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Via USPS and email

30 May 2023

Carl Bush, Civil Engineer
Lake Mead National Recreation Area
Compliance Office
Attn: Cottonwood Cove Road Project
601 Nevada Way
Boulder City, NV 89005
carl_bush@nps.gov
lake_superintendent@nps.gov

RE: Cottonwood Cove Road Improvement Project Environmental Assessment

Dear Mr. Bush,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

Both our physical and email addresses are provided above in our letterhead for your use when providing future correspondence to us. When given a choice, we prefer that you email to us future correspondence, as mail delivered via the U.S. Postal Service may take several days to be delivered. Email is an "environmentally friendlier way" of receiving correspondence and documents rather than "snail mail."

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 had been documented. A recent rigorous rangewide population reassessment of *G. agassizii* (*sensu stricto*) has demonstrated continued adult population and density declines of about 90% over three generations (two in the past and one ongoing) in four of the five *G. agassizii* recovery units and inadequate recruitment with decreasing percentages of juveniles in all five recovery units."

This status, in part, prompted the Council to join Defenders of Wildlife and Desert Tortoise Preserve Committee (Defenders of Wildlife et al. 2020) to petition the California Fish and Game Commission in March 2020 to elevate the listing of the Mojave desert tortoise from threatened to endangered in California.

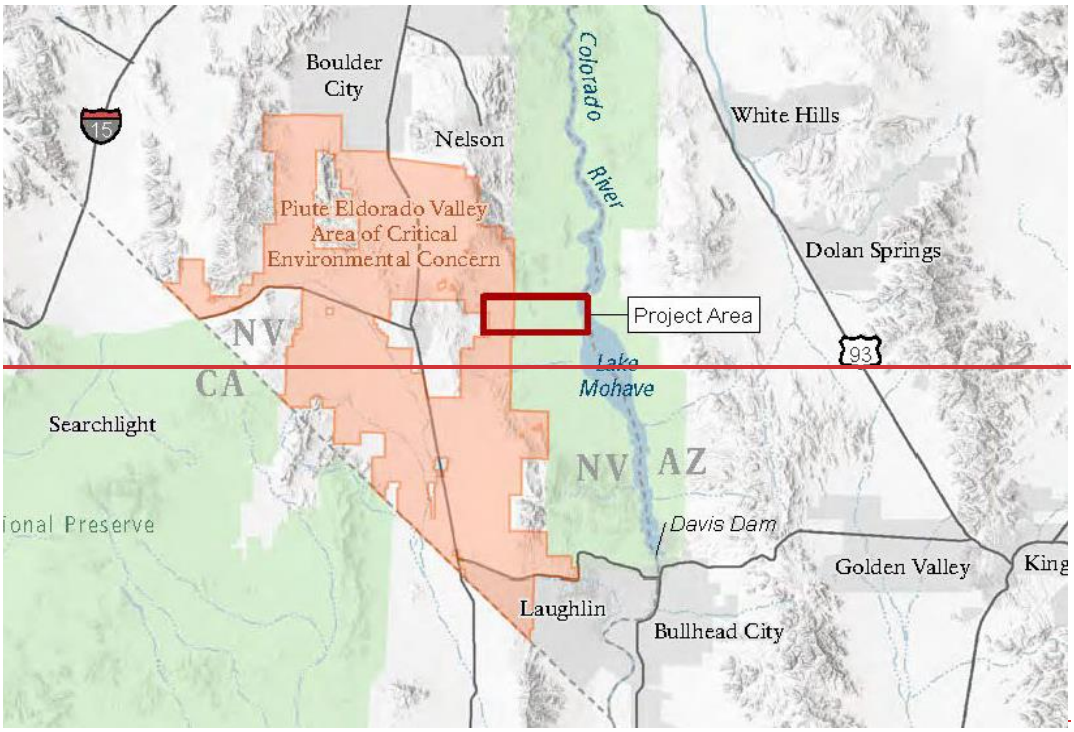
Given the location of the proposed project in habitats likely occupied by Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments pertain to enhancing protection of this species during activities funded, authorized, or carried out by the National Park Service (NPS) in Lake Mead National Recreation Area (NRA), the Bureau of Land Management (BLM) in the Avi Kwa Ame National Monument, and the Federal Highway Administration (FHWA), which we assume will be added to the Decision Record for this project as needed. Please accept, carefully review, and include in the relevant project file the Council's following comments and attachments for the proposed project.

Description of Proposed Project

The NPS, in cooperation with the FHWA, is proposing the rehabilitation of Cottonwood Cove access road from the entrance station to the marina and boat launch area at Lake Mohave in Lake Mead NRA. The Cottonwood Cove Road is a two-lane, asphalt road that extends 13.5 miles from US Route 95 in Searchlight, Clark County, Nevada to Cottonwood Cove at the northern end of Lake Mohave. The current lanes on the Cottonwood Cove access road are inadequate to accommodate the large vehicles and trailers that use the road. If approved, the project will establish "a safe, effective, and accessible driving route from the entrance station to the marina and boat launch area for visitors and NPS employees."

Two alternatives were identified, the No Action Alternative and the Proposed Action Alternative.

No Action Alternative: Cottonwood Cove Road would remain in its current state with narrow 11-foot-wide lanes, unpaved shoulders, and deteriorating pavement conditions. The large vehicles and trailers that use the road cause rutting along the edge of the pavement when vehicles' wheels drop off the pavement edge. No portion of the roadway would be realigned to allow for a continuous speed along the road. From the entrance station to just before the ranger station, the speed limit is 45 miles per hour (mph), but drivers are warned via road signs to slow down before the two curves on this portion of the road. The speed limit in the developed area between the ranger station and the marina is posted as 25 mph.



Location of Cottonwood Cove road.

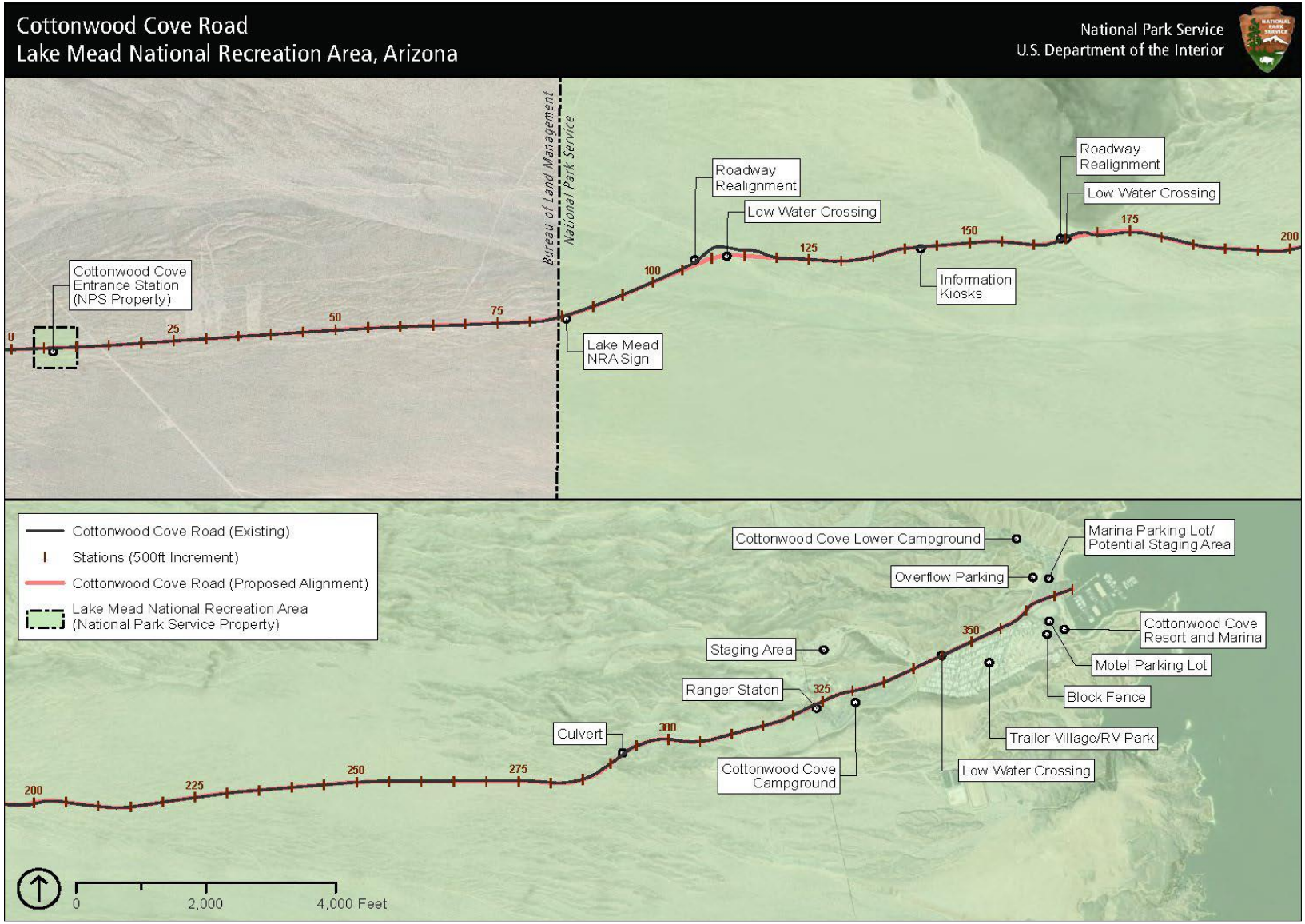
The existing drainage features, three low water crossings at stations 112, 165, and 345 and the culvert at station 293, would remain unchanged. These features are structurally sound, but they provide inadequate drainage, which results in flooding of the roadway.

The entrance station (an "island" of NPS land surrounded by land managed by BLM; please see map below), the monument at the NRA's boundary, the ranger station, and the marina and concessions area would remain in their existing conditions. Improvements to safety and accessibility would not be completed, and additional parking areas would not be constructed.

Lake Mead NRA would continue to repair and clear the road of debris as needed, but roadway conditions would continue to deteriorate.

Proposed Action Alternative: Approximately 6.8 miles of the 13.5-mile-long Cottonwood Cove Road would be rehabilitated and widened (please see map below). The roadway improvements would include widening the roadway between stations 3 and 325 to 12-foot lanes with 3-foot paved shoulders for a total paved width of 30 feet. Within the developed area (between stations 325 and 368 from the ranger station to the marina), the road would be designed with a 24-foot pavement width with a curb and gutter on both sides and a 5-foot-wide sidewalk on one side.

Two sections of the road would be realigned to straighten curves – totaling approximately 2,200 linear feet (0.4 mile total, approximately 1,500 and 700 linear feet, respectively). The existing roadway in these sections would be obliterated and restored to natural conditions.



Map of Cottonwood Cove access road improvement areas and land management responsibilities.

Three existing low water crossings along the road at approximately stations 112, 165, and 345 would be improved and a fourth low water crossing would be installed at station 306. The low water crossings would be concrete pavement with buried concrete barriers for integrity. Gabion mattresses (wire mesh containers to be filled with rocks) would provide bank stabilization on the upstream and downstream sides of the low water crossings.

The existing 30-inch culvert near station 293 that crosses Cottonwood Cove Road would remain in place and be lined and extended with a new 30-inch corrugated metal pipe. Extending the culvert would also allow for the road to be widened. Riprap would be installed at the culvert outlet to reduce the potential for scour.

Other improvements include:

- At the entrance station (station 6) – resurfacing the parking area and installing gutters, curbing, signs and painting pavement markings.
- At the monument at the Lake Mead NRA boundary (station 85) – the pullout would be paved, a sidewalk would be constructed with an adjacent curb and gutter, pavement markings would be painted, and signs would be installed.
- At the ranger station (~station 324) – the curb and gutter around the ranger station would be replaced, the parking lot would be resurfaced, pavement markings would be painted, and signs would be installed.
- At the marina and concession area – repaving the parking area, installing curbing at the western extent of the parking area and around the islands at the end of rows of parking, installing wheelstops and signs, and painting pavement markings, and boat wipe down stalls.

  A new 1-acre overflow parking area would be constructed adjacent to the marina parking lot south of the Cottonwood Cove Lower Campground. Additionally, a parking area south of the road near the Cottonwood Cove Resort would be paved (approximately 1.4 acres).

  Cottonwood Cove Resort motel parking lot would be repaved, and a valley gutter installed to help with drainage to a culvert pipe. Signs would be installed, and pavement markings painted. A block fence constructed of concrete masonry units would be installed along the western edge of the parking lot to separate it from the RV park.

  A construction staging area of approximately 100 feet by 150 feet would be established at station 325, which is an existing NPS maintenance facility parking and storage area. The main parking lot may also be used for equipment storage.

Construction would take approximately 9 months and would likely be scheduled from September to May to avoid peak visitation. However, timing of this project would be subject to funding availability. The sequencing of construction would be as follows: clearing and grubbing, roadway excavation and full-depth reclamation, paving, and widening the roadway, signing, and [sic] stripping.

In addition, other alternatives were identified but dismissed. These alternatives were:

- maintain the existing alignment and widen the road – This alternative was eliminated because it would not adequately address roadway safety concerns including sight distance, steep grades, and substandard curve geometry.
- realign Cottonwood Cove Road between stations 105 and 120 and stations 158 to 180 – This alternative was eliminated because of the increased environmental impacts associated with realigning longer sections of the road through previously undeveloped habitats.
- replace the culvert at station 293 – This alternative was eliminated because it would require either a full roadway closure or a detour route and would have large impacts on visitor use and experience, socioeconomics, and natural resources.

Comments on the Draft EA

Public Participation

Public Review: In this section of the EA NPS says, "[t]he EA will be on formal public and agency review for 30 days and has been distributed to a variety of interested individuals, agencies, tribes, and organizations."

On December 20, 2020 the Council submitted a comment letter via the USPS to the NPS's Lake Mead NRA on the Willow Beach Road Improvement Environmental Assessment. In this letter, we requested that the Council be "identified as an Affected Interest for this and all other NPS projects that may affect species of desert tortoises." Although we identified ourselves as an interested organization and the Cottonwood Cove road improvement project occurs in tortoise habitat/critical habitat, we did not receive a copy of the EA or notification of its availability for public comment. Again, we request that NPS consider the Council an Affected Interest, meaning an interested party in any proposed action that may affect species of tortoises or their habitats. In addition, we recommend that coordination between staff and management at Lake Mead NRA be improved so the superintendent of the park is aware of the public's request to be notified of proposed projects and these requests will be honored.

In addition, this comment letter must be mailed via the USPS as we were unable to upload the Council's comment letter as a pdf file to the NPS's Planning, Environment, and Public Comment (PEPC) website. As mentioned earlier in this letter, email is preferred method of contact/submission of comments as it is an "environmentally friendlier way" / leaves a smaller carbon footprint. Because the NPS is a federal agency and has a conservation mission, we suggest that the NPS's PEPC website be revised to accept comment letters in pdf format. The BLM and U.S. Fish and Wildlife Service have these capabilities for submitting comment letters from the public.

Updated Information: In the EA, the NPS says the Piute Eldorado Area of Critical Environmental Concern (ACEC) is managed by BLM. Our understanding is that in March 2023, the President designated the area that surrounds Searchlight in southern Nevada including most/all of this ACEC as the Spirit Mountain or Avi Kwa Ame National Monument. We suggest the EA be updated to include this executive decision, and management changes required because of national monument

designation that may affect implementing road maintenance or other surface disturbance in a national monument rather than on public land.

Resource Protection Measures

To mitigate impacts related to the Proposed Action Alternative, resource protection measures would be implemented. These measures incorporate the regulatory requirements of various federal laws and NPS policies. However, when we reviewed the resource protection measures, we found these measures would not fully offset the direct, indirect, and cumulative impacts of the Proposed Action Alternative to the tortoise/tortoise habitat.

The NPS's 1916 Organic Act and National Parks Omnibus Management Act of 1998 direct the NPS to manage the natural resources of parks to maintain them in an unimpaired condition for present and future generations. Section 7(a)(1) of the Federal Endangered Species Act (FESA), directs all federal agencies to "… 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…"

Part of the Proposed Action Alternative is located in the Piute Eldorado critical habitat unit (USFWS 1994a), the Eldorado tortoise population in the Eastern Mojave Recovery Unit, and the Piute tortoise population in the Colorado Desert Recovery Unit. In 2021, the Piute tortoise population had a density of 3.9 tortoises per square kilometer, a decline from 5.9 in 2014 (USFWS 2015, USFWS 2022) (Please see attachment - Appendix A. Demographic Status and Trend of the Mojave Desert Tortoise (*Gopherus agassizii*)). The Eldorado tortoise population in 2019 had a density of 2.3 tortoise per square kilometer (USFWS 2020), a density below population viability. Note that a density of 3.9 tortoises is the minimum density level for viable tortoise populations according to the USFWS (1994b). Between 2004 and 2014, tortoise densities in the Eastern Mojave Recovery Unit declined 67 percent (USFWS 2015), the highest rate of decline of the five recovery units. For the Colorado Desert Recovery Unit, tortoise densities declined 36 percent although the Piute population density increased to 5.3 tortoise per square kilometer.

Given the status and trend of the tortoise in the Piute and Eldorado tortoise populations and this critical habitat unit, the Eastern Mojave and Colorado Desert recovery units, and rangewide and the mandate in NPS's Organic Act, National Parks Omnibus Management Act, and FESA, the Council believes the NPS should implement additional mitigation to fully offset the adverse impacts from the improvement and use of the Cottonwood Cove access road in tortoise habitat.

The impacts of roads on the tortoise and wildlife are well documented. Road construction, use, and maintenance impact wildlife through numerous mechanisms that can include mortality from vehicle collisions; collection of animals; alteration of behavior (e.g., from noise, etc.); and loss,

fragmentation, and alteration of habitat. Many of these impacts were not described or analyzed in the EA.

Field studies (LaRue 1992; Nafus et al. 2013; Peaden et al. 2015, von Seckendorff Hoff and Marlow 2002) have shown impact zones from road use eliminate or substantially reduce tortoise numbers up to 0.25 mile from roadways. These impacts are attributed to road kill with roads acting as population sinks for tortoises. Nafus et al. (2013) stated that the ecologically affected areas along roads, otherwise known as "road-effect zones," are those in which a change in wildlife abundance, demography, or behavior is observed. Von Seckendorff Hoff and Marlow (2002) and Peaden et al. (2015) reported that they detected reductions in tortoise numbers and sign from infrequent use of roadways to major highways with heavy use. They noted that the installation of exclusion fences and other barriers along roadways will do much to reduce direct tortoise mortalities. Nafus et al. (2013) reported that roads may decrease tortoise populations via several possible mechanisms, including cumulative mortality from vehicle collisions and reduced population growth rates from the loss of larger reproductive animals.

Other documented impacts from road construction, use, and maintenance include but are not limited to increases in roadkill of wildlife species, including tortoises, that create or increase food subsidies for common ravens. This food subsidy contributes to increases in raven numbers and predation pressure on the desert tortoise. Road construction, use, and maintenance also promotes the spread and proliferation of non-native invasive plants that outcompete native plants and have reduced nutritional value than native plants (Drake et al. 2016). This floristic change adversely affects the health of tortoises (Drake et al. 2016).

These impacts from road use have been grouped into major categories of impacts: (1) wildlife mortality from collisions with vehicles; (2) hindrance/barrier to animal movements thereby reducing access to resources and mates; (3) degradation of habitat quality; (4) habitat loss caused by disturbance effects in the wider environment and from the physical occupation of land by the road; and (5) subdividing animal populations into smaller and more vulnerable fractions (Jaeger et al. 2005a, 2005b, Roedenbeck et al. 2007).

In the Final EA, please include analyses of the impacts of construction, use, and maintenance under the five major categories of primary road effects to the tortoise and special status species. To assist the NPS with this analysis of the impacts of roads on wildlife, including the tortoise, in the Mojave Desert, we have attached a list of some scientific studies and reports on the impacts from vehicle use to desert ecosystems including the Mojave desert tortoise (please see Appendix B). Given this information on road impacts and the NPS's legal mandates, the Council contends the improvement (i.e., construction and maintenance) and use of the Cottonwood Cove Road should be fully mitigated.

In the EA, the NPS says. "[t]he desert tortoise critical habitat between the entrance station and the Cottonwood Cove marina has been developed and fragmented by the existing Cottonwood Cove Road since its [critical habitat] designation in 1994." Fragmentation of habitat and tortoise populations between the Eastern Mojave and Colorado Desert recovery units from road improvement and use is a concern. This impact is especially important as the Mojave desert tortoise

cannot be delisted/recovered until all five recovery units meet recovery criteria. Please analyze this impact in the EA.

The Mojave desert tortoise uses washes to move across roads (Peaden et al. 2017). We recommend that Cottonwood Cove Road in tortoise habitat be fenced with tortoise exclusion fencing (von Seckendorff Hoff and Marlow 2002, Peaden et al. 2015) and that the culvert be designed and maintained so it is usable by all size classes of tortoises to provide connectivity/gene flow between tortoise populations on each side of the road. The proposed use of riprap at the outflow of the culvert would likely require modification in its design and/or placement to achieve both hydrologic goals (prevent scouring) and tortoise access. To facilitate this connectivity, we suggest the new low water crossings in the realigned road at stations 112 and 165 be fitted with one or more culverts if located in tortoise habitat to provide connectivity for the tortoise population and habitat. The USFWS's Desert Tortoise Recovery Office has expertise to help the NPS and FHWA design, implement, and maintain effective tortoise exclusion fencing and culverts to facilitate tortoise/habitat connectivity and hydrology.

We recommend that the surface disturbance portions of the Proposed Action Alternative (e.g., clearing and grubbing, roadway excavation and full-depth reclamation, paving, and widening the roadway) occur outside the tortoise active season. The active season usually occurs in spring and fall. It may also occur at any time of the years during/immediately after precipitation events. Implementing the Proposed Action Alternative outside the tortoise active season would substantially reduce the likelihood of tortoises being encountered above ground during the use of vehicles and equipment for road improvement activities.

The EA mentions that habitat restoration of the former road areas and monitoring of invasive plant species along the roadway would occur for 2 years. This short time is unacceptable given that vegetation restoration requires many years to decades to successfully accomplish (Abella 2010). Rather, NPS should establish success criteria for habitat restoration (e.g., native annual and perennial species composition, cover, density, abundance, etc.) and not a defined short time. It is highly unlikely that the vegetation native to the local area would be restored in 2 years.

NPS is requiring construction vehicles and equipment to be cleaned before entering the park lands to eliminate the transport of nonnative invasive plants during this activity. However, we found no mention in the EA of NPS's management to control invasive species after the construction phase is completed and the road is used by the public.

NPS is improving the road so the public may access Lake Mojave. Unfortunately, the vehicles of NRA visitors unintentionally transport plant propagules (e.g., seeds) from nonnative invasive annual plants along roadways (Brooks and Esque 2002, Brooks and Berry 2006). This unintentional transport promotes the establishment and facilitates the distribution of nonnative invasive annual plants that outcompete native herbaceous plant species. This reduces the availability of native forage that provides the nutrients and water balance tortoises need for survival, growth, and reproduction. Nonnative invasive annual plants provide inadequate nutrition and negative water balance for tortoises (Drake et al. 2016). In some areas in the eastern Mojave Desert, this reduction is substantial with nonnative annual grasses comprising more than 90 percent of the biomass (Brooks and Esque 2002). Consequently, we request that NPS implement an effective program that annually monitors

and substantially reduces the presence of nonnative invasive plants, especially in tortoise critical habitat. Please add this program as a mitigation measure for the Proposed Action Alternative.

In the EA, NPS describes impacts to vegetation as follows – "Construction would require soil and vegetation removal and disturbance from cut and fill, resulting in temporary removal of approximately 15.9 additional acres of vegetation. These impacts would be temporary, as this area would be rehabilitated and revegetated following construction."

The NPS at Lake Mead NRA is aware that revegetation of disturbed areas in the Mojave Desert takes decades to accomplish revegetation to pre-project conditions (Abella 2010). In the EA, NPS appears to have forgotten to describe and analyze the temporal loss of vegetation and habitat for the tortoise especially as some of this vegetation removal will occur in critical habitat for the tortoise. To mitigate for this temporal loss, typical mitigation measures usually require successful revegetation at a ratio greater than the area lost. The longer the time required to successfully revegetate an area, the greater the mitigation ratio. We request that NPS revegetate other areas of tortoise habitat within the critical habitat unit at a ratio of 5:1. NPS should develop and implement a revegetation plan with success criteria, monitoring, and adaptive management to ensure that the revegetation effort is effective as habitat for the tortoise.

In the EA, the NPS mentions that a resource protection measure to control dust would be for water to be "sprayed on the soil during earth-disturbing activities." We request that this measure be further defined to require that no puddling of water would occur from the use of water. Puddles attract common ravens that are predators of tortoises (Boarman 2003, Boarman et al. 2006).

We assert that the Proposed Action Alternative will allow drivers of the road to drive at higher speeds than they currently do. Faster speeds mean that drivers have less time to see a tortoise crossing Cottonwood Cove Road and stop to avoid injury /mortality to the tortoise. Faster speeds also mean that smaller tortoises that would be seen if drivers were driving slowly, will not be seen and will be killed. Road use should be analyzed in the EA and in section 7(a)(2) consultation, as it is likely to result in take of tortoises. Thus, the NPS's statement in the EA that the "proposed action may affect but is not likely to adversely affect the federally threatened Mojave desert tortoise" is incorrect for all the direct and indirect impacts described above to the tortoise, its habitat, and connectivity between populations/recovery units. Please revise the EA to include the myriad of impacts from the use of roads/improved roads to the tortoise.

Cumulative Impacts

Please see G*rand Canyon Trust* v. *F.A.A.,* 290 F.3d 339, 345-46 (D.C. Cir. 2002) in which the court decided that agencies must analyze the cumulative impacts of actions in environmental assessments.

In the cumulative effects analysis of the Final EA, please ensure that the CEQs "Considering Cumulative Effects under the National Environmental Policy Act" (1997) is followed, including the eight principles (listed below), when analyzing cumulative effects of the proposed action to the affected resource issues including the tortoise.

CEQ states, “Determining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems, and human communities of concern. The range of actions that must be considered includes not only the project proposal but all connected and similar actions that could contribute to cumulative effects.” The analysis “must describe the response of the resource to this environmental change.” Cumulative impact analysis should “address *the sustainability of resources* (emphasis added), ecosystems, and human communities.”

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

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

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

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

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

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

and analysis of human communities must use actual sociocultural boundaries to ensure including all effects.

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

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

8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.
Analysts tend to think in terms of how the resource, ecosystem, and human community will be modified given the action's development needs. The most effective cumulative effects analysis focuses on what is needed to ensure long-term productivity or sustainability of the resource.

Please add an analysis of cumulative impacts of each alternative to the DEA for the resource issues caried forward in the DEA for analysis.

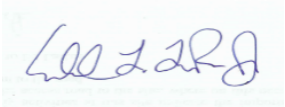
Note that CEQ recognizes that synergistic and interactive impacts as well as cumulative impacts should be analyzed in the NEPA document for the resource issues. In addition, for the tortoise numbers 5 through 8 are particularly relevant especially give the demographic status and trend of the tortoise (please see data provided in Appendix A below).

In addition, we request that NPS add this project and its impacts to a database and geospatial tracking system for the Mojave desert tortoise that tracks cumulative impacts (e.g., surface disturbance, paved and unpaved routes, linear projects, invasive species occurrence, wildfires, etc.), management decisions, and effectiveness of mitigation for each project. Without such a tracking system, NPS is unable to analyze cumulative impacts to the tortoise with any degree of confidence.

We appreciate this opportunity to provide comments on this project and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the Desert Tortoise Council wants to be identified as an Affected Interest for this and all other projects funded, authorized, or carried out by the NPS that may affect species of desert tortoises, and that any subsequent environmental documentation for this Project is provided to us at the contact information

listed above. Additionally, we ask that you respond in an email that you have received this comment letter so we can be sure our concerns have been registered with the appropriate personnel and office for this Project.

Respectfully,



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

cc: Michael Gauthier, Acting Superintendent, Lake Mead NRA lake_superintendent@nps.gov
Justin Pattison, Deputy Superintendent, Lake Mead NRA justin_pattison@nps.gov
Acting Regional Director, Region 8, National Park Service pwr_regional_director@nps.gov

Attachments: Appendix A - Appendix A. Demographic Status and Trend of the Mojave Desert Tortoise (Gopherus agassizii)
Appendix B - Partial bibliography of scientific studies and reports on the impacts from vehicle use to desert ecosystems including the Mojave desert tortoise

Literature Cited

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

To assist the Agencies with their analysis of the direct, indirect, and cumulative impacts of the Proposed Project on the Mojave desert tortoise, we provide the following information on its status and trend. In reviewing the data presented below, note that the location of the proposed project is within the Colorado Desert Recovery Unit, which has experienced a decline in tortoise density and abundance of –36%, since 2004.

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 Tortoise Conservation Areas (TCAs) that comprise each recovery unit.

Below are tables with data on changes to Mojave desert tortoise densities and abundance since 2004. Important points from these tables include the following:

Change in Status for the Mojave Desert Tortoise Range-wide
● Ten of 17 populations of the Mojave desert tortoise declined from 2004 to 2014.

● Eleven of 17 populations of the Mojave desert tortoise are below the population viability threshold trough 2021. These 11 populations represent 89.7 percent of the range-wide habitat in CHUs/TCAs.

Change is Status for the Eastern Mojave Recovery Unit – Nevada and California
● This recovery unit had a 67 percent decline in tortoise density from 2004 to 2014, the highest rate of decline of the five recovery units.

● All tortoise populations in this recovery unit have densities that are below the viability level established by the USFWS (1994a).

● The Eastern Mojave Recovery Unit provides population and habitat connectivity between the Western Mojave and Colorado Desert recovery units and the Northeastern and Upper Virgin River recovery units. Continued development that fragments tortoise populations and habitats eventually severs the genetic connection between the two recovery units to the west and two to the east.

Densities of Adult Mojave Desert Tortoises: A few years after listing the Mojave desert tortoise under the Federal Endangered Species Act (FESA), the U.S. Fish and Wildlife Service (USFWS) published a Recovery Plan for the Mojave desert tortoise (USFWS 1994a). It contained a detailed population viability analysis. In this analysis, the minimum viable density of a Mojave desert tortoise population is 10 adult tortoises per mile^2 (3.9 adult tortoises per km^2). This assumed a male-female ratio of 1:1 (USFWS 1994a, page C25) and certain areas of habitat with most of these areas geographically linked by adjacent borders or corridors of suitable tortoise habitat. Populations of Mojave desert tortoises with densities below this density are in danger of extinction (USFWS 1994a, page 32). The revised recovery plan (USFWS 2011) designated five recovery units for the Mojave desert tortoise that are intended to conserve the genetic, behavioral, and morphological diversity necessary for the recovery of the entire listed species (Allison and McLuckie 2018).

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

At the population level, represented by tortoises in the TCAs, densities of 10 of 17 monitored populations of the Mojave desert tortoise declined from 26% to 64% and 11 have densities less than 3.9 adult tortoises per km^2 (USFWS 2015).

Population Data on Mojave Desert Tortoise: The Mojave desert tortoise was listed as threatened under the FESA in 1990. The listing was warranted because of ongoing population declines throughout the range of the tortoise from multiple human-caused activities. Since the listing, the status of the species has changed. Population numbers (abundance) and densities continue to decline substantially (please see Tables 1 and 2).

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA) for the Mojave desert tortoise, *Gopherus agassizii* (=Agassiz's desert tortoise). The table includes the area of each Recovery Unit and Critical Habitat Unit (CHU)/Tortoise Conservation Area, percent of total habitat for each Recovery Unit and Critical Habitat Unit/Tortoise Conservation Areas, density (number of breeding adults/km^2 and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 adults/km^2 (10 adults per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (Allison and McLuckie 2018, USFWS 2015).

Recovery Unit Designated Critical Habitat Unit/Tortoise Conservation Area	Surveyed area (km^2)	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km^2 (SE)	% 10-year change (2004–2014)
Western Mojave, CA	**6,294**	**24.51**	**2.8 (1.0)**	**–50.7 decline**
Fremont-Kramer	2,347	9.14	2.6 (1.0)	–50.6 decline
Ord-Rodman	852	3.32	3.6 (1.4)	–56.5 decline
Superior-Cronese	3,094	12.05	2.4 (0.9)	–61.5 decline
Colorado Desert, CA	**11,663**	**45.42**	**4.0 (1.4)**	**–36.25 decline**
Chocolate Mtn AGR, CA	713	2.78	7.2 (2.8)	–29.77 decline
Chuckwalla, CA	2,818	10.97	3.3 (1.3)	–37.43 decline
Chemehuevi, CA	3,763	14.65	2.8 (1.1)	–64.70 decline
Fenner, CA	1,782	6.94	4.8 (1.9)	–52.86 decline
Joshua Tree, CA	1,152	4.49	3.7 (1.5)	+178.62 increase

Pinto Mtn, CA	508	1.98	2.4 (1.0)	–60.30 decline
Piute Valley, NV	927	3.61	5.3 (2.1)	+162.36 increase
Northeastern Mojave	**4,160**	**16.2**	**4.5 (1.9)**	**+325.62 increase**
Beaver Dam Slope, NV, UT, AZ	750	2.92	6.2 (2.4)	+370.33 increase
Coyote Spring, NV	960	3.74	4.0 (1.6)	+ 265.06 increase
Gold Butte, NV & AZ	1,607	6.26	2.7 (1.0)	+ 384.37 increase
Mormon Mesa, NV	844	3.29	6.4 (2.5)	+ 217.80 increase
Eastern Mojave, NV & CA	**3,446**	**13.42**	**1.9 (0.7)**	**–67.26 decline**
El Dorado Valley, NV	999	3.89	1.5 (0.6)	–61.14 decline
Ivanpah, CA	2,447	9.53	2.3 (0.9)	–56.05 decline
Upper Virgin River	**115**	**0.45**	**15.3 (6.0)**	**–26.57 decline**
Red Cliffs Desert	115	0.45	15.3 (6.0)	–26.57 decline
Total amount of land	**25,678**	**100.00**		**–32.18 decline**

Density of Juvenile Mojave Desert Tortoises: Survey results indicate that the proportion of juvenile desert tortoises has been decreasing in all five recovery units since 2007 (Allison and McLuckie 2018). The probability of encountering a juvenile tortoise was consistently lowest in the Western Mojave Recovery Unit. Allison and McLuckie (2018) provided reasons for the decline in juvenile desert tortoises in all recovery units. These included decreased food availability for adult female tortoises resulting in reduced clutch size, decreased food availability resulting in increased mortality of juvenile tortoises, prey switching by coyotes from mammals to tortoises, and increased abundance of common ravens that typically prey on smaller desert tortoises.

Declining adult tortoise densities through 2014 have left the Eastern Mojave Desert adult numbers at 64% (a 36% 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 (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).

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

Table 2. Summary of data for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise) from 2004 to 2021 for the 5 Recovery Units and 17 Critical Habitat Units (CHUs)/Tortoise Conservation Areas (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**	**2004 density/ km^2**	**2014 density/ km^2 (SE)**	**% 10-year change (2004–2014)**	**2015 density/ km^2**	**2016 density/ km^2**	**2017 density/ km^2**	**2018 density/ km^2**	**2019 density/ km^2**	**2020 density/ km^2**	**2021 density/ km^2**
Western Mojave, CA	**24.51**		**2.8 (1.0)**	**–50.7 decline**							
Fremont-Kramer	9.14		2.6 (1.0)	–50.6 decline	4.5	No data	4.1	No data	2.7	1.7	No data
Ord-Rodman	3.32		3.6 (1.4)	–56.5 decline	No data	No data	3.9	2.5/3.4*	2.1/2.5*	No data	1.9/2.5*
Superior-Cronese	12.05		2.4 (0.9)	–61.5 decline	2.6	3.6	1.7	No data	1.9	No data	No data
Colorado Desert, CA	**45.42**		**4.0 (1.4)**	**–36.25 decline**							
Chocolate Mtn AGR, CA	2.78		7.2 (2.8)	–29.77 decline	10.3	8.5	9.4	7.6	7.0	7.1	3.9
Chuckwalla, CA	10.97		3.3 (1.3)	–37.43 decline	No data	No data	4.3	No data	1.8	4.6	2.6
Chemehuevi, CA	14.65		2.8 (1.1)	–64.70 decline	No data	1.7	No data	2.9	No data	4.0	No data
Fenner, CA	6.94		4.8 (1.9)	–52.86 decline	No data	5.5	No data	6.0	2.8	No data	5.3
Joshua Tree, CA	4.49		3.7 (1.5)	+178.62 increase	No data	2.6	3.6	No data	3.1	3.9	No data
Pinto Mtn, CA	1.98		2.4 (1.0)	–60.30 decline	No data	2.1	2.3	No data	1.7	2.9	No data
Piute Valley, NV	3.61		5.3 (2.1)	+162.36 increase	No data	4.0	5.9	No data	No data	No data	3.9

Recovery Unit: Designated CHU/TCA	% of total habitat area in Recovery Unit & CHU/TCA	2004 density/ km^2	2014 density/km^2 (SE)	% 10-year change (2004–2014)	2015	2016	2017	2018	2019	2020	2021
Northeastern Mojave AZ, NV, & UT	**16.2**		**4.5 (1.9)**	**+325.62 increase**							
Beaver Dam Slope, NV, UT, & AZ	2.92		6.2 (2.4)	+370.33 increase	No data	5.6	1.3	5.1	2.0	No data	No data
Coyote Spring, NV	3.74		4.0 (1.6)	+ 265.06 increase	No data	4.2	No data	No data	3.2	No data	No data
Gold Butte, NV & AZ	6.26		2.7 (1.0)	+ 384.37 increase	No data	No data	1.9	2.3	No data	No data	2.4
Mormon Mesa, NV	3.29		6.4 (2.5)	+ 217.80 increase	No data	2.1	No data	3.6	No data	5.2	5.2
Eastern Mojave, NV & CA	**13.42**		**1.9 (0.7)**	**–67.26 decline**							
Eldorado Valley, NV	3.89		1.5 (0.6)	–61.14 decline	No data	2.7	5.6	No data	2.3	No data	No data
Ivanpah Valley, CA	9.53		2.3 (0.9)	–56.05 decline	1.9	No data	No data	3.7	2.6	No data	1.8
Upper Virgin River, UT & AZ	**0.45**		**15.3 (6.0)**	**–26.57 decline**							
Red Cliffs Desert**	0.45	29.1 (21.4-39.6)**	15.3 (6.0)	–26.57 decline	15.0	No data	19.1	No data	17.2	No data	
Range-wide Area of CHUs - TCAs/Range-wide Change in Population Status	**100.00**			**–32.18 decline**							

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

**Methodology for collecting density data initiated in 1999.

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.

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

Table 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%**

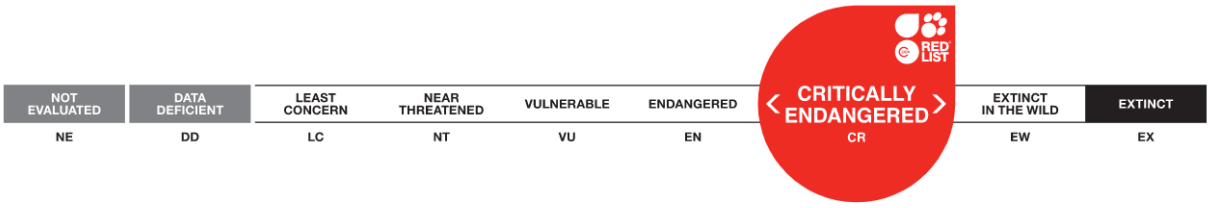
Habitat loss would also disrupt the prevailing population structure of this widely distributed species with geographically limited dispersal (isolation by resistance Dutcher et al. 2020). Allison and McLuckie (2018) anticipate an additional impact of this habitat loss/degradation is decreasing resilience of local tortoise populations by reducing demographic connections to neighboring populations (Fahrig 2007). Military and commercial operations and infrastructure projects that reduce tortoise habitat in the desert are anticipated to continue (Allison and McLuckie 2018) as are other sources of habitat loss/degradation.

Allison and McLuckie (2018) reported that the life history of the Mojave desert tortoise puts it at greater risk from even slightly elevated adult mortality (Congdon et al. 1993; Doak et al. 1994), and recovery from population declines will require more than enhancing adult survivorship (Spencer et al. 2017). The negative population trends in most of the TCAs for the Mojave desert

tortoise indicate that this species is on the path to extinction under current conditions (Allison and McLuckie 2018). They state that their results are a call to action to remove ongoing threats to tortoises from TCAs, and possibly to contemplate the role of human activities outside TCAs and their impact on tortoise populations inside them.

Densities, numbers, and habitat for the Mojave desert tortoise declined between 2004 and 2014 and densities continue to decline in most Recovery Units since 2014. As reported in the population viability analysis, to improve the status of the Mojave desert tortoise, reserves (area of protected habitat) must be established and managed. When densities of tortoises decline, the area of protected habitat must increase. When the abundance of tortoises declines, the area of protected habitat must increase. We note that the Desert Tortoise (Mojave Population) Recovery Plan was released in 1994 and its report on population viability and reserve design was reiterated in the 2011 Revised Recovery Plan as needing to be updated with current population data (USFWS 2011, p. 83). With lower population densities and abundance, a revised population viability analysis would show the need for greater areas of habitat to receive reserve level of management for the Mojave desert tortoise. In addition, we note that none of the recovery actions that are fundamental tenets of conservation biology has been implemented throughout most or all of the range of the Mojave desert tortoise.

IUCN Species Survival Commission: The Mojave desert tortoise is now on the list of the world's most endangered tortoises and freshwater turtles. It is in the top 50 species. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers Mojave desert tortoise to be Critically Endangered (Berry et al. 2021). As such, it is a "species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90 percent over the previous 10 years (or three generations), a current population size of fewer than 50 individuals, or other factors." It is one of three turtle and tortoise species in the United States to be critically endangered. This designation is more grave than endangered.



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Appendix B

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