the collection and poaching of tortoises, as well as those pertaining to hunting and target shooting. Less travelled routes should be patrolled, but less often than the byways.
- § Environmental education within communities in the region may be a method of informing the public about the illegality of tortoise collecting in both Nevada and Arizona. Interpretive signage or kiosks may be implemented as methods of informing recreationists of the consequences of illegal collection.

### 1.1.3 Subsidized Predators

Predation pressure from subsidized predators is likely strongest on the Virgin Slope adjacent to the communities of Mesquite, Bunkerville, Littlefield, and Scenic where human subsidies are abundant. A number of small anthropogenic water sources are scattered throughout the plan area, and are primarily water features associated with livestock grazing operations. The effects of these features per se are not likely impacting local desert tortoise populations to any great degree, though their effects on subsidizing desert tortoise predators may be substantial.

## Recommendations

- § Implement Recovery Actions 2.13 (limit landfills and their effects) and 2.14 (minimize excessive predation on tortoises) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § The BLM should continue to enforce anti-predator attracting measures instituted during the implementation of actions, and monitor their effectiveness.
- § The BLM should ensure that landfill and pond development is limited to areas at least 5 km from the ACEC and WHA boundaries.
- § Water tanks should be removed from closed grazing allotments, and the disturbances livestock cause in their immediate vicinity should be restored. Plans should be developed for restoring these areas that include monitoring/reporting of restoration efforts.
- § The BLM should prohibit the use of open water tanks on open grazing allotments within the Conservation Area. Troughs and other grazing infrastructure should be removed from closed allotments.
- § The BLM should work with local communities to reduce human subsidies to predators within urban environments, particularly along the urban-wildland interface.
- § Additionally, we recommend that in addition to controlling dogs outside of vehicles, the BLM should enforce a policy of zero dogs within the plan area. This should include pets brought in by recreationists or hunters, or entering uncontrolled from local communities, as well as feral dogs. The BLM should develop programs to track population parameters and occurrence locations for feral dogs, coyotes, and common ravens.

#### 1.1.4 Wildfire

The combination of wildfires and intensive grazing appeared to have had a substantial effect on limiting tortoise distributions within the plan area, particularly within the Pakoon Basin. Plot survey data collected from the upper Pakoon Basin (Fire Treatment Area) coupled with reconnaissance searches in likely habitats throughout the treatment area strongly suggest that large areas that burned (sometimes repeatedly) over the past decade no longer support desert tortoise populations. In areas that were both heavily grazed and burned, type conversion from desert scrub to non-native grassland communities has occurred. These areas, in turn, are more susceptible to fire, highlighting the synergistic nature of these threats. The widespread habitat loss and degradation within the Pakoon Basin attributed to fire and livestock grazing appear to have played a significant role in limiting tortoise distributions observed during field work conducted in support of this plan. Areas that burned recently and extensively in the Nevada portion of the Conservation Area (generally Gold Butte ACEC Part B), are at elevations outside of the habitat model.

#### Recommendations

- § A habitat restoration plan should be developed for the Pakoon Basin that includes assessing the distribution of areas within the Conservation Area that have been impacted by fire;

application of habitat restoration to these areas, particularly in areas that may be at risk for vegetation type conversion; and monitoring/reporting of restoration efforts.

- § Invasive plants should be eradicated or suppressed in areas of desert tortoise habitat that have burned.
- § Burned and degraded areas should be revegetated with native annual plants of high nutritive quality to desert tortoises, as well as perennial shrubs that tortoises use for cover.
- § Native seed should be collected and stored to ensure adequate seed availability for post-fire restoration efforts.
- § Regulations pertaining to activities that could cause wildfires should be enforced, particularly use of OHV off of designated routes. The BLM should prescribe and enforce a rule that prohibits camp fires within ACECs and/or Critical Habitat.

## 1.2 Additional Recommendations

In addition to prioritizing the management of threats within desert tortoise management areas, the following measures are recommended for the entire plan area:

- § A more prominent presence of law enforcement with BLM rangers should be applied to the plan area, consistent with Recovery Action 2.4 (increase law enforcement) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § The 1994 Recovery Plan recommends implementing appropriate administration, including a reserve manager, additional staff, and law enforcement personnel. These additional staff should reach out to the public through meeting with various user groups, forming local advisory committees, and developing educational and tourism opportunities. Additionally, the 2011 Revised Recovery Plan (USFWS 2011) recommends developing and building partnerships with other agencies to facilitate coordinated efforts toward desert tortoise population recovery (Recovery Action 1). These recommendations are sound and should be pursued at the Arizona Strip and Las Vegas District Offices.
- § Per Recovery Action 4 (monitor progress toward recovery) as detailed in the 2011 Revised Recovery Plan (USFWS 2011), the BLM should cooperate with and assist USFWS efforts in implementing annual line distance sampling surveys in support of their range-wide population monitoring. Additionally, desert tortoise populations throughout the Gold Butte-Pakoon plan area may be monitored with periodic surveys of the plots that were established for this study. Survey of the plots every five years would, over the long term, allow the BLM to assess whether implementation of land management measures or removal of threats is affecting local desert tortoise populations.
- § Outside of the reporting required for the MSHCP and SNPLMA, there is no accounting of the implementation of management measures within the Conservation Area, including those performed for desert tortoise recovery, in the public record. The Arizona Strip District

should implement a policy of annual reporting of management measures performed in support of desert tortoise recovery to better track the progress of recovery efforts.

- § Desert tortoise population extirpations have occurred over major portions of the Pakoon and Wechech Basins. The BLM should implement Recovery Action 3 (augment depleted populations through a strategic program) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).
- § Per Recovery Action 5 (conduct applied research and modeling in support of recovery efforts within a strategic framework) as detailed in the 2011 Revised Recovery Plan (USFWS 2011), the BLM should fund research projects that investigate methods for restoration of vegetation communities in areas affected by wildfire; methods for restoring desert soils that have been impacted by grazing livestock; and methods for controlling the spread of invasive annual plants.
- § The BLM should continue to implement Recovery Actions 6.3 (amend land use plans, habitat management plans, and other plans as needed to implement recovery actions) and 6.4 (incorporate scientific advice for recovery through the Science Advisory Committee) as detailed in the 2011 Revised Recovery Plan (USFWS 2011).



## **Appendix B. 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<sup>2</sup> (3.9 adult tortoises per km<sup>2</sup>). 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<sup>2</sup> (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<sup>2</sup> and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 adults/km<sup>2</sup> (10 adults per mi<sup>2</sup>) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (Allison and McLuckie 2018, USFWS 2015).

| <b>Recovery Unit</b><br>Designated Critical Habitat<br>Unit/Tortoise Conservation Area | Surveyed<br>area (km <sup>2</sup> ) | % of total<br>habitat area in<br>Recovery Unit<br>& CHU/TCA | 2014<br>density/km <sup>2</sup><br>(SE) | % 10-year<br>change (2004–<br>2014) |
|--|-------------------------------------|---|---|-------------------------------------|
| <b>Western Mojave, CA</b>  | <b>6,294</b>                        | <b>24.51</b>  | <b>2.8 (1.0)</b>                        | <b>-50.7 decline</b>                |
| 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                       |
| <b>Colorado Desert, CA</b>   | <b>11,663</b>                       | <b>45.42</b>  | <b>4.0 (1.4)</b>                        | <b>-36.25 decline</b>               |
| 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                    |
| <b>Northeastern Mojave</b>   | <b>4,160</b>                        | <b>16.2</b>   | <b>4.5 (1.9)</b>                        | <b>+325.62 increase</b>             |
| 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                   |
| <b>Eastern Mojave, NV &amp; CA</b>   | <b>3,446</b>                        | <b>13.42</b>  | <b>1.9 (0.7)</b>                        | <b>-67.26 decline</b>               |
| 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                      |
| <b>Upper Virgin River</b>  | <b>115</b>                          | <b>0.45</b>   | <b>15.3 (6.0)</b>                       | <b>-26.57 decline</b>               |
| Red Cliffs Desert  | 115                                 | 0.45  | 15.3 (6.0)                              | -26.57 decline                      |
| <b>Total amount of land</b>  | <b>25,678</b>                       | <b>100.00</b>   |   | <b>-32.18 decline</b>               |

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<sup>2</sup> so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires ( e.g., 576.2 km<sup>2</sup> of critical habitat that burned in 2005), development of utility-scale solar facilities (as of 2015, 194 km<sup>2</sup> 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.

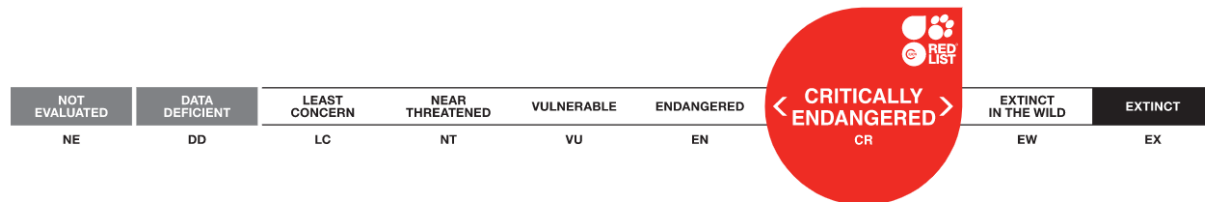
| Recovery Unit       | Modeled Habitat (km <sup>2</sup> ) | 2004 Abundance | 2014 Abundance | Change in Abundance | Percent Change in Abundance |
|---------------------|------------------------------------|----------------|----------------|---------------------|-----------------------------|
| Western 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%                        |
| <b>Total</b>        | <b>68,501</b>                      | <b>336,393</b> | <b>212,343</b> | <b>-124,050</b>     | <b>-37%</b>                 |

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.

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.



## Literature Cited in Appendix B

- Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433–452.
- Berry, K.H., L.J. Allison, A.M. McLuckie, M. Vaughn, and R.W. Murphy. 2021. *Gopherus agassizii*. The IUCN Red List of Threatened Species 2021: e.T97246272A3150871. <https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T97246272A3150871.en>
- Congdon, J.D., A.E. Dunham, and R.C. van Loeben Sels. 1993. Delayed sexual maturity and demographics of Blanding’s Turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. *Conservation Biology* 7:826–833.
- Doak, D., P. Karieva, and B. Klepetka. 1994. Modeling population viability for the Desert Tortoise in the Western Mojave. *Ecological Applications* 4:446–460.
- Fahrig, L. 2007. Non-optimal animal movement in human-altered landscapes. *Functional Ecology* 21:1003–1015.
- Hagerty, B.E., and C.R. Tracy. 2010. Defining population structure for the Mojave Desert Tortoise. *Conservation Genetics* 11:1795–1807.
- Murphy, R.W., K.H. Berry, T. Edwards, and A.M. McLuckie. 2007. A genetic assessment of the recovery units for the Mojave population of the Desert Tortoise, *Gopherus agassizii*. *Chelonian Conservation and Biology* 6:229–251.

- Murphy, R.W., K.H. Berry, T. Edwards, A.E. Leviton, A. Lathrop, and J. D. Riedle. 2011. The dazed and confused identity of Agassiz's land tortoise, *Gopherus agassizii* (Testudines, Testudinidae) with the description of a new species, and its consequences for conservation. *ZooKeys* 113: 39–71. doi: 10.3897/zookeys.113.1353.
- Spencer, R.-J., J.U. Van Dyke, and M.B. Thompson. 2017. Critically evaluating best management practices for preventing freshwater turtle extinctions. *Conservation Biology* 31:1340–1349.
- Turtle Conservation Coalition. 2018. Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles. [www.iucn-tftsg.org/trouble](http://www.iucn-tftsg.org/trouble).
- U.S. Fish and Wildlife Service (USFWS). 1994a. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 73 pages plus appendices.
- U.S. Fish and Wildlife Service. 1994b. Endangered and threatened wildlife and plants; determination of critical habitat for the Mojave population of the desert tortoise. *Federal Register* 55(26):5820-5866. Washington, D.C.
- U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California.
- U.S. Fish and Wildlife Service. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.