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Via email only

November 3, 2026

Attention: Nancy Favour, Paul Misiaszek
Bureau of Land Management, Kingman Field Office
2755 Mission Blvd, Kingman, AZ 86401
nfavour@blm.gov, pmisiasz@blm.gov

RE: Antler Copper Mine and Powerline Project Environmental Assessment (DOI-BLM-AZ-C010-2025-0020-EA)

Dear Ms. Favour, Mr. Misiaszek,

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

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

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats potentially occupied by the Sonoran desert tortoise (synonymous with Morafka's desert tortoise) (*Gopherus morafkai*), our comments include recommendations intended to enhance protection of this species and its habitat during activities that may be authorized by the Bureau of Land Management (BLM), which we recommend be added to project terms and conditions in the authorizing documents [e.g., issuance of right-of-way (ROW) grants, management plan and decision document, etc.] as appropriate. Please accept, carefully review, and include in the relevant project file the Council's following comments for the Proposed Action.

The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers the Sonoran desert tortoise, located in Arizona and Sonora, Mexico, to be Vulnerable at this time, but nearly qualifies as Endangered (Averill-Murray et al. 2023). "Steep declines of approximately 54% have occurred in recent years in several formally monitored local subpopulations in Arizona." "Despite evidence that several subpopulations have stabilized or increased, survival rates are predicted to decline with future drought conditions, which are expected to intensify with global climate change." In Mexico, "patterns of rainfall and drought across Sonora mirror those in Arizona and suggest that Sonoran subpopulations likely increased and decreased similarly over time." According to the IUCN, this designation of Vulnerable means that the species is "considered to be facing a high rate of extinction in the wild" and is one step below endangered.

The IUCN identified several threats to the survival of the Sonoran desert tortoise including residential, commercial, and industrial development; ranching and farming; roads and railroads; hunting and trapping; recreational activities; wildfires and fire suppression activities; invasive non-native plant species; and drought/temperature extremes from climate change. The proposed project directly deals with management of non-native feral burros and indirectly affects wildlife, invasive non-native plant species, and drought/temperature extremes from climate change.

Although we understand that the 516 DM 1 – U.S. Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures (NEPA Handbook), revised February 2026, no longer requires the BLM to contact the public for opportunities to comment on environmental projects, we believe that the Council has a separate agreement and understanding with Arizona offices of the BLM, dated November 12, 2019 (Desert Tortoise Council 2019).

The NEPA Handbook, page 29, states, "NEPA does not require public involvement when a bureau prepares an EA. Therefore, the Responsible Official has discretion to determine whether to involve the public, when to involve the public, and what kind of public involvement is most appropriate when the bureau is preparing an EA to support decision-making on a proposed action and anticipates reaching a Finding of No Significant Impact (FONSI)." We believe that our long-standing relationship and multiple requests of the BLM to identify the Council as an Affected Interest qualifies us to receive notices like the one for the Antler Copper Mine, which was provided by a third party, not the BLM, on October 22, 2026.

We note, too, that the Council was not contacted during the scoping period June 9, 2025 through July 8, 2025, even though that date was before the revised NEPA Handbook made it optional to involved Affected Interests. We did provide scoping comments on proposed exploration, dated August 10, 2022 (Desert Tortoise Council 2022), which are incorporated by reference and provided in the Literature Cited section. On page 8 of our scoping comments, the Council specifically asked BLM to contact us when the draft environmental assessment was available for the mine, which it did not do.

Unless otherwise noted, the page numbers referenced herein are from the Antler Copper Mine and Powerline Project Environmental Assessment (DOI-BLM-AZ-C010-2025-0020-EA), herein "Project" and "Draft EA," dated October 2026.

The Project background on page 3 indicates, “In January 2025, Antler Operations Inc. (Antler), an Arizona corporation, submitted a Mine Plan of Operations (MPO) for the Antler Mine (Antler 2025a) to the Bureau of Land Management (BLM) Kingman Field Office (KFO) proposing to construct, operate, reclaim, and close an underground polymetallic (copper and zinc) mining operation on public land in Mohave County, Arizona. The proposed Antler Mine is anticipated to have 18 months of construction, 15 years of mining, and three years of reclamation for a total of approximately 20 years (mine operations).” An associated 69-kilovolt (kV) powerline to be operated under a 30-year right-of-way (ROW) grant is part of the Project.

The Project/Proposed Action on page 8 states, “For purposes of analysis, the MPO [Mine Plan of Operations] boundary encompasses approximately 1,293 acres, including 375 acres of public land and 918 acres of adjacent private and patented land (Antler 2025a [see Draft EA for cited reference]). The proposed powerline ROW would occupy approximately 23 acres of public land as well as adjacent private land. The Antler Mine would have a total of approximately 252 acres of disturbance: 41 acres on public land and 212 acres on private land. Of the 252 acres, 10 acres would be short-term disturbance and would be reclaimed after construction. The improvements to the Boriana Mine Road would be permanent. The remaining surface disturbance would be long-term and reclaimed at the end of mining. The powerline would have a total of approximately seven acres of disturbance: three acres on public land and four acres on private land. Of the approximately seven acres of disturbance, most would be short-term disturbance reclaimed post-construction with less than one acre of long-term disturbance where the poles would be constructed. Less than one acre of the powerline disturbance would remain for the term of the ROW.”

Page 24 states, “Both white-margined penstemon and Sonoran desert tortoise could [be] present throughout the duration of the Proposed Action and surface disturbance could generate dust and debris that might adversely affect the white-margined penstemon and Sonoran desert tortoises near Boriana Mine Road and the haul road. Areas within the ACEC and Sonoran desert tortoise habitat would be disturbed during the construction of the powerline. New surface disturbance along the edge of the Boriana Mine Road for the proposed powerline would consist of three acres of public land.” Page 25 indicates, “One potential tortoise shelter was identified on private land near the water supply well and water line.” Page 66 states, “Sonoran desert tortoise scat and a single suitable caliche cave burrow were detected in the analysis area; there are occurrence records within three miles of the analysis area.”

We remind BLM of its mandate under the Federal Land Policy and Management Act (FLPMA). BLM tends to focus on the “multiple use” mandate in FLPMA and sometimes forgets that Congress also directed BLM in FLPMA to manage the public lands for sustained yield of resources and environmental quality. Under FLPMA, Congress directed that “the public lands be managed in a manner that . . . will provide food and habitat for fish and wildlife.” Congress defined the principle or major uses of public lands “as limited to domestic livestock grazing, fish and wildlife development and utilization, mineral exploration and production, rights-of-way, outdoor recreation, and timber production.” In addition, FLPMA requires BLM “take any action necessary to prevent unnecessary or undue degradation of the lands.”

In the Final EA, BLM should demonstrate how the actions required of Antler, including actions for reclamation of public lands adversely affected by short-term and long-term disturbance, would comply with all these mandates including unnecessary and undue degradation of the lands. We are concerned that a 3-year reclamation period is substantially inadequate to return the public lands to their pre-project condition. Returning the mining area to pre-project conditions would be an action "to prevent unnecessary or undue degradation of the lands."

To comply with FLPMA, BLM should require Antler to meet the 100% designation for restoration. To determine when this level of restoration effort has been achieved, BLM should require Antler to collect data and photograph existing soil and vegetation conditions at the mining area. Preventing unnecessary and undue degradation of the lands should apply to the percent set for non-native plant species cover, density, distribution, and abundance. For example, for revegetated sites the goal should be less than 5 percent non-native annual plants for vegetated cover.

In addition to FLPMA, BLM is also directed under other authorities, such as Executive Order 13112 on Invasive Plant Species to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species. Antler should be required to develop a Habitat Restoration Plan that explains how the methods it proposes to use and the identified success criteria would comply with these directives.

BLM has identified a three-year reclamation period for the proposed Project. However, the time and actions needed to effectively restore soils and vegetation in the Mojave Desert take much longer. After severe disturbance, desert soils require long periods to recover naturally (Chiquoine et al. 2016). For example, for biological soil crusts, Belnap (2001) reported recovery rates ranging from 14 to 50 years depending on the species comprising the soil crust. Chiquoine et al. (2016) reported that for soil crusts composed of lichens or mosses, recovery time is several decades to centuries depending on the availability of the propagules. Consequently, without assistance to facilitate natural restoration of biological soil crusts, successful restoration will take much longer than the typical five years of monitoring that the BLM's habitat management plans typically require. Establishment of arbuscular mycorrhizal fungi (AMF) likely takes many years.

For restoration of native perennial vegetation, Abella (2010) reported recovery of vegetation lost from surface disturbance would take 200 years, and disturbances can leave scars in the desert visible for multiple human generations (equivalent to tortoise generations). We expect that this time would be reduced if Antler implemented effect actions to assist the soils and vegetation restoration process. However, the monitoring times that BLM typically requires are inadequate. For past projects they have been unsupported by references from the scientific literature. When developing the Habitat Restoration Plans for the proposed Project, please provide documentation from the scientific literature that these reclamation times including monitoring times are sufficient to ensure that the physical, chemical, and biological components of soils and native plants species cover, density, and composition are restored to pre-Project conditions.

In addition, please ensure that the Habitat Restoration Plan uses the latest methods for re-inoculation of soils and replanting including necessary soil conditions and components and realistic monitoring periods.

For recent BLM projects that result in surface disturbance, BLM has required revegetation efforts and has ignored the relationship between AMF, soil crusts, and native desert plant species to achieve successful plant restoration results. In addition, for other projects in the Mojave Desert, BLM has allowed applicants to reseed areas as the primary revegetation effort for native perennial species. While reseeding can cover a larger area than using containerized plants, it has a low success rate. This statement is supported by data that BLM provided on the low density and species richness (diversity) of native perennial plants that are expected after 5 and 10 years of reclamation activities using seeding and transplanting cacti and succulents (BLM 2025).

To improve the success of revegetation efforts, we recommend using the latest information from the scientific literature regarding methods to restore soil crusts (e.g., Chiquoine et al. 2016) and AMF (Titus et al. 2002, Clark et al. 2009, Hernandez et al. 2023, Chavez-Gonzalez 2024), seed banks (DeFalco et al. 2012, Lee et al. 2024), and seeding and outplantings (Abella et al. 2012, Abella and Berry 2016, Abella et al. 2023). For example, Abella and Berry (2016) reported that "because of cost and logistical challenges, outplanting (planting nursery-grown perennials) can be criticized for being unable to cover as much area as seeding. However, no matter how large an area is seeded, the area revegetated is still zero if no seeded species become established, a situation not uncommon." They identified outplanting as the preferred method for success and three main best practices that are well supported in the scientific literature for increasing success of outplanting: carefully select species, use good planting stock, and perform effective plant care.

DeFalco et al. (2012) reported on why supplementing impoverished seed banks and improving the seedbed (i.e., seeding) frequently fail as revegetation efforts.

Chiquoine et al. (2016) reported that soil crusts are significant in contributing to soil surface stability (Belnap and Gillette 1998, Chaudhary et al. 2009), carbon cycling and sequestration (Elbert et al. 2012, Cantón et al. 2014), nitrogen cycling (Belnap 2002, Castillo-Monroy et al. 2010), surface hydrology (Warren 2003, Belnap 2006), ecosystem resilience (Kuske et al. 2012), and ecological restoration (Bowker 2007).

Hernandez et al. (2023) reported that some Mojave-native perennial and annual plant species have been identified to form relationships with important soil biota, such as AMF. Ecological restoration may be facilitated by utilizing cost-effective inoculants of indigenous soil biota and evaluating not only above ground factors, but potential interactions in the rhizosphere of the soil. Soil crusts and AMF should be restored/inoculated before revegetating areas in the Mojave Desert with native perennial species using outplantings rather than reseeding Thus, there is a symbiotic relationship between the biota in desert soils and vegetation that promotes the survival and growth of native vegetation. If BLM desires to have a high degree of success in rehabilitating the Project site, accelerate the natural revegetation process, and demonstrate that it is taking "any action necessary to prevent unnecessary or undue degradation of the lands" as mandated by FLPMA, BLM should require that soil crusts and AMF be inoculated and restored before revegetating areas in the Mojave Desert with native perennial species using outplantings rather than reseeding. Additionally, BLM should use the results of research conducted on revegetating native vegetation in the Mojave Desert in requiring implementation of methods with the highest success rate.

BLM should ensure that Antler posts a sufficient bond for all mitigation and actions necessary to ensure there is no unnecessary and undue degradation of public lands. This bond should cover all activities to be implemented for all phases of the proposed Project including mitigation and restoration to pre-project conditions. BLM should annually review the amount of the bond and require Antler to increase it when the cost for implementing the activities increases from the previous year. Posting a sufficient bond is crucial to ensure compliance with FLPMA and 43 Code of Federal Regulations (CFR) 2805.20. In the Final EA, please describe how BLM would comply with FLPMA and 43 CFR 2805.20 for the proposed Project including science-based reclamation of the Project area.

Page 69 states, "Antler would conduct annual Worker Environmental Awareness Program [WEAP] training for mine employees and contractors on the environmental protection measures and handling procedures for Sonoran desert tortoise." We recommend that this requirement be augmented to say that any new personnel working at the site be given the WEAP training at the beginning of their employment so that they are aware of protective measures that otherwise may not be communicated until the annual program is administered. This recommendation is consistent with WL-3 in Appendix G. All workers should sign a document indicating that the dates they completed the annual WEAP training and initial training as a new employee. These documents should be kept by Antler Operations Inc. for the duration of the mining and restoration activities.

Unfortunately, there are no page numbers associated with Appendix G, which should be rectified in the Final EA. So, we are necessarily referring to the alpha-numeric numbering system assigned to each protective measure, where the measure is italicized followed by our comments:

Improvements to the Boriana Mine Road Would Be Permanent.
Construction of new roads or improvement of existing roads causes a "road effect zone." Vehicles that travel roads used to transport and process materials at the mine site have a road effect zone. The adverse effects to the tortoise from the road effect zone include increased mortality from vehicle collisions; loss, fragmentation, and degradation of habitat; collection; vandalism; increased predation; and modification of tortoise behavior. The road effect zone extends beyond the footprint of the road. Field studies (LaRue 1992; Nafus et al. 2013; von Seckendorff Hoff and Marlow 2002) have shown impact zones from road use eliminate or substantially reduce tortoise numbers along/near roadways. Von Seckendorff Hoff and Marlow (2002) reported a linear relationship between traffic level on roads and tortoise reduction. For two graded, unpaved roads, with low traffic volume, the reduction in tortoises and sign was evident 1.1 to 1.4 km (3,620 to 4,608 feet = 0.68 to 0.87 mile) from the road (von Seckendorff Hoff and Marlow 2002). These impacts are attributed to roadkill with roads acting as population sinks for tortoises. This means that take is ongoing. Thus, wherever roads occur within or outside the mine site associated with the proposed Project including new haul roads or improved roads, there would be ongoing take of tortoises extending more than 0.5 mile from each side of the road. The aerial extent of this ongoing take should be mitigated to comply with the Candidate Conservation Agreement for the Sonoran Desert Tortoise (USFWS et al. 2015).

Adverse impacts to tortoise habitat include loss of habitat through removal of native vegetation, destruction of seed banks of native plants through burial or removal, soil compaction that inhibits the establishment of new plants, unintentional ongoing transport and/or spread of non-native seeds along the road, and nitrogen deposition from vehicle exhaust that encourages the growth of non-native invasive plant species (Rao et al. 2009, Allen et al. 2009, etc.). For example, non-native plant species cover and richness are greater closer to roads (Boarman and Sazaki 2006), cheatgrass invades along two-track vehicle routes and, to an even greater extent, along the edges of improved and paved roadways (Gelbard and Belnap 2003). Surface disturbances and fire lead to increased soil mineralization, which accelerates cheatgrass invasion (Young and Allen 1997) and other non-native plant species.

Roads and their use adversely affect tortoise behavior, including an increase in energy expenditure. a change in behavior by tortoises that affects energy expenditure. Harju et al. (2024) reported that when females were nearer to a highway, they were more likely to switch to and stay within a more energy demanding movement state. Further, when in this state, they moved even greater distances than when in the traveling state and far from the roadway.

Other research that tracked free-moving Mojave desert tortoise behavior found that tortoises would avoid roads or altered movement near roads (Hromada et al. 2020, Hromada et al. 2023, Peaden et al. 2017). Harju et al. (2024) reported that the negative effect of the roadway on female movement "can reduce connectivity by expanding the road effect, depressing local populations and thus functioning as a wider fragmentation barrier."

BLM should include an analysis of all effects to the tortoise from the improvements to this road and require Antler to mitigate these adverse effects to the tortoise to reduce mortality and provide habitat connectivity as directed under BLM's Special Status Species Management Handbook and Policy (BLM 2024) and BLM's commitment in the Candidate Conservation Agreement for the Sonoran Desert Tortoise (USFWS et al. 2015).

General Protection Measures

G-2: Speed limits would be posted at 20 miles per hour (mph) on haul roads and access roads. We noted in our scoping comments (Desert Tortoise Council 2022) that a 10 mph speed limit was identified for exploratory activities and would be appropriate to minimize the risk of crushing tortoises crossing the road. We recommend that this earlier standard be adopted for the actual mine and that a 10 mph speed limit be established wherever a tortoise may be encountered. The following sentence in G-2 should be modified as indicated in bold font: "Speed limits would be lowered in certain sections of the access road to improve safety, based on curve radius, slope, or other design factors **and where crushing tortoises may be an issue**." This is consistent with the statement, "Other sections of the access road may also have reduced speeds due to regulations such as wildlife protection," i.e., desert tortoise crossings.

Additionally, tortoise crossing road signs should be installed to help alert drivers and minimize the risk of crushing tortoises. All speed limits should be enforced.

Wildlife (WL) including Migratory Birds (B), Golden Eagle (GL), Monarch Butterfly (Monarch), and Sonoran Desert Tortoise (SDT)

WL-2: All trash would be placed in covered containers to prevent wildlife from getting into trash receptacles and to avoid trash from being wind-blown into surrounding areas. Please amend this measure to commit the proponent to remove refuse on a regular basis, preferably daily, and hauled to a designated and approved sanitary landfill or transfer station operated or authorized by Mohave County.

WL-4: Antler would install wildlife-friendly fencing that also meets the tortoise-exclusion standards on the lower 12–18 inches of fencing for site security and to prevent wildlife mortality around the MPO boundary which includes both private and public lands. Please reference the "tortoise-exclusion standards" as U.S. Fish and Wildlife Service (2009), so the proponent has the latest acceptable fence configurations. Please clarify in the Final EA, including a diagram, the extent of this fencing. Would this be a complete, impermeable perimeter fence surrounding the entire mine site with tortoise-proof gates? The Draft EA fails to describe the full extent of this fencing, which should be rectified in the Final EA.

SDT-4: Antler would relocate SDT that occur within disturbance areas during construction and operations. During relocation, if an SDT voids, handlers would provide a tray of water to see if the SDT would hydrate before leaving the SDT. We reiterate herein what we recommended in 2022 (Desert Tortoise Council 2022, page 4): "When tortoises are moved, there appears to be no requirement to monitor the tortoise for a time to ensure that its behavior following relocation returns to normal. So, it is appropriate to add wording in the Final EA that ensures monitoring of displaced tortoises until which time the experienced biologist determines the tortoise is out of harm's way and able to find refuge in an existing or artificial burrow."

The "success" of relocation depends on a myriad of factors including the absence of drought, the distance tortoises are moved (Mack and Berry 2023), effective management of the lands receiving tortoises to eliminate human-caused threats (Berry et al. 2014, Hromada et al. 2023), the time of year tortoises are moved (Mack and Berry 2023), and their physiological/hydration state (Field et al. 2018, USFWS 2019).

In reviewing the Draft EA, there appear to be no requirements to first assess environmental conditions and the physiological conditions of the tortoise and management of the lands where tortoise would be released before releasing a tortoise. For example, if the ambient temperature is too warm when a tortoise is relocated it is likely to not survive. Tortoises may overheat or exhibit signs of overheating (*e.g.*, gaping, foaming at the mouth, etc.), or may be placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being (USFWS 2019). Walde et al. (2003) observed that Mojave desert tortoises retreated into burrows when the air temperature reached 91.0 °F ± 3.5 °F (32.7 °C ± 1.2 degrees) and ground temperatures reached 95 °F ± 6 °F (35 °C ± 2.4 degrees). Tortoises should be relocated when ambient temperatures are below 95 °F (35 °C) and not anticipated to rise above 95 °F (35 °C) before handling and processing (i.e., relocating) desert tortoises are completed (USFWS 2009). USFWS (2009) requires that for Mojave desert tortoises, ambient air temperature is measured in the shade, protected from wind, at a height of 2 inches (5 centimeters) above the ground surface. If the ambient temperature is above 95 °F (35 °C) and the tortoise must be moved from harm's way, the tortoise should not be relocated.

Instead, place the desert tortoise in a clean, unused cardboard box or disinfected open plastic container, and keep it in a climate-controlled environment (e.g., air conditioned vehicle or building) until the ambient air and ground temperatures are below the upper limits (USFWS 2009). We recommend that these procedures that were developed based on the best available data be applied for the Sonoran desert tortoise.

Tortoises stored wastes in, and apparently reabsorbed water from, their large urinary bladders (Peterson 1996b). Thus, a tortoise uses its bladder as a "canteen" to help sustain itself through the dry season of the year. If a tortoise voids its bladder during handling or relocation, its probability of surviving the relocation is reduced. Peterson (1996a) reported the reliance of tortoises on drinking rainwater (which can be stored in the bladder to later hydrate dry forage). When a tortoise drinks water, this action allows a tortoise to dump potassium-rich urates and urine from its bladder, reduce circulating potassium levels, and refill its bladder with dilute, hypoosmotic urine. Such rehydrated tortoises are able to eat senescent grasses, deposit body fat, and are better prepared to withstand subsequent droughts (Oftedal 2002).

Regarding drought, in several translocation studies for Mojave desert tortoise, researchers reported that when translocated tortoises were released under drought conditions their survival was lower than under conditions with average or above average precipitation. Thus, moving tortoises under drought conditions could increase mortality (Field et al. 2007, Esque et al. 2010, Zylstra et al. 2013, Lovich et al. 2014, Dickson et al. 2019). In addition, to increase the survival of translocated tortoises, all tortoises should be hydrated before releasing them (Dickson et al. 2019, Field et al. 2007).

Applying this information to BLM's relocation of tortoises for the Proposed Action, we recommend that tortoises should not be relocated during drought conditions and when moved, should be hydrated prior to their release to increase their likelihood of survival. Because there are numerous environmental, physiological, and land management factors that affect the success of relocating tortoises, BLM should establish requirements under which relocation of tortoises may occur.

SDT-8: Antler would coordinate with BLM and conduct annual Worker Environmental Awareness Program (WEAP) training for mine and UNSE employees and contractors on the mitigation measures and handling procedures for SDT. We recommend that this measure be modified to be consistent with WL-3, which reads: "*New hire and annual refresher training for all mine and UNSE employees and contractors would include wildlife protection training (Wildlife Environmental Awareness Program [WEAP]) that specifically addresses the commitment of Antler to implement the protection program and the need for all employees to avoid disturbance of wildlife. Workers would be trained to be aware of special-status species that have the potential to occur in the area. The training would include an emphasis on Sonoran desert tortoise, white-margined penstemon, and breeding migratory birds*."

SDT-11: All tortoises found on the ground surface within the construction area would be moved by a qualified biologist a minimum of 500 feet (but no more than 0.5 mile away from their original location) from the outside edge of disturbance areas and placed in a shaded location. We assume that the tortoise would be placed outside the perimeter fence described in Measure WL-4. If so, please clarify that here for SDT-11.

SDT-12: For construction activities during the SDT active period (February 15 to November 15), a walking clearance of working areas (around equipment, within trenches, etc.) would be performed every morning to check for SDT. Although most tortoise activity may occur between February 15 and November 15, this measure does not acknowledge that tortoises (particularly juveniles and hatchlings) may be active throughout the year. We have observed tortoises aboveground during warmer temperatures, particularly during precipitation events, throughout the year. Desert tortoises, particularly small ones, have been observed to be active aboveground every month of the year. However, the preferred daytime body temperature of desert tortoises is 69 °F to 101 °F (20.5 °C to 38 °C) (McGinnis and Voigt 1971). The critical maximum body temperature is between 103 °F and 112 °F (39 °C to 44 °C) (Brattstrom 1965, Naegle 1976). Berry and Turner (1984) found that juvenile desert tortoises preferred air temperatures of 63 °F to 66 °F (17 °C to 19 °C) during March, and 77 °F to 83 °F (25 °C to 28 °C) during June. Therefore, we recommend that the measure be modified and applied throughout the year, not just between February 15 and November 15.

SDT-13: Antler has established a speed limit of 20 mph within the MSHA-controlled mine facility and along roads used for exploration. Should an SDT be encountered on roadways, traffic would stop until the SDT has moved on its own and is no longer on the road surface. As given above and to be consistent with BLM direction given for exploratory activities (Desert Tortoise Council 2022), we recommend that a 10 mph speed limit be posted in all areas where tortoises are likely to occur, that the speed limit be enforced, and that tortoise crossing signs be posted when and where tortoises are observed crossing roads.

SDT-14: Antler would follow good housekeeping practices and install trash cans that have self-securing lids to minimize the attraction of SDT predators, such as ravens. As mentioned above, the BLM should require that refuse be removed at regular intervals, preferably on a daily basis.

We recommend that a new protective measure be added: SDT-19: All mine-related personnel shall check beneath all motorized vehicles (e.g., passenger vehicles, heavy equipment, etc.) for tortoises before moving the vehicle. If a tortoise is observed, the vehicle will not be moved until the animal has left on its own accord or a qualified biological monitor is enlisted to safely relocate the animal.

Finally, we request that BLM require the proponent to implement all pertinent requirements and recommendations identified in the following documents and agreements:

- Arizona Game and Fish Department. 2010. Desert Tortoise Survey Guidelines for Environmental Consultants.
- Arizona Game and Fish Department. 2014. Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects.
- Arizona Interagency Desert Tortoise Team. 2008. Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat. June 2008.
- U. S. Fish and Wildlife Service and Cooperating Agencies Comprising the Arizona Interagency Desert Tortoise Team. 2015. Candidate Conservation Agreement for the Sonoran Desert Tortoise (*Gopherus morafkai*) in Arizona. Phoenix AZ.
- Bureau of Land Management. 2015. Advancing Science in the BLM: An Implementation Strategy IB 2015-040.
- Bureau of Land Management. 2024. Special Status Species Management. Handbook 6840. September 9, 2024.

For example, in BLM's Information Bulletin on Advancing Science, "BLM entrusts its resource specialists to keep abreast of how scientific understanding is evolving in their respective disciplines and to incorporate science into their work." "BLM should continue efforts to advance a culture that makes it a priority for employees to remain current on the most up-to-date science and the latest research of their peers and deliberately obtain and apply relevant science to all programs and projects. Managers and staff should have the tools and data necessary to apply the best available science in decisionmaking and adaptive management." The Council requests that BLM demonstrate their implementation of "Advancing Science in the BLM: An Implementation Strategy" in the Final EA with respect to the analysis of all effects on the tortoise and its habitat, and identification of effective mitigation, science-based monitoring, and adaptive management to offset these impacts.

BLM's Special Status Species Management Handbook establishes an agency-wide emphasis on proactive, landscape- and ecosystem-level, scientifically informed conservation and recovery of special status species and their habitats that is scientifically informed. It directs BLM to:

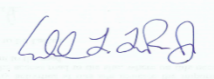
- promote healthy species populations and biodiversity through landscape- and ecosystem-level management; and
- use science and adaptive management to advance conservation and recovery.

The Sonoran desert tortoise is a special status species. In the Final EA, BLM should describe the actions it is requiring Antler to implement during the construction, operation, and reclamation of the Proposed Action with respect to the tortoise and its habitat that demonstrate compliance with this policy. We request that BLM describe the proactive conservation efforts it is requiring of Antler to contribute to the recovery of the tortoise, in addition to the mitigation BLM is requiring to replace the loss and degradation of tortoise habitat, including the temporal loss of habitat, demonstrate how it is promoting healthy populations of tortoises.

We appreciate this opportunity to provide the above comments and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the Council wants to be identified as an Affected Interest for this and all other projects funded, authorized, or carried out by the BLM that may affect desert tortoises, and that any subsequent environmental documentation for this project is provided to us at the contact information listed above. Additionally, we ask that you notify the Council at eac@deserttortoise.org of any proposed projects that BLM may authorize, fund, or carry out so we may comment on them to ensure the BLM fully considers and implements actions to conserve these tortoises as part of its directive to conserve biodiversity on lands managed by that agency.

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

Respectfully,



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Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

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Literature Cited

[AZGFD] Arizona Game and Fish Department. 2010. Desert Tortoise Survey Guidelines for Environmental Consultants, June 2010. https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/2010SurveyguidelinesForConsultants.pdf

Arizona Game and Fish Department. 2014. Guidelines for handling Sonoran desert tortoises encountered on development projects. Arizona Game and Fish Department, Revised September 22, 2014. https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/2014%20Tortoise%20handling%20guidelines.pdf.

Arizona Interagency Desert Tortoise Team. 2008. Recommended standard mitigation measures for projects in Sonoran desert tortoise habitat. June 2008. https://s3.amazonaws.com/azgfd-portal-wordpress/PortalImages/files/wildlife/MitigationMeasures.pdf.

Abella, S.R. 2010. Disturbance and plant succession in the Mojave and Sonoran Deserts of the American Southwest. International Journal of Environmental Research and Public Health 7.4 (2010): 1248-1284. https://www.mdpi.com/1660-4601/7/4/1248

Abella S.R. and K.H. Berry. 2016. Enhancing and restoring habitat for the desert tortoise (*Gopherus agassizii*). Journal of Fish and Wildlife Management 7(1):255–279. https://doi.org/10.3996/052015-JFWM-046.

Abella, S.R., K.H. Berry, and S. Ferrazzano. 2023. Techniques for restoring damaged Mojave and western Sonoran habitats, including those for threatened desert tortoises and Joshua trees. Desert Plants 38:4-52. https://deserttortoise.org/wp-content/uploads/Abella-et-al-2023-Restoration-in-the-Mojave-Western-Sonoran-Desert-Vegetation.pdf

Allen, E.B., L.E. Rao, R.J. Steers, A. Bytnerowicz, and M.E. Fenn. 2009. Impacts of Atmospheric Nitrogen Deposition on Vegetation and Soils at Joshua Tree National Park. Pages 78-100 *in*: R.H. Webb, L.F. Fenstermaker, J.S. Heaton, D.L. Hughson, E.V. McDonald, and D.M. Miller, eds. The Mojave Desert: Ecosystem Processes and Sustainability. University of Nevada Press, Las Vegas.

Averill-Murray, R.C., P.C. Rosen, C.A. Jones, T.R. Jones, R.A. Lara-Resendiz, T. Edwards, A. Karl, & K.H. Berry. 2023. *Gopherus morafkai*. The IUCN Red List of Threatened Species 2023: e.T97246109A97246177. https://dx.doi.org/10.2305/IUCN.UK.2023-1.RLTS.T97246109A97246177.en

Belnap, J., and D. A. Gillette. 1998. Vulnerability of desert biological soil crust to wind erosion: the influences of crust development, soil texture, and disturbance. Journal of Arid Environments 39:133–142.

Belnap, J., J.H. Kaltenecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. Biological Soil Crusts: Ecology and Management. Bureau of Land Management National Science and Technology Center, Information and Communications Group, Technical Reference 1730-2, BLM/ID/ST-01/001+1730. https://www.ntc.blm.gov/krc/system/files?file=legacy/uploads/2939/CrustManual.pdf

Belnap, J. 2002. Impacts of off road vehicles on nitrogen cycles in biological soil crusts—Resistance in different U.S. deserts. Journal of Arid Environments 52:155–165. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=beefb9daf0961b5e6461f234c8152622d3b37323

Belnap, J. 2006. The potential roles of biological soil crust in dryland hydrologic cycles. Hydrological Processes 20:3159–3178.

Berry, K.H. and F.B. Turner. 1984. Notes on the behavior and habitat preferences of juvenile desert tortoises (*Gopherus agassizii*) in California. Proceedings of the Desert Tortoise Council Symposium 1984:111-130. https://deserttortoise.org/ocr_DTCdocs/1984Proceedings-OCR.pdf

Berry, K.H., L.M. Lyren, J.L. Yee, and T.Y. Bailey. 2014. Protection benefits desert tortoise (*Gopherus agassizii*) abundance: The influence of three management strategies on a threatened species. Herpetological Monographs, 28(1):66-92. 2014. https://meridian.allenpress.com/herpetological-monographs/article-abstract/28/1/66/188924/Protection-Benefits-Desert-Tortoise-Gopherus

Boarman, W.I. and M. Sazaki. 2006. A highway's road-effect zone for desert tortoises (*Gopherus agassizii*). Journal of Arid Environments 65:94-101.

Bowker, M. A. 2007. Biological soil crust rehabilitation in theory and practice: an unexploited opportunity. Restoration Ecology 15:13–23. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1526-100X.2006.00185.x

Brattstrom, B.H. 1965. Body temperatures of reptiles. American Midland Naturalist. 73:376-422. https://www.jstor.org/stable/2423461

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

[BLM] U.S. Bureau of Land Management. 2024. Special Status Species Management. Handbook 6840. September 9, 2024. https://www.blm.gov/sites/default/files/docs/2024-11/MS%206840%2C%20Rel.%206-142_0.pdf

Cantón, Y., J. R. Román, S. Chamizo, and M. J. Moro. 2014. Dynamics of organic carbon losses by water erosion after biocrust removal. Journal of Hydrology and Hydromechanics 62:258–268. https://reference-global.com/article/10.2478/johh-2014-0033

Castillo-Monroy, A. P., F. T. Maestre, M. Delgado-Baquerizo, and A. Gallardo. 2010. Biological soil crusts modulate nitrogen availability in semi-arid ecosystems: insights from a Mediterranean grassland. Plant and Soil 333:21–34. https://link.springer.com/article/10.1007/s11104-009-0276-7

Chavez-Gonzalez, J.D., V.M. Flores-Núñez, I.U. Merino-Espinoza, and L.P. Partida-Martínez. 2024. Desert plants, arbuscular mycorrhizal fungi and associated bacteria: Exploring the diversity and role of symbiosis under drought. Environmental Microbiology Reports. 2024;16:e13300. wileyonlinelibrary.com/journal/emi4 1 of 17 https://doi.org/10.1111/1758-2229.13300

Chiquoine, L.P., S. R. Abella, and M.A. Bowker. 2016. Rapidly restoring biological soil crusts and ecosystem functions in a severely disturbed desert ecosystem. Ecological Applications 26(4):1260-1272. https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/15-0973

Clark, N.M, M.C. Rillig, and R.S. Nowak. 2009. Arbuscular mycorrhizal fungal abundance in the Mojave Desert: Seasonal dynamics and impacts of elevated CO_2. Journal of Arid Environments 73(9) September 2009: 834-843. https://www.sciencedirect.com/science/article/abs/pii/S0140196309000688

[Council] Desert Tortoise Council. 2019. Reiteration of the Desert Tortoise Council's Previous Requests as An Affected Interest for Notification of Bureau of Land Management Proposed Actions Affecting the Desert Tortoises or Habitats. Formal letter sent to four Arizona field office of the BLM, dated November 12, 2019. Attention: Amanda Dodson, Field Manager – Kingman Field Office. 3 pages. https://www.dropbox.com/scl/fi/doillkd62ntosx4jwykxk/BLM-AZ-District-Managers-DTC-as-an-Affected-Interest-2019-11-8.docx?rlkey=k659dsv10gy4tmta81wlg5q1v&dl=0

[Council] Desert Tortoise Council. 2022. Antler Operations Inc. Exploration Project Draft Environmental Assessment (DOI-BLM-AZ-C010-2022-0017-EA). Scoping comments provided by the Council on August 10, 2022. Attention: Angelica Rose and Paul Misiaszek. 10 pages.
https://www.dropbox.com/scl/fi/5uyj3rpz3ad4g4bp8mhty/Antler-Mining-BLM-AZ.8-10-2022.pdf?rlkey=596ww41u7pfawtcl57no22auf&dl=0

DeFalco, L.A., T.C. Esque, M.B. Nicklas, and J. M. Kane. 2012. Supplementing seed banks to rehabilitate disturbed Mojave Desert shrublands: Where do all the seeds go? Restoration Ecology 20(1): 85–94.
https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1526-100X.2010.00739.x

Dickson, B.G., R.D. Scherer, A.M. Kissel, B.P. Wallace, K.M. Langin, M.E. Gray, A.F. Scheib, and B. Weise. 2019. Multiyear monitoring of survival following mitigation-driven translocation of a long-lived threatened reptile. . Conservation Biology 33(5):1094–1105.
https://www.cawl.nau.edu/wp-content/uploads/2020/10/Dickson_cobi.13301.pdf

Elbert, W., B. Weber, S. Burrows, J. Steinkamp, B. Büdel, M. O. Andreae, and U. Pöschl. 2012. Contribution of cryptogamic covers to the global cycles of carbon and nitrogen. Nature GeoScience 5:459–462.
https://www.nature.com/articles/ngeo1486

Esque, T.C., K.E. Nussear, K.K. Drake, A.D. Walde, K.H. Berry, R.C. Averill-Murray, A.P. Woodman, W.I. Boarman, P.A. Medica. J. Mack, and J.H. Heaton. 2010. Effects of subsidized predators, resource variability, and human population density on desert tortoise populations in the Mojave Desert, U.S.A. Endangered Species Research, Vol. 12-167-177, 2010, doi: 10.3354/esr00298.
https://www.int-res.com/articles/esr2010/12/n012p167.pdf

Field, K.J., C.R. Tracy, P.A. Medica, R.W. Marlow, and P.S. Corn. 2007. Return to the wild: translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*). Biological Conservation 136**:**232–245.
https://digitalcommons.unl.edu/usgsstaffpub/93

Field, K.J., J.D. Johnson, and N. Lamberski. 2018. Nasal-oral water administration for rehydration of juvenile Mohave desert tortoises. Journal of Fish and Wildlife Management 9(2):591-597. doi: 10.3996/042017-JFWM-034.
https://meridian.allenpress.com/jfwm/article/9/2/610/204596/Nasal-Oral-Water-Administration-for-Rehydration-of

Gelbard, J. L., and J. Belnap. 2003. Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology 17(2): 420-432.
https://doi.org/10.1046/j.1523-1739.2003.01408.x
https://conbio.onlinelibrary.wiley.com/doi/abs/10.1046/j.1523-1739.2003.01408.x

Harju, S., S. Cambrin, and J. Berg. 2024. Indirect impacts of a highway on movement behavioral states of a threatened tortoise and implications for landscape connectivity. Scientific Reports 14:716.
https://doi.org/10.1038/s41598-024-51378-z
https://www.nature.com/articles/s41598-024-51378-z.pdf

Hernández, M.J., O.A. Parra, and J.M. Valliere. 2023. Response of Mojave Desert native perennials to inoculum from invasive and native annuals. University of California Davis, Department of Plant Sciences.
https://www.cal-ipc.org/wp-content/uploads/2023/12/Cal_IPC_Symposium_2023_Mayra_Hernandez_Mojave_Desert_soil_inoculum.pdf

Hromada, S.J., T.C. Esque, A.G. Vandergast K.E. Dutcher, C.I Mitchell, M.E Gray, T. Chang, B.G. Dickson, and K.E. Nussear. 2020. Using movement to inform conservation corridor design for Mojave desert tortoise. Movement Ecology 2020 8/38 doi: 10.1186/s40462-020-00224-8
https://pubmed.ncbi.nlm.nih.gov/33042548/

Hromada, S. J., T.C. Esque, A.G. Vandergast, K.K. Drake, F. Chen, B. Gottsacker, J. Swart, and K.E. Nussear. 2023. Linear and landscape disturbances alter Mojave desert tortoise movement behavior. Front. Ecol. Evol. 11, 971337.
https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2023.971337/full

Kuske, C. R., C. M. Yeager, S. Johnson, L. O. Ticknor, and J. Belnap. 2012. Response and resilience of soil biocrust bacterial communities to chronic physical disturbance in arid shrublands. International Society for Microbial Ecology Journal 6:886–897.
https://www.nature.com/articles/ismej2011153

LaRue, E. 1992. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Proceedings of the 1992 Symposium of the Desert Tortoise Council.

Lee, S., R. Klinger, M.L. Brooks, and S. Ferrenberg. 2024. Homogenization of soil seed bank communities by fire and invasive species in the Mojave Desert. Frontiers in Ecology and Evolution 12:1271824. doi: 10.3389/fevo.2024.1271824.
https://www.frontiersin.org/articles/10.3389/fevo.2024.1271824/full

Lovich, J.E., C.B. Yackulic, J.E. Freilich, M. Agha, M. Austin, K.P. Meyer, T.R. Arundel, J. Hansen, M.S. Vamstad, and S.A. Root. 2014. Climatic variation and tortoise survival—Has a desert species met its match? Biological Conservation 169: 214–224.
https://www.sciencedirect.com/science/article/pii/S0006320713003443

Mack, J.S., and K.H. Berry. 2023. Drivers of survival of translocated tortoises. Journal of Wildlife Management 87(2): (27 pages) (February 2023) 87:e22352.
https://doi.org/10.1002/jwmg.22352.

McGinnis, S.M. and W.G. Voigt. 1971. Thermoregulation in the desert tortoise, *Gopherus agassizii*. Comparative Biochemical Physiology 40A:119-126. https://www.sciencedirect.com/science/article/abs/pii/030096297190154X

Naegle, S. 1976. Physiological response of the desert tortoise, *Gopherus agassizii*. Master of Science thesis, University of Nevada, Las Vegas, Nevada.

Nafus, M.G., T.D. Tuberville, K.A. Buhlmann, and B.D. Todd. 2013. Relative abundance and demographic structure of Agassiz's desert tortoise (*Gopherus agassizii*) along roads of varying size and traffic volume. Biological Conservation 162 (2013) 100–106. https://www.sciencedirect.com/science/article/abs/pii/S0006320713001043

Oftedal, O.T. 2002. Nutritional ecology of the desert tortoise in the Mojave and Sonoran Deserts. *In* Van Devender, T.R., The Sonoran Desert Tortoise—Natural history, biology, and conservation: The University of Arizona Press, Tucson. pp. 194–241.

Peaden, J.M., A.J. Nowakowski, T.D. Tuberville, K.A. Buhlmann, and B.D. Todd. 2017. Effects of roads and roadside fencing on movements, space use, and carapace temperatures of a threatened tortoise. Biological Conservation 214: 13-22. https://www.sciencedirect.com/science/article/abs/pii/S0006320717301325

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

Peterson, C.C., 1996b. Ecological energetics of the desert tortoise (*Gopherus agassizii*)—Effects of rainfall and drought. Ecology 77: 1,831–1,844. https://esajournals.onlinelibrary.wiley.com/doi/abs/10.2307/2265787

Rao, L.E., D.R. Parker, A. Bytnerowicz, and E.B. Allen. 2009. Nitrogen mineralization across an atmospheric nitrogen deposition gradient in Southern California deserts. Journal of Arid Environments 73 (10): 920-930. https://www.sciencedirect.com/science/article/abs/pii/S0140196309001098

Titus, J. H., P.J. Titus, R.S. Nowak, and S.D. Smith. 2002. Arbuscular mycorrhizae of Mojave Desert plants. Western North American Naturalist, 62(3): 327-334. https://oasis.library.unlv.edu/sls_fac_articles/46

[USFWS] U.S. Fish and Wildlife Service. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). December 2009. Region 8, Sacramento, California. https://www.fws.gov/sites/default/files/documents/Desert-Tortoise-Field-Manual.pdf

[USFWS] U.S. Fish and Wildlife Service. 2019. Clearance survey protocol for the Mojave Desert Tortoise. May 2019. https://www.fws.gov/sites/default/files/documents/Attachment%201.Clearance%20survey%20protocol_final.pdf

[USFWS et al.] U.S. Fish and Wildlife Service, Bureau of Land Management, Bureau of Reclamation, National Park Service, Department of Defense, Customs and Border Protection, U.S. Forest Service, Natural Resources Conservation Service, Arizona Game and Fish Department, and Arizona Department of Transportation. 2015. Candidate Conservation Agreement for the Sonoran Desert Tortoise (*Gopherus morafkai*) in Arizona. May 27, 2015. https://www.blm.gov/sites/blm.gov/files/policies/IMAZ-2016-004-a1.pdf.

von Seckendorff Hoff, K. and R. Marlow. 2002. Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. Chelonian Conservation and Biology 4: 449–456.

Walde, A.D., L. Bol, D.K. Delaney, and L.L. Pater. 2003. The desert tortoise: a preliminary analysis of operative and environmental temperatures. A Report by the Construction Engineering Research Laboratory to the U.S. Fish and Wildlife Service. 18 pp.

Warren, S. D. 2003. Synopsis: influence of biological soil crusts on arid land hydrology and soil stability. Biological soil crusts: structure, function and management. Pages 349–360 in J. Belnap, and O. L. Lange, editors. Ecological studies, 150. Springer-Verlag, Berlin, Germany.

Young, J. A., and F. L. Allen. 1997. Cheatgrass and range science: 1930-1950. Journal of Range Management 50:530-535. https://journals.uair.arizona.edu/index.php/jrm/article/viewFile/9254/8866

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