

DESERT TORTOISE COUNCIL

3807 Sierra Highway #6-4514

Acton, CA 93510

www.deserttortoise.org

eac@deserttortoise.org

Via email only

2 January 2023

Attn: Ivanpah-Control Project EIS
Ms. Joan Patrovsky, Project Manager
Bureau of Land Management, California Desert District Office
1201 Bird Center Drive
Palm Springs CA, 92262
jpatrovs@blm.gov, BLM_CA_CD_TLRR_IvanpahControl@blm.gov

RE: Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Ivanpah-Control Project, Inyo, Kern, and San Bernardino Counties, CA [L51010000.ER0000.LVRWB19B6670. LLCAD01000.19X (MO #4500161985)]

Dear Ms. Patrovsky,

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.

As of June 2022, our mailing address has changed to:

Desert Tortoise Council
3807 Sierra Highway #6-4514
Acton, CA 93510

Our email address has not changed. Both our physical and email addresses are provided above in our letterhead for your use when providing future correspondence to us. When given a choice, we prefer that the Bureau of Land Management (BLM) email to us future correspondence, as mail delivered via the U.S. Postal Service may take several days to be delivered. Email is an "environmentally friendlier way" of receiving correspondence and documents rather than "snail mail."

We appreciate this opportunity to provide comments on the above-referenced project, and appreciate BLM's proactivity in contacting us about the project in emails delivered on November 17 and December 27, 2022. Given the location of the proposed project in habitats likely occupied by Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments pertain to enhancing protection of this species during activities funded, authorized, or carried out by the 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.

The Mojave desert tortoise is among the top 50 species on the list of the world's most endangered tortoises and freshwater turtles. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers the Mojave desert tortoise to be Critically Endangered (Berry et al. 2021), as 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), population size fewer than 50 individuals, other factors." It is one of three turtle and tortoise species in the United States to be critically endangered. This status, in part, prompted the Council to join Defenders of Wildlife and Desert Tortoise Preserve Committee (Desert Tortoise Council 2020a) to petition the California Fish and Game Commission in March 2020 to elevate the listing of the Mojave desert tortoise from threatened to endangered in California.

SCE has submitted several transmission line right-of-way (ROW) applications to BLM to rebuild existing subtransmission lines that do not meet current reliability standards established by the California Public Utilities Commission's (CPUC). The Ivanpah Control Project (Project) is described in one of these applications.

According to the BLM's Notice of Intent (NOI) in the Federal Register (BLM 2022), "The purpose of this Federal action is to respond to a right-of-way application from Southern California Edison for demolition, construction, operations, and maintenance of the Ivanpah-Control 115 kilovolt transmission line on BLM-administered lands, consistent with applicable laws, regulations, and policies. The applicant is Southern California Edison [SCE] and the purpose for the Project is to ensure compliance with the California Public Utilities Commission's General Order 95 and National Electric Reliability Corporation reliability standards. The proposed action is to implement engineering solutions to remediate approximately 2,950 discrepancies along the Ivanpah-Control alignment, continue to provide safe and reliable electrical service, meet Project needs while minimizing environmental impacts, and design and construct the physical components of the Project in conformance with industry and/or Southern California Edison's approved engineering, design, and construction standards for substation and subtransmission system projects."

Further, "Southern California Edison proposes to remediate physical clearance discrepancies on existing 115 kilovolt subtransmission lines, referred to collectively as the Ivanpah-Control transmission line, located in southern California. The Project is composed of five segments (1, 2, 3N, 3S, and 4) spanning Inyo County, northeast Kern County, and northern San Bernardino County. The northern/western terminus is the Control Substation, approximately 5 miles west of the city of Bishop in Inyo County; the eastern terminus is at Ivanpah Substation, located in California approximately 6 miles southwest of Primm, Nevada."

Segment 1 is from the Control Substation (Bishop) to Inyokern Substation (126-mile segment) and Segment 2 from Inyokern Substation to Kramer Junction (48-mile segment), Segment 3N (north of SR 58) is from Kramer Junction to Coolwater Substation (near Newberry Springs) (44-mile segment), Segment 3S (south of SR 58) is from Kramer Junction to SEGS2 Substation (east of Newberry Springs) (44-mile segment), and Segment 4 is from the Coolwater Substation to Ivanpah Substation (near Primm, NV) (96-mile segment).

According to SCE's Plan of Development including its attachments (POD; SCE 2022), in Segments 1 and 2, SCE would remove all existing subtransmission towers and poles and replace them with tubular steel poles (TSPs); lightweight steel (LWS) poles; and steel multipole structures constructed from TSPs and LWS poles. Control Substation (Bishop) to Inyokern Substation (126-mile segment). In addition, the upgrade would include installing 174 miles of optical groundwire and/or fiber optic cable overhead on replacement structures and new structures; 1,390 feet of fiber optic cable underground within existing substations, and 2,190 feet of underground cable outside of existing substations; and system protection and telecommunications-associated equipment at 12 existing substations: the Control, Haiwee, Coso, Inyokern, Randsburg, Kramer, Tortilla, Coolwater, Dunn Siding, Baker, Mountain Pass, and Ivanpah substations.

SCE has developed several measures, actions, and draft plans (i.e., Applicant Proposed Mitigation) to mitigate impacts to natural resources that are attachments to the POD. These include Attachment C – Applicant Proposed Measures, Attachment D – Conservation Management Actions, and Attachment H – Applicant-Developed Plans of which there are 19:

- H.1 Burrowing Owl Management and Passive Relocation Plan
- H.2 Fire Prevention and Emergency Response Plan
- H.3 Fugitive Dust Control Plan
- H.4 Habitat Restoration Plan
- H.5 Hazardous Materials and Waste Management Plan
- H.6 Helicopter Use and Safety Plan
- H.7 Invasive Plant Management Plan
- H.8 Mohave Ground Squirrel Relocation Plan
- H.9 Nesting Bird Management Plan
- H.10 Soil Management Plan
- H.11 Bird and Bat Conservation Strategy
- H.12 Recreation Conflict Reduction Plan
- H.13 Surface Treatment Plan
- H.14 Raven Management Plan
- H.15 Night Lighting Management Plan
- H.16 Stormwater Pollution Prevention Plan
- H.17 Health and Safety Plan
- H.18 Environmental Compliance Monitoring Plan
- H.19 Habitat Compensation and Mitigation Plan

BLM is the federal lead agency for the Proposed Action with 10 other agencies as cooperating agencies. In the NOI (BLM 2022), BLM noted the public scoping process will guide the development of alternatives, resource issues and an analysis of their impacts, and mitigation. In comments below the Council provides information on alternatives, resource issues and impacts, and mitigation. We request that BLM include this information and analysis of impacts and effectiveness of mitigation in the Draft Environmental Impact Statement (DEIS).

Comments by the Desert Tortoise Council

Alternatives

The SCE POD describes the decommissioning of the subtransmission lines. We request that the description of Alternatives include all actions associated with the Proposed Action including changes in operations and maintenance, decommissioning of the facility, and mitigation including habitat restoration. The environmental impacts of all these actions should be analyzed in the DEIS, not just impacts from construction.

The Council believes that following the existing route of the transmission line would minimize impacts to natural resources including the tortoise and its habitat.

We request that BLM consider and analyze placing portions of the subtransmission line and associated infrastructure underground using directional boring where it occurs in sensitive habitats rather than above ground. This method would reduce surface disturbance to soils, vegetation, and wildlife; reduce the likelihood of vandalism and fire from human activity; reduce the public's attraction to the route as there would be little or no evidence of its occurrence aboveground; and reduced mitigation costs during construction, operations, and maintenance because of potentially reduced long-term/ongoing impacts to natural resources including the tortoise.

In addition, the DEIS should include an alternative that does not use wooden poles, particularly wood H-frames. Please see below for additional information on this issue and the impacts of wooden poles.

The DEIS should include a provision that severely restricts or prohibits public access to routes along the subtransmission line ROWs. Please see below for additional information on this issue.

Resource Issues and Impacts

Connected Actions: Pursuant to Section 1508.25 of the Council on Environmental Quality's (CEQ) regulations (40 CFR 1508.25), any EIS must cover the entire scope of a proposed action, considering all connected, cumulative, and similar actions in one document. Pursuant to Section 1506.1(a) of these regulations, an agency action cannot "[l]imit the choice of reasonable alternatives" before reaching a final decision in a published [Record of Decision] (ROD)." These regulations ensure agencies will prepare a complete environmental analysis that provides a "hard look" at the environmental consequences of all proposed actions instead of segmenting environmental reviews (Novack 2015). The Council is concerned that the proposed Ivanpah Control Project is being segmented from other SCE projects by its separate analysis. The Council asserts they appear to be connected actions, as SCE has submitted several transmission line ROW applications to BLM to rebuild existing transmission lines that do not meet current reliability standards established by the CPUC. Please explain in the DEIS whether these proposed actions are connected to the IC Project and if not, why.

Impacts to the Tortoise from All Activities associated with the Proposed Action: The POD briefly describes several potential direct and indirect impacts to the tortoise during the construction phase. However, others are not mentioned including collection, vandalism, noise, translocation, population connectivity (e.g., how the location of the ROW alongside major transportation corridors will add to fragmentation of tortoise habitats), and impacts from operations, maintenance, and implementation of all mitigation whether proposed by SCE or required by the approving agencies. The DEIS should include an analysis of all potential direct and indirect impacts to the tortoise and other special status species from all activities associated with the proposed action including any changes to operations and maintenance and to decommissioning and mitigation.

We note that Segments 1 and 2 share the same approach, given as, “The subtransmission lines would be rebuilt in a new alignment adjacent to the existing alignment (but outside the existing right-of-way) [emphasis added] and the existing subtransmission structures would be removed.” Please describe the relationship between this proposed project and alternatives and the designated utility corridors under the California Desert Conservation Area (CDCA) Plan of 1980, as amended, as well as under the Section 368 Energy Corridor Study. We are concerned that BLM, through its 1980 CDCA Plan and amendments, and the Section 368 Utility Corridor Study has designated utility corridors to which utility ROWs are restricted. Please clarify in the DEIS that SCE intends to restrict all new construction to within these designated ROWs and utility corridors. If not, despite the next-to-last paragraph in the NOI, we believe that, in addition to the DEIS, a CDCA Plan amendment would be required for the project. BLM should explain why portions of Segment 1 would be located outside the ROW; that is, why it cannot be located within the ROW.

Following installation of the replacement structures, the existing structures would be removed. What is the time between completion of the new facilities and removal of the old facilities? Would the area in the old ROW that now has a subtransmission line be removed from the ROW grant and restored to pre-project conditions? We request that these questions be addressed in the DEIS and that removal and restoration occur quickly to facilitate use by special status wildlife species such as the tortoise (Jericho Systems 2020, SCE 2022) and Mohave ground squirrel (MGS; *Xerospermophilus mohavensis*) (Esque et al. 2013) now and in the future, as climate change will likely push special status species north along the narrow corridor on the east side of the Sierra Nevada in which the subtransmission line is located.

Please be sure that the DEIS clearly identifies anticipated levels of impacts associated with new tower placement and alignments, including any new roads associated with them. We urge the BLM to require that SCE use existing roads as much as possible, with spur access roads to new towers, rather than create extensive new access roads on our public lands. As part of this assessment, please be sure that the DEIS adequately documents the ubiquitous declines of desert tortoises throughout the Western Mojave Recovery Unit (USFWS 2011, Allison and McLuckie 2018), where most of the ROW is located. “Appendix A. Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*)” that documents these declines through 2021 is provided as an attachment. We request that BLM use this information in the description of the affected environment and analysis of environmental consequences and cumulative effects in the DEIS.

The NOI indicates for Segment 3S that “Some existing subtransmission structures would be replaced with tubular steel pole and wood multipole structures, and steel and wood H-frames.” We recognize that tubular steel structures may be the best for discouraging nesting by common ravens (*Corvus corax*), which are known predators of tortoises, and that they have a propensity for nesting on wooden pole structures, particularly wood H-frames. We strongly encourage SCE to not use new structures that provide nesting opportunities for ravens, and that they retrofit old structures affected under the proposed action with anti-nesting devices and monitor them for effectiveness.

The DEIS should analyze if the proposed action would result in an increase of common ravens and other predators of the desert tortoise in the region. Future operations, maintenance, and decommissioning should include provisions for monitoring and managing raven predation on tortoises as a result of the proposed action. The monitoring and management plan should include reducing human subsidies for food, water, and sites for nesting, roosting, and perching to address local impacts. SCE should contribute to the National Fish and Wildlife Foundation’s Raven Management Fund for regional and cumulative impacts. It is very important that the project use towers that prevent raven nesting. For example, the tubular design with insulators on horizontal cross arms is preferable to lattice towers or wooden poles, which should not be used.

We ask that protocol-level surveys for tortoises be performed throughout the alignment (USFWS 2019), and that appropriate zone of influence transects be surveyed to conform to California Department of Fish and Wildlife [CDFW (previously CDFG)] guidance for tortoise and burrowing owl (*Athene cunicularia*) surveys [California Department of Fish and Game (CDFG 2012)]. The southern third of Segment 1 may enter into a region where there has been documented nesting of Swainson’s hawk (*Buteo swainsoni*), and that SCE should perform CDFW protocol surveys for this species (CDFG 2010). At the time of this writing, the Joshua tree (*Yucca brevifolia*) is designated as a Candidate Species for State listing. As such, we ask that surveys for this species be conducted, that impacts be assessed, and mitigation/monitoring plans be documented in the DEIS. Finally, qualified botanists should be employed by SCE to perform rare plant surveys and habitat assessments for potential occurrence using the latest guidelines (CDFG 2009).

For the DEIS to adequately assess these impacts, the Council believes it is essential that the results of these surveys be obtained immediately so as to be published in the DEIS; that publishing the DEIS without results of these surveys/studies would render the environmental documentation deficient as the extent of impacts cannot be known in the absence of resource inventories. Also, please explain why the environmental documents are not a combined DEIS/Draft Environmental Impact Report (DEIR), given that extensive private lands are also likely to be affected. When this project *was* proposed to be analyzed in an EIR in 2020, the Council prepared scoping documents for the same project¹ (Desert Tortoise Council 2020b). Herein, we incorporate this document by reference, and provide the scoping comments again as they are still relevant.

Judging from the gross scale map on the BLM’s flyer, we suspect that the southern third of Segment 1, all of segments 2, 3S, and 3N, and possibly the southern portions of Segment 4 lie within the range of the State-threatened MGS (*Xerospermophilus mohavensis*). Please indicate in the DEIS the results of SCE’s protocol trapping for MGS [CDFG 2003 (revised 2010)]. We note that in the Mohave Ground Squirrel Relocation Plan, SCE says it intends to apply for a Section

¹ <https://www.dropbox.com/s/lrvhfdlxtuu3wx4/Ivanpah%20Control%20Project.9-30-2020.pdf?dl=0>

2081 incidental take permit for the species from CDFW. Too often, we read environmental documents by the BLM that suggest, for example, that tortoises would be moved from harm's way without acknowledging that, as a State-listed Threatened species, tortoises may not be handled unless a 2081 incidental take permit is also secured. Please be sure that the DEIS reveals the need to secure State authorizations for both desert tortoise and MGS before implementing actions that may result in take of these species, which are both State-listed.

Designated Areas of Critical Environmental Concern (ACECs) are identified within the project area that will be affected by the project. Several of these ACECs identify managing desert tortoises within the Overarching Goals of the ACEC, including “tortoise conservation and recovery until which time the tortoise may be delisted as per criteria given in the Recovery Plan;” managing the area “in accordance with the Desert Tortoise Recovery Plan;” protecting “biological values, including habitat quality, populations of sensitive species, and landscape connectivity while providing for compatible public uses;” maintaining “habitat connectivity for wildlife with movement corridors in all directions;” and preventing “habitat fragmentation.”

The DRECP has identified disturbance caps within these ACECs to protect the range of resource and habitat values within the areas as well as protecting listed species and their habitat. Several of these ACECs have disturbances that exceed the identified disturbance cap including Fremont-Kramer, El Paso to Golden Valley Wildlife Corridor, Soda Mountains Expansion, Ivanpah, and Shadow Mountain. The Draft POD states that “BLM has identified ground disturbance mitigation for the IC Project-related disturbances. With ground disturbance mitigation, amending or renewing the right-of-way would be compatible with the ACEC and its management goals.” We request a full accounting of the disturbances within the ACEC as well as detailed determination as to how the identified ground disturbance mitigation would be factored into this disturbance cap, as well as be compatible with the ACEC and its management goals. This analysis needs to be fully described for other listed species as well within these and the other ACECS.

Climate Change: The DEIS should analyze the impacts of the Proposed Action and alternatives that contribute to climate change including but not limited to emissions from construction, operations, maintenance, decommissioning, and mitigation. Impacts to climate change from the Proposed Action include but are not limited to permanent and long-term loss of vegetation that sequesters carbon; increased occurrence of non-native invasive plant species and increased likelihood of fires; the resulting loss of vegetation from fires that sequester carbon and loss of wildlife habitats; the long-term impacts to and future movement/survival of the tortoise and MGS from construction, operations, maintenance, decommissioning, and mitigation of the IC Project along with other ongoing impacts from human activities, given the modeling that predicts that MGS and tortoises will likely need to move rapidly north along the narrow habitat corridor on the east side of the Sierra Nevada, etc.

Growth-inducing Impacts: Will there be growth-inducing impacts associated with the proposed action? For example, does SCE envision that future solar development will be facilitated or even introduced into adjacent regions as future connected actions that would not result *but for* this project? We are particularly concerned with new development in the North of Edwards provisional Development Focus Area (DFA) identified in the Desert Renewable Energy Conservation Plan (DRECP; BLM 2016), which occurs in Segment 2, along the west side of Highway 395 between Twenty Mule Team Road to the north and Kramer Junction to the south, which is important to the conservation of MGS (LaRue 2016²). Please analyze these resource issues and impacts in the DEIS for the tortoise, MGS, and other special status species.

² <https://www.dropbox.com/s/m59kao1golr1lq1/%23BOWLING%20ALLEY%202016%20MGS%20SURVEY.FINAL.pdf?dl=0>

Cumulative Impacts: With regards to cumulative effects, the DEIS must list and discuss all project impacts within the region including future state, federal, and private actions affecting listed species on state, federal, and private lands. In particular, we ask that the relationship between this proposed project and the DRECP (BLM 2015) be analyzed. 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 DEIS, please ensure that the CEQ's "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."

CEQ's 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 needs 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 each resource impacted by the proposed action including the Mojave desert tortoise.

Mitigation Proposed by SCE as Part of the Ivanpah Control Project Plan of Development

Several Mitigation Plans that were included in the SCE's POD are to mitigate impacts to natural resources. We applaud SCE for developing and including these Mitigation Plans in the POD and to BLM for distributing them to the public during the scoping phase of the IC Project. The Council has repeatedly requested that mitigation plans be included in National Environmental Policy Act (NEPA) documents so the public and the decisionmaker may review them and determine their effectiveness to mitigate the impacts to the affected resources. We request BLM continue this practice and include mitigation plans during the scoping phase and initial NEPA document release for public comment.

SCE has developed Applicant Proposed Mitigation Plans for several wildlife species including burrowing owl, MGS, birds and bats, and nesting bird management. However, we found no mitigation plan for the Mojave desert tortoise, desert bighorn sheep, or other special status species that occur in the Project area. We request that the DEIS explain these omissions and include a section that lists all mitigation that will be implemented for the tortoise and each special status species that are likely to be directly or indirectly impacted by the Proposed Action.

H.1. Burrowing Owl Management and Passive Relocation Plan: In this Plan, SCE proposes to implement pre-construction surveys according to the most recent CDFW guidelines, then implement avoidance of occupied burrows, whenever possible.

The burrowing owl is protected under the Migratory Bird Treaty Act. As such, the U.S. Fish and Wildlife Service (USFWS) in addition to CDFW should be consulted on appropriate measures to implement to avoid take of the species. These measures, if different than in the Burrowing Owl Plan, should be added to the revised Plan.

H.2. Fire Prevention and Emergency Response Plan: In the Fire Prevention and Emergency Response Plan (Fire Plan), we found no description of the fire prevention and response measures that would be implemented during post-construction activities including activities performed for operations, maintenance, decommissioning, and mitigation (including monitoring and adaptive management) as part of the POD. The use of a vehicle with an internal combustion engine for any post-construction activity may start a fire. Consequently, all post-construction activities should be included in the Fire Plan. In addition, the H.7 Invasive Plant Management Plan should be included in the Fire Plan as prevention of the establishment, on-site proliferation, and spread of non-native invasive plant species is critical to ensuring there is limited fuel available to maintain and spread a fire in the Mojave Desert. Please update the Fire Plan to include these measures.

H.3. Fugitive Dust Control Plan: The Fugitive Dust Control Plan (Dust Plan) discusses mitigation measures to comply with air quality standards for human health. We were unable to find a discussion or analysis of the effectiveness of mitigation measures in the Dust Plan for the human environment, which includes the tortoise, its habitat, and other biological resources.

H.4. Habitat Restoration Plan: We were pleased to see a Habitat Restoration Plan (HR Plan) included in the Project Description. However, we were disappointed that the HR Plan was limited in:

1. where it would be implemented,
2. what its success criteria would be, and
3. not using the most recent research on vegetation and soils restoration in the Mojave Desert to maximize the success of implementation of the HRP.

For example, for #1, the HR Plan says “Temporary impacts to regulated species’ habitats, plant species, and vegetation communities shall be restored.” We did not find a definition of “temporary impacts” and request this be added to the HR Plan. In past BLM EISs, “temporary impacts” has been defined as impacts lasting less than 25 years. In the Mojave Desert, one pass of construction equipment can result in soil compaction or damage to perennial vegetation that does not grow back in 25 years. We request this term be defined in the DEIS and a map be added to show where the HR Plan would be implemented.

For #2, some of the success standards are vague such as “evidence of wildlife use” and “recruitment of native plant seedlings documented within restoration areas.” These success standards are not quantifiable but should be to determine clearly when compliance with the Plan has occurred. For success standards that are provided in quantifiable objectives [e.g., when compared to pre-disturbance (baseline) or adjacent reference site conditions, 50 percent of the total number of native species observed, 50 percent of perennial species richness, and 60 percent native species cover are re-established], these standards overlook the habitat restoration needs of the tortoise, as there is no requirement for native annual forage species for the tortoise to be present or a requirement of their diversity or abundance.

We request these success standards be adjusted to meet the needs of the tortoise to comply with page 3, BIO-RES-1 of the HRP that says “Temporary impacts to regulated species’ habitats, plant species, and vegetation communities shall be restored. Regulated species and vegetation communities include all species designated as threatened, endangered or rare, sensitive, or of concern by resource or land agencies.” This would include the Mojave desert tortoise. A suggested plant palette to use when implementing habitat restoration for the tortoise is in Esque et al. (2021), one of the references in “Appendix B. Habitat Restoration Bibliography for the Mojave Desert” (attached). There are several “regulated species” in the Project area and habitat restoration success criteria should include their needs where the IC Project overlaps their ranges.

In addition, the success standards in the HR Plan include, “After five years, SCE will consult with the agencies to discuss options for restoration areas that have not met success standards.” Because of climate change and its effects on rainfall timing, frequency, and amount and substantially reduced soil moisture in the Mojave Desert, which are critical to seed germination and plant survival, we recommend that SCE contact the resource and land agencies and U.S. Geological Survey to update these agencies annually on the success of the habitat restoration efforts.

For #3, the biotic and abiotic factors that influence the success of habitat restoration efforts vary from site to site. We recommend revising the HR Plan to identify the different methods/combinations that are needed at different locations to achieve successful habitat restoration because of variations in temperature, precipitation, soil moisture, soil properties, human disturbance, etc. To increase the likelihood of success, we recommend the HR Plan incorporate the results and recommendations from the research included in “Appendix B. Habitat Restoration Bibliography for the Mojave Desert.” We note that the BLM funded the work by Shryock et al. 2022 and the BLM California State Office funded Rader’s (2019) research. We applaud BLM’s efforts to research more effective methods to restore vegetation in the southwestern deserts. Consequently, BLM should incorporate the results and recommendations of this funded research in the DEIS and revised HR Plan/required mitigation.

We were unable to find how the HR Plan would deal with ongoing and future human activities that degrade/destroy areas with efforts to restore habitat, especially for special status species such as the tortoise. Please include an analysis of this issue and the likely success of the HR Plan for unregulated activities by the public such as off-highway vehicle use, etc.

We were unable to find in the Monitoring section of the HR Plan how SCE would determine the statistical accuracy of the data collected. We request that for any data collected to determine whether quantifiable requirements have been met, BLM require SCE to collect data that is statistically robust.

In summary, the best available scientific data and should be used when implementing, managing, monitoring, and applying adaptive management to habitat restoration areas for the tortoise and other regulated/special status species. This approach is needed to ensure the greatest level of accuracy and effectiveness.

H.5. Hazardous Materials and Waste Management Plan: On page 5 of the Hazardous Materials and Waste Management Plan (HMWM Plan), SCE says, “hazardous material spills or releases—including petroleum products such as gasoline, diesel, and hydraulic fluid, regardless of the quantity spilled—will be immediately reported to the Environmental Monitor and SCE by the construction contractor if the spill enters a navigable water, stream lake, wetland, or storm drain; impacts sensitive areas including conservation areas and wildlife preserved;...” We request that critical habitat for the tortoise be included in this statement. We suggest that “wildlife preserved” should be replace with “wildlife preserves.”

The HMWM Plan requires notification of the CPUC, BLM, and “other applicable regulatory agencies of all incidents impacting sensitive resource areas.” We request that all Tortoise Conservation Areas including critical habitat and BLM ACECs be considered sensitive resource areas.

H.7. Invasive Plant Management Plan: In the Invasive Plant Management Plan (IPM Plan), SCE provides the type of information that will be included in the Plan. Thus, the IPM Plan is not a plan but a narrative outline. We suggest this document be retitled to reflect the current contents and not the future contents.

In the IPM Plan, SCE says it will “specify manual and chemical invasive plant control methods to be employed.” The IPM Plan “will be submitted to the BLM and CPUC, for review and approval. The Draft IPMP will be provided to BLM and CPUC for review at least 60 days prior to SCE’s application for its initial Notice to Proceed. A final version of the Plan will be provided to the BLM and CPUC with comments incorporated prior to issuance of the initial Notice to Proceed on the Project.” If herbicides will be used in tortoise habitat, BLM will need to complete section 7 consultation with the USFWS prior to using the herbicides, if this has not already occurred. A similar process would likely need to occur between the CPUC and CDFW for species listed under the California Endangered Species Act (CESA) including the tortoise and MGS. This consultation/coordination is necessary to ensure that any take of federal or state listed species is minimized and mitigated and will not jeopardize their continued existence. Please add this requirement to the DEIS.

Please note that other methods may be available for management of invasive plant species including biological and energy. These methods should be included and analyzed in the IPM Plan/DEIS.

The goal of the IPM Plan is to “prevent introduction and establishment of new invasive plant species and noxious weeds not previously identified within the Project area and to minimize the spread of existing invasive plant populations resulting from construction of the Project.” We request the goal be expanded to include all activities associated with the Proposed Action, not just construction. Similarly, the objectives should be expanded to include all activities associated with the Proposed Action.

We were unable to find the methodologies for determining the presence of invasive plants in the Project area prior to initiating construction (baseline surveys) and for monitoring after application of mechanical or chemical methods or other methods in the IPM Plan. We request that these methodologies be science-based and statistically rigorous, rather than only observational and be described in the Plan.

Any herbicide spill or excessive use should be considered a reportable incident under the HMWM Plan. Please add this requirement in the DEIS.

H.8. Mohave Ground Squirrel Relocation Plan: As part of the Mohave Ground Squirrel Relocation Plan (MGS Relocation Plan), “SCE intends to apply for a state incidental take permit for Mohave ground squirrel through the California Department of Fish and Wildlife (CDFW).” According to the MGS Relocation Plan, no survey per CDFW’s protocol was conducted in the Project area, only pedestrian surveys. Near Kramer Junction, camera surveys for MGS were conducted for ten days between May 24 and June 4, 2017, but this camera study “was not intended to replace protocol-level site assessments.”

Although issuance of a Section 2081 permit requires CDFW to ensure that all impacts of the taking are fully mitigated, including impacts to habitat, the MGS Relocation Plan does not address/discuss the loss/degradation of habitat to the MGS. It only addresses relocation of the individuals species. Thus, it does not deal with the requirement to fully mitigate. However, for the relocation part of the mitigation, we request the MGS Relocation Plan identify in advance the areas to where the ground squirrels would be relocated so the public and decisionmaker have information that the area(s) is/are managed for the MGS and not for multiple use. In addition, we found no information on the handling and relocation of the species if encountered during dormancy, or how long monitoring after relocation will occur to determine success, etc. We suggest this information be included in the DEIS as this Plan should be fully supported by science.

We suggest that the mitigation for habitat loss/degradation that is usually required by CDFW in a section 2081 permit, be included in this Plan or referenced to H.19 Habitat Compensation and Mitigation Plan provided by SCE.

H.10. Soil Management Plan: “The Soil Management Plan will provide guidance for the proper handling, on-site management, and disposal of impacted soil that may be encountered during construction activities.” We request this plan be expanded to include all activities associated with the Proposed Action, not just construction.

Soils include biotic components (e.g., soil crusts, seeds, plant propagules, etc.) that should be properly managed to maintain and restore these components during construction, operations, maintenance, decommissioning, and mitigation/restoration phases of the Proposed Action. Please revise the Soil Management Plan to include effective management of these biotic components for all phases of the Proposed Action.

H.12. Recreation Conflict Reduction Plan: The Recreation Conflict Reduction Plan (RCR Plan) should be revised to close SCE access roads to/along the IC Project during construction, operations, maintenance, decommissioning, and mitigation including implementation of the HR Plan. These roads should be permanently closed to the public to assure security of the subtransmission lines and that the HR Plan implementation will not be impacted by current and future human use. While the RCR Plan cites the Federal Land Policy Management Act (FLPMA) regarding the definition of “multiple use,” it ignores other sections of FLPMA.

FLPMA established the California Desert Conservation Area (CDCA) “to provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality” (emphasis added). Much of the Proposed Action is in the CDCA. BLM should provide the entire purpose of the CDCA in the RCR Plan and demonstrate how the RCR Plan complies with BLM’s requirement to provide for “sustained yield” and “maintenance of environmental quality” for special status species and their habitats such as the tortoise, and by opening roads to the public for activities that degrade/destroy habitat restoration efforts by SCE as well as compromise security of the electric grid. Please see our comments under “H19. Habitat Compensation and Mitigation Plan” below for more information on the impacts of utility roads to the tortoise that support why these roads should be closed to public use.

H.14 Raven Management Plan: SCE has developed a Programmatic Raven Management Plan (RM Plan) to implement for the IC Project and other SCE projects. The Council applauds this approach as common raven abundance and predation is a western region-wide impact to wildlife species including the tortoise and other special status species. However, we were unable to find (1) a description of what measures would be implemented to manage for the common raven during the pre-construction, construction, habitat restoration, and maintenance phases of the IC Project; (2) how that implementation is science-based; or (3) how funding during these phases would change with increasing costs due to inflation, shortages of materials/trained staff, etc.

For example, the RM Plan includes, “identification of monitoring reporting procedures and requirements; strategies for refuse management; as well as design strategies and passive repellent methods to avoid providing perches, nesting sites, and roosting sites for Common Ravens.” It does not say whether these strategies and methods will be implemented, when they would be implemented, how they would be monitored to determine effectiveness, whether adaptive management would be required, and if so, when, or what would trigger adaptive management. For example, the RM Plan says, “All activity work areas will be kept free of trash and debris,” but it does not say that food and trash will be kept in raven-proof/predator-proof containers. This distinction is important as ravens have been documented to enter open passenger compartments of vehicles, open food containers, and consume/fly away with food while the driver was not present. When preparing the DEIS for the IC Project, a RM Plan for the IC Project should comply with the PRM Plan and should address these issues along with quantifiable objectives. We request that BLM add this information and these requirements in the DEIS.

H.19. Habitat Compensation and Mitigation Plan: “The purpose of this Plan is to demonstrate how SCE will compensate for short-term and long-term impacts to habitat that result from construction of the IC Project area and comply with the requirements of the document titled Desert Renewable Energy Conservation Plan Land Use Plan Amendment to the California Desert Conservation Area Plan, Bishop Resource Management Plan, and Bakersfield Resource Management Plan (DRECP LUPA).”

In this Habitat Compensation Plan, short-term impacts is a heading, but temporary impacts is the term used in the describing paragraph under this heading. In the Mojave Desert, any surface disturbance using construction equipment is neither short-term nor temporary. It results in long-term impacts to soils, vegetation, and other aspects of the human environment. We reiterate our earlier comment about the definition of temporary impacts and request this Compensation/Mitigation Plan be revised to define and clarify what types of impacts would be mitigated through compensation.

The Habitat Compensation/Mitigation Plan says, “when existing infrastructure is decommissioned and removed the associated impacted areas will be restored.” This requirement should be stated clearly in the DEIS along with a required Habitat Restoration Plan as BLM does for other EISs for development projects. Because this is a requirement, the actions that would be implemented during decommissioning and restoration should be described and analyzed in the DEIS.

Although the Bishop Resource Management Plan (RMP) “does not contain quantified restoration or revegetation ratios” for habitat destruction/degradation, SCE will apply the Standard Biological Resources Compensation Ratio from the Desert Renewable Energy Conservation Plan Land Use Plan Amendment (DRECP LUPA).” The DEIS should clarify that these compensation ratios will apply throughout the Bishop RMP, and not just the area in the DRECP boundary.

SCE says, the standard compensation ratio is 1:1 with the exception of 5:1 for tortoise critical habitat and within the same critical habitat unit, 2:1 for the MGS, 5:1 for riparian habitat, and 2:1 for wetlands. SCE asserts that “SCE-owned existing permanent features (old roads, tower footings, etc.) that are removed and restored per LUPA-BIO-7 will serve as compensatory mitigation for the IC Project. Therefore, within a given Critical Habitat Unit, restoration of existing permanent impacts and restoration of IC Project-related disturbance areas, in addition to land acquisition, will fulfill the compensation 5:1 ratio requirements.”

The Council questions this statement as we found no information in this Plan that quantifies the estimated long-term impacts, or the areas and locations of the SCE-provided lands in the range of the tortoise. We request that SCE and BLM provide supporting documentation for these claims. The BLM requirement for habitat compensation is not merely a simple mathematical calculation, as the science of ecology and conservation biology will assert. The Desert Tortoise – Mojave Population Recovery Plan (USFWS 1994) clearly stated that the “principles of reserve design” should be used when designing and managing an area for the survival of the tortoise. These areas should be large in size, well-distributed throughout the species’ range, contain large blocks of protected, preferred habitat that are close together and contiguous, not fragmented, that minimize edge to area ratios, and are roadless or otherwise inaccessible to humans.

We remind BLM and SCE that when assessing wetland mitigation for projects requiring a permit under the Federal Water Pollution Control Act, U.S. Environmental Protection Agency requires that the ecological functions and values of the lands to be impacted by a proposed project be determined so the appropriate compensation is implemented to replace those lost functions and values. This analysis also includes the temporal loss of functions and values.

Because of the large lifetime home range of the tortoise, landscape level management for the tortoise is necessary to be meaningful and successful. While small acreage added to existing reserves may provide additions of ecological functions and value to replace those lost from project implementation, this information and analysis of data should be provided. Simply asserting that certain lands will provide compensation when information is not provided on the locations of these lands, how they will be managed in the future, or a Property Analysis Record-like analysis to assess current and future conservation values for target species is inappropriate and has no scientific foundation. We request that when BLM is analyzing whether proposed compensation lands are acceptable to replace developed lands, a PAR-like analysis be conducted to replace the ecological functions and values, not simple arithmetic that provides no analysis of conservation values. This is a science-based method that BLM and SCE should implement, not BLM's ratios for which we request the scientific sources that support why BLM adopted these ratios.

In addition, linear projects are highly destructive and the "zone of disturbance can vary in width from 15.2 to 30.5 meters (50 to 100 feet) to several hundred meters/yards, depending on the number of transmission lines (USFWS 1994 as cited in USFWS 2011). Impacts to desert tortoise habitat and individuals occur both during initial construction as well as during long-term maintenance activities (Boarman 2002 cited in USFWS 2011). Additionally, utility corridors are often used by the public for off-highway vehicle and recreational access. LaRue and Dougherty (1998) evaluated results of over 230 biological opinions issued by the USFWS in southern California and Nevada and found that 80 percent of the tortoises reported killed in these two states were found along utility corridors (USFWS 2011).

Consequently, the compensation of habitat "lost" and "restored" is a combination of quality, quantity, configuration/arrangement, and time to list a few of the variables that should be considered when assessing the value of compensation lands. Usually, compensation for lost habitat occurs before the habitat is degraded/destroyed so there is no loss of the ecological function or value of the habitat. We request this occur and that the compensation lands have a conservation easement in perpetuity or similar protection placed on them as they are mitigation lands, and should not be used for other purposes. The Habitat Compensation Plan should describe how these lands will be managed and protected in the future to provide long-term benefits to the target species including the tortoise. They should be added to a geographic information system that maps project locations and the associated locations of mitigation/compensation lands for the impacts from these projects. This accounting is needed to ensure that mitigation/compensation lands are not available for development or other uses non-compatible in the future. We request that BLM develop this map and associated metadata, include it in the DEIS, and update and include it in all future NEPA documents that BLM produces in the range of the tortoise.

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.
Ecosystems Advisory Committee, Chairperson
Desert Tortoise Council

Attachments:

- Appendix A. Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*)
- Appendix B. Habitat Restoration Bibliography for the Mojave Desert

cc: Karen Mouritsen, California State Director, Bureau of Land Management,
kmouritsen@blm.gov; castatedirector@blm.gov

Heidi Calvert, Regional Manager, Region 6 – Inland and Desert Region, California Department of Fish and Wildlife, Heidi.Calvert@wildlife.ca.gov
Clifford Rechtschaffen, California Public Utilities Commissioner via Winnie Chen, staff assistant; Winnie.Chen@cpuc.ca.gov

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

We provide the following information on the status and trend of the listed population of the desert tortoise to assist the BLM and Southern California Edison with their analysis of the direct, indirect, and cumulative impacts of the Proposed Project on the Mojave desert tortoise.

BLM's implementation of a conservation strategy for the Mojave desert tortoise in its resource management plans through 2020 has resulted in the following changes in the status for the tortoise throughout its range and in Nevada from 2004 to 2014 (Table 1; USFWS 2015) and 2004 to 2020 (Table 2). There are 17 populations of Mojave desert tortoise described below that occur in the Critical Habitat Units (CHUs) and Tortoise Conservation Areas (TCAs); 14 are on lands managed by the BLM.

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, and within the 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 mile² (3.9 adult tortoises per km²). This assumed a male-female ratio of 1:1 (USFWS 1994a, page C25) and certain areas of habitat with most of these areas geographically linked by adjacent borders or corridors of suitable tortoise habitat. Populations of Mojave desert tortoises with densities below this 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 densities less than 3.9 adult tortoises per km² (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 Tables 1 and 2).

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 CHUs/TCAs for the Mojave desert tortoise, *Gopherus agassizii* (=Agassiz’s desert tortoise). 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/km² and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 adults/km² (10 adults per mi²) (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 CHU/TCA	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 Valley, 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 Eastern Mojave adult numbers at 33% (a 67% decline of their 2004 levels) (Allison and McLuckie 2018, USFWS 2015). Such steep declines in the density of adults are only sustainable if there 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 Eastern Mojave Recovery Unit the proportion of juveniles in 2014 declined from 14 to 11 percent (a 21% decline) of their representation since 2007 (Allison and McLuckie 2018).

The USFWS and Utah Division of Wildlife Resources have continued to collect density data on the Mojave desert tortoise since 2014. The results are provided in Table 2 along with the analysis USFWS (2015) conducted for tortoise density data from 2004 through 2014. These data show that adult tortoise densities in most Recovery Units continued to decline in density since the data collection methodology was initiated in 2004. In addition, in the Northeastern Mojave Recovery Unit that had shown an overall increase in tortoise density between 2004 and 2014, subsequent data indicate a decline in density since 2014 (USFWS 2016, 2018, 2019, 2020, 2022a, 2022b).

Table 2. Summary of data for Agassiz’s desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise) from 2004 to 2021 for the 5 Recovery Units and 17 CHUs/TCAs. 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/km² 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/km² (10 breeding individuals per mi²) (assumes a 1:1 sex ratio) (USFWS 1994a, 2015) or showing a decline from 2004 to 2014 are in **red**.

Recovery Unit: Designated CHU/TCA &	% of total habitat area in Recovery Unit & CHU/TCA	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	2014 density/km ² (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 Unit & CHU/TCA	2004 density/ km ²	2014 density/km ² (SE)	% 10-year change (2004–2014)	2015	2016	2017	2018	2019	2020	2021
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, that is resident adult tortoises and translocated adult tortoises.

**Methodology for collecting density data initiated in 1999.

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 km² so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires (e.g., 576.2 km² of critical habitat that burned in 2005), development of utility-scale solar facilities (as of 2015, 194 km² have been permitted) (USFWS 2016), or other sources of degradation or loss of habitat (e.g., recreation, mining, grazing, infrastructure, etc.). Thus, the declines in abundance of Mojave desert tortoise are likely greater than those reported in Table 3.

Table 3. Estimated change in abundance of adult Mojave desert tortoises in each recovery unit between 2004 and 2014 (Allison and McLuckie 2018). Decreases in abundance are in red.

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

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

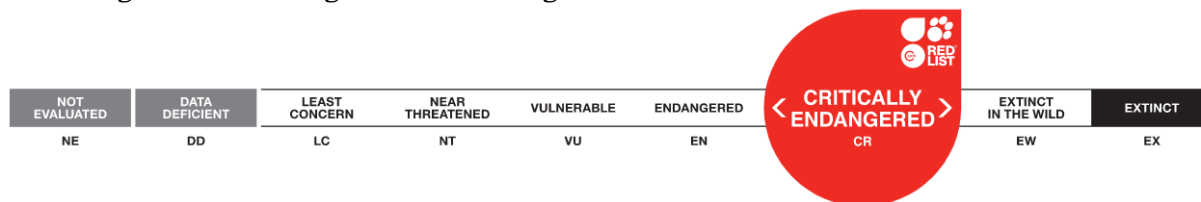
Habitat loss would also disrupt the prevailing population structure of this widely distributed species with geographically limited dispersal (isolation by resistance Dutcher et al. 2020). Allison and McLuckie (2018) anticipate an additional impact of this habitat loss/degradation is decreasing

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 and densities continue to decline in most Recovery Units since 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.



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