

DESERT TORTOISE COUNCIL

3807 Sierra Highway #6-4514

Acton, CA 93510

www.deserttortoise.org

eac@deserttortoise.org

Via email

October 23, 2023

Elizabeth Fairbank
Center for Large Landscape Conservation
P.O. Box 1587
Bozeman, MT 59771
c/o flogardipee@gmail.com

RE: Comments on Technical Guidance: Mojave Desert Tortoise Conservation and Recovery
Measures Along Roads

Dear Ms. Fairbank,

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

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

We appreciate this opportunity to provide comments on the above-referenced document. Our comments include additional recommendations for moving forward with conservation of the tortoise and its habitat with the goal of recovering the species. Please accept, carefully review, and include in the relevant file the Council's following comments for this document.

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), habit loss of over 80% over three generations (90 years), including past reductions and predicted future declines, as well as the effects of disease (upper respiratory tract disease/mycoplasmosis). *Gopherus agassizii* (sensu stricto) comprises tortoises in the most well-studied 30% of the larger range; this portion of the original range has seen the most human impacts and is where the largest past population losses have been documented. A recent rigorous rangewide population reassessment of *G. agassizii* (sensu stricto) has demonstrated continued adult population and density declines of about 90% over three generations (two in the past and one ongoing) in four of the five *G. agassizii* recovery units and inadequate recruitment with decreasing percentages of juveniles in all five recovery units.”

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

Purpose of the Technical Guidance Document

The objective of Technical Guidance: Mojave Desert Tortoise Conservation and Recovery Measures Along Roads (Guidance Document or Document) is “to make information available to stakeholders (practitioners, researchers, and managers) on the factors that contribute to the successful implementation of measures taken to avoid, mitigate or compensate for the effects of roads and traffic on Mojave desert tortoise populations.”

The Document identifies five major types of impacts from roads and vehicle use –

- habitat loss,
- direct road mortality,
- barriers to wildlife movements,
- decreased habitat quality in a zone adjacent to the road and increased access to areas adjacent to the highways for humans, and associated disturbance, and
- adverse or beneficial impacts to the right-of-way (ROW) habitat and corridor.

The Document focuses most of its efforts on identifying methods that have been implemented to avoid or minimize these impacts and evaluating their effectiveness.

General Comments

We appreciate the authors compiling this information into one Guidance Document where it is accessible to Federal, State, and County transportation agencies, tortoise biologists, and agencies responsible for recovering the tortoise under the Federal Endangered Species Act and California Endangered Species Act. Our comments include recommendations for enhancing this Document so it will be readily used and implemented by the managers of these agencies.

At the beginning of the Guidance Document is a disclaimer that states, “The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official policies of the Center for Large Landscape Conservation, the Western Transportation Institute or Montana State University, or the U.S. Fish & Wildlife Service. This report does not constitute a standard, specification, or regulation.”

We appreciate this disclaimer. However, because this is a Guidance Document, we suggest that the Document provide a summary of the authors’ recommendations for the suite of actions that should be implemented to effectively avoid/minimize the direct and indirect loss/degradation to tortoises and tortoise habitat from road construction, use, and maintenance. We suggest the Document provides a summary that, for example, stresses that implementing measures to avoid/minimize mortality during construction will only be effective if subsequent use of the road and effective maintenance are conscientiously implemented and enforced. Such a summary, rather than requiring them to read a 90+ page document, would be more useful to agency personnel responsible for recovering the tortoise.

Further, because this is a technical guidance document, we suggest that where technical information or specifications are available, they should be included in this Document (e.g., the specifications for tortoise exclusion fencing, etc.).

We suggest adding to this Document that the Federal Highway Administration (FHWA) and State and County transportation/highway agencies in the range of the tortoise should record and geospatially map the locations, types, and dimensions of all underpasses, including culverts and their upstream and downstream designs, and overpasses.

We suggest adding a glossary to the Document to ensure that the terms and acronyms are defined for the reader. For example, we were confused by the use of the term “underpass” as synonymous with “culvert.” To us, a culvert is one type of an underpass, but not all underpasses are culverts.

The photographs were effective in conveying the problems in tortoise fencing, shade structures, and underpass designs and the solutions of ensuring these structures are functioning properly for the needs of the tortoise. However, we recommend that persons with biological expertise on the movements and ecological needs of tortoise be part of all efforts by FHWA and State and County transportation/highway agencies when designing and constructing underpasses in tortoise habitat and when maintaining underpasses in tortoise habitat especially after substantial rainfall events in project areas or upslope of those areas.

Although this Document focuses on the Mojave desert tortoise, we recommend that recommendations for the Sonoran desert tortoise be included in this Guidance Document.

Specific Comments

Page 10: The rainfall pattern in southern Nevada is discussed. We are not sure why this discussion is limited to southern Nevada when the distribution of the tortoise includes southeastern California, northwestern Arizona, and southwestern Utah. We recommend the Document be revised to include rainfall pattern information throughout the entire range of the Mojave desert tortoise from California to Utah.

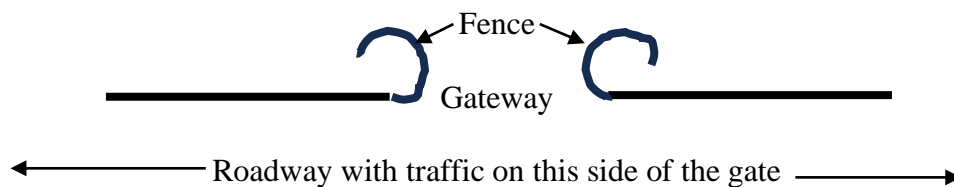
Page 14: Planning – During the planning process, the authors recommend to “identify and prioritize 1-km segments of roads that are most in need of Mojave desert tortoise fences from both a biological need and a feasibility perspective.” We ask the significance of selecting a 1-km segment rather than a longer or shorter segment, especially given the discussion on fence length later in the Document (pages 24-26). We suggest information be added to the Document that explains the reason(s) for selecting this length.

Pages 16 and 17: Design – An example of plastic sheeting used for fencing is pictured along with its problems if used in a desert environment. Please consider adding that the effects of high temperature and ultraviolet light would reduce the lifespan of a plastic fence when compared to a metal fence.

Page 25: Design, Fence Length – The Document says, “the average home range for resident males was 23-55 ha and 17-19 ha for resident females (Turner et al. 1980, Harless et al. 2010).” Please add that lifetime home ranges for adult tortoises are larger than those determined using only a few years of movement data. As the Document notes, environmental conditions affect home range size. In wetter than average years, tortoises travel greater distances and occasionally make forays of up to 7 miles (Berry 1986).

Page 25: Design, Fence Length – “Longer sections of wildlife fencing also reduce the potential of environmental leakage where roadkill is moved from a newly fenced road section to a nearby unfenced area rather than overall reduced (Huijser & Begley 2022).” We do not understand this sentence. We think the intent is to say that longer sections of wildlife fencing are more effective at reducing wildlife mortality than shorter sections. Shorter sections may result in moving the location of the roadkill down the road to the unfenced area and not reducing mortality. Please clarify your intent in the revised document.

Page 26: Design, Fence-end Treatments – One recommendation for treatments at fence-ends to reduce the likelihood of a “fence-end run” and increase the effectiveness of the fenced road section in reducing direct road mortality was “to bring fence-ends close to the paved road surface.” We did not understand this solution even after viewing the diagram or how it would be effective for the Mojave desert tortoise. Please elaborate on how bringing fence ends close to the paved road surface deters a tortoise from entering the roadway. We have observed fences curl back on themselves as a standard approach that may prove effective, pending additional input (see below).



Page 47: Shade Structures – The Document provides a general description of a shade structure. We recommend that if the design has been tested and proven effective, the specifications for it, including its location on the ground, by the tortoise exclusion fence, and placement of soil on/around it should be included in the Document. For example, at which intervals along the fence should shade structures be placed? If PVC pipe is cut in half and used, which is pretty typical in California, what is the recommended diameter of the pipe?

The Document says, “If the structure is in-line with the *face* [sic], take care that the overall height of the shade structure does not allow the tortoises to climb over the fence.” We believe the sentence should say, “If the structure is in line with the **fence**, take care that the overall height...”

We agree this is an important factor to consider when locating and constructing shade structures.

The Document says, “NVDOT recommends that the structures be placed at a minimum of 12 inches (60 cm) from the fence.” We presume this recommendation is to prevent a tortoise from climbing on top of the shade structure and over the tortoise exclusion fence. If the FHWA or other State or County transportation agencies in the range of the tortoise (e.g., Caltrans) have recommendations, we suggest including these and the reasons for their recommendations.

Page 52: The correct crossing structure type – The Document says, “Mojave desert tortoises are known to use underpasses, including culverts of a few feet in diameter” and “[c]ulverts are somewhat similar to Mojave desert tortoise burrows and combined with the fact that Mojave desert tortoises follow drainages, underpasses, including culverts, are likely the ‘correct’ type of crossing structure (Boarman et al.1998).”

We suggest that the term “correct” may not be the appropriate word to use in describing culverts under roads/highways. Although some culverts may look like a tortoise burrow, this does not mean that a tortoise will walk through the culvert to the other side of the road/highway. A tortoise may limit its ingress into the culvert to a few feet or the depth of tortoise dens reported by Woodbury and Hardy (1948).

We recall the U.S. Fish and Wildlife Service (USFWS) has data that show that specific lengths and opening sizes of culverts are traversed by tortoises. During studies conducted by the USFWS on culvert use by tortoises, the longest culvert navigated by a desert tortoise was 240 feet (K. Holcomb, USFWS 2020 pers. comm. Palm Springs, CA 2020-12-14 email; Table 1, page 60 of this Document). Culverts spanning a typical multi-lane highway including the shoulder and possibly ROW are likely longer than this dimension. Until additional research is conducted with respect to culvert diameter, length, and other factors, we conclude that certain types of culverts for wider highways may not be effective crossing structures if they are not traversed by tortoises. Based on this conclusion, we suggest this section of the Document provide data on the combination of parameters (e.g., diameter, shape, length, material, substrate, divided culverts for divided highways, etc.) for culverts that have proven successful in conveying tortoises from one side of a road/highway to the other. In addition, the Document should identify studies needed to address unanswered questions on tortoise use of culverts.

If underpasses (e.g., culverts and bridges, etc.) are successfully used by tortoises, this information should be included in this section along with supporting documentation. If there is information on the use of overpasses (and there should be from the Bureau of Reclamation for the Central Arizona Project), these data should be provided.

Page 54: Of the correct dimensions – This paragraph appears to mix underpasses, overpasses, and culverts when discussing dimensions. In addition, the following sentence is provided, “most underpasses, including culverts (e.g. 2-3 ft in diameter)[*sic*], are likely among the ‘correct dimensions’ for a crossing structure for Mojave desert tortoises.”

We suggest that this sentence be supported with available data from research conducted by the USFWS and others (Please see our previous comments concerning page 52 of the Document.)

Page 54: Not too far apart – Under “achieve a viable population” paragraph, we strongly recommend changing the following statement: “if Mojave desert tortoise populations have been depleted in areas adjacent to roads already, fences in combination with crossing structures are insufficient. In those cases, population augmentation or reintroduction, and reducing unnaturally high densities of predators (e.g. raven, coyote)[*sic*] is likely required.” It should say, “In those cases, population augmentation or reintroduction, and reducing unnaturally high *tortoise mortality* is likely required.” The statement in the Document assumes that predation is likely the major issue at this location, when it may not be, and there are likely several other sources of high mortality that threaten the tortoise.

The network of numerous threats to the tortoise “demonstrates that many human activities can have negative effects on tortoise populations through many pathways. Taking management actions that break one pathway, even though the pathway is real, may not be adequate to prevent the mortality factor from continuing to diminish a tortoise population. This is because alternative pathways exist to ‘compensate’ by removing animals that were otherwise ‘saved’ by a management action as with ‘compensatory mortality’” (Tracy et al. 2004). Breaking the predator pathway as suggested in the Document still leaves a multitude of other anthropogenically-caused threat pathways that result in tortoise mortality.

Page 55, Not too far apart – The authors say, “the current general guidance is to space suitable [crossing] structures 670 m (0.42 miles) [*sic*] apart to achieve connectivity for adult Mojave desert tortoises (U.S. Fish and Wildlife Service 2014). This is based on a home range size of 45 ha (square sized, each side is 670 m).” On page 25 of the Document, the authors say, “the average home range for resident males was 23-55 ha and 17-19 ha for resident females (Turner et al. 1980, Harless et al. 2010).” The USFWS recommendation does not appear to consider the smaller home range sizes for adult females. Using the data provided in this Document, we conclude that implementing the USFWS recommendation would foster the movement of adult male desert tortoises through crossing structures but not adult females. We request that the authors explain this discrepancy in the Document. We recommend that the crossing structure be placed at appropriate intervals where the data indicate they are available for both adult male **and female** desert tortoises.

Page 56: Planning – The Document says, “The planning process for installation of fencing in any priority road segment should include an inspection of existing culverts to determine their suitability as potential tortoise crossings and an analysis to identify potential sites for construction of new crossing structures.” We recommend adding to this sentence, “The planning process for installation of fencing in any priority road segment should include an inspection of existing culverts **and other underpasses** to determine their suitability as potential tortoise crossings...” Not all underpasses are accessible or can be traversed by tortoises. However, there are many suitable tortoise crossings or, with minor modifications, may become suitable.

Page 60: Table 1: Structure type and dimensions “used” by Mojave desert tortoises – This information is helpful and should be updated periodically. In addition, we request that data on the use of bridges and overpasses be added to this table.

Page 61: Construction – “Plunge pools should be filled in with finer substrate to reduce the likelihood of trapping Mojave desert tortoises.”

We recommend revisiting the issue of culverts with downstream plunge pools as there may be other ways to effectively slow water flow that do not result in barriers to tortoise movements or mortality from drowning/entrapment. Has this issue of plunge pools and tortoise mortality been addressed in biological opinions for highway construction/improvements?

Page 67: Maintenance – The Document says, “Regular inspection of culverts, especially prior to high movement periods for Mojave desert tortoises is recommended.” Please clarify in the Document what constitutes high movement periods for tortoises.

One such time is usually immediately following a rain event. We presume that culvert inspection by State and County transportation/highway agencies occurs (1) just before a rain event, especially if it is forecast to be a substantial event, to ensure that the culverts and other underpasses are able to convey flows and maintain the integrity of the highways, and (2) just after a substantial rain event to ensure that the underpasses are not blocked or damaged and that highway integrity was maintained. This timing by transportation agencies seems to coincide with the needs of the tortoise.

Page 72: Population Augmentation and Reintroductions, Effectiveness – “Additionally, improved management plans for selected release sites and known predators (e.g., ravens), when appropriate, may improve augmentation effectiveness.” This paragraph needs to identify the myriad of threats to the tortoise and if the causes of tortoise population declines are not addressed, simply adding individuals to populations in the wild through augmentation will not result in recovery or increased population numbers (USFWS 2021). Additionally, “[o]ne of the most insidious problems preventing desert tortoise recovery is that tortoise populations face multiple threats” (Tracy et al. 2004). “Individual populations face a suite of threats simultaneously and threats act together to become synergistic in their impacts” (Tracy et al. 2004). “Actions to recover the tortoise should emphasize the importance of cumulative, interactive, and synergistic threats to desert tortoise populations” (Tracy et al. 2004). This section of the document seems to gloss over this most important factor. We recommend that this information be added to the Document.

Writing improved management plans for the selected release site will not result in improved management of the tortoise. The responsible management agencies need to effectively implement these plans. From the Council’s interpretation of the status of the tortoise, most populations areas currently managed for the tortoise (e.g., critical habitat units) are below the minimum density needed for population viability. We conclude that management plans are not working.

The Document should emphasize the complex relationship of multiple threats and corresponding coordinated efforts that need to be implemented by multiple agencies simultaneously to effectively increase tortoise population numbers and densities in the wild.

The Document says, “population augmentation may still need to be combined with habitat restoration and reducing populations of human-subsidized predators (Daly et al. 2019).” Please see our comments above concerning pages 54 and 72.

Page 75: Predator Management along Roads – We suggest changing the wording that currently say, “Ravens (*Corvus corax*) and coyotes (*Canis latrans*) are important predators for the Mojave desert tortoise” to “Ravens (*Corvus corax*) and coyotes (*Canis latrans*) **have become major** predators for the Mojave desert tortoise.” This statement is supported, especially for ravens, by information provided later in this paragraph that says, “In the southwest, ravens have increased by an estimated 1000% between the mid-1980s and 2011” because of human subsidies for food, water, and nest sites (Kristan and Boarman 2003). It is also inferred for coyotes as “[c]oyotes consumed anthropogenic material at much higher frequencies than desert kit foxes (Kelly et al. 2019) in the Mojave Desert.”

Page 79 and 80: Measures for park roads – In this section, the authors indicate, “...vehicle speed may be limited through reduced legal posted speed limit and associated measures that affect the design speed of a road (e.g., curves, narrow lanes, no road shoulder, speed bumps).” We suggest adding the results of studies conducted by the National Park Service at Mojave National Preserve to demonstrate the effectiveness, or lack thereof, when some of these measures are implemented and as a result of these studies, and the measures that Mojave National Preserve is implementing to effectively reduce tortoise mortality from road use (Hughson 2023).

Appendix A: Minimization Measures – Because Appendix A is a list of Minimization Measures, the assumption is that these are the recommended minimization measures of the authors. We suggest adding language at the beginning of this Appendix about its purpose and the sources used to compile this information.

Our understanding is that a Task Force subgroup was formed to review and compile a list of minimization measures implemented by Federal, State, and County transportation agencies during construction and maintenance of transportation projects to avoid or minimize potentially negative or harmful effects to desert tortoises and their habitat. Consequently, all these measures may or may not be implemented by the transportation agencies, and they may not be effective in minimizing mortality from direct or indirect impacts of road construction, use, and maintenance. This information should be stated in Appendix A as it should be treated as a stand-alone document.

Please add wording that explains the source of these measures, whether some or all of these measures are routinely implemented, and their effectiveness at addressing the direct and indirect sources of tortoise mortality caused by construction, use, and maintenance of roads.

“Entrapment Inspections. Any stored pipes or similar structures with a diameter greater than 3 inches and less than 8 inches aboveground should be inspected by a designated AQB [Authorized Qualified Tortoise Biologist] for desert tortoises before the material is moved, buried, or capped.” We are unsure of the origin of the height limit of 8 inches aboveground. It appears that an assumption was made that a tortoise would not be able to reach the pipe stored 8 inches or more from the ground. We surmise that the type of support for that pipe would play a role in whether it was accessible to a tortoise, as some types of support might facilitate a tortoise climbing up and into the pipe.

We appreciate this opportunity to provide the above comments on this Report and trust they will help future conservation efforts for the tortoise. 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 Document.

Respectfully,



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

Literature Cited

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