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Via email and BLM NEPA ePlanning webpage

Date: 10 June 2024

Bureau of Land Management
c/o NEPA Coordinator
SDNM Grazing RMP-EA 2024 Public Comments
2020 E Bell Road
Phoenix, Arizona 85022
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Re: SDNM Grazing RMP/EA Public Comment (DOI-BLM-AZ-P040-2024-0001-RMP-EA)

Dear NEPA Coordinator for BLM Phoenix District,

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

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

We appreciate this opportunity to provide comments on the above-referenced proposed project and that the Bureau of Land Management (BLM) contacted the Council to advise us of the opening of the public comment period for the project. Given the location of the proposed project in habitats occupied by the Sonoran desert tortoise (*Gopherus morafkai*) (synonymous with Morafka's desert tortoise), our comments include recommendations intended to provide protection and sustainability of this species and its habitat during activities authorized by the BLM, which we recommend be added to the authorizing document (e.g., resource management plan amendment, etc.) for this proposed action, as appropriate. Please accept, carefully review, and include in the relevant project file the Council's following comments and attachments for the proposed project.

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 above 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 ranching and indirectly wildlife, invasive non-native plant species, and drought/temperature extremes from climate change.

Background

In 2012, BLM issued a Record of Decision (ROD) for the Sonoran Desert National Monument (SDNM or Monument) Resource Management Plan (RMP). Subsequently, BLM was sued and in 2016 was ordered to complete a new Land Health Evaluation (LHE) and Grazing Compatibility Analysis (GCA). The U.S. District Court – District of Arizona issued a ruling concluding the administrative record for the RMP/Record of Decision (ROD) did not support the analysis that led to the decisions in the ROD to make grazing available on five allotments north of Interstate-8 (I-8). In 2020, BLM issued a revised LHE, GCA, and an RMP Amendment/Environmental Assessment (RMPA/EA). BLM was sued and in 2023, the U.S. District Court concluded that the LHE and RMP Amendment/EA included errors in the analysis. BLM negotiated with the plaintiffs to conduct additional NEPA analysis followed by a ROD or other appropriate decision document and, as necessary, revise the LHE, Compatibility Determination, and RMP Amendment.

Description of the Proposed Action and Alternatives

The purpose of this action is to consider the compatibility of livestock grazing with Monument objects for which the Monument was established and to amend the 2012 Sonoran Desert National Monument RMP/ROD. For the Monument north of I-8, BLM is proposing to identify allotments available/unavailable for livestock grazing, and the range of animal unit months (AUMs) available for livestock grazing across all SDNM allotments.

In the Sonoran Desert National Monument Livestock Grazing Draft Resource Management Plan Amendment/Environmental Assessment (EA), BLM has analyzed five alternatives:

Alternative A, No Action Alternative: This alternative would continue to implement the management direction in the 2012 RMP. BLM would continue the livestock management on portions of five allotments (Arnold, Beloat, Big Horn, Hazen, and Lower Vekol), north of I-8 in the SDNM (157,170 acres). It allows 3,318 AUMs across the Planning Area. The current management actions, best management practices (BMPs), and mitigation as approved in the 2012 ROD would continue to apply to the No Action Alternative. Range improvements, such as allotment fencing and water developments, would continue to be maintained by permittees in allotments available for livestock grazing.

Alternative B, Maximum Acreage Alternative: Grazing would be available on all six allotments in the SDNM north of I-8 (252,460 acres). This alternative would allow grazing on 77,710 acres of the Conley Allotment, a portion of the Big Horn Allotment (16,970 acres), and a portion of the Lower Vekol Allotment (610 acres), that were previously unavailable for grazing under the No Action alternative. Livestock grazing use would range from ephemeral use only to a maximum of 4,232 perennially authorized AUMs across the Planning Area. This alternative increases AUMs by 914 above the No Action alternative.

Alternative C, No Grazing Alternative: Livestock grazing would be unavailable on all six allotments in the SDNM north of I-8 (0 acres). AUMs would be 0 (zero) across all six allotments within the SDNM. Permittees would be reimbursed for their interest in documented range improvements. Range improvements would then be removed, maintained, or modified to achieve resource goals, such as wildlife and recreation, on a case-by-case basis.

Alternative D, Reduced Grazing Alternative: Grazing would be available on portions of all six allotments in the SDNM north of I-8 (180,370). Portions of the Big Horn and Conley allotments north of State Route 238 (SR-238) would be unavailable to livestock grazing. Livestock grazing use would range from ephemeral use only to a maximum of 3,293 perennially authorized AUMs across the Analysis Area. When compared to the No Action Alternative, there would be a decrease of 25 AUMs across all six allotments.

Alternative E, Ephemeral Use Only: This is the preferred alternative identified by BLM. This alternative would authorize grazing on up to 252,460 acres, the same acreage as Alternative B. It would allow grazing on 77,710 acres of the Conley Allotment, a portion of the Big Horn Allotment (16,970 acres), and a portion of the Lower Vekol Allotment (610 acres), that were previously unavailable for grazing under the No Action Alternative. When compared to the No Action Alternative, there would be a decrease of up to 3,318 AUMs per year across all six allotments within the SDNM on an annual basis. The level of seasonal grazing (i.e., AUMs) would be determined by BLM each year. No upper limit is provided on the maximum level AUMs that would be authorized under this alternative.

Comparison of Acres and Animal Unit Months (AUMs) Available for Grazing between Alternatives

(from page 9, Table 5 in the Draft RMP/EA).

Allotment Name	Alternative A Perennial	Alternative B Perennial & ephemeral use	Alternative C No grazing	Alternative D Perennial & ephemeral use	Alternative E Ephemeral use only
Arnold	1,610	1,610	0	1,610	1,610
Beloat	33,600	33,600	0	33,600	33,600
Big Horn		92,200	0	61,590	92,200
Conley	0	77.710	0	36,230	77,710
Hazen	31,930	31,930	0	31,930	31,930
Lower Vekol	14,800	15,410	0	15,410	15,410
Total	**157,170**	**252,460**	**0**	**180,370**	**252,460**
AUMs	**3,318**	**4,232**	**0**	**3,293**	**Determined annually**

In addition, BLM considered other alternatives but eliminated them from detailed analysis. These included:

- Make portions of allotments not meeting standards for rangeland health due to grazing, unavailable to grazing;
- Create a forage reserve on the Lower Vekol Grazing Allotment;
- Allow other classes of livestock to graze (i.e. sheep, goats, and horses);
- Make sensitive areas such as cultural sites and saguaro forests unavailable to livestock grazing; and
- Authorize AUMs at historical use.

The SDNM is located in Maricopa and Pinal counties between Buckeye to the north, Maricopa to the east, and Gila Bend to the west. It is bordered by the Barry M. Goldwater Military Range to the southwest and the Tohono O'odham Tribal Lands to the southeast. The remaining boundary is bordered by BLM, state, and private lands. Interstate-8 bisects the Monument from east to west.

Background: The SDNM was established in 2001 under Presidential Proclamation 7397 (Proclamation). This Proclamation directed the land manager, currently BLM, to *protect* [emphasis added] the objects listed in the Proclamation. These objects include fauna – endangered Sonoran pronghorn, desert bighorn sheep, three species of bats, numerous species of nesting birds, and the Sonoran desert tortoise. These objects include flora – the "large saguaro cactus forest communities," "palo verde/mixed cacti association," "saguaros, palo-verde trees, ironwood,

prickly pear, and cholla," and the endangered acuña pineapple cactus along with other plant species. In addition, 25,000 acres of "critical habitat" for the Sonoran desert tortoise in the Maricopa Mountains are listed in the Proclamation along with the diversity of native wildlife and vegetation in the SDNM and the biological, scientific, and historic resources.

The approximately 252,460-acre Planning Area for the Draft RMP Amendment/EA is the Analysis Area; it is located in Maricopa County and encompasses the entire SDNM north of I-8. It includes the North Maricopa Mountains Wilderness, South Maricopa Mountains Wilderness, "critical habitat" in the Maricopa Mountains, and approximately 154,200 acres of Category I tortoise habitat, 22,340 acres of Category II tortoise habitat and 3,450 acres of Category III tortoise habitat (BLM 2024 Appendix 3). "Category I desert tortoise habitat includes habitat that is necessary to maintain populations with the highest densities, which are stable or increasing, and experiences the fewest conflicts with current land uses. Category II habitats may support stable populations and/or are contiguous with medium to high-density habitat. Category III habitats are the least manageable and contain medium to subpar habitats; however, these areas do exist between Category I and II habitats and should be managed for dispersal between Category I and II habitats (Spang et al. 1988, MOG 1991).

The goal of the BLM is to "maintain stable and viable populations with no net loss of habitat in Category I and II habitats and to limit population declines to the extent possible in Category III habitats by mitigating impacts (BLM 2012)."

These categories of tortoise habitat were established in 1988 by BLM and applied to public lands managed by the BLM for multiple use and sustained yield. However, the Council believes that management of the objects identified in a national monument proclamation should be afforded a higher level of management than authorized on BLM lands under the Federal Land Policy and Management Act (FLPMA) .

Comments on the Sonoran Desert National Monument Grazing Draft Resource Management Plan Amendment/Environmental Assessment

Page 6 – BLM says, "The determination of each individual allotment's classification and/or perennial AUMs will be made at the implementation-level and not in this planning effort." However, the figures and tables provided by BLM for some of the alternatives identify ephemeral grazing only or perennial and ephemeral grazing. The Council is confused by what it perceives as an inconsistency in the EA between the wording in the EA and the information presented in these tables and figures. We request that BLM clarify in the description of each alternative, table and figures whether an allotment would be classified as ephemeral, perennial, or perennial/ephemeral and analyze the impacts of grazing using this classification.

Page 8 – In Section 2.1 Description of the Alternatives, BLM says, "implementation-level adjustments in livestock grazing management, including the number of authorized perennial-AUMs by allotment, would be required to maintain and achieve Standards for Rangeland Health (Standards) and be compatible with monument objects."

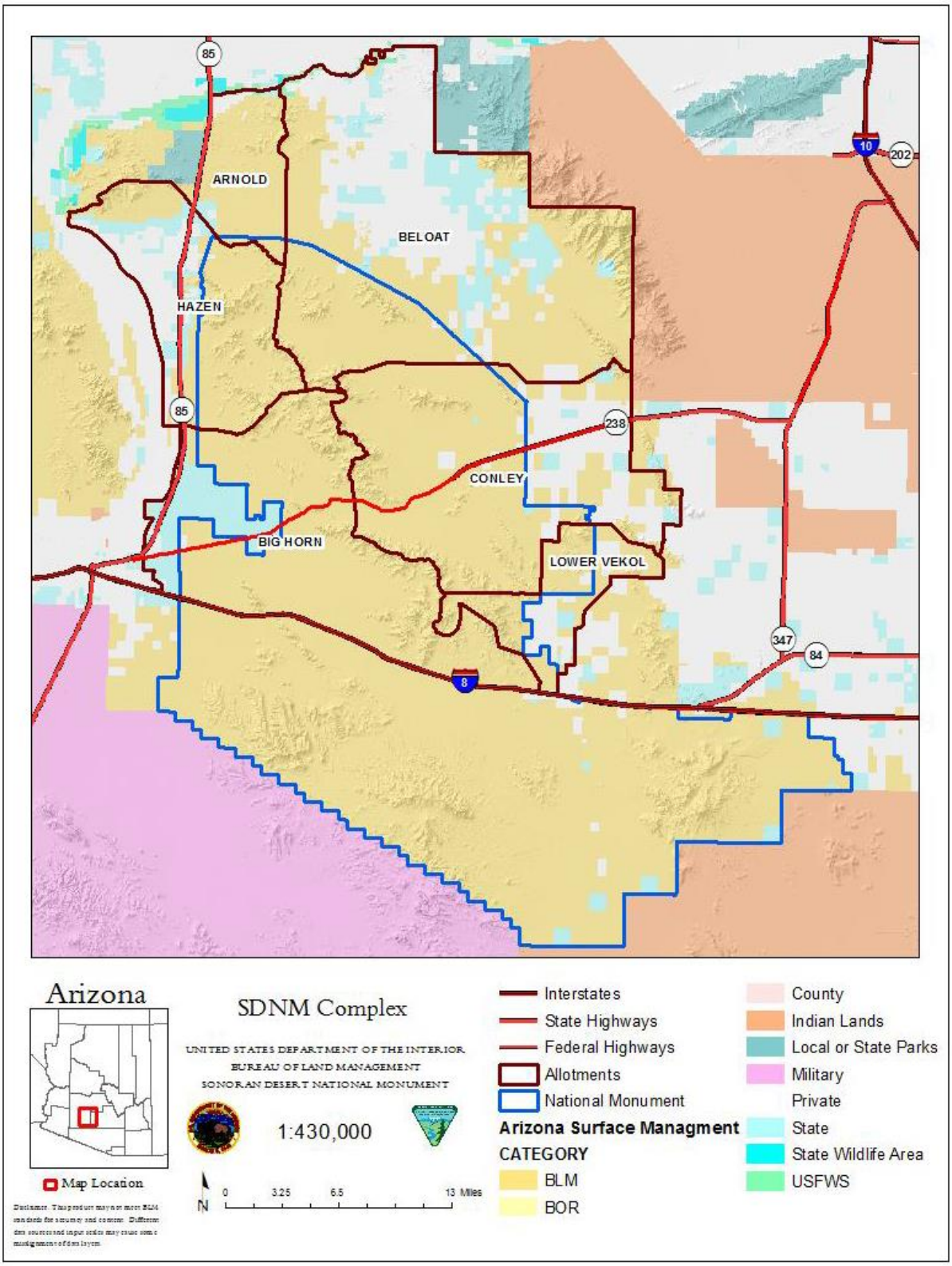
The Council asks how effective this process would be in guaranteeing that appropriate and timely adjustments would be made. Grazing permits are issued for 10 years. Climate change affects temperature and precipitation patterns that affect plant productivity and reproduction/recruitment. These patterns do not align with the 10-year terms of grazing permits. When issued they "are often adjusted based on information gathered in one decadal cycle but the permit extends into a drier or wetter decadal cycle. Ecological damage is more likely when the stocking rate is based on plant production during a wet cycle but the stocking rate is inappropriate for a dry cycle (Hall et al. 2005).

In addition, Hall et al. (2005) notes that "[e]xperience and past use [to identify general thresholds below which livestock impacts for an allotment are expected to be compatible with the objects identified in the Proclamation] may help to some extent; however, we suggest that much more is involved here, as little guidance can be presently gleaned from the literature on how to set appropriate stocking rates for the Sonoran Desert. Our analysis of the literature on Sonoran Desert ecosystem dynamics also indicates that numerous ecological factors that characterize the Sonoran Desert have been under-appreciated in how they may affect implementing an appropriate grazing management strategy and setting appropriate stocking rates for the Sonoran Desert." The Council emphasizes the issues identified in this last sentence, and provides information on ecological factors that BLM does not adequately include but must consider in its analysis for determining appropriate stocking rates for the SDNM to protect objects including the tortoise.

Pages 8 & 9, Alternative C: No Grazing Alternative – The description of this alternative says, "grazing would be unavailable on all six allotments in the SDNM north of I-8." However, the Monument does not encompass any of these allotments; it overlaps them with the amount of overlap ranging from about 10 percent to about 80 percent. Because the action is for management of the Monument and not areas adjacent to it, we are unsure of BLM's reason for making a management decision for lands outside the Monument. Please clarify in the Final EA this decision to analyze a no grazing alternative that includes areas both inside and outside the Monument.

In addition, the description of this alternative is not to withdraw the lands in the Monument from grazing. Rather, the "AUMs would be 0 (zero) across all six allotments within the SDNM." This wording implies that these allotments could be revisited in the future and the BLM may issue grazing permits for AUMs above 0.

Page 16, Affected Environment, Livestock Grazing – "The results of these [Land Health Evaluation and Desired Plant Community] studies showed some areas with and without expected historical livestock use are meeting Standards and are therefore compatible with monument objects. This indicates that livestock grazing could continue on the SDNM north of Interstate 8 with adjustments in grazing management." Unfortunately, we do not see that BLM "connected the dots" between areas meeting standards for rangeland health and livestock grazing and areas meeting the ecological needs of the objects named in the Proclamation. BLM should provide citations from the scientific literature that the Land Health Evaluation (LHE) and Desired Plant Community (DPC) methods that BLM implemented are collecting and analyzing relevant data that the identified protected objects (e.g., tortoise, etc.) require for persisting in the Monument. This would include but is not limited to data on the species composition, frequency/abundance, and phenology/structure of annual and perennial plants that tortoises consume to ensure these species are available and providing the necessary nutrition and water requirement for all size classes of tortoises. The current LHE and DPC studies implemented by BLM do not collect these data. Rather these studies focus on general soils and perennial vegetation parameters with the plant species focused on livestock forage needs. Please see Comment on Appendix 3 for more information.



Map 1. Sonoran Desert National Monument Complex Allotments North of Interstate-8.

We are unsure why BLM has decided to focus its data collection on methods for managing livestock grazing rather than focusing management and monitoring on the directives in the Proclamation to protect the identified objects. We presume that BLM's reasoning is if it can demonstrate that the impacts of livestock grazing would not having a significant adverse impact on rangeland health, the objects and habitats of the objects are being protected. The Council contends that while the data collected on livestock grazing is helpful, it does not answer the question of whether BLM is managing for the tortoises and tortoise habitat as specified under the Monument's RMP (i.e., the management levels defined in the categories of tortoise habitat) or the Proclamation (i.e., protection for the tortoise).

To comply with the RMP and the 2001 Proclamation, BLM should have developed and implemented a science-based, statistically robust management and monitoring plan on the demographic status and trend of the tortoise and the ecological components of its habitat for neonate/juvenile tortoises and adult tortoises in the Monument. This method would provide the needed data on the status and trend of the tortoise to show whether the tortoise population in the Monument is viable and not decreasing, that the tortoises are healthy, and that there is breeding (e.g., exchange of genetic material) from adjacent tortoise populations to maintain genetic diversity. A similar approach is needed for the other plant and animal objects named in the Proclamation.

BLM started this process with the contracting of Hall et al.'s (2005) "The Impacts of Livestock Grazing in the Sonoran Desert: A Literature Review and Synthesis." However, the Council has been unable to find in the Draft RMPA/EA that BLM used the results of this report in developing the alternatives in the Draft RMPA/EA. For example, we were unable to find any of the conclusions or recommendations from Hall et al. (2005) cited in this Draft RMPA/EA. The Council requests that BLM include in the Final RMPA/EA these data and analyses on the tortoise and the contracted report by Hall et al. (2005) for the environmental issues that were researched including composition, structure, and function of plant communities; saguaro recruitment and survival; other individual components of plant communities (such as rare plants); soils and biological soil crusts; wildlife, including non-game species soils and soil crusts, vegetation, protected wildlife species and plants, protected plant communities, and grazing management strategies. The Council also requests that BLM include alternatives that incorporate the conclusions and recommendations in Hall et al. (2005).

Page 16, Livestock Grazing, Affected Environment – "Upon conclusion of [a NEPA allotment-by-allotment or group allotments] implementation-level analysis, the BLM would proceed to authorize potential new range improvements and issue grazing permit(s) with terms and conditions ensuring compatibility with monument objects."

The Council concludes from reading this statement that unless BLM issues grazing permits that authorize no grazing, BLM has already decided and is stating in this RMP/EA that it will be issuing grazing permits to graze livestock even though one of the action alternatives is to authorize no grazing. We suggest that BLM's statement in the Draft RMPA/EA is pre-decisional, inappropriate, and should be removed from the Final EA.

Page 17, Livestock Grazing, Environmental Consequences, No Action Alternative (Current Management) – "Impacts to livestock grazing would be beneficial, minor, and long-term for the Arnold, Beloat, and Hazen allotments." We could not find an analysis in this section of the Draft RMPA/EA that support these conclusions and appropriate citations from the scientific literature that support these statements. Please add the analysis/explanation of how BLM concluded the impacts would be beneficial, minor, and long-term.

Please see our comments below on trespass grazing on page 54, Cumulative Effects, Past and Presen Actions. In these comments, we request that BLM revise the description of this alternative and its impacts to the tortoise and other identified objects in the Final EA to include the presence of trespass grazing, because it is part of the baseline/No Action Alternative.

Page 17, Livestock Grazing, Environmental Consequences, Maximum Acreage Alternative – This alternative has a wide range of AUMs from which the authorizing BLM manager could approve for the 10-year permit term depending on the results of the implementation-level decisions that will occur later. Consequently, the analysis of the impacts of this alternative seem premature. However, this alternative along with all the alternatives except the No Grazing and No Action Alternatives would increase the maximum amount of AUMs and acreage that BLM could authorize under a perennial grazing 10-year permit process. BLM should add this as a beneficial impact to all the permittees/livestock grazing.

Page 18, Livestock Grazing, Environmental Consequences, No Grazing Alternative – "Livestock grazing could continue on those portions of the existing allotments outside the SDNM." This option was not included in the Description of Alternatives for this alternative on pages 8 and 9. We suggest that BLM add this information to the description of the No Grazing Alternative.

Page 22, Socio-economics, Environmental Consequences, No Grazing Alternative – "Under the No Grazing Alternative, no allotments would be available for livestock grazing in the SDNM, however 69 other allotments in the Analysis Area would continue to be available for livestock grazing." However, on page 14 of the EA, BLM says "[t]he Planning Area is the Analysis Area, encompassing the entire SDNM north of I-8 which includes portions of six grazing allotments (Arnold, Beloat, Big Horn, Conley, Hazen, and Lower Vekol allotments) and is south of the City of Goodyear, northeast of Gila Bend, and north of Mobile, Arizona (Figure 1). The Analysis Area is approximately 252,460 acres of public land." The Analysis Area, Monument boundary, and allotment boundaries are shown on Map 1 above. In looking at this Analysis Area including the maps provided in Appendix 3 of the EA, we do not see that there are 69 other allotments in the Analysis Area. The Council requests that BLM review the Draft RMPA/EA for consistency in its use of the term and definition of "Analysis Area" throughout the EA (including appendices) and revise its analysis under Socio-economics to accurately reflect the socio-economic impacts within the defined Analysis Area.

In addition to the socio-economic costs/benefits to the six permittees and the local businesses they use, BLM should include in the Draft RMPA/EA an analysis of the socio-economic costs and benefits to the public. We suggest using the topics discussed in Kauffman et al. (2022) when conducting this analysis. They have calculated the costs of an AUM ($1.35), the estimated social cost of greenhouse gases arising from a cow-calf pair on public lands (almost $36), the

administrative costs for managing livestock grazing on public lands (estimated at $8-$12 per AUM), Additional costs not calculated in the greenhouse gas emission calculations include trucking livestock to meat processing facilities, fencing, maintenance of water developments and hauling mineral supplements and water (likely to increase with climate change), invasive species management, and social costs from losses in biodiversity, and carbon sequestration capacity of the lands grazed.

Page 23, Socio-economics, Environmental Consequences, Ephemeral Use Only Alternative – BLM states "Under the Ephemeral Use Only Alternative, six allotments would be available for grazing within the Analysis Area in the SDNM, in addition to 69 other allotments in the Analysis Area." As mentioned above, where are the 69 allotments located in the Analysis Area? The Draft EA says, "the Planning Area is the Analysis Area, encompassing the entire SDNM north of I-8 which includes portions of six grazing allotments (Arnold, Beloat, Big Horn, Conley, Hazen, and Lower Vekol allotments)"…. and "[t]he Analysis Area is approximately 252,460 acres of public land." This figure is the same as the total acreage on page 9, Table 5 of the EA for the six allotments, which is approximately 252,460 acres. We were unable to find in the Draft EA where these 69 allotments are located.

Page 26, Vegetation, Noxious and Invasive Weed Species, Environmental Consequences - Biological Resources, No Action Alternative (Current Management) – BLM says, "light to moderate use of most forage species may have little to no impact on cover and plant community composition (Navarro et al. 2002, Martin and Severson 2007, Molinar et al. 2011, Gamoun 2014) and can improve range conditions (Holechek et al. 1999, Holechek et al. 2006)."

We downloaded the referenced papers and offer the following information on their relevance to current climatic and ecological conditions of the Sonoran Desert vegetation in the Monument and the impacts of grazing:

- Holechek et al. (2006) did not analyze studies on the effects of livestock grazing on Sonoran Desert vegetation.
- Holechek et al. (1999) reported on the Martin and Cable study for the 10 year study period (1957 - 1967) in the Santa Rita Experimental Range. The current climatic conditions differ from the time of the study and the elevations on the Experimental Range are from 2,950-4,757 ft (900-1450 m). The highest elevation in the Analysis Area is 1,993 feet (607 m) (BLM 2024 Appendix 3 - Final Land Health Evaluation, Sonoran Desert National Monument Complex). The Experiment Station is mostly semi-desert grassland.
- Gamoun (2014) reported on grazing studies from southern Tunesia.
- Navarro et al. (2002) studied the grazing effects in the Chihuahuan Desert from 1952 to 1999. Plant "categories" measured were "Tobosa, Black Grama, Burrograss, Aristida spp., other perennial grasses, annual grasses, total grasses, total forbs, Honey mesquite, Broom snakeweed, other shrubs, total shrubs, and Total basal cover." They reported "[m]ajor changes ($P > 0.05$) in rangeland condition occurred within the study period due to annual fluctuations in precipitation. Ecological condition scores increased in the 1980s and early 1990s due to above average precipitation. However, "drought in the early to mid 1950's [sic] and again in the mid to late 1990's caused rangeland condition scores to decline." Average elevation is (1,372 m).

- Molinar et al. (2011) reported on a study in the Chihuahuan Desert from 1962, 1982, 1991, 1998, 1999, and 2000. Annual forbs declined from 3.56±0.3 in 1962 to 0.46±0.02 in 1982, 0.46±0.02 in 1991, 0.16±0.01in 1998, 0.16±0.01 in 1999, and 0.26±0.02 in 2000. The individual plant species measured were Blackgrama, Tobosa, Threeawns, Burrograss, Other perennial grasses, Total perennial grasses, Annual grasses, Total grasses, Globemallow, Other perennial forbs, Annual forbs, Total forbs, Snakeweed, Mesquite, Other shrubs, and Total shrubs.

The Council concludes that the references cited to support the effects of grazing in vegetation in the SDNM do not support grazing as a beneficial effect regarding the abundance of native Sonoran Desert plants. Most of the research cited did not occur in Arizona and occurred outside the Sonoran Desert. For the research conducted in Arizona, it occurred at higher elevations and in earlier decades when precipitation amounts were greater; evaporation rates were lower; the impacts of invasive plant species, wildfires, and climate change were not as severe as they are today. These impacts have a high probability of increasing in severity in the future. Thus, the Arizona studies cited by BLM to support their conclusions were not conducted in the same or similar environments/environmental conditions as at the Monument. They do not support BLM's statement/conclusion on the impacts of light to moderate use of most forage species by livestock. In the Final EA, BLM should revisit its analysis of the environmental consequences and use the results from the literature review it conducted to discuss the various impacts and provide these references. We want to ensure that the scientific process is properly implemented and that the public does not have the perception that BLM is first developing alternatives and describing impacts and then seeking data to support these alternatives and impacts.

Pages 26-30, Vegetation, Noxious and Invasive Weed Species, Environmental Consequences - Biological Resources, Maximum Acreage Alternative, Reduced Grazing Alternative, and Ephemeral Grazing Only Alternative – Under the Maximum Acreage Alternative, BLM concludes that "[a]djustments to grazing management, as described above, have been shown to maintain and improve the monument objects tied to vegetation. Conservative grazing may improve vegetation diversity, and productivity (Holechek et al. 1999, Holechek et al. 2006)." BLM repeats this conclusion for the remaining alternatives where grazing would be authorized.

As demonstrated in our comment above, the Holechek et al. (2006) paper did not analyze any studies on the effects of livestock grazing on Sonoran Desert vegetation. Holechek et al. (1999) provided data from a study that occurred at higher elevations than the Monument and during the mid-20th century when precipitation amounts were greater; evaporation rates were lower; the impacts of invasive plant species, wildfires, and climate change were not as severe as they are today and will increase in severity in the future. Thus, the Arizona studies cited by BLM to support their conclusions were not conducted in the same or similar environments/environmental conditions as at the Monument. They do not support BLM's statement/conclusion that conservative grazing may maintain and improve the monument objects tied to vegetation.

This same unsupported conclusion by BLM is repeated for the Reduced Acreage Alternative and Ephemeral Grazing Alternative. We request that BLM revisit its analysis of the environmental consequences and use the results from the literature review it conducted to discuss the various impacts and provide these references in the Final EA.

Information in and conclusions from the report by Hall et al. (2005) on "The Impacts of Livestock Grazing in the Sonoran Desert: A Literature Review and Synthesis" is missing from the Draft RMPA/EA. To better inform decision-making, the BLM's Phoenix Field Office contracted The Nature Conservancy in Arizona to write this report that reviews of the scientific literature regarding the state of knowledge of: (1) the impacts of domestic livestock grazing (primarily cattle) on natural and cultural resources in desert ecosystems, with a focus on the Sonoran Desert; (2) the implications of different grazing management strategies; and (3) Sonoran Desert plant community dynamics. The report evaluates the literature relative to how livestock grazing in the Sonoran Desert impacts:

- composition, structure, and function of plant communities;
- saguaro recruitment and survival;
- other individual components of plant communities (such as rare plants);
- soils and biological soil crusts;
- wildlife, including non-game species; and
- cultural sites.

Hall et al. (2005) used this information and the roles of climate, based in part on an analysis of local weather data, vegetation response, and range ecology theory to report findings and make and recommendations to BLM regarding livestock grazing in the Monument. They concluded that "continuous grazing in which livestock are maintained within fenced allotments yearlong is not a feasible grazing management strategy on Sonoran Desert public lands." Further, they state that in most of the Sonoran Desert, "only grazing in response to winter rains may be feasible." Hence, we question why BLM used this analysis in the Draft EA for alternatives with continuous grazing.

BLM should revise its analysis for *reasonable* [emphasis added] alternatives (i.e., not continuous grazing alternatives). We suggest that BLM start with the information provided to BLM in Hall et al. (2005) and add all recent research conducted on the effects of livestock grazing on vegetation in the Sonoran Desert and other relevant research. The results of the research should be summarized in the Draft RMPA/EA including identifying assumptions and omissions made, and the impacts analyzed using the results of science-based, statistically robust research. BLM should ensure that it does not give the public the impression of using an *a posteriori* approach to the selection of alternatives and the analysis of the impacts of these alternatives.

Throughout the Draft RMPA/EA we found several unsupported statements/conclusions by BLM. For example, on page 30 under "Environmental Consequences, Ephemeral Grazing," BLM states, "Ephemeral only grazing would be compatible with monument objects tied to vegetation due to the smaller portion of vegetation being consumed by livestock and the majority of forage consumed, when ephemeral grazing is approved, is comprised of annual/ephemeral species. This conclusion makes several assumptions, among them:

1) that annual plants are not part of the "spectacular diversity of plant and animal species;"
2) that annual plants are not part of "the wide variety of trees, shrubs, and herbaceous plants that make up the [saguaro] forest community;"
3) that annual plants are not part of "the washes in the area [that] support a much denser vegetation community than the surrounding desert, including mesquite, ironwood,

paloverde, desert honeysuckle, chuparosa [sic], and desert willow, as well as a variety of herbaceous plants;" and

4) that annual plants are not part of "the diverse plant communities present in the monument [that] support a wide variety of wildlife, including the endangered Sonoran pronghorn, a robust population of desert bighorn sheep, . . .and the Sonoran desert tortoise" (Presidential Proclamation 2001).

Page 27, Vegetation, Noxious and Invasive Weed Species, Environmental Consequences - Biological Resources, Maximum Acreage Alternative – "Fencing would not be required around livestock waters greater than two miles from saguaro forest area because cattle generally do not travel more than two miles from water on flat terrain and no more than one mile in rough terrain."

Please see our comments on Pages 37-40, "Appendix 3 – Final Land Health Evaluation, Sonoran Desert National Monument Complex, Livestock Utilization, Use Pattern Mapping, and Use Probability Mapping." In these comments we examine the method and assumptions that BLM used to determine the greatest distance that livestock would travel to/from water. We concluded that BLM did not present information that indicated a high probability that livestock under seasonal or year-round conditions in the Monument would not travel more than 2 miles from water during each season.

Page 31, General Wildlife, Special Status Species (Animals), Migratory Birds Affected Environment – BLM says, "Because there is little overlap in the habitat shared by livestock and SDT [Sonoran desert tortoise] in most areas in Arizona, and because livestock grazing in Arizona is actively managed by land management agencies, livestock grazing is not currently thought to affect populations in Arizona (USFWS 2015)." Looking at recent information, the Council disagrees with this statement. The areas of habitat used by tortoises overlap more than reported by USFWS (2015).

Sonoran desert tortoises have been documented using a variety of habitats in the Arizona Upland Subdivision of the Sonoran Desert. These include low-elevation series of hills with few rock outcrops in a region of transition from creosote–bursage flats to saguaro–palo verde-dominated uplands with arroyos with caliche formations (Sullivan et al. 2016), valleys that provide important shelter resources (Averill-Murray and Averill-Murray 2005), bursage-dominated habitat on the alluvial slopes above the washes (Reidle et al. 2008), and areas with "a higher percentage of canopy cover, absence of cattle grazing, and xeric washes—especially those with exposed caliche refuges" (Grandmaison et al. 2010). Tortoises use intermountain valleys as part of their home ranges and for dispersal of all age classes (Averill-Murray et al. 2020 cited in USFWS 2022).

Further, differences have been recorded for juvenile versus adult tortoises and seasonal variations. Sullivan et al. (2016) reported seasonal differences for adult female tortoises with females moving to higher elevations on north facing slopes in late summer, but returning to lower elevations in and near washes the remainder of the year. Adult male tortoises remained at lower elevations year round during the 3-year study. Habitat used by hatchlings differed from adults with hatchlings using open washes or gentle slopes adjacent to washes. Burrows were located outside of washes and under shrubs (Sullivan et al. 2016). The authors assumed that eggs were laid in the caliche tunnels used by female tortoises. Thus, the hatchlings moved outside the washes to locate their overwintering burrows. This information indicates that tortoises use a variety of habitats depending on the age, sex, and season.

Tortoises also require linkage areas to provide connectivity for tortoise among tortoise populations. Please see the discussion on this ecological requirement under "Appendix 3, Connectivity among Tortoise Populations." Thus, tortoises use more types of vegetation and geographic areas than previously thought including resident, dispersal, and linkage habitats. BLM should add this information to this section of the Final RMPA/EA and use it when analyzing impacts to the tortoise under all environmental consequences sections on vegetation and wildlife. Further, the Council requests that BLM map the habitat/areas used by tortoises using this updated information, map the distance from water and areas used by livestock using appropriate and revised information, and overlay the tortoise map on the distance from water map to show the extent of areal overlap/habitat used seasonally and annually. We request the seasonal analysis for the other alternatives because BLM may be authorizing ephemeral grazing under these alternatives (except for the no grazing alternative). We request that these maps display seasonal and annual uses/movements. This revised information should be included in BLM's Land Health Evaluation when evaluating impacts to the tortoise and its habitat from cattle grazing.

Pages 32 – 37, Environmental Consequences – On these pages of the Draft RMPA/EA, BLM describes the impacts of the five alternatives. BLM reports that for the No Action Alternative that reflects current grazing authorizations and grazing uses, which includes no grazing for the last few years in many of the allotments for which BLM provides data (Appendix 3, Final Land Health Evaluation, page 42); of the six allotments, five have one or more ecological sites that are not achieving standards "as a result of livestock grazing" (BLM 2020, Land Health Evaluation). However, despite not achieving standards because of grazing, BLM is proposing to increase the AUMs and acreage where grazing would be authorized in Alternative B, maintain the AUMs but increase the acreage grazed in Alternative D, and increase the acreage in Alternative E with no limit on AUMs authorized. BLM should provide data with references from the scientific literature on why increasing acreage and AUMs for areas not achieving standards is warranted with references from the scientific literature on the Sonoran Desert to support these management recommendations.

Page 33, General Wildlife, Special Status Species (Animals), Migratory Birds, Environmental Consequences, No Action Alternative (current management) – BLM states, "According to the 2020 LHE, there are areas that are not achieving Standards as a result of historical livestock grazing." These areas occur in five of the six allotments. The Council asks that BLM explain how they determined these areas are not achieving standards, which we assume is based on historical livestock grazing and not more recent livestock grazing.

BLM states, "Under the No Action Alternative, impacts to general wildlife, special status species and migratory birds would be adverse, moderate, and long-term on the Arnold, Beloat, Big Horn, Hazen, and Lower Vekol allotments and would be adverse, minor, and long-term on the Conley Allotment." We found no scientific references that support this statement in this section of the Draft RMPA/EA. Please add them to the Final RMPA/EA.

Because this is the current management alternative, BLM should have population data for special status species and named objects (e.g., for the tortoise; Hoffman et al. 2017 Maricopa Mountain monitoring plots), to use as a baseline to demonstrate whether the populations of these species are stable or increasing and viable under current management or decreasing or non-viable. These metrics in addition to habitat quality, quantity, and connectivity are basic data that would confirm whether the current management is protecting the named objects. Please include this information in BLM's analyses of the alternatives in the Final EA.

The impacts to the tortoise extend beyond the direct geographical overlap of habitats used by this taxon. Livestock defoliate native plants, trample vegetation and soils, and accelerate the spread of exotic species resulting in a shift in landscape function from carbon sinks to sources of greenhouse gases; are significant sources of greenhouse gases through enteric fermentation and manure deposition; exacerbate the effects of climate change on ecosystems by creating warmer and drier conditions (Kauffman et al. 2022) that reduce the diversity, abundance and cover of native vegetation needed by tortoises and other protected objects for food, shelter from temperature extremes and predators. These impacts should be included in the environmental consequences section of all alternatives except the No Grazing Alternative.

The Council on Environmental Quality (CEQ) recently issued Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors (CEQ 2023). The purpose of this document is for Federal agencies to consider "how their actions can support the management, long-term conservation, enhancement, protection, and restoration of year-round habitat, seasonal habitat, stopover habitat, wildlife corridors, watersheds, and other landscape/waterscape/seascape features and processes that promote connectivity." "The objective is to build consideration of connectivity and corridors into the early steps of these [planning] processes to facilitate easy implementation."

CEQ applies this guidance to the following areas:

- Agency planning and decision-making;
- Science and data; and
- Collaboration and coordination.

For the first bullet, agency planning and decision-making, CEQ specifically identifies the following focal areas where connectivity and corridors should be considered early in planning, funding, and decision-making:

- Energy development planning and permitting;
- Rangeland planning and management;
- Hard rock mining and mineral exploration and development planning and permitting;
- Public land planning and management;
- Recreation planning;
- Telecommunications infrastructure and management; and
- Transportation planning and use management.

In addition, CEQ identifies best practices that should be incorporated into planning and decision-making, gathering baseline information to assess public lands for connectivity and corridor values, using science and data to develop performance measures and metrics to assess whether and how Federal agencies collectively are promoting greater connectivity across terrestrial habitats.

For the second bullet, science and data, CEQ says. "Federal agencies should address how the best available science and data will inform planning and decision-making, and consider approaches to identify and address gaps in available science and data." CEQ describes the types of science and data to be used and the sharing of science and data.

For the third bullet, collaboration and coordination, Federal agencies "should support strategic collaborations and partnerships to advance work on connectivity and corridors," and "should promote both intra- and interagency coordination and collaboration, to ensure that planning and information regarding connectivity and corridor efforts are not siloed within individual agencies or within distinct programs within a single agency." BLM's proposed action is adjacent to designated areas with investments in conservation [e.g., U.S. Fish and Wildlife Service (USFWS) for Sonoran pronghorn and Arizona Game and Fish Department (AZGFD) for desert bighorn sheep]. BLM should ensure that its proposed management is not affecting their current or future management efforts, especially for maintaining or enhancing connectivity across jurisdictional boundaries, as part of the process in analyzing the impacts of authorizing livestock use in the Monument.

Because CEQ has identified rangeland planning and management as focal areas where connectivity and corridors should be considered early in planning, funding, and decision-making, and because these areas are what BLM is undertaking in the Draft RMPA/EA for the Monument, we request that BLM explain in the Final RMPA/EA how BLM is complying with this CEQ guidance. Please explain how all the action alternatives would comply with the purpose and objective of this guidance including enabling "wildlife to adapt to fluctuating environmental conditions, including those caused by climate change." In addition, the Final RMPA/EA should demonstrate how BLM is implementing "consistent Federal action on connectivity and corridors" with other Federal agencies in agency planning and decision-making, science and data, and collaboration and coordination

Pages 33 & 34, General Wildlife, Special Status Species (Animals), Migratory Birds, Environmental Consequences, Maximum Acreage Alternative – "Depending on the number of perennially, if any, authorized AUMs under implementation-level decisions, the Maximum Acreage Alternative could have similar or fewer impacts than the No Action Alternative." While this statement is true, BLM does not describe and analyze the impacts to the wildlife named objects in the Proclamation. These objects have different ecological needs and some of them are very specialized, possessing unique adaptations and special dietary needs to meet these adaptations. For example, tortoises are herbivorous browsers requiring high protein nutrition and water content from native annual and perennial forbs and non-woody subshrubs. Annual and perennial grasses are not preferred because of their lower moisture and protein content. A grazing alternative or particular scenario under that alternative may not impact one named object, may result in beneficial impacts to another, but may result in substantial adverse impacts to another. The wildlife objects should not be consolidated in one group and a generalized description of impacts to each object should be provided. Many of the named wildlife objects are not species that are generalists. Please revise the Final EA to include a complete and comparable discussion and analysis from implementing this alternative for the named wildlife objects.

BLM states, "[i]mpacts would vary depending on the classification of each allotment as follows: there would be minor adverse impact to wildlife if a low number of perennial AUMs are allocated without the option of ephemeral increases; there would be a negligible adverse impact to wildlife if ephemeral grazing only is authorized; and there would be a moderate adverse impact to wildlife if the maximum number of perennial AUMs are allocated with the option of ephemeral increases. These conclusions are based on the idea that fewer livestock interactions would be beneficial to wildlife and there would be more forage resources available for wildlife."

Apparently, BLM's analysis of the impacts from implementation of the Maximum Acreage Alternative is "based on ideas" and not supported by science. For example, for the statement that there would be a negligible adverse impact to wildlife if ephemeral grazing only is authorized is a general statement and demonstrates that BLM did not consider the nutritional and physiological needs of the tortoise, especially neonate/juvenile tortoises and females; the geographical overlap of the areas/habitats used by tortoise and cattle; and how drought, invasive plant species and climate change have put the tortoise closer to the edge of its ability to survive. Please provide references from the scientific literature that support these "ideas."

Pages 35 & 36, General Wildlife, Special Status Species (Animals), Migratory Birds, Environmental Consequences, Reduced Grazing Alternative – Please see above comments for Page 31, General Wildlife, Affected Environment (habitat used by tortoise and revising the analysis and maps for tortoise and cattle to illustrate the overlap); Page 33, General Wildlife, Environmental Consequences, No Action Alternative, and Pages 33 & 34, Maximum Acreage Alternative, also apply to the Reduced Grazing Alternative.

Pages 36 & 37, General Wildlife, Special Status Species (Animals), Migratory Birds, Environmental Consequences, Ephemeral Grazing Only Alternative – Please see above comments for Page 31, General Wildlife, Affected Environment (habitat used by tortoise and revising the analysis and maps for tortoise and cattle to illustrate the overlap); Page 33, General Wildlife, Environmental Consequences, No Action Alternative, and Pages 33 & 34, Maximum Acreage Alternative, also apply to the Reduced Grazing Alternative.

BLM states, "Ephemeral use only would be compatible with monument objects tied to wildlife." Please provide references from the scientific literature that support this statement for the plants, vegetation associations, and wildlife named in the Proclamation. Absent these references this is an unsupported claim by BLM.

For all grazing alternatives, we did not find the information below in the Draft RMPA/EA or its appendices. It is relevant to BLM's analysis of the impacts to the tortoise from implementation of grazing alternatives and should be incorporated in the methods BLM uses to determine Desired Plant Community, Ecological Site Descriptions, Land Health Evaluations, and Grazing Compatibility Analysis if BLM wants to ensure that the nutritional and physiological needs of the tortoise are included in the numerous methods and analyses.

BLM should include studies on the quality, quantity, location, and species diversity of forage needed to sustain the identified wildlife objects through long periods of drought and support reproduction and recruitment. This would include the tortoise. The life cycle of the Sonoran Desert tortoise is dependent upon rainfall and winter forage availability. Female tortoises emerge from their hibernacula in the spring to forage on spring annual plants and build up the energy reserves necessary for egg production (AIDTT 2000, Averill-Murray 2002).

With respect to the wildlife species identified in the Proclamation that BM is to protect, BLM should include studies on the quality, quantity, and species diversity of forage needed to sustain them through long periods of drought and support reproduction and recruitment. This would include the tortoise. For example, for the Maricopa Mountains tortoise population located in the

Monument, their diet was comprised of 86 percent C3 forbs and shrubs and not C4 grasses (Murray and Wolf 2013), and tortoises in this population showed a constant and high reliance on C3 plants across their lifetimes (Murray and Wolf 2013). Overall, the majority of the lifetime diet of the tortoises from the eight sites in the Sonoran Desert in Arizona were composed of C3 plants (Murray and Wolf 2013). Thus, managing for C3 forbs and shrubs to meet the nutritional and physiological needs of adult and neonate/juvenile tortoises especially in late winter and spring months must occur if tortoises are to persist and be protected in the Monument. Please see "Comments on Appendix 3 – Final Land Health Evaluation, Sonoran Desert National Monument Complex, Forage Utilization" below for more information on this subject including age class and seasonal differences in diet.

Please ensure that this information is included in the Final RMPA/EA and Appendices and incorporated into the analyses of impacts from implementation of the grazing alternatives.

Pages 38, Soil Resources, Affected Environment – BLM should ensure that its description in this section is for the Analysis Area and not a larger area because the term "project area" is used in this section.

Pages 38-41, Soil Resources, Environmental Consequences – For the alternatives that would permit grazing, BLM makes the following statement, "Adjustments to grazing management have been shown to maintain and improve soil resources." Please provide references from the scientific literature that support this statement.

Page 53, Cumulative Effects, Geographic Scope – BLM says, "[t]he Cumulative Effects Study Area (CESA) for all resources, except socio-economics, is approximately 733,973 acres of BLM-administered, Arizona State Land Department, and privately-owned lands (Figures 10, 11, 12). This CESA consists of the six livestock grazing allotments including those portions outside the SDNM, plus the Kirian, Palo Verde Mountains, and Powers Butte allotments." We found no explanation of how BLM decided on this area for the CESA or why the CESA for socio-economics is much larger (i.e., all of Maricopa County).

On page 54, BLM says, "Construction of the initial two-lane highway by the City of Maricopa is not anticipated to start until 2021 or later. This wording indicates that this section of the EA was written prior to 2021 and has not been updated. These errors in this section lead the Council to believe that this analysis of cumulative effects was previously issued as part of another document prior to 2021 and inserted into the Draft RMP/EA without being revised. We suggest that BLM review the entire Cumulative Effects section of the Draft EA, and reissue it for public review and comment in the Final EA.

Also on page 54, BLM says, "Uses inside the SDNM and north of I-8 include non-motorized trails for hiking and equestrian use, travel routes for motorcycles and motor vehicles, trespass livestock …" Trespass livestock should have been described and analyzed in Alternative A for all resource issues. The description of the alternatives should have included the actions BLM would implement to correct the trespass grazing along with the impacts associated with the trespass grazing and actions to remove the livestock, as it is part of the baseline under the National Environmental Policy Act (NEPA) analysis. Please add this information to the Final RMPA/EA for Alternative A, No Action Alternative.

In the cumulative impacts analysis for all resource issues, BLM mentions increased recreation use by people, invasive plant species, and climate change but does not mention wildfires. There are publications on the increased frequency of wildfires occurring in the southwest deserts with most fires being human-caused and started along/near roads (Brooks and Matchett 2003). BLM needs only to look at its own records and those of the U.S. Forest Service in Arizona and Arizona Department of Forestry to learn that wildfire numbers have increase substantially in the last few decades. We recommend that BLM add that the likelihood of wildfires occurring in the Monuments are increasing and likely to occur in the CESA.

To assist BLM with updating the Cumulative Effects section of the Draft RMP/EA, we remind BLM of the Council on Environmental Quality's CEQ's "Considering Cumulative Effects under the National Environmental Policy Act" (1997) is followed, including the eight principles, when analyzing cumulative effects of the proposed action to the affected resource issues. This CEQ document is referred to in BLM's National Environmental Policy Act Handbook (BLM 2008b).

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

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

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

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

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

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

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

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

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

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

Please add an analysis of cumulative impacts of each alternative to the Final EA for the resource issues carried forward in the Draft EA for analysis following these eight principles.

Note that CEQ recognizes that synergistic and interactive impacts as well as cumulative impacts should be analyzed in the NEPA document for the resource issues. Also note that numbers 3, 5, and 8 above are frequently forgotten. In the Draft RMPA/EA, BLM defined the Cumulative Effects Study Area (CESA) to be the same for all resource issues analyzed except one. BLM did not explain how it determined this was the appropriate CESA for the tortoise or the other identified objects, given CEQ's directive that cumulative effects analysis on natural systems must use natural ecological boundaries.

If protecting the tortoise is important in the Monument in areas with historical livestock grazing and where cattle still graze, managers should analyze tortoise habitat needs and how they are being impacted directly, indirectly, and cumulatively by livestock grazing as one of a combination of threats to the tortoise that occur in and adjacent to the Monument. The impacts of one threat may not be significant but the cumulative effects of several or all threats may be highly significant.

We request that the Draft RMP/EA (1) include these eight principles in its analysis of cumulative impacts to the Sonoran desert tortoise; (2) address the sustainability of the tortoise in/near the Monument; and (3) include effective science-based mitigation, monitoring, and adaptive management that protect desert tortoises and their habitats during BLM's implementation of the selected alternative on livestock grazing.

For example, BLM established the same area for the CESA for all resource issues except socio-economics. BLM should explain how it followed CEQ's guidance including #5 for the identified objects to be protected and followed natural ecological boundaries. We would recommend expanding the CESA to include nearby tortoise populations and linkage areas to these populations. An expanded CESA for the tortoise and likely other identified species (e.g., desert bighorn sheep, etc.) is needed because the tortoise occurs in small populations dispersed among the Sonoran Desert. To ensure their persistence in the Monument, these small dispersed populations must have functioning linkage areas or habitats that ensure the genetic (e.g., genetic drift, etc.), demographic (e.g., small population size, etc.), and/or environmental (e.g., drought, invasive plant species, wildfires, climate change, etc.) variables individually or in combination do not result in the decline and extirpation of the tortoise in the Monument. In the section of the Draft RMPA/EA, BLM only mentions some of the environmental variables. Genetic and demographic variables are not analyzed in the Draft RMPA/EA. Please revise the cumulative impacts analysis in the Final RMPA/EA to include these variables.

In addition, we request that BLM add this project and its impacts to a BLM database and geospatial tracking system for special status species, including the Sonoran desert tortoise, that track cumulative impacts (e.g., surface disturbance, paved and unpaved routes, linear projects, invasive species occurrence, herbicide/pesticide use, wildfires, etc.), management decisions, and effectiveness of mitigation for each project. Without such a tracking system, BLM is unable to analyze cumulative impacts to special status species (e.g., desert tortoises) with any degree of confidence.

The Draft RMPA/EA should include an analysis of all the action alternatives and how the implementation of each one would result in "no net loss in quantity and quality of Sonoran desert tortoise habitat" (USFWS et al. 2015) as BLM committed to in the Candidate Conservation Agreement for the Sonoran Desert Tortoise (CCA; USFWS 2015).

Comments on Appendix 3 – Final Land Health Evaluation, Sonoran Desert National Monument Complex

Page 7, Precipitation: Please add that the Sonoran Desert receives low-intensity winter rains, as well as the isolated summer (July/August) "monsoon" thunderstorms (NPS Sonoran Desert Network Ecosystems https://www.nps.gov/im/sodn/ecosystems.htm). Summer "monsoon" storms are usually local in occurrence, can represent half or more of the annual rainfall, but usually

provide little soil moisture for plants to access because of their short duration and high runoff patterns. This seasonal variability in rainfall and its availability to plants and the objects identified in the Proclamation (including the tortoise) is crucial when understanding the effects its has on plant productivity and biodiversity. BLM should include this information when developing the alternatives and in its analysis of the environmental consequences for the alternatives.

Page 9, Soils: BLM says, "[o]nly the most common soils that are potentially accessible to livestock were included in this evaluation. Variables that limit livestock accessibility include slope (>30 percent), rockiness of terrain, and fencing/manmade barriers." We found no citation from the scientific literature to support this statement made by BLM. Please provide this documentation in the Fina EA.

In addition, we found information in the scientific literature that does not support this statement, Please see below.

Page 18, Sonoran Desert Tortoise: In this section, BLM says, the "CCA does state, 'there is little overlap in the habitat shared by livestock and SDT in most areas in Arizona (USFWS 2015).'" We appreciate that BLM clarified this statement by adding that "there is a potential for overlap to occur in areas that are classified as SDT [Sonoran desert tortoise] habitat and in areas that the LHE [Land Health Evaluation] defines as 'sandy bottom' in and around tortoise habitat."

There are many *recommended* [emphasis added] tortoise conservation measures in the 2015 CCA when grazing is implemented. We request that BLM describe the specific conservation measures for the tortoise that will be implemented, including the science-based measures that BLM is implementing to monitor the tortoise population in the Monument so BLM has verification that implementation of its management and mitigation for grazing is effective in ensuring the conservation of the tortoise as identified in the Presidential Proclamation.

The requirements for managing the tortoise in the Monument under the Proclamation are more stringent than the *recommended* [emphasis added] conservation measure in the CCA. While BLM may implement all the recommended management measures listed in the CCA, these measures would not necessarily result in the conservation of the tortoise in the Monument. Consequently, we request that BLM describe the conservation measures for the tortoise that will be implemented, and the monitoring and adaptive management that BLM will implement so BLM has verification that implementation of its management and mitigation for grazing and conservation measures for the tortoise are effective in ensuring the conservation of the tortoise as identified in the Presidential Proclamation. The conservation measures, grazing management, mitigation, monitoring, and adaptive management should be science-based for the tortoise, not livestock, because BLM is required to manage for the conservation of the tortoise. For example, the Range Health Evaluation is designed to measure range health for cattle, not for tortoises.

Pages 33 – 36, SDNM Complex Land Health Objectives: BLM has two standards for managing rangeland health for upland sites:

- Standard 1 - Upland Sites: Upland soils exhibit infiltration, permeability, and erosion rates that are appropriate to soil type, climate and landform, and
- Standard 3 - Desired Resource Conditions: Productive and diverse upland and riparian-wetland communities of native species
  exist and are maintained.

The emphasis is on rangeland health standards, that is, standards for managing the land for livestock, not tortoises.

To achieve rangeland health standards, for Standard 1, the majority (i.e., greater than 50 percent) of the plots representing the ecological site within the allotment are achieving at least two of the three rangeland health attributes (soil site stability, hydrologic function, and biotic integrity). An ecological site within an allotment achieves Standard 3 if the majority, greater than 50 percent, of the plots representing the ecological site are achieving DPC [Desired Plant Community] objectives.

However, on page 36, BLM reported, "Only perennial plants were the measured using these methods in order to relate the attributes of perennial vegetation communities to corresponding ESDs [Ecological Site Descriptions]. Annual plants were excluded from this study due to the inherent variability of occurrence and production." From this statement, we conclude that BLM does not collect data on annual vegetation when it inventories the vegetation in the Monument or use data on annual vegetation to determine whether a site meets rangeland health standards.

From this information, the Council concludes that BLM is assuming that managing BLM land to meet rangeland health will also manage these lands adequately to protect species identified in the Proclamation. Annual plants are part of the vegetation named in the Proclamation. Please see our comments above under Pages 26-30, "Vegetation, Noxious and Invasive Weed Species, Environmental Consequences - Biological Resources, Maximum Acreage Alternative, Reduced Grazing Alternative, and Ephemeral Grazing Only Alternative."

For many wildlife species named in the Proclamation, they are herbivores that forage directly on the native annual forbs (e.g., tortoise), or they are predators (e.g., mountain lion, gray fox, and bobcat) whose prey base depends on the native annual forbs for forage. Little native annual vegetation means little food available for prey species, which results in reduced prey available for the named predators, which results in reduced population size for named predators. The tortoise, especially relies on native annual forbs to meet its nutritional and physiological requirements so it can survive drought years. Thus, to manage objects identified in the Proclamation, BLM needs to monitor and manage native annual species.

In addition, many non-native invasive plants are annuals. According to a BLM webpage (https://www.blm.gov/programs/weeds-and-invasives/blm-control-strategies/arizona), they "destroy wildlife habitat and forage, threaten endangered species and native plants, increase soil erosion and groundwater loss, impact wildland fire risk, and damage recreational opportunities." Given their numerous impacts to natural resources including named objects in the Proclamation, BLM should be monitoring their occurrences and managing them to reduce their locations and abundance in the Monument. Please address this absence of management and monitoring of native and non-native annual plants in the Final EA.

Page 41, Precipitation: The data provided stop at 2018 Please include recent data in the documents and analyses.

Pages 41-42, Actual Use: Please add data from 2019 through 2023 to this document and BLM's analysis.

Page 42, Livestock Use Probability Map: "A livestock use probability map was developed to illustrate the distribution of potential livestock impacts near livestock waters that have been in operation over the past 10 years." Please add corrals and other facilities where livestock would congregate to this calculation and revise the Livestock Use Probability Map in the Final EA. Adding this information should change the results of the Livestock Use Probability Map for Class 1 – High Use Probability.

Page 44, Conclusion: BLM states, "The percentage of the three most common vegetation communities (creosote-bursage, palo verde-mixed cactus, and ephemeral wash) and wildlife habitat (bighorn sheep and SDT) failing to achieve Standards 1 and 3 are also summarized based on the proportion (percentage) each plot represents in the vegetation community/habitat area by allotment."

The Council is concerned that BLM believes that LHE Standards 1 and 3 are adequate to manage habitat for all age classes and life requisites for the tortoise and for all other identified species in the Proclamation. These two standards are general and BLM's implementation of them did not consider the specialized ecological requirements of the tortoise to meet the life requisites for all age classes of tortoises.

Pages 37-40, Livestock Utilization, Use Pattern Mapping, and Use Probability Mapping: BLM states, "Using the best available data, a livestock use probability map was developed to illustrate areas with and without expected livestock use across the SDNM Complex." On page 34, BLM defines areas with little livestock impact as "greater than 2 miles of [sic] livestock waters (See Appendix H)." BLM used the mean of the longest distances that livestock were reported from waters to arrive at this conclusion (see Table below). BLM reported that the maximum mean livestock were recorded from water was 0.7 mile for the shortest mean distance to 4.97 miles for the longest mean distance. BLM used data from studies conducted in Australia, Southern Mongolia, the Mojave Desert, Montana, and southeastern Arizona, with most of the studies located in the Chihuahuan Desert in southern New Mexico.

Average distance from water cattle traveled using the shortest and longest distance published by each paper.

	Distance (Miles)	
Publication	**Shortest**	**Longest**
Millward et al. 2020	2	2
Nash et al. 1999	0.7	0.7
Nyamuryekung'e et al. 2022	0.95	0.95
Fusco et al. 1995	0.994	0.994
Russell et al. 2012	1.056	1.056
Bailey et al. 2010	1.25	2.33
Herbel et al. 1967	3.5	3.5
Stumpp et al. 2005	0.932	0.932
Brooks et al. 2006	0.124	0.124

Ganskopp, D. 2001	0.721	0.721
Foran, B.D. 1980	1.864	1.864
Pickup & Chewings 1988	3.73	3.73
Pickup & Bastin 1997	4.35	4.97
Blanco et al. 2009	1.243	1.243
Fensham et al. 2010	1.25	3.75
Average	**1.64**	**1.92**

The data provided in this table by BLM show that in all but two papers cited, the shortest distance was the same as the longest distance. We are unsure how the shortest distance can be the same as the longest distance to measure the location of cattle from water. This implies one data point. This presents a question as to the reliability of the data and/or how BLM is using it.

We randomly selected two of the papers BLM cited, and reviewed them, Millward et al. (2020) and Russell et al. (2012). For the Millward et al. (2020) study, the data we found on distance to water was a graph of the frequency of cattle for three categories of distance from water – 0 to 1.6 km (<1 mi), >1.6 km to 3.2 km (>1 to 2 mi), and >3.2 km (>2 mi) for gentle terrain (see Figure 2 below). When cattle were observed greater than 3.2 km (2 miles) from water we found no information on the maximum distance they were recorded from water. "Cattle at the Corona Ranch used areas >1.6 km from water and even areas >3.2 km from water (Fig. 4) *where cattle are not expected graze* [emphasis added] (Millward et al. 2020)" (Figure 2 below). This statement by the authors may explain why the greatest distance from water category is open-ended – the authors thought that cattle would not travel more than 3.2 km (2 mi) from water. Thus, the graph of the data from Millward et al. (2020) show that cattle frequently occurred greater than 2 mi from water.

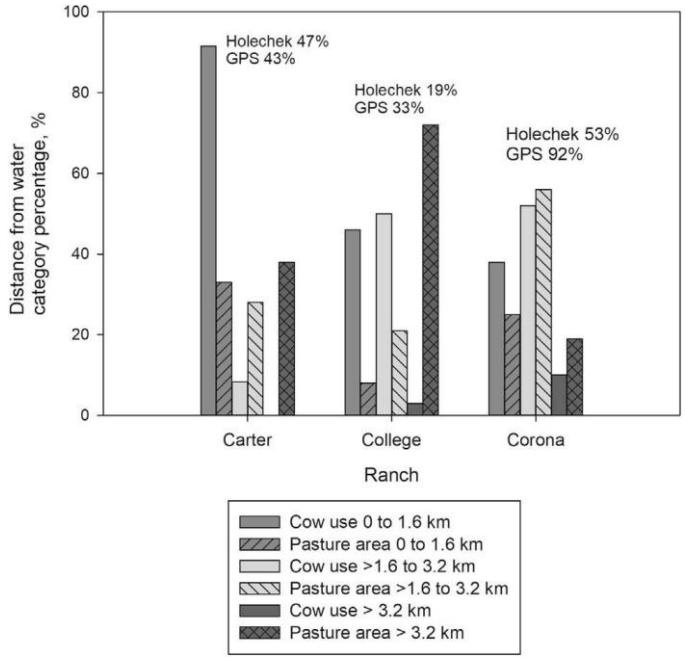


Figure 2. Percent of time GPS collared cattle spent at various horizontal distances from water. From Millward et al. (2020).

In reviewing the Russell et al. (2012) study in the Chihuahuan Desert, the distance to water in the Chihuahuan Desert was reported by season in 2008 and 2009 for three breeds. In winter 2008 and 2009, the least square means and standard errors (SE) reported were 1,049 m, 746 m, and 1,308 m [SE= 473; p= 0.74] and 698 m, 1,090 m, and 1,257 m 2 [SE=83, p= 0.44], respectively. In early summer it changed to 1,185 m, 1,029 m, and 964 m [SE= 69; p= 0.13]. In late summer the data reported were 1,276 m, 1,364 m, and 1,337 m, respectively [SE=164; p= 0.93]. We are unsure how BLM calculated the mean maximum distance to/from water using these data.

Russell et al. (2012) reported that in winter one breed of bovine traveled a substantially greater distance to water than other breeds. "The willingness of Brahman cows to travel was especially apparent in pasture 19 where they walked over 8 km [5 mi] from water near the western boundary to the northeast gate on a daily basis." In examining the data from winter, the Brahman breed traveled about 40 percent more to/from water than the Brangus breed traveled. While this figure is not the mean maximum distance traveled to/from water, it indicates that the breed of bovine and season are important factors in calculating the distances that cattle will move from water. It also indicates that using a metric such as the annual mean maximum distance to water does not capture the variability in livestock movement during the year. It may substantially underestimate the area used by livestock and would not be an accurate metric to use in mapping the anticipated impacts of livestock grazing on objects listed in the Proclamation and wildlife and ensure their protection.

Using the mean of a data set may greatly underestimate the distances traveled by livestock. We request that BLM revisit the method that it used to calculate the mean maximum distance traveled to water and include how factors such as season, breed, etc. may affect the results. BLM should err on the side of the protected objects (i.e., ensure that when several factors influence the variability of a metric, BLM includes this variability in its analysis to ensure that the objects listed in the Proclamation are being protected).

Using the results reported from these two papers, the Council contends that several factors influence the distance that livestock travel from water. These include the breed of cattle, ambient temperature, availability of forage, water content of forage, length of time and seasons livestock were monitored, whether the observations on the locations of cattle were opportunistic or continuously telemetered [please see percentages in the figure above for GPS data versus other methods], etc. Some of these factors are more important that others and likely change as environmental conditions change seasonally and annually. BLM did not account for these factors or their variability during the year and among years in their calculation of the distance that livestock travel from water. For the reasons stated above, we request that BLM revisit the methodology it used to calculate the distance that livestock travel to/from water.

In addition, we found no information that explained BLM's selection of the statistic it used to calculate this distance, the average of the maximum distance traveled from water. Usually, calculations include a metric that indicates whether there is a high probability of the resulting calculation being correct (e.g., 95%). Because of these many questions and discrepancies, we request that BLM explain their reason for selecting the average of the longest distance from water as the metric to use when assuming little livestock use. We request that BLM use a metric that has a high probability of accuracy when determining distance from water and applying these data to overlap to spatial overlap between cattle grazing and protected object such as the tortoise.

We reviewed another paper in the scientific literature that concluded that cattle could access and forage in areas that do not have gentle terrain. Cattle can acclimate to rugged terrain (Ganskopp and Vavra 1987, Bailey et al. 2004) and increase use when forage resources on gentler slopes are depleted (Garrison et al. 2016). Garrison et al (2016) reported that cattle that graze year round are likely acclimated to more rugged conditions. This would explain why the poor forage conditions they observed were on slopes steeper than 30 percent (Garrison et al. 2016).

However, we did not find that BLM discussed/included this paper on cattle use of areas larger than previously described.

Please include in the Final EA the information provided above on the areas/habitats used by tortoises and cattle in recalculating the potential geographic area of overlap in the Appendix. The findings suggest that there is likely more overlap with respect to habitats used by tortoise and cattle than calculated and reported by BLM.

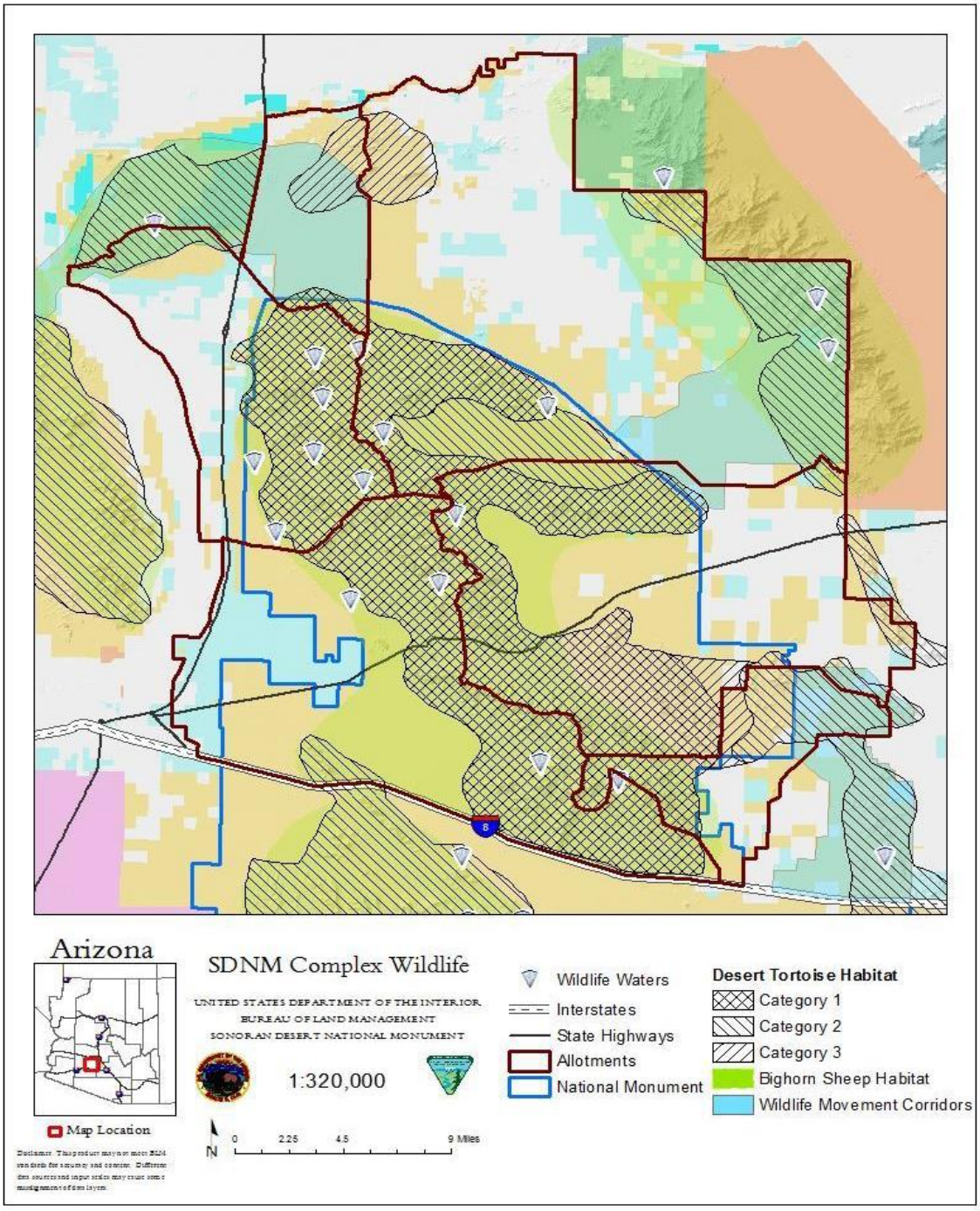
Connectivity among Tortoise Populations – Appendix 3 describes the locations of the tortoise as occurring "primarily on rocky slopes and bajadas of Mohave desert scrub and Arizona Upland and Lower Colorado River Valley subdivisions of Sonoran desert" (USFWS et al. 2015). However, this section does not mention the need to maintain connectivity between tortoise populations for long-term survival. BLM did provide a map of the wildlife corridors (Map 4.).

However, the needs of all species identified in the Proclamation for movement corridors are not the same. BLM should not assume that meeting the needs of one or a few species will meet the needs of all species identified in the Proclamation. Effective linkage areas with tortoise habitat should be identified so that tortoises in the Monument have the ability to move to nearby populations and maintain genetic diversity within and among populations. These functioning linkage areas are needed to ensure that the tortoise population in the Monument does not become an isolated population with no means to exchange genes with nearby populations. Isolated populations have a higher risk of extirpation from the loss of genetic variability and environmental and demographic stochasticity.

Sonoran desert tortoises exist in small populations dispersed throughout the Sonoran Desert (Sutor et al. 2023). "Sonoran desert tortoise populations were historically well-connected, as evidenced by little population genetic structuring throughout their range, suggesting that individuals are capable of making long-distance movements and that, over generations, dispersal between mountain populations has played a critical role in the species' evolutionary history (Edwards et al. 2004), at least in the absence of barriers."

The potential for the interpopulation movements that historically linked tortoise populations has been drastically reduced by the development of anthropogenic barriers, so much so that these movements have likely become impossible (Edwards et al. 2004, Sutor 2023). "The consequences of these barriers on movement or gene flow (e.g. reduced structural connectivity) may not become detectable until generations have passed (Sutor et al. 2023). "Tortoise populations approaching extirpation may heavily rely on immigrants from neighboring habitats" (Edwards et al. 2004).

In addition, the Sonoran desert tortoise is "a species that is considered highly vulnerable to climate change" (Griffis-Kyle et al. 2018, USFWS 2021). Failure to maintain connectivity habitats or improve degraded connectivity habitats would inhibit the potential northward range shift of the tortoise in response to climate change.



Map 4: Wildlife Habitat and Movement Corridors in the SDNM Complex
Desert tortoise habitat and wildlife movement corridor layers source: 2012 BLM LSFO/SDNM RMP

Management recommendations to ensure the tortoise will be conserved into the future especially with the impacts of climate change include "identifying areas where restoring connectivity between tortoise habitat patches should be explored" or identify at-risk or priority habitat to direct conservation efforts.

Recall that the grazing allotment boundaries extend beyond the Monument boundary so their management affects connectivity areas between the tortoise population in the Monument and other tortoise populations. The lands surrounding the Monument are managed for multiple use, military use, or development, consequently, the tortoises that occur in the Monument may become an isolated population unless suitable functioning connectivity habitat to other tortoise populations are identified and protected by BLM in the RMPA for the Monument. The only connectivity habitat identified in the RMP for tortoises are washes.

Suitable functioning connectivity habitats for the Mojave desert tortoise have been generally described by Averill-Murray et at. (2021) and apply the principles of conservation biology. Their characteristics include "[m]aintaining an ecological network of core habitats with tortoise populations connected by linkages. This arrangement is necessary to support demographically viable populations and long-term gene flow within and between the tortoise populations."

"Ignoring minor or temporary disturbance on the landscape could result in a cumulatively large impact that is not explicitly acknowledged (Goble, 2009); therefore, understanding and quantifying all surface disturbance on a given landscape is prudent." Furthermore, habitat linkages among tortoise populations "must be wide enough to sustain multiple home ranges or local clusters of resident tortoises (Beier and others, 2008; Morafka, 1994), while accounting for edge effects, in order to sustain regional tortoise populations."

The mean home range size for adult tortoises during Sullivan et al.'s (2016) 3-year study was 11.9 ha (range = 4–20 ha) for males and 12.2 ha (range 4–29 ha) for females. At another south-central Arizona site, Reidle et al.'s (2008) 5-year study reported the mean home range size for adult tortoises as 33.4 ± 28.9 ha for males and 14.8 ± 14.1 ha for females. Consequently, effective linkage habitats are not long narrow corridors or washes. Any development within them has an edge effect (i.e., indirect impact) that extends into the linkage habitat further narrowing or impeding the use of the linkage habitat, depending on the extent of the edge effect. Similarly, any development adjacent to linkage habitat may have an indirect impact that extends into the linkage habitat further narrowing or impeding the use of the linkage habitat depending on the extent of the effect.

Managers should ensure that the lands needed for connectivity between tortoise populations "does not become degraded by activities that may inhibit tortoise movement" (Sutor et al. 2023). This would include impacts from grazing that degrade tortoise habitat by various means (e.g., reduced availability of native annual forbs during the limited growing season because of consumption by livestock, introduction and spread of non-native invasive plant species with reduced nutritional and water content, etc.).

Appendix D Palatable and Key Forage Species

Pages 91 & 92: The key forage species that BLM selected to use in their LHE were: *Ambrosia dumosa, Ditaxis neomexicana, Janusia gracilis, Justicia californica, Krameria grayi, Krameria erecta, Lyrocarpa coulteri, Pleuraphis rigida, Sphaeralcea* spp., *Trixis californica*, and *Muhlenbergia porteri*. An additional 24 palatable species were selected. Most of these species are trees and woody shrubs, which are species that are not usually used by tortoises for forage. No annual forbs are included or species from the genera *Lupinus*, *Lotus*, or *Astragalus* that the tortoise relies on for growth and recruitment. This information supports the Council's concerns that BLM is managing vegetation for livestock forage and not for the forage needed by the identified objects including the tortoise.

When implementing the Random Plot Monitoring Methods to determine plant cover and density, annual species are not included in this count of plant density.

Below we provide BLM with information on the dietary needs of tortoise. BLM should include this information in the Final EA, demonstrate how this information was used to develop alternatives, and analyze how each alternative would protect these vegetation resources needed by the tortoise population in the Monument to survive, recruit tortoises into the population through reproduction, and be viable.

Dietary Needs & Forage Utilization: Murray and Wolf (2013) reported that adult and juvenile tortoises showed differences in their dietary niche and degree of specialization. During the growth period for neonate and juvenile tortoises, they had more specialized diets while adult tortoises has more generalized diets (Murray and Wolf 2013). For juvenile tortoises, their reduced gut capacity and shorter retention times as well as their smaller and weaker mandibles limit their foraging to relatively low-fiber, leafy C3 forbs whose availability may be temporally and spatially restricted. This finding indicates that for recruitment to occur in tortoise populations, specific plants must be available and consumed by these tortoises so they may grow and replace the adult tortoises in the population to sustain a tortoise population.

Murray and Wolf (2013) suggest that juvenile Sonoran desert tortoises may emerge from winter brumation earlier than adults to take advantage of cooler conditions in late winter/early spring, when their preferred forbs have just emerged, their heights make them accessible to small tortoises, and their chemical composition meets their constrained physiological needs. Thus, when managing for the tortoise, this early emergence in late winter/spring or periodic emergence during winter should be included in the management of availability of native vegetation for neonate and juvenile tortoises.

Regarding the preferred plant species that tortoises consume, Murray and Wolf (2013) offer that Oftedal (2007) and others reported that C3 forbs, and especially plants in the genera *Lupinus*, *Lotus*, and *Astragalus* are likely to make up a major portion of the biomass ingested in the spring. When implementing the LHE and DPC methods, BLM did not include annual forbs or forbs from these genera. Consequently, BLM is not measuring the availability of a limited and limiting resource that is needed by the tortoise for recruitment to maintain the population in the Monument. If an adequate number of tortoises are not recruited into the tortoise population in the Monument, it will decline and be extirpated.

In addition, for current and future climatic and habitat conditions, a shift to a warmer and drier climate coupled with invasive C4 grass-fueled fire regimes may significantly alter the availability of the plant resources required by desert tortoises to balance their energy and nutrient budgets, primarily through the reduced availability of C3 forbs and shrubs. This has the potential to negatively impact the growth and fitness of desert tortoises, particularly juveniles with a high degree of dietary specialization on C3 forbs (Murray and Wolf (2013). BLM should add this information on the nutritional requirements of the tortoise to the Final RMPA/EA and demonstrate how this information was analyzed to develop the grazing alternatives in the Draft EA that would protect these vegetation resources needed by the tortoise population in the Monument to survive, recruit tortoises into the population through reproduction, and be viable.

Below we provide BLM with information on the dietary variation in cattle and the impacts of grazing on desert shrublands including the Sonoran Desert. BLM should include this information in the Final EA, demonstrate how this information was used to develop alternatives, and analyze how each alternative would impact these vegetation resources needed by the tortoise population in the Monument to survive, recruit tortoises into the population through reproduction, and be viable.

Cattle are primarily grazers (Garrison et al. 2016), with diets of mostly grasses, with forbs and shrubs seasonally important (Rosiere et al. 1975, Hakkila et al. 1987, Daniel et al. 1993). Cattle forage on shrubs (e.g., >20% daily intake; King and Workman 1984, Daniel et al. 1993, Martinez et al. 1997) with consumption increasing as preferred forage (i.e., grasses) declines (Chaikina and Ruckstuhl 2006, Fulbright and Ortega-Santos 2006), during dry periods (Daniel et al. 1993, Stewart et al. 2002) or when grazing intensity is high (Willms et al. 1980, Kie et al. 1991). However, few of the key forage species BLM uses for the Monument are perennial grasses. This indicates that BLM considers cattle to be primarily browsers in the Monument. In addition, we found no information that BLM used data on the abundance of perennial grasses in the Monument or on the diet of cattle in the Monument (e.g., observation, fecal analysis) to determine whether forbs and shrubs are seasonally important, important during dry periods, or when grazing intensity is high (e.g., ephemeral grazing), and to what degree. This information is important because grazing is occurring in a desert environment with seasonal and annual fluctuations in dry periods, and longer periods of drought with increasing impacts from climate change. BLM should assess these data in its analysis of impacts to the tortoise and other identified objects.

Livestock grazing impacts desert shrublands in numerous ways. Regardless of season of use or grazing intensity, domestic livestock generally influence ecosystems by: (1) removing vegetation through grazing; (2) trampling soils, biotic soil crusts, and vegetation; (3) redistributing nutrients via defecation and urination; (4) dispersing or creating favorable conditions for the establishment and dominance of exotic organisms, including noxious plant species and pathogens. Grazing spreads invasive annual grasses by removing native perennial grasses (Reisner et al. 2013; Rosentreter 1994; Chambers et al. 2007; Belsky and Blumenthal 1997), disturbing soils (Olff and Ritchie 1998), and damaging biological soil crusts. Livestock distribute annual grass seeds across the landscape through their hooves, fur, and digestive tracts (Schiffman 1997; Olff and Ritchie 1998; Chambers et al. 2014; Mack 1981; Knapp 1996). Many exotic plant species that have appeared or proliferated since the introduction of livestock in the mid-nineteenth century evolved under continuous grazing pressure and are well-adapted to the disturbed conditions caused by livestock grazing.

These four influences *interact* [emphasis added] to result in significant physical and biotic alterations of ecosystem structure and function (Kauffman et al. 2022). Among other shifts in ecosystem structure and function, alterations include modified fire cycles, increased soil erosion, lowered water holding capacities, and decreased infiltration rates in soils.

These effects result in significant sources of greenhouse gases through enteric fermentation and manure deposition; shifting the landscape function from carbon sinks to sources of greenhouse gases; exacerbating the effects of climate change on ecosystems by creating warmer and drier conditions (Kauffman et al. 2022). Please include this information in the analysis of impacts to identified objects.

Appendix A – Executive Summary: Methodology and Process in Appendix 3

Unfortunately, there are no page numbers in Appendix 3. We will use the page number identified by the pdf software.

Page 75: "The absence of livestock grazing on the majority of the allotments that make up the SDNM since the 2012 LHE, inconsistencies of monitoring protocols, and incomplete documentation of monitoring protocols has continued to prevent the BLM from ascertaining the trend of potential livestock impacts on the SDNM."

"Between 2016 and 2018, the BLM re-inventoried the soils and vegetation and collected additional monitoring data to assess land health and provide well documented and repeatable monitoring data to inform the development of new DPC [desired plant community] objectives for the seven most prevalent ecological sites within the allotments that make up the SDNM." What changed that caused BLM to develop new DPC objectives? This statement indicates that the past DPC objectives were no longer acceptable. Please add this information to the Final RMPA/EA.

In addition, we are unsure how BLM is able to show a trend of potential livestock impacts when it has data from one point in time. Determining trend requires a minimum of comparing data collected at least two times, and more to be statistically meaningful.

Page 76: "The BLM has implemented these new methods to evaluate land health and provide a rationalized basis for grazing management decisions on the SDNM Complex." Our interpretation of this statement is that BLM has developed new methods to justify their grazing management decisions. This approach appears to be contrary to the NEPA regulations (40 CFR 1502.16, 1502.24), and the wording suggests that the scientific process was not implemented properly – it did not ask the appropriate question when designing the study. The question that BLM still needs to answer in the Final EA is: Are the ecological needs of the protected objects being protected under each of the alternatives presented including the baseline condition?

Page 77: "The Department [of the Interior] *intends* [emphasis added] that assessments and corrective actions will be undertaken in priority order as determined by BLM." This statement is not assuring. For example, there has been ongoing trespass cattle grazing in tortoise critical habitat and Areas of Critical Environmental Concern for years with population data indicating substantial declines in tortoises, yet BLM has done nothing to correct these impacts. In addition, BLM has a history in Arizona of not conducting LHEs for several years including after major disturbance

events. For example, the White Hills Area in Arizona was evaluated in 2000, 2007, and 2017. This infrequent monitoring is especially of concern because there was a fire in 2005. Grazing combined with wildfire facilitate the establishment and proliferation of non-native annual grasses such as red brome. As provided earlier, the establishment and proliferation of non-native plants provides fuels to carry wildfires and substantially impact native desert vegetation that did not evolve with wildfires. This allows for more proliferation of invasive non-native plants and more fuels to carry fires, establishing the invasive plants – wildlife fire cycle in desert plant communities.

Appendix F - SDNM Complex Livestock Use Probability Map

In this appendix, BLM presents the results of a modeling exercise to determine cattle distribution. Also presented in this appendix are the assumptions BLM made in developing this model. These include that all waters are used evenly when functional, wells are always functional, forage quality is evenly distributed across the landscape, and all livestock breeds and ages use the landscape in a similar fashion, among others. These are major assumptions that are not likely met in any year. If these assumptions are not being met at the SDNM Complex, the results would have a much lower probability of being correct.

In addition, we found no information in the Draft EA that this model was verified in the field to determine its accuracy. This is paramount when developing and using ecological models, especially when used to make management decisions.

The Council contends that BLM's livestock use probability map has little useful information in analyzing impacts or making management decisions, because of the many assumptions it violates, it has not be field tested, and that it did not consider other conditions that affect livestock use (e.g., breed, season) (please see information presented). The map should not be used to determine the impacts of livestock grazing on the protected objects because of its inaccuracy.

Comments on the Draft Finding of No Significant Impact

Page 5, 1) Impacts that may be both beneficial and adverse – BLM states, "Under the Proposed Action, livestock grazing would be available on all allotments within the SDNM north of I-8 and economic contributions from livestock grazing would be the highest. This would result in beneficial and long-term impacts to livestock grazing and socio-economics."

In addition to the socio-economic costs/benefits to the six permittees and the local businesses they use, BLM should include in the Final RMPA/EA an analysis of the socio-economic costs and benefits to the public. We suggest using the topics discussed in Kauffman et al. (2022) when conducting this analysis. They have calculated the costs of an AUM ($1.35), the estimated social cost of greenhouse gases arising from a cow-calf pair on public lands (almost $36), and the administrative costs for managing livestock grazing on public lands (estimated at $8-$12 per AUM). Additional costs not calculated in the greenhouse gas emission calculations include trucking livestock to meat processing facilities, fencing, maintenance of water developments and hauling mineral supplements and water (likely to increase with climate change), invasive species management, and social costs from losses in biodiversity, and carbon sequestration capacity of the lands grazed.

Page 5, 3) Unique characteristics of the geographic area – BLM states, "'Objects' identified in the Proclamation were the following:

• Functioning desert ecosystems;
• Diversity of plant and animal species;
• Saguaro cactus forest;
• Scientific analysis of plant species and climates in past eras;
• Vegetation communities;
• Wildlife; and
• Archeological and historic sites."

The Council contends this statement is not correct. This is a summary and general grouping of the objects identified in the Proclamation. The objects identified in the Proclamation included individual plant and animal species and named vegetation associations. Thus, BLM is directed to protect these specific objects. Please correct this information in the Finding of No Significant Impact (FONSI).

Page 6, 4) The degree to which the effects on the quality of the human environment are likely to be highly controversial – BLM says, "The BLM received 62 public comment emails and letters to consider. None of the comments indicated any substantial dispute in the scientific community over the nature of the effects from the Proposed Action."

The Council is not sure how BLM knows before the public comment period for the Draft RMPA/EA closes how many comment letters it will receive on the subject document or what the comments will be. We suggest that for this and future draft FONSIs, BLM should leave this part of the sentence blank and add the relevant information after it becomes available.

Herein, we dispute BLM's analysis of several of the effects of the proposed action, including ephemeral grazing, especially regarding its impacts on the tortoise and native annual vegetation and the absence of science and probability BLM used in its methods. One specific area was the method used to calculate the distance from water by livestock. BLM ignored and did not consider several factors that can substantially influence the distance that cattle occur from water and that vary by season. BLM decided to use a simple arithmetic calculation to determine the maximum distance that cattle occur from water in the Monument and provided no information on the probability of this calculation being correct. BLM did not update its information on the habitats used by tortoises, instead citing a publication from 2015. Since 2015, there have been additional scientific papers published on how tortoises use other habitats.

The Council opposes grazing in the Monument until BLM can demonstrate that its implementation would protect the tortoise population in the Monument, which is what the Proclamation requires. This approach is different than BLM's which is to demonstrate that ephemeral grazing does not substantially impact the wildlife in the Monument. In our comments, we provide data that BLM did not include in its discussion and analysis on the impacts of the ephemeral grazing alternative as well as the other grazing alternatives.

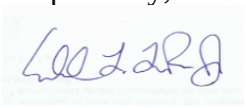
Page 6, 5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks – BLM says, "There are no highly uncertain or unknown risks associated with the Proposed Action, which would allocate livestock grazing allotments in the SDNM north of I-8 as available. Known risks to the human environment would be minimized or reduced through implementation-level decisions."

Grammatically, we agree that there are no unknown risks; if we can identity a potential risk, then it is a known risk, not an unknown risk. What is unknown is the probability of the risks occurring and the degree of severity of impacts to the tortoise and identified objects from the impacts. We suggest that this criterion be reworded and replace "uncertain" with "unknown."

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 Desert Tortoise Council at eac@deserttortoise.org of any proposed projects that BLM may authorize, fund, or carry out in the range of any species of desert tortoise in the southwestern United States (i.e., *Gopherus agassizii*, *G. morafkai*, *G. berlandieri*, *G. flavomarginatus*) so we may comment on them to ensure BLM fully considers actions to conserve these tortoises as part of its directive to conserve biodiversity on public lands managed by BLM.

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

Respectfully,



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