

DESERT TORTOISE COUNCIL

4654 East Avenue S #257B
Palmdale, California 93552

www.deserttortoise.org
eac@deserttortoise.org

Via fax only
(775) 289-1910

29 August 2019

Tiera Arbogast
Planning and Environmental Coordinator
Ely District Office
Bureau of Land Management
702 North Industrial Way
Ely, NV 89301

Subject: Comments on Preliminary Environmental Assessment December 2019 Competitive Oil and Gas Lease Sale DOI-BLM-NV-L000-2019-0005-EA August 2019

Dear Ms. Arbogast,

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.

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats occupied by Agassiz's desert tortoise (*Gopherus agassizii*) (synonymous with "Mojave desert tortoise"), our comments pertain to enhancing protection of this species during activities authorized by the Bureau of Land Management (BLM).

Summary of the Proposed Action

In the Preliminary Environmental Assessment (EA), BLM analyzes the impacts of issuing leases on 451 parcels encompassing 777,197 acres located in Lincoln and White Pine counties, Nevada. The purpose of the leases is to explore for fluid minerals (oil and natural gas). The EA contains

the following information regarding the purpose of the Proposed Action:

- “The lessee has the ability to develop the lease by exploring, drilling, and producing all of the oil and gas within the lease boundaries, subject to the stipulations and notices attached to the lease (Title 43 CFR 3101.1–2). Leases are issued for a 10 year period and continue for as long thereafter as oil or gas is produced in paying quantities.”
- “If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, ownership of the lease reverts back to the federal government and the lease can be resold.”
- “The Ely District Office will determine whether or not to recommend leasing all or part of the nominated parcels in the upcoming December 2019 Competitive Oil and Gas Lease Sale to the Nevada BLM Deputy State Director for Minerals Management. The Ely District will also determine which notices and stipulations must be attached to the parcels at the leasing stage in order to help protect resources while allowing for exploration and development of mineral resources. The BLM Deputy State Director of Minerals would make the final decision and sign the Decision Record (DR).”
- “The decision to be made is only to identify which parcels are to be leased and which notices and stipulations must be attached to those parcels. The lease does grant certain rights but it does not authorize any ground disturbance or development of the leased parcels. Any development of the leased parcels would be subject to additional, site-specific NEPA analysis.”
- “The best available science was used by Resource Specialists (hereby referred to as the interdisciplinary team, or ID Team) to analyze the effects to their respective resources as a result of the Proposed Action. Stipulations were applied based on the analysis in the 2007 Ely Proposed Resource Management Plan/Final Environmental Impact Statement (Ely District PRMP/FEIS) and the Ely District RMP.”
- “The Proposed Action is in conformance with the Goals and Objectives of the Ely District Record of Decision and Approved Resource Management Plan (BLM 2008, the Ely District RMP), as amended, which are to: ‘provide for the responsible development of mineral resources to meet local, regional, and national needs, while providing for the protection of other resources and uses.’” BLM notes that other resources include wildlife.

Approximately 14,752 acres of desert tortoise habitat are nominated parcels in Lincoln County, Nevada.

The EA contains a description of the Proposed Action and No Action. No other alternatives are presented.

Using the Best Available Science

In reviewing the EA, we note that it provides little information on the biology/ecology of, threats to, and status and trend of the federally threatened Mojave desert tortoise. In addition, we found few references on the Mojave desert tortoise in the EA or the Ely RMP (BLM 2007, 2008). Those we did find were from 2000 or older. We are concerned that “the best available science” may not have been used to analyze the effects of the Proposed Action on the respective resources that BLM identified in the EA as “present and may be affected,” including special status species and the Mojave desert tortoise. Consequently, we are providing BLM with information/citations

as an enclosure. Our intent is that BLM will use this information as it examines and develops a “fully informed and well-considered decision” by BLM’s Ely District and the Nevada State Offices for any decisions they may make within/near desert tortoise habitat and linkage areas in southern Nevada. In addition, we believe this information supports our recommendations stated later in this letter.

The Council contends that the recent scientific information and analyses on the status and trend of the Mojave desert tortoise shows (1) an ongoing declining population trend throughout most of the range of the tortoise despite implementation of minimization measures to reduce direct impacts, and (2) population densities below the viability threshold for most desert tortoise populations. These facts illustrate that implementation of standard minimization measures for development projects in desert tortoise habitat “to help protect resources” have not been effective in reducing the loss of tortoises/tortoise habitat since the tortoise was listed as threatened under the federal Endangered Species Act (FESA) in 1990. They also indicate that the Mojave desert tortoise meets the definition of endangered under FESA. Thus, more action is needed to halt the decline of tortoise numbers and densities throughout its range and contribute to the recovery of the species.

“The Ely District Resource Management Plan, signed in August 2008, identified areas closed and open to fluid mineral leasing as well as appropriate stipulations to protect resources of concern, and comply with federal law.” The Council contends that much has changed regarding the status of the Mojave desert tortoise since the Ely RMP was signed, and these changes were not considered when BLM identified lands available for leasing of fluid minerals (oil and gas) in this EA. The updated information on the status and trend of the tortoise is included as an enclosure. In addition, there are other recent sources of information on the status, trend, and threats to the Mojave desert tortoise. For example, the U.S. Fish and Wildlife Service has released three updates on the status of the Mojave desert tortoise since the Ely District RMP was signed (please see https://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html) and a Revised Recovery Plan (USFWS 2011). The U.S. Geological Survey has published the Desert Tortoise Annotated Bibliography, 1991–2015 (<https://pubs.usgs.gov/of/2016/1023/ofr20161023.pdf>). The Council has published abstracts of scientific papers on the Mojave desert tortoise and its habitat presented at the annual Desert Tortoise Council Symposiums. These are available at (<https://deserttortoise.org/annual-symposium/symposium-proceedings/>). We request that BLM use the best available science and update the EA and RMP with respect to the status and trend of, threats to, and mitigation for the Mojave desert tortoise. The BLM updated the RMP for the greater sage-grouse a special status species but not listed under the FESA.

Complete the Analysis of Impacts before Issuing Access to Leased Sites: In the EA, BLM provides little description or analysis of environmental effects from the Proposed Action. BLM states for many of the resource issues “there would be no direct effects from issuing new oil and gas leases because leasing does not directly authorize oil and gas exploration and development activities. Direct impacts from these activities would be analyzed under a separate, site-specific NEPA analysis.” We request that indirect and cumulative impacts also be analyzed in this separate, site-specific analysis. When BLM prepares its NEPA documents with site-specific analysis, the Council requests that BLM include the following analyses at a qualitative and quantitative level of the direct, indirect, and cumulative environmental effects to the Mojave

desert tortoise:

- impacts to survival, reproduction, and recruitment of the tortoise at the recovery unit level and rangewide. This would include an analysis of sufficient space or adequate habitat quality to support viable populations within each of the recovery units and provide for movements, dispersal, and gene flow;
- impacts from predation (common raven, coyote, other species), vandalism, collection, road use (authorized and unauthorized) and the “road effect zone,” disease, fire, invasive plant species, forage availability and nutrition, hazardous materials, and other forms of mortality;
- impacts of climate change on the tortoise and how the location, quality, and quantity of its habitat may change in the foreseeable future;
- how the configuration and quality of tortoise habitat under the no action and action alternatives impacts the future survival of the tortoise including tortoise populations and linkage areas; and
- whether these additional effects would result in cumulative effects that rise to the level of significance regarding the survival and recovery of the Mojave desert tortoise (e.g., minimum viable density, etc.).

We encourage BLM’s commitment to use the best available science. This science should be the foundation of the analysis of effects of the Proposed Action and future actions, not just a description of the impacts to the desert tortoise. We request that BLM implement this in a manner that avoids segmentation of the current Proposed Action and future proposed actions.

We request that BLM implement the eight principles of cumulative impacts analysis (CEQ 1997) in its subsequent documents regarding the leasing, exploration, drilling, and production of parcels for fluid mineral development. The CEQ (1997) states “Determining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems, and human communities of concern. The range of actions that must be considered includes not only the project proposal but all connected and similar actions that could contribute to cumulative effects.” The analysis “must describe the response of the resource to this environmental change.” Cumulative impact analysis should “address the sustainability of resources, ecosystems, and human communities.”

CEQ provides eight principles of cumulative impacts analysis (CEQ 1997, Table 1-2). These are as follows and should be addressed in the Final Document

Recommendations for Issuing Oil and Gas Leases in Desert Tortoise Habitats/Linkage Areas

The purposes of the FESA include “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species.” The FESA includes language that “all Federal departments and agencies shall seek to conserve endangered species and threatened Species.”

The status and trend of the Mojave desert tortoise continues to decline (i.e., more than 76 % of the habitat area in the five Recovery Units for the tortoise have populations that are below the viability level; four of five recovery units have 10-year population declines ranging from 26.57%

to 67.26%) (please see Table 1 of the enclosure, Status of the Mojave Desert Tortoise) such that it meets the definition of endangered (a “species which is in danger of extinction throughout all or a significant portion of its range”). Therefore, the Council believes BLM is obligated to implement avoidance and recovery actions rather than the typical minimization actions for direct impacts for proposed actions in desert tortoise habitat to halt the tortoise’s long-term downward trend.

The Council requests that BLM exclude nominated parcels that provide habitat for the desert tortoise or habitat that can be used as linkages between populations in the area of the Proposed Action. If this is not possible, the Council recommends stipulation of no surface occupancy for these parcels. Such a stipulation would remove most of the direct impacts associated with activities typically conducted for oil or gas exploration, development, etc. However, stipulations that, as a minimum, offset indirect impacts should be required. These would likely include the implementation of predation, invasive plant species, road management, and hazardous materials mitigation plans and effectiveness monitoring plans that use the best available science in their design and implementation.

If BLM leases parcels with desert tortoise habitat or linkage areas and does not require a stipulation of no surface occupancy, then BLM would need to require appropriate mitigation, monitoring, and adaptive management plans that fully address and offset the local, regional, and cumulative impacts of the site-specific leasing activity. Such mitigation, monitoring, and adaptive management plans would include (but are not limited to): 1) a fully-developed desert tortoise repatriation plan (and translocation plan if repatriation is not possible); 2) predator management, weed management, fire prevention and response, and hazardous materials management plans; 3) road management plan; 4) compensation plan for the degradation and loss of tortoise habitat and road effect zone (if road management plan is incomplete) that includes protection of the acquired, improved, and restored habitat in perpetuity for the tortoise from future development and human use; 5) a plan to protect tortoise translocation area(s) in perpetuity from future development and human use; and 6) habitat restoration plan when the lease is terminated. These plans would use the best available science in their design and implementation.

Specific Comments:

In section 3.3.13 - **Wastes, Hazardous and Solid**, BLM provides a description of likely oil and gas activities including exploration drilling, extraction, production facilities, pipeline transport, and tanker loading, unloading and transport.” These activities “have the potential to affect the environment through production of waste fluids, emissions and site impacts resulting from field development and related infrastructure. Oil spills, produced waters, drill fluids/cuttings, and hazardous materials could be encountered at a facility or drill pad. In the EA, BLM “predicts that approximately 200 exploration wells would be drilled in the [Ely] District in the next 10 years, of which 40 would continue into development and production phases.” BLM further provides a description of the likely effects of oil and gas activities during exploration, development, production, and final abandonment.

We request that BLM use the information it has provided in this section of the EA and apply it to the sections on soils, vegetation, and wildlife and special status species, including the desert

tortoise. We are confused that BLM states in several Environmental Effects sections for identified resources in the EA that analysis cannot be completed because the lease will not authorize any ground disturbance or development of the leased parcels.

In section 4.2, **Past, Present, and Reasonably Foreseeable Future Actions under Cumulative Impacts**, BLM provides a table that “shows a list of Reasonably Foreseeable Future Actions (RFFA) that have been analyzed for environmental impacts within the project area. Mining, grazing, recreation, realty actions, fuels treatments and oil exploration are being conducted throughout the District. For purposes of this cumulative impacts analysis the project area includes White Pine County. The approximate total ground disturbance of RFFAs is 14,791 acres.”

The Council is confused by this language. It appears as though BLM is limiting its discussion of cumulative impacts for the Proposed Action to White Pine County; however, the Proposed Action includes parcels in White Pine and Lincoln counties. We request BLM clarify this section and expand its analysis of cumulative impacts to include Lincoln County where desert tortoises occur.

In section 4.3.6, **Fish and Wildlife, Special Status Species, Migratory Birds**, of the EA, BLM states “Cumulative impacts to special status species were addressed in the Ely District RMP EIS on pages 4.28-38 – 4.28-43.” We note, the Ely District RMP EIS was signed in August 2008. Please see our comments and concerns in Best Available Science above regarding the changes that have been documented to the Mojave desert tortoise in the Northeastern Mojave Recovery Unit and rangewide for the tortoise, and BLM’s statement that it used the “best available science” in the preparation of this EA.

In Appendix D, **Stipulations and Lease Notices and BLM Nevada Standard Lease Notices**, BLM has a stipulation for “Fire” that says, “In the event your operations should start a fire, you could be held liable for all suppression costs.” We request that the lessee be required to restore all natural resources destroyed because of the fire (e.g., soil crusts and vegetation). If restoration of lost resources is not possible, then the lessee should be required to fully mitigate for the loss (e.g., loss of wildlife). These are public resources held in trust by BLM.

In Appendix E, **Ely District Best Management Practices for Oil & Gas**, under **Special Status Species**, BLM provide a Best Management Practice (BMP) that states, “When managing weeds in areas of special status species, carefully consider the impacts of the treatment on such species. Wherever possible, hand spraying of herbicides is preferred over other methods.” Please note that the use of any herbicide for weed control may not be used until the U.S. Fish and Wildlife Service has completed the section 7 consultation process for the particular herbicide and its effects on a listed species. Although the U.S. EPA has licensed many herbicides (a federal action), for most herbicides it failed to complete section 7 consultation. Therefore, BLM should ensure that section 7 consultation is completed for the Mojave desert tortoise before BLM authorizes its use on BLM lands. This is especially important for the desert tortoise as it is a long-lived species and bioaccumulation is a factor along with the species’ unique physiology.


We note that the biological opinion issued for the Ely RMP (USFWS 2008) states “Site-specific effects of weed management activities would be identified when such actions are proposed and developed by appropriate agencies. At that time, BLM will submit the appropriate documents to the [U.S. Fish and Wildlife] Service to append the action to this biological opinion. Any vegetation and weed treatment in desert tortoise habitat will be conducted only after coordination/consultation with the Service.” In addition, we found no analysis of the effects to the Mojave desert tortoise from exposure to (e.g., contact, ingestion. etc.) of specific herbicides or herbicides in general in the biological opinion.

To assist BLM in its issuance of BMPs appropriate for the Mojave desert tortoise, we direct BLM to the Council’s documents on Construction BMPs and Habitat Restoration BMPs (<https://deserttortoise.org/library/plans-bmps/>). These documents should be incorporated into the Stipulations and Lease Notices if BLM decides to allow surface disturbance in or near desert tortoise habitat/linkage habitat for the nominated parcels in Lincoln County, Nevada.

In summary, because of the density levels of most tortoise populations below viability, the decades-long decline in tortoise numbers rangewide, and because the Mojave desert tortoise meets the definition of endangered, the Council recommends BLM not lease the nominated parcels that contain tortoise habitat or habitat that can be used a linkages between populations.

We appreciate this opportunity to provide input and trust that our comments will further protect tortoises, aid BLM in its efforts to comply with NEPA and other federal regulations, and assist BLM in its management of the Mojave desert tortoise and its habitat to contribute to its recovery. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other BLM projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this Proposed Action, related proposed actions, or the entire proposed project is provided to us at the contact information listed above in a timely manner.

Regards,



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

Enclosure

Literature Cited

Bureau of Land Management (BLM). 2007. Ely Proposed Resource Management Plan/Final Environmental Impact Statement for the Ely District. U.S. Department of the Interior, Bureau of Land Management, Ely Field Office, Ely, Nevada. November 2007.

Bureau of Land Management. (BLM). 2008. Ely District Record of Decision and Approved Resource Management Plan. U.S. Department of the Interior, Bureau of Land Management, Ely Field Office, Ely, Nevada. August 2008.

Council on Environmental Quality. 1997. Considering Cumulative Effects Under the National Environmental Policy Act. https://ceq.doe.gov/publications/cumulative_effects.html

U.S. Fish and Wildlife Service (USFWS). 2008. Programmatic biological opinion, informal consultation, and technical assistance for implementation of actions proposed in the Ely Proposed Resource Management Plan, Lincoln, White Pine, and portions of Nye County, Nevada. July 10, 2008. Nevada Fish and Wildlife Office, Reno, Nevada. 84320-2008-F-0078.

Status of Mojave Desert Tortoise

The Mojave desert tortoise was listed as threatened under the federal Endangered Species Act 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 (see Table 1).

Allison and McLuckie's (2018) analyses provide the first estimates of regional and range-wide population trends for the Mojave desert tortoise in the scientific literature. A summary of the trend data is provided in the table below.

Densities of Adult Mojave Desert Tortoises: A few years after listing the Mojave desert tortoise under the federal Endangered Species Act (FESA), the USFWS published a Recovery Plan for the Mojave desert tortoise (USFWS 1994a). It contained a detailed population viability analysis. In this analysis, the minimum viable density of a Mojave desert tortoise population is 10 adult tortoises per mile² (3.9 adult tortoises per km²). This assumed a male-female ratio of 1:1 (USFWS 1994a, page C25) and certain areas of habitat with most of these areas geographically linked by adjacent borders or corridors of suitable tortoise habitat. Populations of Mojave desert tortoises with densities below this amount 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 genetic, behavioral, and morphological diversity necessary for the recovery of the entire listed species (Allison and McLuckie 2018).

Rangewide, 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 tortoise 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 a density that is less than 3.9 adult tortoises per km² (USFWS 2015). Of the two populations of Mojave desert tortoises that are near the Proposed Action, the Beaver Dam Slope and Mormon Mesa populations are above the minimum viable density (Allison and McLuckie 2018), but they only comprise 6.2% of the total habitat area in the Recovery Units. While the data analyses indicate that these populations are increasing, tortoises cannot afford additional impacts that would slow or reverse this trend (Allison and McLuckie 2018).

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA) for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise). The table includes the area of each Recovery Unit and Critical Habitat Unit (CHU)/Tortoise Conservation Area (TCA), percent of total habitat for each Recovery Unit and Critical Habitat Unit/Tortoise Conservation Areas, density (number of breeding adults/km² and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 breeding individuals/km² (10 breeding individuals per mi²) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red (from Allison and McLuckie 2018 and 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 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 densities through 2014 have left the Western Mojave adult numbers at 49% (a 51% decline) and in the Eastern Mojave 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 were 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 Western and Eastern Mojave recovery units the proportion of juveniles in 2014 declined to 91% (a 9 % decline) and 77% (a 23% decline) of their representation in 2004, respectively (Allison and McLuckie 2018).

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 tortoises in each recovery unit (Table 2). They noted that these estimates in abundance are likely higher than actual numbers of tortoises and the changes in abundance (i.e., decrease in numbers) are likely lower than actual numbers because of their habitat calculation method. They used area estimates that removed only impervious surfaces created by development as cities in the desert expanded. They did not consider degradation and loss of habitat from other sources, such as the recent expansion of military operations (753.4 km² so far on Fort Irwin and the Marine Corps Air Ground Combat Center), intense or large scale fires (e.g., 576.2 km² of critical habitat that burned in 2005), development of utility-scale solar facilities (so far 194 km² have been permitted) (USFWS 2016), or other sources of degradation or loss of habitat (e.g., recreation, mining, grazing, infrastructure, etc.). Thus, the declines in abundance of Mojave desert tortoise are likely greater than those reported in Table 2.

Table 2. 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 distance; Murphy et al. 2007; Hagerty and Tracy 2010). 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 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. 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 be protected 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.

Definition of an Endangered Species: Agassiz's 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 Agassiz's desert tortoise to be Critically Endangered (Turtle Conservation Coalition 2018).

The IUCN places a taxon in the Critically Endangered category when the best available evidence indicates that it meets one or more of the criteria for Critically Endangered. These criteria are: 1) population decline - a substantial (>80 percent) reduction in population size in the last 10 years; 2) geographic decline - a substantial reduction in extent of occurrence, area of occupancy, area/extent, or quality of habitat, and severe fragmentation of occurrences; 3) small population size with continued declines; 4) very small population size; and 5) analysis showing the probability of extinction in the wild is at least 50 percent within 10 years or three generations.

In the FESA, Congress defined an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range..." Given the information above under the Status of the Mojave Desert Tortoise and the definition of an endangered species, the Council believes the status of the Mojave desert tortoise is that of an endangered species.

Literature Cited

- Allison, L.J.. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433–452.
- 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.
- Fahrig, L. 2007. Non-optimal animal movement in human-altered landscapes. *Functional Ecology* 21:1003–1015.
- Hagerty, B.E., and C.R. Tracy. 2010. Defining population structure for the Mojave Desert Tortoise. *Conservation Genetics* 11:1795–1807.
- 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.
- 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
- U.S. Fish and Wildlife Service (USFWS). 1994a. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Region 1, Portland, Oregon. 73 pages plus appendices.
- U.S. Fish and Wildlife Service (USFWS). 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.
- U.S. Fish and Wildlife Service (USFWS). 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.
- U.S. Fish and Wildlife Service (USFWS). 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.