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Via email only

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RE: Southern Nevada Supplemental Airport Resource Management Plan Amendment & Environmental Impact Statement – Public Scoping (DOI-BLM-NV-S010-2025-0035-RMP-EIS)

Dear Mr. Kessler and Ms. Guerro,

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 northern 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."

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats occupied by the Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments include relevant information from the recent scientific literature on the tortoise/tortoise habitat, other relevant information, and recommendations intended to enhance protection of this species and its habitat during activities that may be authorized by the Bureau of Land Management (BLM), which we recommend be included and analyzed in the environmental documents associated with this proposed action. Please accept, carefully review, and include in the relevant environmental documents and the project file the following comments from the Council for the proposed action.

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 DTC and Desert Tortoise Preserve Committee (DTPC) to join Defenders of Wildlife (Defenders of Wildlife et al. 2020) to petition the California Fish and Game Commission (Commission) in March 2020 to elevate the listing of the Mojave desert tortoise from Threatened to Endangered in California under the California Endangered Species Act (CESA). In its status review, California Department of Fish and Wildlife (CDFW 2024a) 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 April 2024 meeting (CDFW 2024b), the Commission voted unanimously to accept the CDFW's petition evaluation and recommendation to uplist the tortoise from threatened to endangered under CESA based on the scientific data provided on the species' status, declining trend, numerous threats, and lack of effective recovery implementation and land management. On July 15, 2025, the tortoise was officially uplisted to endangered status under CESA (Commission 2025).

Description of the Proposed Action

The proposed action is the construction and operation of a supplemental airport in Clark County, Nevada. The Clark County Department of Aviation is proposing the development and operation of the Southern Nevada Supplemental Airport (SNSA). The Federal Aviation Administration (FAA) and BLM are Joint Lead Agencies (JLA) for preparation of an Environmental Impact Statement (EIS) to comply with the National Environmental Policy Act (NEPA). BLM will evaluate the need for a Resource Management Plan Amendment (RMPA) for this proposed action, resulting in the preparation of a combined EIS/RMPA. The RMPA to modify the Visual Resource Management (VRM) class is being considered for the BLM to evaluate the Ivanpah Transportation and Utilities Corridor. This 2,640-foot-wide corridor between the Las Vegas Valley and the proposed Ivanpah Airport was established for the placement, on a nonexclusive basis, of utilities and transportation when Congress passed the Clark County Conservation of Public Land and Natural Resources Act of 2002.

According to the information provided by the FAA during a public scoping meeting on July 29, 2025, the proposed airport is not a replacement for the existing Harry Reid International Airport in Las Vegas. The location of the proposed supplemental airport is along the east side of Interstate 15 between Jean and Primm, Nevada and south of the current Las Vegas city boundary. It would be located on 6,000 acres or about double the area occupied currently by Harry Reid International Airport with an additional 17,000 acres to be conveyed to Clark County (Figure 1).

On May 19, 2025, the JLA published a Notice of Intent to prepare the EIS that initiated the public scoping process and public comment period for the proposed action.

Issues to Be Analyzed in the EIS/RMPA

The purpose of scoping is to allow the public to participate in an "early and open process for determining the scope of issues to be addressed, and for identifying the significant issues related to a proposed action" [40 Code of Federal Regulations (CFR) 1501.7]. For purposes of our letter, we request that the FAA and BLM prepare an EIS/RMPA that:

1. Discusses how each proposed alternative complies within the management structure of the current land management plan for the area, including management of adjacent/nearby lands.

2. Provide maps of Areas of Critical Environmental Concern (ACECs), and other areas identified for special management [e.g., Ivanpah ACEC, Large-Scale Translocation Site (LSTS), etc. Tortoise Connectivity Pathways identified in Averill-Murray et al. (2021) in the Ivanpah Valley and other nearby locations] and how each alternative would impact the successful function of these special management areas.

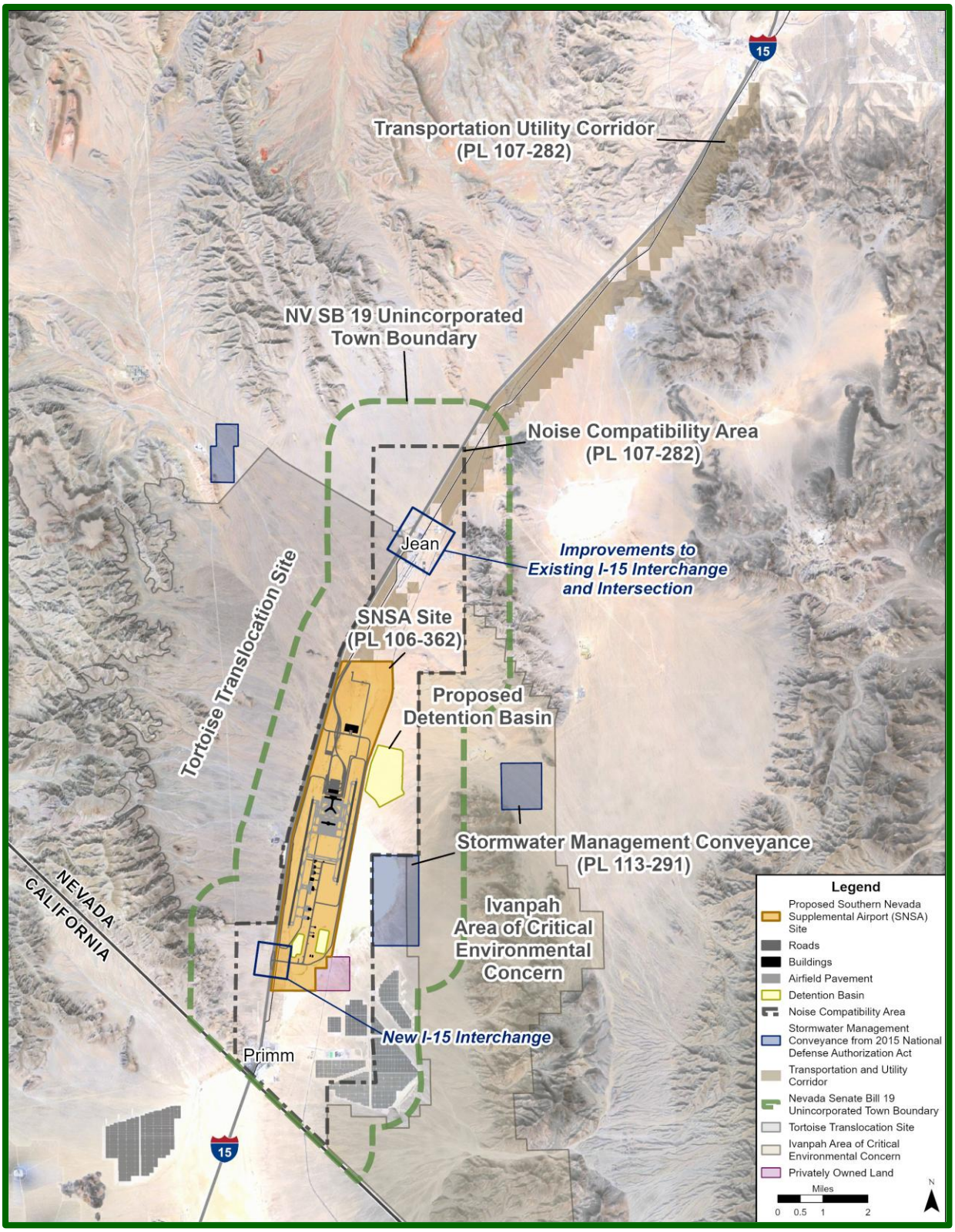


Figure 1. Proposed location, related facilities, and development associated with the SNSA, Clark County, Nevada.

3. Provide maps of all areas identified by CDFW and Mojave National Preserve (Preserve) (because the location of the proposed action is near the California-Nevada border and the Preserve), Nevada Department of Wildlife (NDOW), BLM, and U.S. Fish and Wildlife Service (USFWS) as managed for the tortoise and other special status species, including mitigation lands for previous projects.

4. Provide (a) maps with the locations of existing and proposed development projects in the Ivanpah Valley and adjacent areas, and (b) an analysis of their direct, indirect, cumulative, interactive, synergistic, and connected action impacts for the tortoise and other special status species and their habitats.

5. Provide maps that identify the ownership of the lands associated with the proposed alternatives and ownership of surrounding lands.

6. Provide maps with existing and proposed developments/surface disturbance activities on the project site and adjacent lands surrounding the project area.

Compliance with Relevant Federal Laws, Regulations, and Policies

The Council requests that the EIS/RMPA clearly describe and analyze how the various action alternatives for the proposed SNSA fully comply with all applicable federal laws, regulations, and policies including those listed below with respect to the tortoise and tortoise habitat. The descriptions and analyses should include linkage habitat needed for population connectivity with tortoises to the northwest, west, south, and southeast of Northern Ivanpah Valley.

Southern Nevada Public Land Management Act of 1998: This law requires Clark County to use the funds from an account to "acquire environmentally sensitive land in the State of Nevada with priority given to lands located within Clark County." Please explain in the EIS/RMPA how the Airport Environs Overlay District Land Transfer section of this law and any gross proceeds from the sale, lease, or other such conveyance of lands in this overlay area would be used to help mitigate the adverse impacts to the tortoise including the loss, degradation, and/or fragmentation of tortoise populations and tortoise habitat in the Northern Ivanpah Valley.

Ivanpah Valley Airport Public Lands Transfer Act of 2000: The requirements of this law should be explained with respect to what the conditions are for lands to be transferred to Clark County, the amount and location of the acreage, and the specified conditions of the transfer. In addition, the EIS/RMPA should address the type of airport that would be constructed and used – commercial passenger, private passenger, cargo, combination(s), etc., and the associated support services, planned development (e.g., NV SB 19), and other development that would likely occur.

This law requires that the funds Clark County pays to acquire the lands from the United States for the proposed action "may be expended only for the acquisition of private inholdings in the Mojave National Preserve and for the protection and management of the petroglyph resources in Clark County, Nevada." Please explain how this requirement has been or will be implemented with respect to land acquisition in the Preserve, and, with respect to the tortoise, compare the direct and indirect functions and values of the habitat destroyed, degraded, and/or fragmented from the

construction and use of the airport and associated services with the indirect and direct impacts of the functions and values of the lands acquired in the Preserve. Please explain whether the acquisition of lands in the Preserve will occur prior to surface disturbance of the lands for the proposed airport (i.e., will there be a temporal loss of habitat because development would occur prior to acquisition of habitat in the Preserve?).

This law requires the development of an air space management plan and that it "restrict aircraft arrivals and departures over the Mojave Desert Preserve in California." Please include in this airspace management plan the direct and indirect impacts of air space to the tortoise and other special status species in Nevada and California for the area of influence from the construction and use of the proposed airport and associated services and development.

In addition, in this law Congress directed that any actions conducted in accordance with NEPA "shall specifically address any impacts on the purposes for which the Mojave National Preserve was created."

The purposes for which the Preserve was created (NPS 2002) include:

- an extensive variety of habitats, species, and landforms unique to the Mojave Desert;
- outstanding scenic resources, rich in visual diversity containing a varied landscape of sand dunes, mountain ranges, dry lakebeds, lava flows, cinder cones, Joshua tree forests, and far-reaching vistas; and
- a naturally quiet desert environment with very dark night skies that offers visitors and researchers opportunities for natural quiet, solitude and star gazing with few human-caused noise or light glare sources.

Also, the Preserve has two designated wilderness areas near the California-Nevada border and the SNSA proposed site. The Clark Mountains are located southwest of the SNSA site and the New York Mountains to the southeast.

Please include an analysis of these purposes and others in the EIS/RMPA and analyze how the construction and use of the SNSA and associated development would directly and indirectly impact the purposes for establishing the Preserve, designated wilderness, and the effective mitigation and monitoring that would be implemented to fully offset these impacts.

This law also requires that Clark County retain ownership of Jean Airport, located at Jean, Nevada, and "maintain and operate such airport for general aviation purposes." Because of the proximity of the Jean Airport to proposed location of the SNSA, the EIS/RMPA should include an analysis of whether the SNSA would be able to operate safely while maintaining and operating the existing airport for general aviation purposes. The EIS/RMPA should also analyze whether the construction and use of the SNSA and associated services and development (e.g., NV SB 19 unincorporated town that is planned to surround Jean Airport and the Town of Jean) (Figure 1) would affect the functions of this existing airport in the future (i.e., cumulative impacts and impacts of connected actions).

Clark County Conservation of Public Land and Natural Resources Act of 2002: Congress authorized the "establishment of a 2,640-foot-wide corridor [Figure 1] between the Las Vegas valley and the proposed Ivanpah Airport for the placement, on a nonexclusive basis, of utilities and transportation." The EIS/RMPA should describe development alternatives within this corridor so that it results in the least amount of impacts to the tortoise and tortoise habitat and identify mitigation and monitoring to determine the effectiveness of the mitigation.

Under this law Congress authorized the transfer of all rights, title, and interest of the United States in and to the land identified as Ivanpah Airport noise compatibility area (Figure 1) and compliance with section 47504 of title 49, U.S. Code on noise compatibility. This area should be displayed on a map and included in the EIS/RMPA. The measures that would be implemented in the noise compatibility area should be described and analyzed including where each measure would be implemented and the expected results with respect to the tortoise/tortoise habitat in the area affected by the noise emanating from airport use and associated services. The standard list of measures that may be implemented include:

(A) establishing a preferential runway system;
(B) restricting the use of the airport by a type or class of aircraft because of the noise characteristics of the aircraft;
(C) constructing barriers and acoustical shielding and soundproofing public buildings;
(D) using flight procedures to control the operation of aircraft to reduce exposure of individuals to noise in the area surrounding the airport; and
(E) acquiring land, air rights, easements, development rights, and other interests to ensure that the property will be used in ways compatible with airport operations.

In addition, to comply with the conditions of transfer of the land, the EIS/RMPA should demonstrate how the management of this land complies with the Federal Endangered Species Act (FESA) for the tortoise. We refer the BLM and FAA to documents prepared by the USFWS at the request of the BLM to identify areas to exclude solar development (albeit any development) in southern Nevada so the future survival and recovery of the tortoise would not be jeopardized (USFWS 2023a, 2023b, 2023c, 2024). Please include this information in the EIS/RMPA and analyze how the placement of measures (A) through (E) and any other proposed measures would impact the tortoise and other special status species or impact the use of habitat by these species.

Federal Land Policy and Management Act of 1976: With the passage of the Federal Land Policy and Management Act (FLPMA), Congress directed BLM to manage public lands "for multiple uses that consider the long-term needs of future generations for renewable and non-renewable resources" and "to take any action necessary to prevent unnecessary or undue degradation of the lands."

In developing the proposed action and other action alternatives, the EIS/RMPA should clearly describe and analyze how each alternative fully meets the regulatory requirements and most important, the statutory requirements under FLPMA for the identified resource issues of the tortoise and tortoise habitat, including population connectivity and linkage habitats for the long-term survival and conservation of the tortoise in the Eastern Mojave Recovery Unit and rangewide. This is especially crucial for the tortoises in this recovery unit, because tortoises in this recovery unit are located geographically in the center of the distribution of the tortoise. The Eastern Mojave Recovery Unit connects to the two tortoise recovery units to the east and the two to the west and southwest (USFWS 2011). Thus, this recovery unit plays a crucial role in maintaining gene flow across the range of the tortoise.

As the primary land management entity in the range of the Mojave desert tortoise, the BLM's implementation of a conservation strategy for the Mojave desert tortoise through implementation of its RMPs in the Eastern Mojave Recovery Unit has resulted in a substantial decline in tortoise numbers and densities. Of the five tortoise recovery units, the tortoise population in the Eastern Mojave Recovery Unit has experienced the greatest amount of decline in population density and numbers (greater than 60%) (Allison and McLuckie 2018; USFWS 2015, 2016, 2020, 2022). A greater than 60% decline in 10 years is substantial. The data indicate that tortoise densities are less than that needed for population viability (USFWS 1994). Allison and McLuckie (2018) reported that "the negative population trends in most of the TCAs [Tortoise Conservation Areas] for Mojave Desert Tortoises indicate that this species is on the path to extinction under current conditions." The population trends have not improved since the analysis by Allison and McLuckie (2018) was conducted.

Data reported in USFWS (2011), Tuma et al. (2016), Averill Murray et al. (2021), and a recent federal court decision in 2024 (21-7171 - Center For Biological Diversity et al. v. United States Bureau of Land Management et al.) indicate that BLM is not demonstrating that it is taking "any action necessary to prevent unnecessary or undue degradation of the lands" for the tortoise and tortoise habitat. The ongoing reduction in tortoise abundance, density, and recruitment has been attributed to the loss, degradation, and fragmentation of habitat needed by the tortoise due, in part, to activities authorized by BLM, particularly solar development in southern Nevada.

These data demonstrate that BLM is not complying with this mandate of FLPMA with respect to managing for tortoise populations and tortoise habitat for current and future generations of Americans.

Please analyze in the EIS/RMPA how these requirements in FLPMA would be accomplished for each action alternative with respect to the tortoise and tortoise habitat.

Federal Endangered Species Act: In section 2(b) of the FESA (or Act), Congress stated that the "purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species." In section 2(b) of the Act, Congress further declared that "it is policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

In Section 7(a)(1) of the FESA, Congress stated that ***all federal agencies*** [emphasis added] "shall … utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act." In Section 3 of the FESA, "conserve," "conserving," and "conservation" mean "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition…" Consequently, these sections of FESA apply to the FAA and the BLM with respect to the federally threatened Mojave desert tortoise.

When analyzing the proposed action and action alternatives in the EIS/RMPA, the FAA and BLM should demonstrate how each agency is contributing effectively to the conservation and recovery of the tortoise, and how the implementation of mitigation for the action alternatives and proposed action will contribute to the conservation and recovery of the tortoise. Please describe and analyze in the EIS/RMPA how the alternatives carried forward for analysis would comply with these mandates from Congress in FESA.

Department of the Interior (DOI) Regulations for Implementing NEPA, 43 CFR Part 46*:* These regulations require the DOI agency (e.g., BLM) maintain the scientific quality and integrity of the NEPA document. The Council requests that in the EIS/RMPA, BLM use the most recent available information from scientific journals and reports in the analysis of impacts to the tortoise and tortoise habitat including linkage habitats needed for population connectivity.

BLM's NEPA Handbook H 1790-1: The BLM NEPA Handbook has numerous requirements of BLM when preparing an EIS. They include:

- rigorously exploring and objectively evaluating all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated (see "**Alternatives to the Proposed Action"** below);
- including reasonable alternatives not within the jurisdiction of the lead agency (see "**Alternatives to the Proposed Action"** below);
- for joint lead agencies, reaching consensus and identify the agencies' preferred alternative; if consensus cannot be reached, having each agency clearly identify their preferred alternative and explain the basis for their preference and why consensus could not be reached;
- identifying past and ongoing actions that contribute to existing conditions;
- providing relevant reasonably foreseeable development scenarios for cumulative effects analysis;
- analyzing connected actions and cumulative effects actions (e.g., disposal of BLM lands in addition to those needs for airport construction and operations such as landfills, land disposal for the creation of a new town, etc.);
- quantifying the effects analysis;
- analyzing long-term impacts and the effect of foreclosing future options;
- identifying all relevant, reasonable mitigation measures that could improve the project even if they are outside the jurisdiction of the agency;
- analyzing and comparing the effectiveness of mitigation measures proposed and the effects if the project were to proceed without mitigation;
- assessing any residual direct, indirect, or cumulative effects that will remain after application of the mitigation measures;
- to ensure compliance with decisions, describing the monitoring that would be implemented to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the decision; and
- develop and implement a monitoring program that incorporates monitoring schedules, approaches, and standards.

BLM should implement these and other requirements described in the BLM NEPA Handbook with respect to the tortoise and its habitat needs.

BLM's Resource Management Planning Regulations (43 CFR Part 1600) and the 1998 Las Vegas RMP: In 43 CFR 1610.4-9, BLM is directed under Monitoring and Evaluation as follows: "The proposed [resource management] plan shall establish intervals and standards, as appropriate, for monitoring and evaluation of the plan. Such intervals and standards shall be based on the sensitivity of the resource to the decisions involved and shall provide for evaluation to determine whether mitigation measures are satisfactory . . . or whether there is new data of significance to the plan."

Please explain in the EIS/RMPA (1) the intervals and standards of monitoring for the 1998 Las Vegas Resource Management Plan for the tortoise and tortoise habitat; (2) the results of BLM's implementation of this monitoring; (3) BLM's evaluation of these results to determine whether mitigation measures are resulting in a satisfactory outcome; and (4) whether there are new data of significance to this RMP especially with respect to the tortoise/tortoise habitat.

In 43 CFR 1610.5-5, "A resource management plan may be changed through amendment. An amendment shall be initiated by the need to consider monitoring and evaluation findings, new data, new or revised policy, a change in circumstances or a proposed action that may result in a change in the scope of resource uses or a change in the terms, conditions and decisions of the approved plan."

Since the Las Vegas RMP was finalized in 1998 there has been an abundance of data collected, analyzed, and published on the tortoise and its habitat in southern Nevada that demonstrate new data of significance to the RMP. For example, the data clearly show the tortoise has and is experiencing substantial declines and that habitat is no longer supporting viable populations of tortoises in the Eastern Mojave Recovery Unit.

In 2015, USFWS released a scientific report on the substantial declines in tortoise abundance and densities throughout most of the range of the tortoise. This included the Eastern Mojave Recovery Unit. In 2018, Allison and McLuckie published a scientific paper on the demographics of the tortoise that analyzed data beginning in 2004 that documented substantial tortoise declines in abundance, densities, ***and recruitment*** [emphasis added] throughout most of the range and especially in the Eastern Mojave Recovery Unit. Since the 2015 report and 2018 publication, the status of the tortoise has not improved (USFWS 2020, 2022). When this information was released, BLM should have initiated action shortly thereafter to revise or amend the Las Vegas RMP, if BLM were complying with its regulations in 43 CFR 1610.5-5 on amending resource management plans.

In addition, Averill-Murray et al. (2021) released a scientific publication on the importance of and locations of remaining linkage habitats needed for population connectivity and survival of the tortoise. These data are significant changes affecting the management needs for the survival and recovery of the tortoise. BLM should include these data on the tortoise and its habitat when revising or amending the Las Vegas RMP.

The Council has repeatedly provided to BLM in comment letters on proposed projects information on the substantially declining demographic status of the tortoise in southern Nevada, and requested that the decades-old Las Vegas RMP be revised to reverse the changing status and trend of the tortoise and implement new management actions to facilitate its survival and recovery. These letters included (among others):

- March 3, 2022 Proposed Implementation Plan for Management of Gold Butte National Monument
- December 1, 2022 Gold Butte National Monument Implementation Plan
- January 13, 2023 Copper Rays Solar Project (DOI-BLM-NV-S030-2022-0009-EIS)
- May 10, 2023 Muddy Mountains Travel Management Plan (DOI-BLM-NV-S010-2023-0040-EA)
- September 12, 2023 GridLiance West Core Upgrades Project – Scoping (DOI-BLM-NV-S030-2023-0008-RMP-EIS)
- February 17, 2024 Dry Lake East Energy Center Solar Project Environmental Assessment (DOI-BLM-NV-S010-2023-0027-EA
- August 16, 2024 Muddy Mountains Special Recreation Management Area Travel Management Plan and Environmental Assessment (DOI-BLM-NV-S010-2024-0087-EA)
- November 27, 2024 Variance for Larrea Solar, Mosey Solar, and Rock Valley Solar Projects, Clark County & Nye Counties, NV
- December 5, 2024 Bonanza Solar Project Draft Environmental Impact Statement/ Resource Management Plan Amendments (DOI-BLM-NV-S000-2022-0002-EIS)
- February 13, 2025 – Purple Sage Energy Center Draft Environmental Impact Statement and Draft Resource Management Plan Amendment (DOI-BLM-NV-S010-2022-0094-EIS)
- May 8, 2025 – Carey to Pabco 69kV Transmission Line Rebuild (DOI-BLM-NV-S010-2025-0028-EA).

On the current BLM NEPA ePlanning website for this proposed action, BLM posted "Preliminary Planning Criteria for the Southern Nevada Supplemental Airport Resource Management Plan Amendment (RMPA)." BLM stated that the following preliminary planning criteria will help guide the planning process and may be modified, and/or other criteria may be identified during the public scoping process.

> "Criteria (*sic*) 1: Any plan amendments will be completed in compliance with FLPMA, NEPA, and all other relevant Federal laws, executive orders, and BLM policies.
>
> Criteria (*sic*) 2: Existing valid Las Vegas Resource Management Plan decisions will not change, and any new plan decisions will not conflict with existing valid plan decisions.
>
> Criteria (*sic*) 3: Any resource management plan amendments will recognize valid existing rights."

To comply with Criterion 1, the Council reiterates its request that during the current RMP amendment process, BLM should revise the Las Vegas RMP for the management of the tortoise and its habitat, so it incorporates all relevant information from scientific reports and journal articles on the tortoise/tortoise habitat, analyzes what is needed for the long-term survival of the species, and incorporates and implements effective management actions and monitoring for the tortoise. BLM should not continue to follow an RMP that is 27 years old with outdated information, analysis, management, and monitoring on the tortoise/tortoise habitat, especially with respect to the survival and recovery of the tortoise.

Please see related comments below under "**BLM Special Status Species Management – Manual 6840**," "**Using Science in NEPA Documents and Decisionmaking**," and "**Importance of Ivanpah Valley in Nevada for Survival and Recovery of the Mojave Desert Tortoise**."

In 43 CFR 1601.05(i), the definition of "multiple use" includes ". . . harmonious and coordinated management of the various resources without permanent impairment of the productivity of the lands and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output."

BLM should analyze in the EIS/RMPA how the alternatives in the EIS/RMPA will comply with this regulation with respect to the tortoise and its habitat needs.

BLM Special Status Species Management – Manual 6840: For Wildlife, Migratory Birds, and Other Special Status Wildlife and for Threatened and Endangered Species, BLM should demonstrate in the EIS/RMPA how the proposed action and alternatives would comply with BLM's Special Status Species Management – Manual 6840 released in 2024. This policy established an agency-wide emphasis on proactive, landscape- and ecosystem-level, scientifically informed conservation and recovery of special status species and their habitats. It directs BLM to:

- Comply with FESA Section 7(a)(2) consultation regulations and ***incorporate proactive recovery efforts*** (emphasis added) into proposed actions;
- promote healthy species populations and biodiversity through landscape- and ecosystem-level management; and
- use science and adaptive management to advance conservation and recovery.

For each alternative, we request that the EIS/RMPA describe (1) the proactive conservation efforts they are requiring that contribute to the recovery of the tortoise; (2) the mitigation needed to replace the functions and values that would destroy and degrade habitats from implementation of the proposed action and alternatives, (3) the mitigation that will be implemented to replace the loss, degradation, and fragmentation of tortoise habitat, including the temporal loss of habitat; (4) how BLM and FAA are promoting healthy populations of tortoises in the Eastern Mojave Recovery Unit including enhancing connectivity; and (5) how BLM and FAA are using science to advance the conservation and recovery of the tortoise in this recovery unit.

Using Science in NEPA Documents and Decisionmaking: In NEPA, Congress declared that federal agencies shall "[u]tilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences . . . in planning and in decisionmaking." BLM's Advancing Science in the BLM: An Implementation Strategy IB 2015-040 (BLM 2015) reinforces the use of science in decision-making.

To comply with these requirements, the EIS/RMPA should use the latest information from scientific journals and reports on the demographic status and trend of the tortoise; the needs of the tortoise for its survival and recovery in the Eastern Mojave Recovery Unit and rangewide including linkage habitats for connectivity; and how the direct, indirect, and cumulative impacts and impacts from connected actions and alternatives would affect the future survival and recovery of the tortoise in this recovery unit and range-wide, This analysis should include the ongoing and increasing severity of drought/climate change impacts and numerous development projects that have occurred and are planned to occur in southern Nevada. This analysis, which should include a spatial analysis of habitat for the tortoise and any conclusions stated in the EIS/RMPA regarding the tortoise, should be supported with citations from the scientific literature rather than be unsupported conclusions.

Clarify the Purpose and Need of the Proposed Action

The Ivanpah Valley Airport Public Lands Transfer Act states that the federal public lands are to be transferred "for the purpose of developing an airport facility and related infrastructure." However, during the public scoping meeting, the information conveyed was that the SNSA would be a cargo airport. The wording in the legislation does not limit the construction and use of the SNSA to a cargo airport. Thus, the wording in the legislation does not agree with the information conveyed during the public scoping meeting. The EIS/RMPA should clearly describe the purpose, function, and related infrastructure and uses of the airport.

The federal nexus for BLM's requirement to comply with NEPA in the development of the SNSA should be clearly explained in the EIS. For example, are some or all of the lands where the proposed airport development would occur currently managed by BLM?

The map provided on the BLM NEPA ePlanning webpage that shows the location of the proposed SNSA (Figure 1 in this letter) indicates that some airport infrastructure would occur in the Ivanpah ACEC. Please describe the purpose(s) for designating this ACEC; BLM's current management directives for this ACEC; the direct, indirect, and cumulative impacts and impacts from connected actions that would occur to the resources in this ACEC from airport construction and use; and using the best available information from the scientific literature analyze how these impacts to this ACEC would affect the ability of this ACEC to provide the purpose(s) for which it was designated.

Alternatives to the Proposed Action

The FAA and BLM should analyze several actions alternatives and ensure they are alternatives, not minor changes to the proposed action.

Alternatives that should be analyzed in the EIS/RMPA include the construction and use of a supplemental airport at one or more locations other than the proposed location. Another alternative to be evaluated is restricting the area of airport development and use to the immediate footprint of the airport, and securing all tortoise habitat on BLM land in the Northern Ivanpah Valley from future development (see "**Development of Airport and Associated Facilities that Accompany an Airport Servicing a Major Metropolitan Area**") and human activities (e.g., OHV use, etc.) that adversely impact the tortoise and tortoise habitat. This restricted land use around and near the airport footprint may partially mitigate the impacts to the tortoise and tortoise habitat from the direct, indirect, and cumulative impacts of the construction and use of the airport. This restrictive land use on BLM land in the Northern Ivanpah Valley would need to be a permanent commitment with assurances provided in legal authorities that are not subject to changes in planning documents or other federal agency authorizations. It would need to have effective and ongoing implementation of management, monitoring, and enforcement. The development and use of the airport would be a permanent impact so the mitigation for its construction and use also needs to be permanent.

However, BLM has a history of ineffective implementation of management, monitoring, and enforcement actions for the tortoise and tortoise habitat as documented with the data on the status and trend of the tortoise in the Eastern Mojave Recovery Unit (e.g., Allison and McLuckie 2018, USFWS 2020, 2022) and of allowing uses that are not compatible with conservation and recovery of the tortoise and its habitat (Tuma et al. 2016, Hromada 2022). This is in part because of inadequate funding and staffing. Thus, until it is analyzed, it is unknown whether it is a viable alternative for the tortoise.

When Congress identified lands in the Northern Ivanpah Valley in 2000 to be transferred to Clark County for the development and use of a supplemental airport, it is apparent in the crafting of this legislation that Congress was concerned about the impacts to natural and cultural resources from the airport's development and use. Congress expressed concerns about impact to the Preserve in the House Report on this legislation, and in the final bill Congress required that the NEPA analysis "specifically address any impacts on the purposes for which the Mojave National Preserve was created."

Also, the Ivanpah Valley Airport Public Lands Transfer Act was passed 25 years ago. At that time the available information on the distribution of the tortoise was that it was one species whose distribution extended from the Western Mojave Desert in southern California east to southwestern Utah and south through western and southern Arizona and western Sonora to northwestern Sinaloa, Mexico; the data on the rangewide demographic status and trend of the tortoise did not exist and therefore did not indicate substantial declines in tortoise abundance, density, and recruitment including in southern Nevada; and more intact, unfragmented habitat for the tortoise existed (Allison and McLuckie 2018).

Today the distribution of the tortoise has been revised based on new genetics analysis. What had been one species prior to 2011 is now recognized as three species: *G. agassizii,* in the Mojave and Colorado deserts in California, southern Nevada, southwestern Utah, and northwestern Arizona; *G. morafkai* (= Sonoran desert tortoise) in western and southern Arizona and northwestern and western Sonora; and *G. evgoodei* (Sinaloan thornscrub tortoise) in southwestern Sonora and northwestern Sinaloa.

With its limited distribution and ongoing development in much of its range including the Las Vegas metropolitan area, the development of a major airport in the Northern Ivanpah Valley would likely result in severing important linkage areas that provide population connectivity and gene flow (Averill-Murray et al. 2021) for the tortoise (Figure 2) from direct, indirect, and cumulative impacts and impacts from connected actions. This loss of connectivity would violate the purpose (i.e., to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved) and policy (i.e., that all federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act) of FESA.

If in 2000 Congress had the information on the current demographic status and trend of the Mojave desert tortoise, its needs for population connectivity to sustain the species, its dwindling likelihood for survival in the future, that its distribution was about a third of that described prior to 2011 because that distribution was comprised of three species of tortoises, not one, and increasing development and human activities that are destroying, degrading, and fragmenting tortoise habitat throughout the distribution of the species, it is unlikely Congress would have identified the lands in the Northern Ivanpah Valley to transfer to Clark County to develop an airport. (See "**Importance of Ivanpah Valley in Nevada for the Survival and Recovery of the Mojave Desert Tortoise**"). In other words, current conditions have changed compared those in 2000 and these changes should be analyzed in the EIS/RMPA.

We strongly request that the FAA and BLM identify other lands for locating a supplemental airport to serve Clark County. Such alternatives may include expanding an existing airport or identifying a new location that would not have the debilitating impacts to the tortoise that the Ivanpah Valley Airport site would have based on the best available biological information. Identifying and analyzing other sites for the supplemental airport is needed so that the FAA and BLM do not violate NEPA, and selecting another site is strongly recommended so the Ivanpah Valley Airport does not result in impacts that would likely preclude and survival and recovery of the tortoise in the Eastern Mojave Recovery Unit.

Another alternative that should be analyzed includes limiting the size of the supplemental airport, that is, the area of surface disturbance to the approximate area identified in the Ivanpah Valley Airport Public Lands Transfer Act of 2000 depicted in Figure 1 as light orange and Figure 3 as the long rectangle with private land at the southeast corner. This would include locating all ancillary facilities and associated development that typically occur with an airport near a major city within this footprint.

Economic Viability of the SNSA and Socio-economic Analysis of the Action Alternatives

When the Ivanpah Valley Airport Public Lands Transfer Act of 2000 was passed, the Las Vegas area was the fastest growing area in the United States. However, that has changed. Tourism is down, and tourism is the major source of employment in the Las Vegas area (Nevada Office of Workforce Innovation 2025). Also, the availability of water is reduced with climate change, continuing long-term drought, warmer temperatures, and greater demand for water because of the drought. A reliable source of water is critical for a city located in the Mojave Desert.

The EIS/RMPA should include an accounting of the benefits that would be lost from the implementation of the action alternatives and the economic cost that would be passed on to the local community and American public to "mitigate" these losses. Some of the benefits that are currently provided and that would be lost from construction and use of the SNSA include: (1) protection of air quality (cost = greater air pollution from particulate matter); (2) improved infiltration of precipitation adding to groundwater (cost = soil erosion, less groundwater available); (3) carbon sequestration (cost = more carbon released into and no longer removed from the atmosphere making climate change worse), nitrogen harvesting from the air to allow native woody plants to make food, grow, and reproduce (cost = loss of native woody shrubs elevating soil temperature, reduction of water infiltration); (4) loss of food and shelter for wildlife; (5) loss of visual resources; (6) loss of many current recreation opportunities; and (7) loss of wildlife. Currently these benefits are provided without a cost to the public.

Please analyze in the EIS/RMPA using information from the scientific literature the economic viability of the SNSA given current and future projections of economic growth and availability of water in the Las Vegas area and the socio-economic benefits, both direct and indirect, that would be lost from implementation of the proposed action.

Importance of Ivanpah Valley in Nevada for the Survival and Recovery of the Mojave Desert Tortoise

Linkage Habitats for Population Connectivity: In their analysis of linkage areas needed for population connectivity for the tortoise, Averill-Murray et al. (2021) identified crucial linkage areas for the tortoise (Figure 2).

"Maintaining an ecological network (recovery network) for the Mojave desert tortoise, with a system of core habitats (TCAs) connected by linkages (Hilty et al. 2020), is necessary to support demographically viable populations and longterm gene flow within and between TCAs" (Averill-Murray et al. 2021). In addition, "[l]arge, connected landscapes also are necessary to facilitate natural range shifts in response to climate change (Averill-Murray et al. 2021)." "Habitat linkages among TCAs must be wide enough 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." "[N]arrowly delineated corridors may not allow for natural population dynamics if they do not accommodate overlapping home ranges along most of their widths so that tortoises reside, grow, find mates, and produce offspring that can replace older tortoises (Beier and Loe, 1992; Beier, 2018)"(Averill-Murray et al. 2021). Consequently, effective linkage habitats are not long narrow corridors. Any development within them or adjacent to them has an edge effect (i.e., indirect impact) that extends from all sides into the linkage habitat further narrowing and impeding or preventing the use of the linkage habitat, depending on the extent of the edge effect. In addition, most habitats outside TCAs may receive more development and surface disturbance than habitats within TCAs (Carter and others, 2020a in Averill-Murray et al. 2021).

Edge effects for the tortoise have been quantified to include the metric of "limited tortoise observations in areas with greater than 5-percent surface disturbance per km^2." (Averill-Murray et al. 2021). However, this metric is provided with a cautionary note because "5 percent may not maintain population sizes needed for demographic or functional connectivity; therefore, ideally, development thresholds should be lower" (Averill-Murray et al. 2021).

We remind BLM and FAA of the "importance of tortoise habitat outside of TCAs to recovery" of the tortoise as well as long-term survival because these areas are necessary to provide "gene flow among TCAs and minimizing impacts and edge effects within TCAs" (Averill-Murray et al. 2021).

Some of the area delineated for the SNSA is not considered to have a high tortoise habitat suitability ranking (Hromada et al. 2020). However, much of the area delineated for the SNSA in Figure 1 above has a high suitability ranking for tortoise habitat and all of the SNSA is immediately adjacent to high-ranking suitability habitat (Hromada et al. 2020) that was identified as linkage habitat for the tortoise (Figure 2) to provide needed connectivity (Averill-Murray et al. 2021). Thus, the direct loss of habitat needed for connectivity and the indirect impacts and edge effects to the remaining linkage habitat resulting from the construction, use of the SNSA, associated facilities, and services likely means that the function of this linkage habitat would be severely reduced or curtailed for the tortoise.

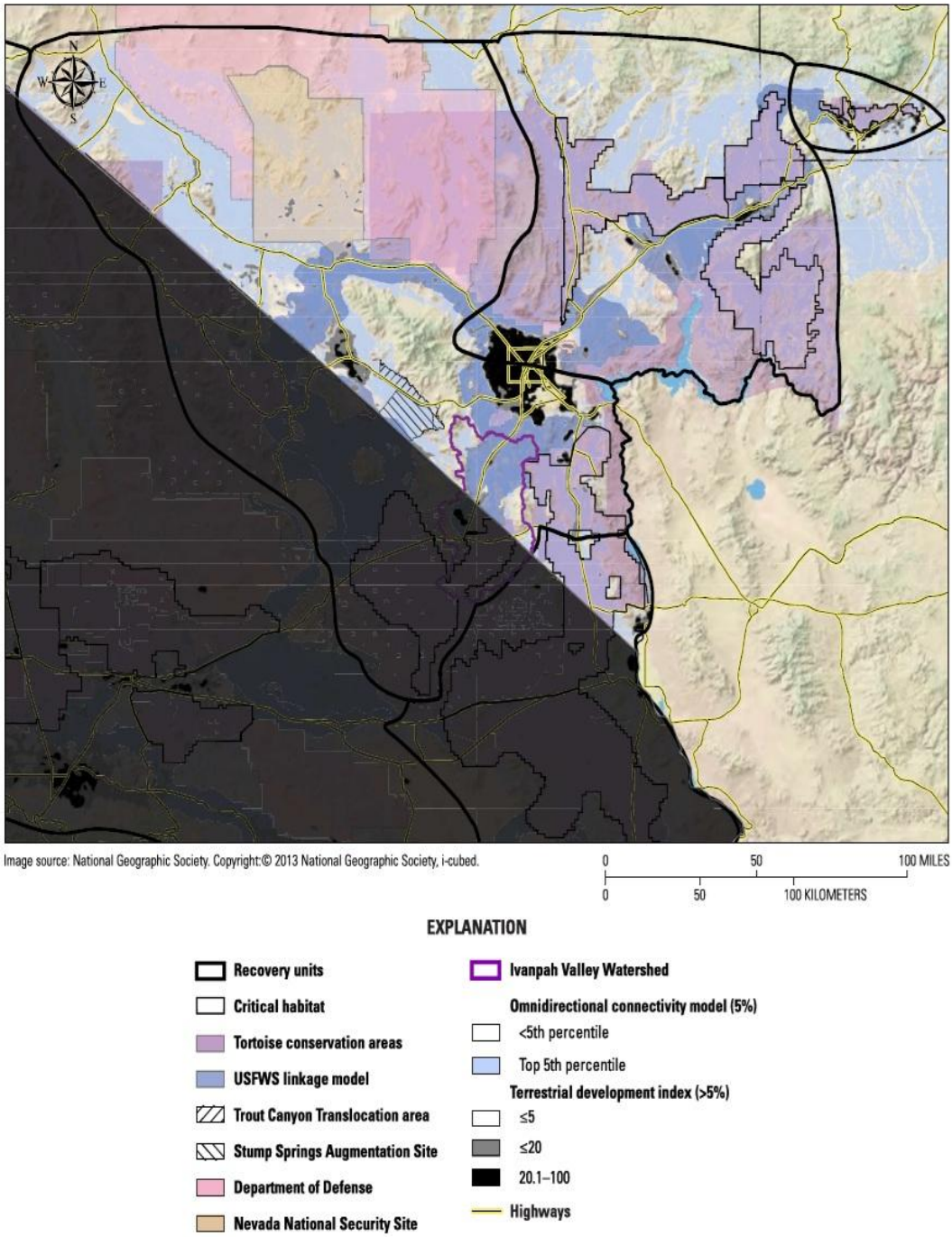


Figure 5. Tortoise conservation areas, linkages, and other habitat managed for desert tortoise population connectivity in Nevada, Utah, and Arizona.

Figure 2. TCAs, linkages, and other habitat managed for desert tortoise population connectivity in Nevada, Utah, and Arizona. From Averill-Murray et al. (2021).

Furthermore, with the additional development associated with the operation of large airports near large cities and the designation of an unincorporated town with boundaries that extend well beyond the SNSA footprint (Figure 1), the loss of additional tortoise habitat and extension of the indirect impacts and edge effects from the development and activities of this new town would effectively halt population connectivity for the tortoise in this identified linkage habitat.

Hromada (2022) studied natural and artificial corridors and their use by tortoises including Ivanpah Valley. The low mobility of the tortoise has led to "its classification as a corridor-dweller" (Averill-Murray et al. 2013), and a pressing concern is the configuration of functional corridors to maintain historic connectivity around new landscape-level disturbances within formerly contiguous habitat (Hromada 2022) needs to be sufficiently wide to contain home ranges of more than one tortoise. Hromada (2022) reported that the estimated home ranges of tortoises at his study plots were generally larger than those reported in other studies likely because of the finer-scale method he used to track tortoises.

Hromada (2022) reported that tortoise movement selection responded significantly to anthropogenic disturbances including roads, OHV use, and grazing. Tortoises are avoiding movement in proximity to paved and dirt roads. These behavioral responses to roads can contribute to fragmentation of tortoise populations either through behavior that leads to reduced habitat use near roads or increased use that may lead to higher rates of mortality (Hromada 2022). Tortoises are also avoiding other areas with impacts such as reduced vegetation cover that typically results from human activities (e.g., OHV use, grazing).

Designing corridors to maintain connectivity for a corridor-dwelling species such as the tortoise requires careful consideration of both habitat and movement preferences of tortoises (Beier et al. 2008) including the temporary forays outside a tortoise's established interannual home range and dispersal behavior exhibited by most size classes of tortoises, especially younger tortoises (Hromada 2022).

Please include the information from Averill-Murray et al. (2021) and Hromada (2022) and other relevant research when analyzing the impacts of the proposed action and alternatives in the EIS/RMPA on the needs of the tortoise for linkage habitat in the Northern Ivanpah Valley.

Genetic Importance of Tortoises in the Ivanpah Valley: The tortoises in the Ivanpah Valley are a genetic "hot spot" of genetic divergence (Vandergast et al. 2013). This divergence may "provide a rich resource for evolutionary resilience." "Low or reduced genetic diversity is generally associated with reductions in fitness and survival. Because genetic diversity underlies differentiation and adaptation, preserving regions with the greatest levels of genetic diversity and differentiation may help to preserve the evolutionary potential of these species (Vandergast et al. 2013)." The importance of the Ivanpah Valley tortoise population should be explained in the EIS/RMPA along with appropriate mitigation that avoids the impacts to this population. Avoidance should be the focus of the EIS/RMPA because it is not likely that equivalent functions and values can be created elsewhere to replace those of this population.

BLM's Decision to Exclude Development in Tortoise Habitat: During the development of the Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development (Solar PEIS) (BLM 2024), the USFWS provided to BLM information and maps on where development should be excluded to help manage for the survival of the tortoise in southern Nevada. The USFWS (May 2023) provided the following information to BLM:

> Exclusion areas were selected based on designated critical habitat for the species (USFWS 1994; USFWS 2011); updated datasets and models for tortoise occupancy (Kissel et al. 2023) and density (Allison and McLuckie 2018; Zylstra et al. 2023); habitat suitability (Nussear et al. 2009; Edwards et al. 2015); habitat connectivity (Grey et al. 2019; Averill-Murray et al. 2021); habitat disturbance (Carr and Leinwand 2020; Carter et al. 2020); road density (TIGER 2022; Averill-Murray and Allison 2023); land ownership, management, and conservation status (e.g., BLM Wilderness Areas, BLM ACECs, BLM TCAs); proximity of non-BLM managed federal lands and non-federal lands deemed important for tortoise populations and connective linkages (USFWS National Wildlife Refuges, Department of Defense Lands and Conservation Areas, National Park Service lands, etc.); solar energy zone (SEZ) designations in Nevada (SEZ; BLM 2012); solar development focal areas (DFA) in California (BLM 2016); and regional tortoise augmentation sites (USFWS 2021).
>
> Connected landscapes are essential for tortoises to maintain robust and heterogenetic populations that can withstand future landscape and climate change (Averill-Murray et al. 2021).

The USFWS identified tortoise habitat on both sides of I-15 between Jean and Primm, NV and between Jean and Las Vegas as those that should be excluded from development (Figure 3). In their August 2023 correspondence with BLM, USFWS stated that "[a]dditional areas such as habitats along the west side of Interstate 15 between Jean and Las Vegas, Nevada are needed to maintain connected tortoise populations in this region. Connective landscapes are essential for tortoises to maintain robust and heterogenetic populations that can withstand future landscape and climate change (Averill-Murray et al. 2021)." In the Final Solar PEIS (BLM 2024), BLM excluded this area from development because of its importance to the survival of the tortoise.

In the EIS/RMPA, please explain why the map provided for the proposed action (Figure 1 in this letter) shows BLM proposing to develop lands (e.g., detention basin, stormwater management conveyance, new I-15 interchange, noise compatibility area, unincorporated town boundary, etc.) that in 2024 were excluded from development in the Final Solar PEIS because of the importance of these lands for population connectivity and tortoise survival. BLM's decision to exclude these areas from solar development should apply to all development.

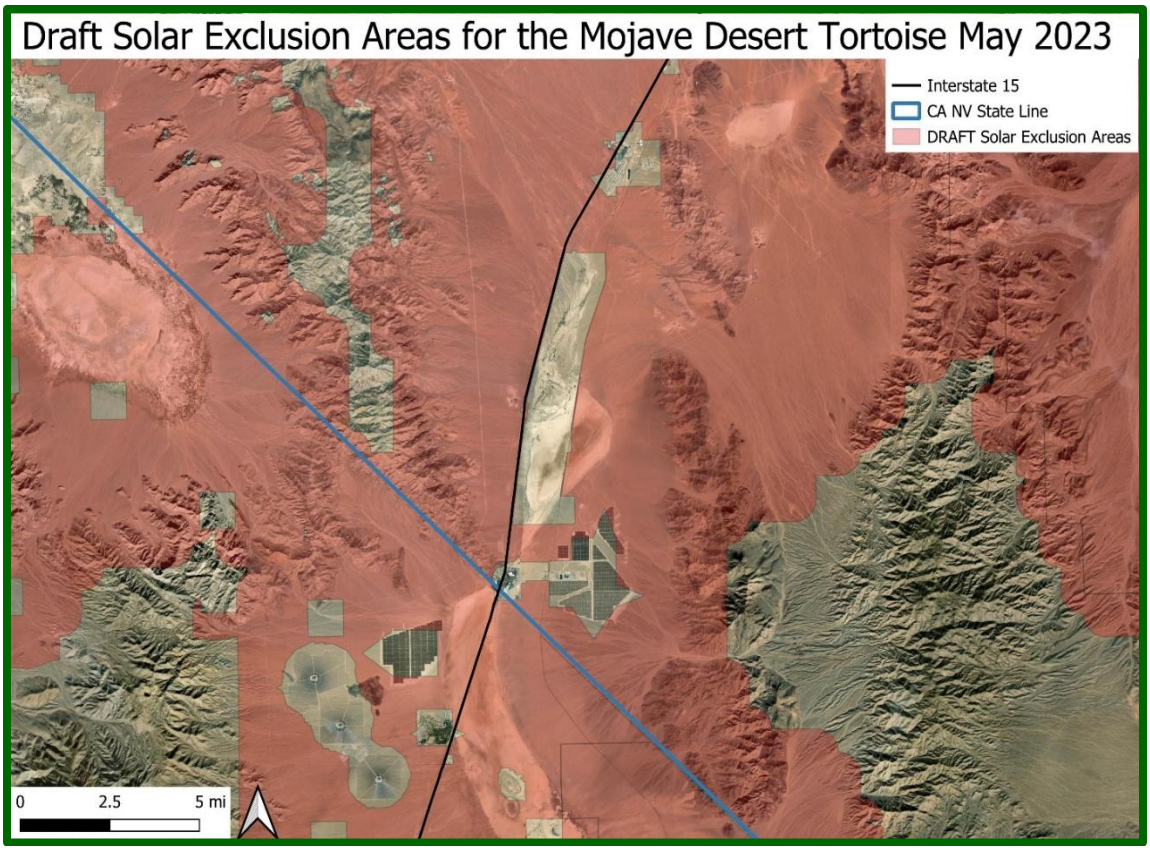


Figure 3. Areas identified by USFWS to BLM to exclude from development. Map depicts the area from just north of Jean, NV to the Ivanpah Solar Energy Generating System project (three connected circles, lower left) in California.

Environmental Assessment – Restoration Plan for Desert Tortoise Habitat Condition and Connectivity in the Large-Scale Translocation Study Site and Northern Ivanpah Valley: In 2024, BLM prepared and circulated this environmental assessment. According to BLM, the purpose of this proposed action was "to improve habitat conditions and to restore and maintain connectivity of desert tortoise habitat within the Northern Ivanpah Valley to decrease the effects of habitat fragmentation on tortoise population dynamics and long-term gene flow." "The need for the proposed action stems from the Endangered Species Act of 1973 and BLM Manual 6840 that compels the BLM to conserve federally listed species, such as the threatened desert tortoise (*Gopherus agassizii*)." "[C]oncerns have arisen over the connectivity of desert tortoise habitat as development continues to fragment habitat and surround designated conservation areas."

Habitat fragmentation negatively influences population dynamics by separating a population into smaller isolated populations. These isolated populations have a greater risk of extinction than populations that are connected due to the removal of genetic variation (Averill-Murray et al. 2021) and other factors. In contrast, populations with high connectivity are generally more resilient to localized disturbance through rescue effects from individuals of neighboring populations, meaning that the population remains genetically diverse (Scott and Shaffer 2020, Averill-Murray et al. 2021).

The proposed action in this environmental assessment included the area of the existing LSTS, which is a 26,200-acre area established in 1996 as the location for translocation of desert tortoises from areas of development within the Las Vegas Valley (Figure 1).

In 2024, BLM recognized the importance of connectivity of desert tortoise populations and linkage habitat within the Northern Ivanpah Valley by excluding all BLM lands from development in the Solar PEIS except the SNSA footprint. In the EIS/RMPA, BLM should explain why in 2025 they cancelled this project that would have improved habitat conditions and restored and maintained connectivity of desert tortoise populations and linkage habitat in the Northern Ivanpah Valley, and how the SNSA, connected actions, direct, indirect and cumulative impacts, and growth-inducing impacts would affect the implementation of this restoration plan for the benefit of tortoises and tortoise habitat in the LSTS and the Northern Ivanpah Valley.

Development of Airport and Associated Facilities that Accompany an Airport Servicing a Major Metropolitan Area

Airports that service large cities and associated suburban areas have numerous interrelated and interdependent actions that "but for" the airport would not likely occur. These include increased traffic to access the airport and associated facilities to provide access (e.g., added lanes to existing roads and/or construction of new roads, installing public transportation such as light rail, etc.), increased cargo hold buildings, customs inspection facilities, law enforcement facilities, fire and other emergency services and facilities, hotels, restaurants, shops, medical care, banks, rental cars, fuel stations, service facilities for rental cars, meeting facilities, waste holding and disposal, etc. Because the SNSA is in Nevada, there are also likely to be gambling facilities. In short, establishing a large airport near a major metropolitan area results in the creation of a new city or major expansion of an existing city.

All likely facilities and services associated with an airport to a major metropolitan area should be analyzed in the DEIS with respect to direct, indirect, and cumulative effects to the tortoise and its habitat including size, configuration, connectivity, and edge effects on tortoise populations and habitats at the project site in the Eastern Mojave Recovery Unit, and adjacent recovery units. In the cumulative impacts and connected actions sections of the EIS/RMPA, the growth-inducing impacts to the area surrounding the airport should be described, mapped, and analyzed especially with respect to the needs of the tortoise for survival and linkage habitat for population connectivity across the range of the species. Following this analysis, BLM and FAA should develop appropriate mitigation to fully offset these impacts and include this mitigation in the description of the proposed action and alternatives. If mitigation to fully offset these impacts to the tortoise is not feasible, BLM and FAA should explain the extent of the remaining impacts to the tortoise and how these impacts would affect the long-term persistence of tortoises in the Northern Ivanpah Valley.

Analysis of Impacts to Biological Resources & Special Status Species Including the Tortoise

We expect that the EIS/RMPA will include in the Affected Environment/Environmental Baseline section the current demographic status and trend of the tortoise and its habitat requirements including linkage habitat needed for population connectivity, and analyze the direct, indirect, and cumulative impacts to the tortoise as well as impacts from connected actions, and the tortoise's

ability to survive and recover if the proposed project is implemented. The analysis of the current status and needs and future conditions of the tortoise and its habitat including linkage habitat and population connectivity should include using the results from current scientific publications in this analysis and information in BLM files at the local and state levels for the four states where the Mojave tortoise occurs. Sources of information on the demographic status and trend for the tortoise include but are not limited to Allison and McLuckie (2018); USFWS (2015, 2016, 2018, 2019, 2020, 2022a, 2022b, 2025); Kissel et al. 2023. To facilitate this analysis, we are providing to BLM the "Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*) including the Eastern Mojave Recovery Unit" as an appendix to this letter. Sources of information on habitat needs are provided in Averill-Murray et al. (2021) and information on areas avoided by tortoises in Hromada (2022). We expect this and other status information to be used in the EIS/RMPA in the analysis of direct, indirect, and cumulative impacts and impacts from connected actions from the implementation of the proposed action and alternatives.

Impacts to the tortoise and its habitat from the construction, use and maintenance of the proposed action include ongoing mortality, injury, collection, and vandalism from increased human access. Indirect impacts from human activities associated with the SNSA include the destruction, degradation, and/or fragmentation of tortoise habitat; removal of key areas of linkage habitat that prevents or severely impedes population connectivity; surface disturbance and introduction of non-native invasive plant species via construction equipment, public vehicles, and other sources; replacement of native forbs having high nutritional and water value with low nutritional non-native invasive grasses (Drake et al. 2016); increased occurrence of the size, intensity, and frequency of human-caused wildfires from fuels provided by non-native invasive plant species (Brooks and Esque 2002); increased predation from substantially increased numbers of predators that utilize subsides of food, water, and nesting locations provided by human activities (Boarman 2003); entrapment and drowning of tortoises in surface water management and flood control features; noise; and artificial light. Additional indirect impacts include modifications to a large area that disrupt established natural patterns of sheet flow and water movement in washes, thereby impacting large areas that are down-gradient and substantially reducing soil moisture and water for existing native vegetation down-gradient (Devitt et al. 2022). This would result in the death of vegetation in down-gradient areas and loss of additional tortoise habitat needed for connectivity with tortoise populations.

Other indirect impacts include the creation of an "urban heat island" effect, where native vegetation is replaced with large areas with buildings, parking facilities, runways, tarmacs, paved roads, and other hard-surface areas. These hard-surface areas absorb heat and raise the temperature of adjacent areas including tortoise habitat. This decreases soil moisture and increases plant transpiration that stresses native desert vegetation from reduced water availability and increased water loss. Increased temperatures could impact the species composition of vegetation and wildlife in the vicinity of the solar facility, where temperatures could be too high for certain species to persist. Wildlife species may be displaced as they are forced to vacate the area of increased temperatures.

Changes in hydrology could reduce water availability for vegetation communities and increases or decreases in soil temperatures could affect persistence of vegetation and habitat suitability for burrowing wildlife such as the tortoise. This rise in temperature also impacts the availability of

soil moisture and the ability of burrowing animals such as the tortoise in nearby areas to reduce their body temperatures at night to conserve energy and moisture. Recall that the tortoise is already living near the edge of its thermal and water balance tolerance levels especially reproductive female tortoises (Henen 2002, Petersen 1996). This impact would affect neonate and juvenile tortoises and reproductive females to a greater degree than subadult and adult male tortoises.

The impacts of elevated soil and air temperatures to areas adjacent to the proposed project should be analyzed in the EIS/RMPA including impacts to the survival, growth, and recruitment of native vegetation. This is important to the tortoise because the area surrounding the footprint of the SNSA is linkage habitat identified as needed for population connectivity. Because the tortoise is a corridor-dweller, this habitat must be able to support resident tortoises for it to function as linkage habitat and when tortoises exhibit forays and dispersal behavior.

These human activities and impacts to the tortoise would result in further declines in tortoise numbers and densities near the proposed SNSA where densities are already below the threshold of population viability in the Eastern Mojave Recovery Unit. These impacts would create an edge effect that would extend into adjacent tortoise habitat and impede or curtail the ability of this tortoise habitat to function as linkage habitat in the Northern Ivanpah Valley.

Please ensure that the EIS/RMPA describes and analyzes these impacts to the tortoise and any other impacts. Please ensure that the EIS/RMPA develops effective mitigation to fully offset these impacts so the proposed action does not result in severing connectivity for the tortoise in the Northen Ivanpah Valley.

Effects to the Tortoises in the Large-Scale Translocation Site and the Management of this Area for the Tortoise

The LSTS is part of the mitigation for the tortoise under the Clark County Incidental Take Permit (ITP) issued by the USFWS and described in the *Clark County Desert Conservation Plan* (CCDCP) (1995). It is the recipient area for healthy tortoises translocated from development projects on private lands in Clark County as authorized under the ITP. The LSTS is located adjacent to and along the west side of Interstate 15 between Jean and Primm, NV, extends west into the Spring Mountains (BLM 2024), and encompasses approximately 26,200 acres in the northwest portion of Ivanpah Valley on BLM land (BLM 2024). As part of the mitigation, the area was secured from some human activity by fencing it, because of numerous threats to tortoises and tortoise habitat.

As a mitigation area for receiving tortoises removed from lands developed in the Las Vegas Valley, this area should continue to be managed in perpetuity for the tortoise because it, in part, is intended to offset the authorized displacement of tortoises. Thus, any development proposed in a mitigation area is inappropriate and should be denied.

During the public scoping meeting, a map was presented that showed a town boundary and designation of 16,000 additional acres around the proposed SNSA. That town designation encompassed about one third of the LSTS mitigation area. The EIS/RMPA should explain what this overlay means for future land use on BLM land in the LSTS and how that development would impact the tortoise, tortoise habitat, and the current designation of the LSTS and the ITP's function.

What would be the final use of the additional 16,000 acres of land mentioned in the public scoping meeting? What would be the disposition of the tortoises that currently occupy the LSTS if this area is developed? How would BLM explain the authorization of this development when in 2024 BLM issued a NEPA document and Record of Decision that development would not occur on these lands because of their importance to the survival and recovery of the tortoise (BLM 2024)? Please answer these questions in the EIS/RMPA.

Impacts to Mojave National Preserve

Please analyze the impacts to the Preserve from the construction, operation, use, and maintenance of the SNSA and associated facilities and uses. This would include the direct effects, interrelated and interdependent actions, indirect effects, and cumulative effects of the SNSA and the other development and activities associated with airport construction, use, and maintenance.

In the Ivanpah Valley Airport Public Lands Transfer Act, Congress directed that funds collected from the purchase of federal lands under the Nevada Public Land Management Act of 1998 (112 Stat. 2345) are to be expended only for the acquisition of private inholdings in the Preserve. Please identify and analyze in the EIS the lands that would be acquired using these funds and when the acquisitions would occur with respect to the construction schedule for the SNSA**.** We presume that acquisition would occur prior to the initiation of airport construction because the public lands would need to be purchased before construction on the SNSA could begin.

Importance of Ivanpah Valley in Nevada for Survival and Recovery of the Mojave Desert Tortoise

The mission of the Council is to assure the perpetual survival of viable populations of desert tortoises represented throughout their historical ranges, which includes the Mojave desert tortoise. In their Revised Recovery Plan for the Mojave Population of the Desert Tortoise (USFWS 2011), the USFWS identified five recovery units for the tortoise. “Recovery units for the desert tortoise are special units that are geographically identifiable and are essential to the recovery of the entire listed population, i.e., recovery units are individually necessary to conserve the genetic, behavioral, morphological, and ecological diversity necessary for long-term sustainability of the entire listed population” (USFWS 2011). This Revised Recovery Plan specified that the first objective is to “maintain self-sustaining populations of desert tortoises within each recovery unit into the future.” This statement reinforces the Desert Tortoise Mojave Populations Recovery Plan (USFWS 1994) that stated “[w]hen all recovery units are considered recovered, the Mojave population of the desert tortoise could be considered for delisting.” Thus, if the tortoise in one recovery unit does not meet the recovery criteria, the Mojave tortoise population would not meet recovery criteria and would not be delisted.

The Proposed Action is located in the Eastern Mojave Recovery Unit of the tortoise. Tortoises in this recovery unit have experienced the greatest percent of decline in population density and abundance among the five recovery units, which is 67% between 2004 and 2014 (USFWS 2015, Allison and McLuckie 2018). Population densities are below those needed for population viability (USFWS 1994, USFWS 2015, Allison and McLuckie 2018) and more recent data indicate this downward decline and population densities below population viability is not improving (USFWS 2020, 2022, 2025).

For the tortoise to survive, recover, and persist, the USFWS must evaluate in a biological opinion whether a proposed action is likely to jeopardize the continued existence of a listed species. 50 Code of Federal Regulations (CFR) 402.02 defines "jeopardize the continued existence" to mean "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." Thus, any proposed action should be sited and designed so it does not reduce appreciably the likelihood of survival and recovery of the tortoise in the Eastern Mojave Recovery Unit or rangewide with respect to the current demographic status of the tortoise, threats, and how they affect the tortoise and tortoise habitat.

Consequently, it is in the best interest of the BLM and FAA to ensure that the construction and long-term use and maintenance of the SNSA and all associated facilities and activities do not reduce appreciably the survival and recovery of the tortoise in the Eastern Mojave Recovery Unit. This would include the direct effects, interrelated and interdependent actions, indirect effects, and cumulative effects of the SNSA to the tortoise and tortoise habitat needed for feeding, breeding, shelter, and connectivity of populations in the Eastern Mojave Recovery Unit with the adjacent Northeastern Mojave, Colorado Desert, and Western Mojave recovery units.

The Council has many concerns about the proposed action that extend beyond the direct loss of tortoise habitat to construction on the 6,000 acres given to Clark County via the Ivanpah Valley Airport Public Lands Transfer Act of 2000 for building an airport. We note the acreage allotted for the SNSA in the legislation is about twice the size of the current Herry Reid Airport in Las Vegas.

Analysis of Mitigation for Impacts to Tortoise Habitat and Disruption of Connectivity between Tortoise Populations: The EIS/RMPA should identify mitigation that would fully offset the functions and values of the habitat that would be lost, degraded, and fragmented from the development and use of the proposed SNSA. Partial mitigation for the direct loss of habitat could be decommissioning and restoring the Ivanpah Solar Energy Generating System (ISEGS) Project. Because the ISEGS Project may no longer have a purchaser for the power it generates, it may no longer be an economically viable project to operate and maintain. If so, it should be decommissioned and the lands restored to the quality and quantity of tortoise habitat that occurred there prior to construction of this project (i.e. undue degradation of public lands). Please analyze this proposed mitigation in the EIS/RMPA.

Such habitat restoration, if successfully implemented, would be considered partial mitigation for the direct loss of tortoise habitat from construction of the SNSA. It would not mitigate the loss of population connectivity necessary for the survival and recovery of the tortoise (Averill-Murray et al. 2021). The proposed location of the SNSA would sever the existing tortoise habitat that links the Northern Ivanpah Valley with the Southern Ivanpah Valley in the Ivanpah TCA and Mojave National Preserve, and would sever the link between the Ivanpah TCA and the Piute-Eldorado TCA.

Averill-Murray et al. (2021) reported that the limits of development "in some areas of California within the Desert Renewable Energy Conservation Plan, such as Ivanpah Valley, are more restrictive, at 0.1 percent [of the total area]. Continuity across the state line in Nevada could be achieved with comparable limits in the adjacent portion of Ivanpah Valley, as well as the Greater Trout Canyon Translocation Area and the Stump Springs Regional Augmentation Site. These more restrictive limits would help protect remaining habitat in the major interstate connectivity pathway through Ivanpah Valley and focal areas of population augmentation."

Furthermore, Averill-Murray et al. (2021) reported that to maintain tortoise habitability and permeability across non-conservation-designated tortoise habitat (e.g., linkage habitat), all surface disturbance should 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)."

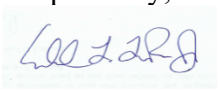
Averill-Murray et al. (2021) cautioned that this "…5-percent development per square kilometer may not allow for long-term persistence of healthy populations that are of adequate size needed for demographic or functional connectivity; therefore, a conservative interpretation suggests that, ideally, development could be lower."

We request that the EIS/RMPA use the information provided above and other relevant information from scientific journals and reports when analyzing the issues identified in this letter with respect to the survival and recovery of the tortoise. We also request that the EIS/RMPA answer the questions in this letter with respect to the future survival and recovery of the tortoise.

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 and the FAA that may affect desert tortoises or their habitats, and that any subsequent environmental documentation for this proposed action is provided to us at the contact information listed above. Additionally, we ask that you notify the Council at eac@deserttortoise.org of any other proposed actions that the BLM or FAA 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 that the BLM fully considers and implements actions to conserve these tortoises as part of its directive to conserve biodiversity on lands managed by the 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,



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Attachment: Appendix A. Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*) including the Eastern Mojave Recovery Unit

Literature Cited

Allison L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). Herpetological Conservation and Biology. 2018 Aug 1. 13(2):433–452. http://www.herpconbio.org/Volume_13/Issue_2/Allison_McLuckie_2018.pdf
or
https://www.fws.gov/media/allison-and-mcluckie2018mojave-desert-tortoise-population-trends

Averill-Murray, R.C., T.C. Esque, L.J. Allison, S. Bassett, S.K. Carter, K.E. Dutcher, S.J. Hromada, K.E. Nussear, and K. Shoemaker. 2021. Connectivity of Mojave Desert tortoise populations—Management implications for maintaining a viable recovery network. U.S. Geological Survey Open-File Report 2021–1033, 23 p., https://doi.org/ 10.3133/ ofr20211033.
https://pubs.usgs.gov/of/2021/1033/ofr20211033.pdf

Averill-Murray, R.C., and L.J. Allison. 2023. Travel Management Planning for Wildlife with a Case Study on the Mojave Desert Tortoise. Journal of Fish and Wildlife Management 14(1):269–281; e1944-687X.
https://doi.org/10.3996/JFWM-22-030

Berry, K.H., L.J. Allison, A.M. McLuckie, M. Vaughn, and R.W. Murphy. 2021. *Gopherus agassizii*. The IUCN Red List of Threatened Species 2021: e.T97246272A3150871.
https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T97246272A3150871.en

[BLM] Bureau of Land Management. 2012. Approved resource management plan amendments/record of decision for solar energy development in six southwestern states.
https://solareis.anl.gov/documents/index.cfm

[BLM] U.S. Bureau of Land Management. 2015. Advancing Science in the BLM: An Implementation Strategy IB 2015-040. March 18, 2015. https://www.blm.gov/policy/ib-2015-040

[BLM] Bureau of Land Management. 2016. Desert Renewable Energy Conservation Plan Amendment to the California Desert Conservation Area Plan, the Bishop Resource Management Plan and the Bakersfield Resource Management Plan. Land Use Plan Amendment and Record of Decision. https://eplanning.blm.gov/eplanning-ui/project/66459/510

[BLM] Bureau of Land Management. 2024. Restoration Plan for Desert Tortoise Habitat Condition and Connectivity in the Large-Scale Translocation Study Site and Northern Ivanpah Valley. DOI-BLM-NV-S010-2024-0084-EA.

Carr, N.B., and I.L.L. Leinwand. 2020. Terrestrial Development Index for the western United States:1-kilometer moving window: U.S. Geological Survey data release. DOI 10.5066/P93ZU0R9. https://www.usgs.gov/data/terrestrial-development-index-western-united-states-1-kilometer-moving-window

Carter, S.K., K.E. Nussear, T.C. Esque, I.I.F Leinwand, E. Masters, R.D. Inman, N.B. Carr, and L.J. Allison. 2020. Quantifying development to inform management of Mojave and Sonoran desert tortoise habitat in the American southwest. Endangered Species Research 42:167–184. https://doi.org/ 10.3354/ esr01045. https://www.int-res.com/abstracts/esr/v42/p167-184/

[CDFW] California Department of Fish and Wildlife. 2024a. Status Review for Mojave Desert Tortoise (*Gopherus agassizii*) Report to the Fish and Game Commission, February 2024. https://nrm.dfg.ca.gov/documents/ContextDocs.aspx?cat=CESA-Listing

[CDFW] California Department of Fish and Wildlife. 2024b. 2022-2024 News Releases. California Fish and Game Commission Holds Hybrid Meeting, April 23, 2024. https://wildlife.ca.gov/News/Archive/california-fish-and-game-commission-holds-hybrid-meeting11

California Fish and Game Commission. 2025. CESA, Petitions to List Species Under the California Endangered Species Act, Finalized Petitions. https://fgc.ca.gov/CESA#1089124-mojave-aka-agassizs-desert-tortoise-2025 https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=232827&inline

Defenders of Wildlife, Desert Tortoise Preserve Committee, and Desert Tortoise Council. 2020. A Petition to the State of California Fish And Game Commission to move the Mojave desert tortoise from listed as threatened to endangered. https://defenders.org/sites/default/files/2020-03/Desert%20Tortoise%20Petition%203_20_2020%20Final_0.pdf

Dewitz, J., and U.S. Geological Survey [USGS]. 2021. National Land Cover Database (NLCD) 2019 Products (ver. 2.0, June 2021). U.S. Geological Survey data release. https://doi.org/10.5066/P9KZCM54

Edwards, T., K.H. Berry, R.D. Inman, T.C. Esque, K.E. Nussear, C.A. Jones, and M. Culver. 2015. Testing Taxon Tenacity of Tortoises: evidence for a geographical selection gradient at a secondary contact zone. Ecology and Evolution, 5(10): 2095-2114.

Gray, M.A., B.G Dickson, K.E. Nussear, T.C. Esque, and T. Chang. 2019. A range-wide model of contemporary, omni-directional connectivity for the threatened Mojave desert tortoise, Ecosphere 10(9)e02847. 10.1002/ecs2.2847. https://esajournals.onlinelibrary.wiley.com/doi/pdfdirect/10.1002/ecs2.2847

Henen, B.T., 2002. Energy and water balance, diet, and reproduction of female desert tortoises (*Gopherus agassizii*). Chelonian Conservation and Biology 4: 319–329.

Kissel, A.M., B. Wallace, J. Anderson, B.G. Dickson, K. Van Neste, V. Landau, R.C. Averill-Murray, L.J. Allison, A. Fesnock. 2023. Range-wide occupancy trends for the Mojave desert tortoise (*Gopherus agassizii*). Ecosphere 10.1002/ecs2.4462. https://doi.org/10.1002/ecs2.4462??

[NPS] National Park Service. 2002. Mojave National Preserve General Management Plan. April 2002. https://www.nps.gov/moja/learn/management/gmp.htm

Nevada Office of Workforce Innovation. 2025. Employment By Industry. https://gowinn.nv.gov/workforce-development-matters/

Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102, 18 p. https://pubs.usgs.gov/of/2009/1102/ofr20091102.pdf

Peterson, C.C. 1996. Anhomeostasis: seasonal water and solute relations in two populations of the desert tortoise (*Gopherus agassizii*) during chronic drought. Physiological Zoology 69:1,324–1,358.

[TIGER] Topologically Integrated Geographic Encoding and Referencing (TIGER) System (2022). U.S. Census Bureau's geographic spatial data. TIGER Data Products Guide (census.gov)

[USFWS] U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 73 pages plus appendices. https://ecos.fws.gov/docs/recovery_plan/940628.pdf

[USFWS] U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California. https://www.fws.gov/sites/default/files/documents/USFWS.2011.RRP%20for%20the%20Mojave%20Desert%20Tortoise.pdf

[USFWS] U.S. Fish and Wildlife Service. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2015%20report.%20Rangewide%20monitoring%20report%202013-14.pdf

[USFWS] U.S. Fish and Wildlife Service. 2016. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2015 and 2016 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2016%20report.%20Rangewide%20monitoring%20report%202015-16.pdf

[USFWS] U.S. Fish and Wildlife Service. 2018. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2017 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2018%20report.%20Rangewide%20monitoring%20report%202017.pdf

[USFWS] U.S. Fish and Wildlife Service. 2019. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2018 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2019%20report.%20Rangewide%20monitoring%20report%202018.pdf

[USFWS] U.S. Fish and Wildlife Service. 2020. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2019 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. 42 pages. https://www.fws.gov/sites/default/files/documents/2019_Rangewide%20Mojave%20Desert%20Tortoise%20Monitoring.pdf

[USFWS] U.S. Fish and Wildlife Service. 2021. Population augmentation strategy for the Mojave desert tortoise recovery program. U.S. Fish and Wildlife Service, Las Vegas, Nevada. https://www.fws.gov/sites/default/files/documents/Mojave%20Desert%20Tortoise%20population%20augmentation%20strategy_2021FEB.pdf

[USFWS] U.S. Fish and Wildlife Service. 2022a. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2020 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2022%20report.%20Rangewide%20monitoring%20report%202020.pdf

[USFWS] U.S. Fish and Wildlife Service. 2022b. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2021 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2022%20report.%20Rangewide%20monitoring%20report%202021.pdf

[USFWS] U.S. Fish and Wildlife Service. 2023. Exclusion Areas for Solar Energy Development to Promote Viable and Connected Populations for the Mojave Desert Tortoise. Draft document and associated spatial file provided to the U.S. Bureau of Land Management August 28, 2023.

Zylstra, E.R., L.J. Allison, R. Averill-Murray, V. Landau, N.S. Pope, R.J. Steidl. 2023. Spatially explicit model for density. Ecosphere 14(3):1-18. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.4448

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 (*Gopherus agassizii*) to assist the FAA and particularly the BLM 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 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 between 2004 and 2014 (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 $km^{2,}$ that is densities below population viability (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 2023 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	2023 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	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*	No data
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	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	6.9
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	No data
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	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	No data
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	No data
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	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	No data

Recovery Unit: Designated CHU/TCA	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km² (SE)	% 10-year change (2004–2014)	2015 density/ km²	2016 density/ km²	2017 density/ km²	2018 density/ km²	2019 density/ km²	2020 density/ km²	2021 density/ km²	2023 density/ km²
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	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	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	No data
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	No data
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	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	No data
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)**	**–26.57 decline**	15.0	No data	19.1	No data	17.2	No data	No data	17.5
Rangewide Area of CHUs - TCAs/Rangewide 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%**

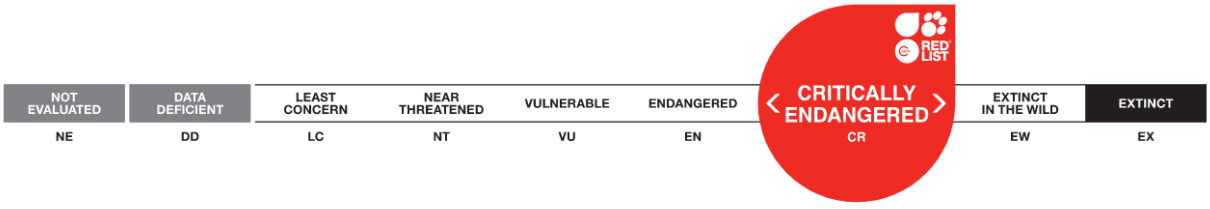
Habitat Availability: Data on population density or abundance does not indicate population viability. The area of protected habitat or reserves for the subject species is a crucial part of the viability analysis along with data on density, abundance, and other population parameters. In the Desert Tortoise (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.



Literature Cited in Appendix A

Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). Herpetological Conservation and Biology 13(2):433–452.

Berry, K.H., L.J. Allison, A.M. McLuckie, M. Vaughn, and R.W. Murphy. 2021. *Gopherus agassizii*. The IUCN Red List of Threatened Species 2021: e.T97246272A3150871. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T97246272A3150871.en

Congdon, J.D., A.E. Dunham, and R.C. van Loeben Sels. 1993. Delayed sexual maturity and demographics of Blanding's Turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. Conservation Biology 7:826–833.

Doak, D., P. Karieva, and B. Klepetka.1994. Modeling population viability for the Desert Tortoise in the Western Mojave. Ecological Applications 4:446–460.

Dutcher, K.E., A.G. Vandergast, T.C Esque, A. Mitelberg, M.D. Matocq, J.S. Heaton, and K.E. Nussear. 2020. Genes in space: what Mojave desert tortoise genetics can tell us about landscape connectivity. Conservation Genetics 21:289–303(2020).

Fahrig, L. 2007. Non-optimal animal movement in human-altered landscapes. Functional Ecology 21:1003–1015.

McLuckie, A.M., T.G. Victor, and R.A. Fridell. 2024. Mojave Desert Tortoise Population Monitoring within the Red Cliffs National Conservation Area, 2023. Publication Number 24-07, Utah Division of Wildlife Resources, Salt Lake City. A Final Report to the St. George Field Office, Bureau of Land Management, St. George, Utah, Cooperative Agreement L22AS00196.

Murphy, R.W., K.H. Berry, T. Edwards, and A.M. McLuckie. 2007. A genetic assessment of the recovery units for the Mojave population of the Desert Tortoise, *Gopherus agassizii*. Chelonian Conservation and Biology 6:229–251.

Murphy, R.W., K.H. Berry, T. Edwards, A.E. Leviton, A. Lathrop, and J. D. Riedle. 2011. The dazed and confused identity of Agassiz's land tortoise, *Gopherus agassizii* (Testudines, Testudinidae) with the description of a new species, and its consequences for conservation. ZooKeys 113: 39–71. doi: 10.3897/zookeys.113.1353.

Spencer, R.-J., J.U. Van Dyke, and M.B. Thompson. 2017. Critically evaluating best management practices for preventing freshwater turtle extinctions. Conservation Biology 31:1340–1349.

Turtle Conservation Coalition. 2018. Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles. www.iucn-tftsg.org/trouble.

[USFWS] U.S. Fish and Wildlife Service. 1994a. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 73 pages plus appendices.

[USFWS] U.S. Fish and Wildlife Service. 1994b. Endangered and threatened wildlife and plants; determination of critical habitat for the Mojave population of the desert tortoise. Federal Register 55(26):5820-5866. Washington, D.C.

[USFWS] U.S. Fish and Wildlife Service. 2011. Revised Recovery Plan for the Mojave Population of the Desert Tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California.

[USFWS] U.S. Fish and Wildlife Service. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2015%20report.%20Rangewide%20monitoring%20report%202013-14.pdf

[USFWS] U.S. Fish and Wildlife Service. 2016. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2015 and 2016 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2016%20report.%20Rangewide%20monitoring%20report%202015-16.pdf

[USFWS] U.S. Fish and Wildlife Service. 2018. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2017 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2018%20report.%20Rangewide%20monitoring%20report%202017.pdf

[USFWS] U.S. Fish and Wildlife Service. 2019. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2018 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2019%20report.%20Rangewide%20monitoring%20report%202018.pdf

[USFWS] U.S. Fish and Wildlife Service. 2020. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2019 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. 42 pages. https://www.fws.gov/sites/default/files/documents/2019_Rangewide%20Mojave%20Desert%20Tortoise%20Monitoring.pdf

[USFWS] U.S. Fish and Wildlife Service. 2022a. Range-wide Monitoring of the Mojave Desert Tortoise (Gopherus agassizii): 2020 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2022%20report.%20Rangewide%20monitoring%20report%202020.pdf

[USFWS] U.S. Fish and Wildlife Service. 2022b. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2021 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. https://www.fws.gov/sites/default/files/documents/USFWS.2022%20report.%20Rangewide%20monitoring%20report%202021.pdf

[USFWS] U.S. Fish and Wildlife Service. 2025. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2023 Annual Reporting. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Las Vegas, Nevada. https://www.fws.gov/sites/default/files/documents/2025-05/usfws_2023_rangewide-mojave-desert-tortoise-monitoring.pdf