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Via email and BLM NEPA ePlanning webpage

Date: April 18, 2024

To: Jeremy Bluma, Senior Advisor
Attn: Draft Solar EIS
Bureau of Land Management
1849 C Street NW
Washington, D.C. 2 20240
jbluma@blm.gov, solar@blm.gov

Re: Utility-Scale Solar Energy Development PEIS/RMPA (DOI-BLM-HQ-3000-2023-0001-RMP-EIS)

Dear Mr. Bluma,

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.

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 to receive emails for 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."

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), "… based on population reduction (decreasing density), habitat loss of over 80% over three generations (90 years), including past reductions and predicted future declines, as well as the effects of disease (upper respiratory tract disease/mycoplasmosis). *Gopherus agassizii* (sensu stricto) comprises tortoises in

the most well-studied 30% of the larger range; this portion of the original range has seen the most human impacts and is where the largest past population losses have been documented. A recent rigorous rangewide population reassessment of *G. agassizii* (sensu stricto) has demonstrated continued adult population and density declines of about 90% over three generations (two in the past and one ongoing) in four of the five *G. agassizii* recovery units and inadequate recruitment with decreasing percentages of juveniles in all five recovery units."

This status, in part, prompted the Council to join Defenders of Wildlife and Desert Tortoise Preserve Committee (Defenders of Wildlife et al. 2020) 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. In its status review, California Department of Fish and Wildlife (CDFW) (2024) stated: "At its public meeting on October 14, 2020, the Commission considered the petition, and based in part on the Department's [CDFW] petition evaluation and recommendation, found sufficient information exists to indicate the petitioned action may be warranted and accepted the petition for consideration. The Commission's decision initiated this status review to inform the Commission's decision on whether the change in status is warranted."

Importantly, in their February 2024 status review, CDFW concluded: **"The Department's recommendation is that uplisting the Mojave Desert Tortoise is warranted.** Receipt of this [status review] report is to be placed on the agenda for the next available meeting [expected in April 2024] of the Commission after delivery [at the February meeting]. At that time, the report will be made available to the public for a 30-day public comment period prior to the Commission taking any action on the petition."

Additionally, our comments pertain to protection of the Sonoran desert tortoise (*Gopherus morafkai*), which we believe also warrants BLM's consideration and protection throughout suitable habitats in Arizona, as a species that we believe also warrants federal listing as a Threatened species.

Unless otherwise noted, referenced page numbers pertain to the Draft Programmatic Environmental Impact Statement (Draft PEIS) for Utility-Scale Solar Energy Development (PEIS Project), Volumes 1 and 2 and associated appendices. In additional to the general and specific comments identified in the following text, we have provided comments on specific design features in Attachment A to this comment letter.

Although BLM has apparently unilaterally, without formal public input, decided to exclude lands in California subject to the Desert Renewable Energy Conservation Plan (DRECP) (page ES-4), we believe that this is a grave mistake with regards to current management and tortoise protection. As documented in Attachment B and USFWS (2019, 2020, 2022a, 2022b), there has been a 62 percent decrease in adult tortoise densities in designated critical habitats in the Western Mojave Recovery since 2004, where the population continues to decline at an estimated rate of 2 percent per year. We believe that exclusion criteria identified in the PEIS Project may have benefitted tortoise conservation in California and exclusion of the DRECP may lead to inconsistent standards that disfavor tortoise conservation in California, where it is vitally needed (e.g., as per page 1-15, Variance Process Lands would remain in California but be eliminated from the other five states identified in the 2012 PEIS).

Given the declines in tortoise densities, the Council would favor Alternative 5 because development would be restricted to degraded habitats that no longer support the essential elements needed for desert tortoises to occupy such habitats and are proximate to transmission infrastructure. We appreciate that all alternatives would avoid desert tortoise critical habitat (Table ES-1), noting that the DRECP has already facilitated solar development in critical habitats along the Interstate 10 corridor between Palm Springs and Blythe, CA and may likely continue to do so now that the precedent has been set and the more restrictive PEIS Project exclusion areas would not apply. We also suspect that excluding solar development from slopes >10% would result in less of a direct impact to the Sonoran desert tortoise, which primarily occupies rocky hillsides, mountain foothills, and incised washes (Zylstra and Steidl 2009). However, locating solar projects in valleys that connect hillsides and foothills would impede movement between tortoise populations, reduce genetic and demographic connectivity, and impede the species' ability to move as an adaptation to climate change.

The following statement on page 10 reflects the "slippery slope" concepts that haunted the variance process of the 2012 PEIS, introducing uncertainty into the anticipated impacts of the current PEIS Project: "In cases where solar energy development proposals are not in conformance with an existing BLM land use plan adopted as part of this alternative because the project site is not within 10 miles of transmission, the *BLM may choose to amend the existing land use plan concurrently with processing the application* using the same environmental review process," by implication leading to development that does not conform with the PEIS Project. Our suspicion and concerns are reaffirmed with the following statement given on page 2-3: "The screening process would preserve some aspects of the Western Solar Plan's variance process." See also the third paragraph on page 2-12 where "the BLM still has the discretion to consider the[se types of] solar project[s]."

We note that the following definitive statement given on page 2-12 (which is an objective statement that we support) is inconsistent with the subjective, tentative language given above: "Remaining BLM-administered lands farther than 10 miles from these transmission lines *would not be available* [emphasis added] for solar applications."

This kind of open-ended planning concerns us; that the BLM maintains the right to perform significant actions outside the context of the PEIS Project undermines the public's trust in the planning process. We note, and are not surprised to see, the following statement on page 2-35: "since 2012, the BLM *has received and approved* [emphasis added] the same number of utility-scale solar energy development applications in areas identified as variance areas as it has within priority areas." We appreciate Table 2.3-1 that indicates the number and acres of approved projects on BLM lands. **We ask that a second table be added to the Final EIS that documents the number of projects BLM has considered and disapproved**. Pending these data, we suspect that this comparison will demonstrate that BLM is overly inclined to approve most projects, even those that have displaced hundreds of tortoises and resulted in the loss of thousands of acres of occupied habitats.

Is it possible for the BLM to identify disincentives for such development and development caps that limit the amount of land disturbance that may occur in areas unaffected by exclusion criteria? If so, we would like to see such restrictions and development caps documented in the Final Project PEIS. These concerns and potential remedies would also apply to new transmission lines not currently anticipated by the BLM.

We appreciate in Table ES-3, which lists exclusion criteria, that the following statement is made for Exclusion No. 2, Threatened and Endangered Species: "Known occupied habitat for ESA [Endangered Species Act]-listed species, based on current available information or surveys of project areas." We believe that it is prudent to clarify that "Areas where current (or future, updated) survey protocols (currently USFWS 2019) detect any evidence of desert tortoises, including animals, scats, burrows, or carcasses will be unavailable for solar development, as per this exclusion criterion." We note that in the absence of "living" tortoise sign (e.g., scat and burrows), even carcasses are an indication of recent habitation and the heightened possibility of periodic movement from adjacent areas into the proposed project area. If BLM chooses to adopt this recommendation, the wording in Design Feature **ER-C-10sss** may need to be clarified.

The description of Exclusion Criterion 2 is, "All designated and proposed critical habitat areas for species protected under the ESA (https://ecos.fws.gov/ecp/report/critical-habitat). Known occupied habitat for ESA-listed species, based on current available information or surveys of project areas.[b]"

It is not clear in the Draft PEIS if Exclusion Criterion 2 would also apply to transmission lines (e.g., gen-tie lines, etc.) so please be sure to clarify this question in the Final PEIS.

We are concerned that BLM's stated intent to avoid all Threatened and Endangered species in Exclusion Criterion 2 is not a solid prescription BLM intends to require and implement. We make this conclusion because of numerous design features that would result in the take of desert tortoises and other Threatened and Endangered species, which would not be needed if Criterion 2 were a serious proposal. We note that none of following Design Features taken from Appendix B would be necessary if Exclusion Criterion 2 was a realistic proposal:

(1) **ER-G-1sss**: "Project developers shall coordinate with the BLM and USFWS to develop the threatened and endangered species protection plan and include proactive conservation measures as appropriate and feasible."

(2) **ER-G-3sss**: "…project developers shall include a transplantation plan for SSS [special status species] that will be directly impacted by facility development if impacts are unavoidable."

(3) **ER-G-4sss**: "Project developers shall develop and implement measures to ensure mitigation (i.e., avoidance, minimization)." No such measures would be needed if all federally-listed species are to be avoided.

(4) **ER-G-5sss**: "Project developers shall acquire and protect, in perpetuity, compensation habitat to offset (i.e., no net habitat loss or net benefit; BLM H-1794-1 Rel. No. 1-1808) for aquatic species, wildlife, and SSS." Compensatory habitat is not needed if listed species are to be avoided. See also **ER-G-10sss**, which anticipates "…direct, indirect, and cumulative impacts on, and loss of habitat for, SSS."

(5) **ER-G-7sss**: If surveys for "listed threatened and endangered species [find evidence] during any phase of project design… An appropriate course of action shall be determined to avoid, *minimize*, or *compensate impacts* [emphasis added]. Again, Exclusion Criterion 2 says listed species shall be avoided, so it is conflicting that BLM is anticipating impacts that would need to be minimized and compensated.

(6) **ER-C-2sss**: "Project developers shall conduct project *clearance* [emphasis added] surveys for BLM special status plant and animal species…" For desert tortoises, *presence-absence* surveys (USFWS 2019) are intended to discover if tortoises are present and *clearance* surveys function to remove tortoises from harm's way, which would not be applicable if Exclusion Criterion 2 were implemented. See also Design Feature **ER-C-11sss**.

(7) **ER-C-14dt**: "During operations, BLM shall consult with FWS, on a case-by-case basis, on the appropriateness of considering allowing tortoises to *reoccupy* [emphasis added] project sites." There is no opportunity for tortoises to "reoccupy" habitats that they never occupied, given the intent of Exclusion Criterion 2.

(8) **ER-C-16dt**: "Project developers shall require that any unavoidable impacts to tortoises are mitigated…"

Collectively, the above design features (and many others not listed) suggest that BLM already anticipates take of tortoises and other listed species; otherwise, none of these measures would be necessary if Exclusion Criterion 2 is implemented consistently. We anticipate that the measures have been identified so that when BLM rescinds Exclusion Criterion 2, or substantially modifies it, that these measures would then be applied to the less-protective measure that replaces this commendable exclusion criteria. Consequently, BLM should explain why these conflicting design features are include in Appendix B of the Draft PEIS.

We recommend that the following strike-out wording be eliminated from Design Feature **ER-C-15g**: ~~To the maximum extent practicable d~~ "**D**evelopers shall confine vehicular traffic to designated open routes of travel to and from the project site, and prohibit, within project boundaries, cross- country vehicle and equipment use outside of approved designated work areas to prevent unnecessary ground and vegetation disturbance."

We are concerned with the following Design Feature as it would pertain to desert tortoise exclusion fencing: "**ER-C-3w** Project developers shall monitor and repair any fencing *on at least a quarterly basis* [emphasis added] for possible damage, structural integrity, and unintended openings." Quarterly inspections are inadvisable. Rather, fences should be monitored on a regular basis and particularly immediately following storm events that will erode and undermine the integrity of the perimeter fences. This includes storm events that occur upslope of solar projects and not on the solar project site.

We ask that Design Feature **ER-C-7w**, which would "…avoid the use of evaporation ponds for water management when the water could harm birds," be amended to specify that evaporation ponds not become a water source for common raven (*Corvus corax*) and coyote (*Canis latrans*), which are known predators of desert tortoises.

We ask that Design Feature **ER-C-21w** be amended by adding the bold wording: "Project developers shall design transmission line support structures and other facility structures to discourage use by raptors **and common ravens** for perching or nesting (e.g., by using monopoles rather than lattice support structures or by use of anti-perching devices)." This prescription is intended to benefit both tortoises and sage grouse.

We are concerned with the exorbitant amount of solar development that has already occurred in southern Nevada in tortoise habitat, and now with this plan, even more tortoise habitat has been identified for more development. We remind BLM of its obligation under the Federal Land Policy and Management Act (FLPMA) to manage public lands "to prevent unnecessary or undue degradation of the lands." We request that BLM includes in the Final PEIS an analysis of how the development of these lands in any of the action alternatives would prevent unnecessary or undue degradation of the lands.

We remind BLM that the part of the Eastern Mojave Recovery Unit, most of the Northeastern Mojave Recovery Unit, and all of the Upper Virgin River Recovery Unit occur within the area impacted by this PEIS. "Preserving viable populations of desert tortoises within each recovery unit is essential to the long-term recovery, viability, and genetic diversity of the species" (USFWS 1994a). "Each of the five recovery units are *individually necessary* [emphasis added] to conserve the genetic, behavioral, morphological, and ecological diversity necessary for long-term sustainability of the entire listed population" (USFWS 2011). Consequently, BLM's failure to adequately conserve and manage for the long term persistence of the tortoise in the Eastern, Northeastern, or Upper Virgin River Recovery Units in Nevada, Arizona, and Utah in the implementation of the Final PEIS and subsequent National Environmental Policy Act (NEPA) documents means the tortoise would not meet recovery criteria. BLM would violate Section 2 of the ESA to "conserve endangered species and threatened species" and to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species."

The acreages of available solar development (see pie chart on page 2-13 for example) seem minimal when the entire 11-state planning area is being considered. What we and the concerned public need to see is the percentage of tortoise habitat that would be impacted under a given alternative. We suspect that Alternatives 4 and 5 would involve the least amount of occupied tortoise habitat, if those habitats are truly degraded and do not support animals. If a majority of the green areas available for solar development that are depicted in Figure 2.1-6 are actually developed, it would likely mean the extirpation of tortoises from southern and southwestern Nevada, which is already well underway given the way the 2012 PEIS has been implemented equally within Solar Energy Zones and Variance Lands.

To exacerbate this concern the Draft PEIS fails to even begin to analyze impacts to the Mojave desert tortoise in either Chapter 4, the Affected Environment or in Chapter 5, Environmental Impacts. We conclude that the Draft PEIS is deficient in regards to its analysis of impacts to the Mojave desert tortoise. Whereas the Draft PEIS dedicates five pages to sage grouse, desert tortoise is not even mentioned in Chapter 4. Chapter 5 is a vague, general discussion of direct and indirect impacts without providing any data that help the reader understand how much of the available habitat, for desert tortoises and other Threatened and Endangered species, would be affected by each alternative. When we view the low resolution Figure 2.1-6 on page 2-14, which shows BLM Lands Available for Application in Alternative 3, we are concerned with the apparent amount of tortoise habitat in Nevada south of Nellis Air Force Base and Desert National Wildlife Range, particularly in the Pahrump region, that will be available for solar development under the Project PEIS.

Chapter 4 and/or Chapter 5 of the Final PEIS needs to be amended to (1) provide a map analogous to Figure 4.4-2 for sage grouse showing suitable tortoise habitat (e.g., Averill-Murray et al. 2021) with overlays of habitats available for development under each alternative; (2) a table documenting the acreage and percentage of suitable tortoise habitats that may be developed under each alternative, particularly in Nevada since California is excluded; and (3) a trends analysis using available data like those included in Attachment B of this letter, focusing on the acreage and percentage of tortoise habitat that has been developed in Nevada already and the amounts that would be developed with each alternative. Certainly, our focus is on the federally-Threatened desert tortoise, but we believe that this level of information is likely needed for all of the Threatened and Endangered species likely to be adversely affected by this Project.

With regards to Exclusion No. 5, Habitat Areas, we read, "All areas where the BLM has agreements with USFWS and/or state agency partners *and other entities* [emphasis added] to manage sensitive species habitat in a manner that would preclude solar energy development, including habitat protection and other recommendations in conservation agreements/strategies." We ask that the BLM clarify in the Final PEIS that this criterion would apply to all lands that have been previously purchased through both State and federal planning processes to serve as mitigation (e.g., purchase of grazing allotments) and dedicated conservation areas to offset prior development impacts.

On page ES-19, Section ES.2.4.1.2, Design Features Under the Action Alternatives, we read the following statement: "In addition, projects on BLM-administered lands are required to follow all applicable federal, state, and local laws and regulations, such as the ESA, which will impose additional requirements that avoid and/or minimize resource impacts." It is our understanding that current solar technologies use lead and cadmium in their panel designs, that both of these materials are harmful to human welfare, and there may be millions of cubic tons of panels to be disposed of upon decommissioning in 25 to 30 years. We feel that it is appropriate in this Project PEIS to specify that panels be disposed of in appropriate hazardous waste repositories intended, in part, to receive decommissioned panels.

On page ES-19 and elsewhere as stated (e.g., second paragraph on page 2-25), we recommend that the following wording be modified as per the strike-out and replacement bold-font wording: "For those impacts that cannot be avoided or minimized, the BLM will ~~consider implementing~~ **require** compensatory mitigation **as per current and future management** to offset impacts, with a goal of ensuring viability of resources over time." We find the phrase, "consider implementing" to be arbitrary and subject to inconsistent interpretation by BLM field offices. In inserting the second phrase, the sentence clarifies that the existing fee structure will be used as appropriate. Further, we note that "compensatory mitigation" routinely applies to those projects, in southern Nevada for example, where the take of tortoise is anticipated based on protocol survey results. Since Exclusion Criterion No. 2 states that occupied habitats of Threatened and Endangered species shall not be developed, there would be no need for compensatory mitigation. We ask that BLM clarify this apparent conundrum in the Final PEIS.

We read the following statement on page ES-19, "The AIM [Assessment, Inventory, and Monitoring] Strategy provides a replicable, consistent framework for collecting monitoring data and for adaptively managing the siting and permitting of solar energy projects. Further, an AIM-based project- or region-specific long-term monitoring plan can take advantage of guidance and support available from BLM's AIM staff." For several years now in our comment letters to the BLM, the Council has asked that the BLM develop and maintain a data base and geospatial tracking system of solar projects that can be shared with affected interests for each of the project-specific National Environmental Policy Act (NEPA) documents so that we can be better informed of regional impacts by solar projects. Is there an "AIM tool" currently available to the public or is it available only to BLM staff?

The Council is concerned that the Draft PEIS has not adequately considered the increasing impacts of climate change on the habitat of flora and fauna in the project area, particularly special status species, and does not include a plan to deal with these changing impacts or to facilitate the movement of species, most likely latitudinally, in response to these impacts. BLM says it will not approve solar projects in critical habitat or occupied habitat. However, the concept of critical habitat was passed by Congress when climate change was not realized. The USFWS and National Marine Fisheries Service (NMFS) have not revised critical habitat regulations to account for the "movement" of critical habitat needed by listed species for their survival and recovery. Unfortunately, for many species, designation of their critical habitat did not include the location of habitat needed in the future to deal with climate change. Consequently, if BLM limits its exclusion of approving solar projects to currently occupied habitats of special status species and critical habitats, it may be contributing to the extirpation/extinction of species by blocking their path to move in response to climate change.

The Council requests that BLM include the U.S. Geological Survey, the science arm of the Department of the Interior, in the analysis of the direct, indirect, and cumulative impacts of proposed solar projects to ensure they do not interfere with the needs of species to move in response to the impacts of climate change. This request is especially needed because the regulations for implementing NEPA, including 40 Code of Federal Regulations (CFR) 1500.1(b), 40 CFR 1507(2)(a), 40 CFR 1502.22(b), and 40 CFR 1502.24, require BLM to use current science when developing and analyzing NEPA documents. We recommend that USGS be a partner when BLM develops its solar NEPA documents including the Final PEIS.

The Council on Environmental Quality (CEQ) recently issued Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors (CEQ 2023). The purpose of this document is for federal agencies to consider "how their actions can support the management, long-term conservation, enhancement, protection, and restoration of year-round habitat, seasonal habitat, stopover habitat, wildlife corridors, watersheds, and other landscape/waterscape/seascape features and processes that promote connectivity." "The objective is to build consideration of connectivity and corridors *into the early steps of these* [planning] *processes* [emphasis added] to facilitate easy implementation." This purpose seems to match with one of the purposes of preparing a programmatic EIS. Consequently, the Council requests that BLM include an analysis of the impacts of the alternatives on the areas needed as movement corridors to connect tortoise populations within recovery units, among recovery units, and in response to the impacts of climate change. This analysis should include the current scientific information available.

For example, Averill-Murray et al. (2021) published a paper on connectivity of Mojave desert tortoise populations and linkage habitat. The authors emphasized that "[m]aintaining an ecological network for the Mojave desert tortoise, with a system of core habitats (TCAs = Tortoise Conservation Areas) connected by linkages, is necessary to support demographically viable populations and long-term gene flow within and between TCAs."

"Ignoring minor or temporary disturbance on the landscape could result in a cumulatively large impact that is not explicitly acknowledged (Goble, 2009); therefore, understanding and quantifying all surface disturbance on a given landscape is prudent." Furthermore, "habitat linkages among TCAs *must be wide enough* [emphasis added] to sustain multiple home ranges or local clusters of resident tortoises (Beier and others, 2008; Morafka, 1994), while accounting for edge effects, in order to sustain regional tortoise populations." Consequently, effective linkage habitats are not long narrow corridors. Any development within them has an edge effect (i.e., indirect impact) that extends from all sides into the linkage habitat further narrowing or impeding the use of the linkage habitat, depending on the extent of the edge effect.

Averill-Murray et al. (2021) further notes that "[t]o help maintain tortoise inhabitance and permeability across all other non-conservation-designated tortoise habitat, all surface disturbance could be limited to less than 5-percent development per square kilometer because the 5-percent threshold for development is the point at which tortoise occupation drops precipitously (Carter and others, 2020a)." They caution that the upper threshold of 5 percent development per square kilometer may not maintain population sizes needed for demographic or functional connectivity; therefore, development thresholds should be lower than 5 percent.

The lifetime home range for the Mojave desert tortoise is more than 1.5 square miles (3.9 square kilometers) of habitat (Berry 1986) and, as previously mentioned, tortoises may make periodic forays of more than 7 miles (11 kilometers) at a time (Berry 1986).

The Council has been concerned that over the past 12 years the 2012 Solar PEIS has functioned in such a way that project proponents do not extend a "reasonable range of alternatives" to the proposed development sites, themselves. We are unaware of a single solar project in the last 10 years that has included more than a single site for the proposed solar development. Even the Gemini site in southern Nevada, which BLM touts as a successful project (see photo on the front page of this PEIS), an area twice the size of the solar impact footprint was surveyed, yet the proponent still opted to develop the western half of the survey area even though the eastern half contained fewer tortoises. Ideally, the proponent should perform – at a minimum – reconnaissance surveys on several prospective sites and choose the site with the fewest impacts tortoises for more detailed studies. This recommendation is particularly important if the BLM, in its final analysis in the Final PEIS, chooses to adopt Exclusion Criteria No. 2.

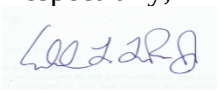
The Council fully supports the Desert Tortoise Management Oversight Group's recommendations of April 4, 2024, which are in Attachment C.

We appreciate this opportunity to provide the above comments and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the 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 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 notify the Desert Tortoise Council at eac@deserttortoise.org of any proposed projects that BLM may authorize, fund, or carry out in the range of any species of desert tortoise in the southwestern United States (i.e., *Gopherus agassizii*, *G. morafkai*, *G. berlandieri*, *G. flavomarginatus*) so we may comment on it to ensure BLM fully considers actions to conserve these tortoises as part of its directive to conserve biodiversity on public lands managed by BLM.

Please 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

Attachment A: Specific Comments on Design Features – from Appendix B; Proposed Programmatic Design Features Under the BLM Action Alternatives, Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development.

Attachment B. Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*).

Attachment C: Desert Tortoise Management Oversight Group (MOG); Recommendations Related to the BLM Draft Solar Programmatic EIS

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Attachment A. Specific Comments on Design Features from Appendix B: Proposed Programmatic Design Features Under the BLM Action Alternatives, Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development

Solar Exclusion Areas

All ACECs identified in applicable land use plans.

> Comment: Because indirect impacts extend beyond the project footprint, solar projects built immediately adjacent to an ACEC may have undesirable effects. The indirect impacts from the solar project would negate the management of some or all of the ACEC depending on the geographical extent of the impacts and the size of the ACEC. Examples of such threats include altered surface hydrology, elevated surface and air temperatures, disruption of species movements and connectivity, etc. We therefore suggest that there be an exclusion criterion that prohibits solar development within a half-mile of ACECs and critical habitats.

Known occupied habitat for ESA-listed species, based on current available information or surveys of project areas.

> Comment: This exclusion criterion would not effectively avoid many wide-ranging species including the tortoise. A site may be occupied but the surveys may not find tortoises because tortoises spend most of their time underground and they are difficult to see. This situation occurred at the Ivanpah and Yellow Pine solar projects. Tortoises like most animals are not sedentary. They may use a site in one season or year and not the next. The lifetime home range for the Mojave desert tortoise is more than 1.5 square miles (3.9 square kilometers) of habitat (Berry 1986) and tortoises may make periodic forays of more than 7 miles (11 kilometers) at a time (Berry 1986).

All desert tortoise translocation sites identified in applicable resource management plans, project-level mitigation plans, or Biological Opinions

> Comment: Because indirect impacts of a solar project extend beyond the project footprint, a solar project could be built immediately adjacent to a translocation site. The indirect impacts would negate the management of the translocation site from threats such as altered surface hydrology, elevated surface and air temperatures, etc.

Design Features (From Appendix B)
Design features are project requirements that would be incorporated into the Preferred Alternative and other Action Alternatives to avoid, minimize, and/or compensate for adverse impacts.

ER-G-1sss: Project developers shall develop a threatened and endangered species protection plan at each project location. The U.S. Fish and Wildlife Land-Based Wind Energy Guidelines. All relevant exclusions and design features for threatened, endangered, and other SSS species will be clearly identified in the species protection plan. Project developers shall coordinate with the BLM and USFWS to develop the threatened and endangered species protection plan and include proactive conservation measures as appropriate and feasible.

Comment: These plans are usually limited to protection of species on site from direct impacts. Most impacts to special status species are indirect and cumulative. How will these be mitigated?

ER-G-3sss: As part of the threatened and endangered species protection plan, project developers shall include a transplantation plan for SSS that will be directly impacted by facility development if impacts are unavoidable, if proven that transplantation works for the specific species, and if approved by USFWS (for ESA threatened and endangered species), BLM, and/or state wildlife agencies.

Comment: In the Draft PEIS, BLM mentions threatened and endangered species under the ESA. Please provide information on how BLM will mitigate for threatened and endangered species under the California Endangered Species Act and for any of the other 10 states that may have an endangered species act.

ER-G-4sss: Project developers shall develop and implement measures to ensure mitigation (i.e., avoidance, minimization), monitoring, and adaptive management of impacts to special status and priority species in coordination with appropriate federal and state agencies (e.g., BLM, USFWS, and state resource management agencies). Compensatory mitigation will be required when resource impacts cannot be avoided.

Comment: Will BLM require that the compensatory mitigation fully mitigates for the remaining direct, indirect, and cumulative impacts from the project? Compensatory mitigation should include indirect and cumulative impacts (e.g., altered surface hydrology, elevated surface and air temperatures, disruption of species movements and connectivity, etc.).

ER-G-5sss: Project developers shall acquire and protect, in perpetuity, compensation habitat to offset (i.e., no net habitat loss or net benefit; BLM H-1794-1 Rel. No. 1-1808) for aquatic species, wildlife, and SSS. The acreages will be based upon final calculation of impacted acreage. Acreages will be adjusted as appropriate for other alternatives or future modifications during implementation. Compensation will be provided for impacts at a ratio determined by the BLM consistent with applicable mitigation policy. For example, suggested ratios for loss of Mojave desert tortoise and Mohave ground squirrel are 5:1 (in same critical habitat unit) and 2:1, respectively, for renewable energy development under the Desert Renewable Energy Conservation Plan. However, the USFWS and state resource management agencies shall be consulted for species and habitat-specific mitigation ratio requirements.

Comment: Would the impacted acreage include the indirect and cumulative impacts or just the impacts within the project footprint? Impacted acreages should include indirect and cumulative impacts (e.g., altered surface hydrology, elevated surface and air temperatures, disruption of species movements and connectivity, etc.).

ER-G-9sss: Project developers shall develop and implement proactive conservation efforts from recovery plans or conservation agreements/recovery efforts to assist with conservation and recovery of special status species above and beyond that required by regulatory processes. Proactive conservation efforts will be developed in consultation with the BLM, USFWS and relevant state resource agencies.

Comment: These efforts should be science-based. Therefore, BLM and USFWS should include USGS in this process as this agency is the science arm of the Department of Interior (DOI). Including USGS would increase the likelihood that the efforts would be effective as the latest scientific data would be used to determine the adequacy and effectiveness of the proposed conservation efforts.

ER-G-10sss: Project developers shall implement compensatory mitigation, monitoring, and adaptive management of direct, indirect, and cumulative impacts on, and loss of habitat for, SSS. Project proponents will provide compensatory mitigation for loss of habitat for federally listed species as coordinated and agreed to by BLM, USFWS (for threatened and endangered species), and/or state wildlife agencies. Mitigation may be in the form of land acquisition and/or funding/implementing conservation actions that will benefit the recovery of federally listed species.

Comment: Funding in the form of an estimated payment to a third party fund should not be allowed based on past failures of this approach. USFWS and BLM do not have the financial expertise to determine whether funds requested would be adequate to implement effective compensatory mitigation. The issuance of contracts to implement mitigation by the federal government is inefficient; it takes years to award a contract. In addition, the initial estimated costs for labor and supplies continues to increase and would be inadequate by the time the contract was awarded.

For efficiency and to ensure effectiveness, the project proponent should be responsible for implementing the effective conservation actions. Please delete "or funding."

In addition to the design features, the following mitigation measures may be useful in avoiding, minimizing, and/or mitigating some impacts on SSS resources:

Project developers should avoid to the extent practicable all solar energy development activities in Priority 1 and 2 desert tortoise habitat (BLM 2012) and identified desert tortoise project areas that will result in removal of habitat supporting more than 5 adult tortoises. The number of desert tortoises on-site is based on estimates derived from the protocol surveys described previously using the USFWS's pre-project survey protocol (USFWS 2019, or most recent). These design features apply to any solar energy development applications within modeled desert tortoise habitat with a suitability index ≥ 0.5 (Nussear et al. 2009 or most recent as approved by permitting agencies) or habitat supporting ≥ 5 tortoises per square-mile (number of tortoises is based on estimates derived from the USFWS pre-project survey protocol (USFWS 2019 or most recent).

Comment: The wording "to the extent practicable" should be defined. We suggest that if the cost of fully replacing all the ecological functions and values that would be lost/degraded from the project, including the temporal loss of the functions and values, costs more than the avoidance, then avoidance should be the decision.

ER-C-10v: Following construction, project developers shall revegetate the solar array area with native plant communities to the maximum extent practicable.

Comment: "To the maximum extent practicable" should be defined. Spreading seed one time at a site could be what BLM determines to be a revegetation effort implemented to the maximum extent practicable. In addition, these efforts should be science-based. Therefore, BLM should include USGS in this process as this agency is the science arm of DOI. Including USGS would increase the likelihood that the efforts would be effective as the latest scientific data would be used to determine the adequacy and effectiveness of the proposed revegetation efforts.

ER-C-1sss: Project developers shall develop, in coordination with state wildlife agencies and the USFWS and/or National Marine Fisheries Service (NMFS), the level and extent of surveys required to determine effects and avoid occupied habitats and connectivity corridors for special status species, and other plant and wildlife species of concern, in all solar development project areas.

Comment: Please add the expert scientists at USGS to the entities with whom coordination is required.

ER-C-2sss: Project developers shall conduct project clearance surveys for BLM special status plant and animal species, in coordination with BLM, USFWS, NMFS, state wildlife agencies, and, as applicable, Tribes and consistent with relevant statutes, regulations, programs, policies, permit requirements, and survey protocols or standards, prior to receiving land use authorizations for the purpose of informing analyses necessary for BLM compliance with the NEPA, FLPMA, and, as applicable, the ESA.

Comment: Please add the expert scientists at USGS to the entities with whom coordination is required.

ER-C-5sss: The BLM shall require compensatory mitigation for any residual unavoidable impacts to special status species and their habitats (e.g., occupied, migratory, habitat connectivity, roosting, breeding, nesting). Compensatory mitigation shall be developed in accordance with direction and recommendations provided by the BLM Mitigation Policy (BLM MS-1794) and BLM Mitigation Handbook (BLM H-1794-1), including any future revisions. Compensatory mitigation for threatened and endangered species and their habitats must: 1) achieve a net benefit, consistent with applicable law, to a level that would improve upon the baseline conditions of the species available habitat or population status, and 2) be durable, i.e., it will be effective for at least the duration of the impacts resulting from the associated public land use.

Comment: Please add "etc." following "e.g., occupied, migratory, habitat connectivity, roosting, breeding, nesting" to indicate there may be other residual impacts to the habitats of species.

ER-C-6sss: Project developers shall review the FWS's Information for Planning and Consultation (IPaC; https://ipac.ecosphere.fws.gov/) and coordinate with state resource agencies for updated information (e.g., occurrences and distribution) and recommended conservation measures for ESA-listed, candidate, and proposed species, BLM sensitive species, and other state-managed wildlife species within the project area. For threatened and endangered species, project developers will also provide an official species list from IPaC to the BLM.

Comment: IPaC is not accurate. It is a starting point but should not be the only source of information. For example, IPaC shows the Mojave desert tortoise occurring in the Tehachapi Mountains and the San Joaquin Valley near Bakersfield, California. Maintaining the accuracy of IPaC is not a priority for the USFWS. This may also include timeliness in adding species that are candidates, proposed for listing, or listed. We suggest that each USFWS ecological services office and State wildlife office be contacted to confirm the information in IPaC. The state wildlife agencies should be contacted, as they may have species that are protected under state laws that should be included in the analysis and mitigation for each NEPA document and project.

ER-C-22sss: Project developers shall incorporate relevant conservation measures from the USFWS and NMFS recovery plans for threatened and endangered species, specifically conservation measures and proactive recovery actions for energy-related development.

Comment: Most recovery plans have not been written with specific conservation measures for energy-related development. Consequently, this would result in little or no implementation of conservation measures and proactive recovery actions. Please remove the wording after "recovery plans for threatened and endangered species."

ER-C-4dt: If tortoise exclusion is necessary, as determined only after coordination with BLM and USFWS, project developers will ensure access for other wildlife through the fence by adding wildlife access gaps. Raised fences are preferable to fence gaps when habitat is deemed suitable to minimize wildlife pacing as much as possible. Alternatively, wildlife-friendly/permeable fencing with wider-spaced chain link could be used to allow for wildlife access without the use of fence gaps.

Comment: Please add USGS to coordinating agencies to ensure that this decision is based on current science including climate change data.

ER-C-6dt: Scraping, grading, and leveling of the project area (including disc and roll, drive and crush) of the project's developable area must be minimized and limited to designated main access roads, substations, operations and maintenance facilities, temporary laydown areas, and equipment pads. Project developer will work with BLM in coordination with USFWS to ensure scraping, grading, and leveling is minimized with a recommended goal of <20 percent to ensure retention of suitable desert tortoise habitat.

Comment: Depending on their locations on the project site, these facilities can still result in substantial impacts, e.g., alter the surface hydrology of the site down gradient, and therefore impact soils, vegetation, and wildlife, including special status species.

Operations and Maintenance

Comment: If not provided, please include general requirements (e.g., objectives) for decommissioning and restoration phases of the solar projects. These general requirements would be updated and refined at the time of decommissioning and restoration to reflect the best methods to use according to science and the ecological needs of the resource issues affected.

Design features specific to Special Status Species

ER-O-2sss: Project operators shall remove raven nests in desert tortoise habitat only when inactive (i.e., no eggs or young). The removal of raven nests may be addressed in the most current USFWS guidance (e.g., FONSI, Implementation of a Desert Tortoise Recovery Plan Task: Reduce Common Raven Predation on the Desert Tortoise, 2008).

> Comment: Please modify this wording so it refers to the latest permit requirements for removing raven nests. In the future, there may be other methods authorized to remove raven nests.

Literature Cited in Attachment B

Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: Implications of social behavior and movements. Herpetologica 42:113-125. https://www.jstor.org/stable/3892242

Attachment B. 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 with its 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 mile^2 (3.9 adult tortoises per km^2). This assumed a male-female ratio of 1:1 (USFWS 1994a, page C25) and certain areas of habitat with most of these areas geographically linked by adjacent borders or corridors of suitable tortoise habitat. Populations of Mojave desert tortoises with densities below this density are in danger of extinction (USFWS 1994a, page 32). The revised recovery plan (USFWS 2011) designated five recovery units for the Mojave desert tortoise that are intended to conserve the genetic, behavioral, and morphological diversity necessary for the recovery of the entire listed species (Allison and McLuckie 2018).

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

At the population level, represented by tortoises in the TCAs, densities of 10 of 17 monitored populations of the Mojave desert tortoise declined from 26% to 64% and 11 have densities less than 3.9 adult tortoises per km^2 (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/km^2 and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 adults/km^2 (10 adults per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (Allison and McLuckie 2018, USFWS 2015).

Recovery Unit Designated 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/km^2 and standard errors = SE), and percent change in population density between 2004-2014 (USFWS 2015). Populations below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) (USFWS 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 km^2 so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires (e.g., 576.2 km^2 of critical habitat that burned in 2005), development of utility-scale solar facilities (as of 2015, 194 km^2 have been permitted) (USFWS 2016), or other sources of degradation or loss of habitat (e.g., recreation, mining, grazing, infrastructure, etc.). Thus, the declines in abundance of Mojave desert tortoise are likely greater than those reported in Table 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%**

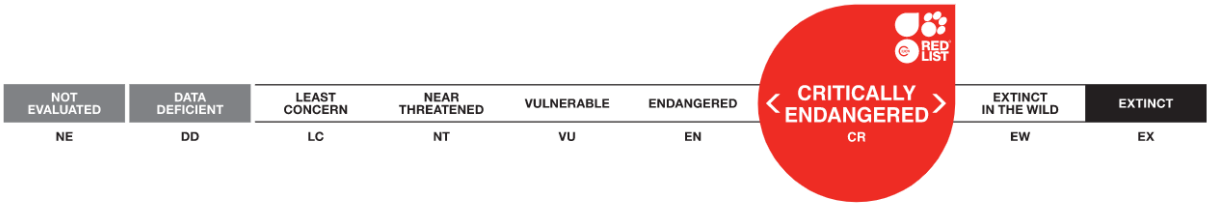
Habitat Availability: Data on population density or abundance does not indicate population viability. The area of protected habitat or reserves for the subject species is a crucial part of the viability analysis along with data on density, abundance, and other population parameters. In the Desert Tortoise (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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Attachment C: Desert Tortoise Management Oversight Group (MOG) Recommendations Related to the BLM Draft Solar Programmatic EIS From the April 4, 2024, Meeting of the MOG

Exclusion Areas and Criteria

Additional areas to exclude from solar energy project development

- Mitigation lands
- Conservation banks
- Existing and proposed Areas of Critical Environmental Concern
- BLM disposal lands
- Desert tortoise connectivity corridors (see Averill-Murray et al. 2021 Connectivity of Mojave Desert tortoise populations—Management implications for maintaining a viable recovery network (usgs.gov)
    - For example, Amargosa Valley, Indian Springs Valley, and Mercury Valley, which are in a crucial tortoise connectivity corridor, have multiple solar proposals that total nearly 170,000 acres.
    - Recommendation to suspend all project applications in progress in prioritized or highly suitable desert tortoise habitat
    - All Priority 1 and Priority 2 desert tortoise connectivity habitat as defined in BLM's 2012 Western Solar Plan Variance Protocol for Desert Tortoise
- All habitats occupied by desert tortoise
- Areas with sensitive groundwater-dependent ecosystems or significantly depleted aquifers
- All habitats identified for or previously used as recipient populations for translocated tortoises. Additionally, habitats currently used as reference populations to understand the long-term outcomes and efficacy of translocation actions.
- Allow BLM Field Offices to identify additional exclusion areas at the local level
    - Problems occur when project developers attempt to apply in sensitive areas (e.g., agencies repeatedly need to educate project proponents about not developing in dune beetle habitat)
- Areas identified as climate refugia (e.g., northern part of the tortoise's range), such as areas that allow access to higher elevations
- Areas/roads with established fencing and tortoise crossings; adding solar could reduce use of the area and reduce connectivity.
- Design buffers around Areas of Critical Environmental Concern, Critical Habitat Units, National Park units, National Wildlife Refuges, Department of Defense lands, and other protected areas. Allow local land managers to define buffers based on the sensitive resources being protected in the conservation areas.

Design Features for the Desert Ecoregion/Mojave Desert Tortoise Habitat

Solar Panels, Roads, and Infrastructure

- Require (rather than recommend) panels to be elevated to permit vegetation growth.
- Reduce roads and lay-down areas to only those absolutely necessary to limit vegetation removal.
- Space panels to prevent complete shade cover or too much sun.

- Increase the height of the bottoms of fences to allow passage by tortoise and other small animals if habitat and environmental conditions are appropriate for reintroduction to the site.
- Coordinate on dust abatement with government agencies.
- Strategically design the placement of panels and vegetation to utilize water flowing off of panels.
- Avoid duplicative fencing.
- Conduct site restoration continually (through project construction and production, rather than only once).
- Develop a vision for the future use of the facility after it is decommissioned, and design the facility to work toward that future condition.
- Include security features to avoid illegal incursions by recreational off-highway vehicle drivers.
- Reduce human resource subsidies (such as open trash cans, dumps, and other human created food sources) to avoid additional predator management concerns.

Topography, geomorphology, and hydrology

- Limit grading of the site to 20% of the developable area.
- Maintain natural surface water flows and topography, Including aeolian processes.

Vegetation

- Avoid vegetation removal to the maximum extent possible.
- Mowing should be mandatory not optional. Require elevated and vegetated solar installations.
- Mitigate the risk of starting wildfires through fuels management.
- Reduce risk of herbicide impacts
- Design and build to maintain 60-80% cover of perennial vegetation uniformly across the project site. The vegetation species should be representative of the original plant community.
- Collect seeds of native plants prior to site construction for use in revegetation.
- For restoration efforts, exclusively use seeds of species native to the site.
- Salvage plants from the areas that will be graded and use them for restoration.

Features Specific to Desert Tortoise

- Design features recommended for desert tortoise should be applied throughout the Mojave and Sonoran desert tortoise range. The Sonoran desert tortoise population is declining as well as the Mojave, and their requirements are similar.
- Add perch deterrents, monopoles, and other measures to deter tortoise predators.
- Avoid impacts to tortoise burrows and thermal shade shrubs during construction, or replace these resources if lost during construction.
- Design projects to provide a net increase of 10% of tortoise burrows on site.

Mitigation

- Established consistent mitigation requirements for any adverse effects in tortoise habitat (fees, land acquisition, or other compensatory mitigation). Do not rely on potentially inconsistent or ad hoc mitigation promises.
- Encourage the purchase and retiring of grazing allotments for mitigation of desert tortoise impacts from solar energy development.
- Consider using solar project sites for release of head started tortoises, or develop head starting facilities at solar sites for this purpose.

Monitoring and Adaptive Management

Guidance Needed from the PEIS

- Define whether adaptive management is occurring at the individual project level, or across projects to support future decision-making across a region/state.
- Establish provisions in the PEIS to adapt management and design features and mitigation measures as technology improves and information is learned.
- Identify who is going to update plans and decisions based on the data.
- Provide information on the questions/information BLM is going to gather using the AIM framework.

Project Monitoring

- Recommendation for the project proponent and land manager to work together to create a monitoring plan. Potential items to monitor on project sites include:
    - Vegetation cover (including cover and/or production of native vegetation and invasive species) - In cooperation with the land manger, set goals for the amount of perennial plant cover based on pre-construction surveys.
    - Surface water flows and flow paths
    - Soil erosion and/or quality and biological soil crusts
    - Depth to groundwater
    - Tortoise cover (e.g., selected perennial plants)
    - Tortoise burrows
    - Use of the site by tortoise
    - Survival rates of translocated tortoise
    - Predation of tortoises at the project site
    - Post-construction mortality of birds and bats
    - Use of the site by tortoise predators (particularly to determine whether predator activity increases due to perching on the panels, and whether mortality of other bird species attracts tortoise predators)
    - Energy production at the site (and the consequences of the management alternatives on energy production)
- If a project is within a grazing allotment, monitor the impacts of grazing on the site and make decisions accordingly, potentially including termination of the grazing lease.
- Monitor areas outside the project site that may experience impacts on hydrologic function (surface water and/or groundwater). Consider charging fees for projects that incur negative impacts outside the project area.

- Establish success criteria for mitigation areas and monitor the criteria to determine whether mitigation is successful. Mitigation criteria should include whether the mitigation activities are in fact implemented.
- Establish reference sites (areas ecologically similar to the project site) to compare what happened to the items monitored at the facility versus in a similar area that was not developed.
- Capture a pre-construction record of the site (and reference sites) for all variables monitored.
- Compliance monitoring should be conducted by an independent entity not hired by the project proponent.
- Consider using efficient, cost-effective technology such as drones and existing satellite imagery to monitor the sites.

Coordination and Communication

Recommendations for the PEIS

- Provide clear language on how local decisions on siting and management, as well as changes in management strategies that result from new technology and research findings, will be incorporated into national policies going forward.
- Answer phone calls and emails from Cooperating Agencies and other partners.
- Ensure the BLM has sufficient staff to properly respond to and plan for renewable projects. This is not currently the case in the field offices in the desert tortoise range.

Coordination needed between BLM and Partners after Plan Publication

- Work closely with local Habitat Conservation Partnerships.
- Compile and provide BLM offices and partners with annual updates from local managers for adaptive management.
- Designate a partner to act as coordinator for tracking solar projects.
- Coordinate with partners on the following topics:
    - Establishing consistent permitting requirements and design features to achieve avoidance, minimization, and mitigation of impacts.
    - Ensuring top-down coordination within the BLM from the national to local level, and consistent decision-making at the local level.
    - Evaluating the impacts of solar projects on tortoises.
    - Collectively ensure compliance on mitigation measure commitments.
    - Maintaining a working knowledge across the region of project proposals, status, and effects.
        - One idea to increase awareness is posting billboards at project sites to notify partners and the public of the project.

Available Information to Incorporate into the PEIS

- Use Fast 41 dashboard as an example of a project tracking approach.
- BLM Southern Nevada District Office has an internal memo on how to communicate with Clark County and other partners on managing across jurisdictions for a sensitive species. This could be used as an example for agency coordination.

- The Stagecoach Wind project was indefinitely suspended in Greater Sage Grouse habitat. This is an example of stopping a project in the NEPA stage that would have harmed a non-listed species.
- Desert tortoise recipient areas for translocated tortoises and their associated reference sites have been identified and mapped. These should be added to the BLM's Solar Mapper.
- Develop a mapping utility that identifies exclusion areas.
- Utilize climate studies (e.g. to identify climate refugia exclusion areas).