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Via email only

13 June 2018

Attention: WMRNP Plan Amendment
Bureau of Land Management, California Desert District
22835 Calle San Juan de Los Lagos
Moreno Valley, California 92553
blm_ca_wemo_project@blm.gov, cawemopa@blm.gov

RE: Draft Supplemental Environmental Impact Statement (Draft SEIS) and draft Land Use Plan Amendment (Draft LUPA) for the West Mojave Route Network

Dear Bureau of Land Management,

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

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats occupied by Agassiz's desert tortoise (*Gopherus agassizii*), our comments pertain to enhancing protection of this species while the Bureau of Land Management (BLM) formulates a route network that will promote rather than detract from tortoise recovery. The Council submitted scoping comments on 3 June 2015 on the 2015 Draft SEIS for the West Mojave Route Network, which are herein incorporated by reference. Many of the concerns expressed at that time persist, as the Preferred Alternative in the 2018 Draft SEIS and Draft LUPA would have serious irreversible impacts on Agassiz's desert tortoise and their essential habitats. Unless otherwise noted, referenced page numbers given below and in the attached tables are found in the current Draft SEIS dated January 2018, and "critical habitat" refers to that formally designated by the U. S. Fish and Wildlife Service (USFWS 1994a) for desert tortoise.

Compliance with Court Remand

A federal court's partial remand of the 2005 West Mojave (WEMO) Plan directed BLM to consider new data and policies, emerging issues, and changing circumstances that have occurred since the 2006 WEMO Plan Record of Decision (ROD) was signed (BLM 2006). However, it appears that BLM has been selective or arbitrary in its consideration of new data, emerging issues, and changing circumstances since the 2006 WEMO Plan ROD. We were unable to find that BLM has included new data and changing circumstances regarding wildlife resources, especially for listed species under the federal Endangered Species Act (FESA), which are a public trust resource on BLM land. We believe that BLM is obligated by statutes, regulations, executive orders, and policies to manage for the recovery, sustainability, and environmental quality of listed species and wildlife resources. However, in all of BLM's alternatives, they are proposing land management decisions/actions that appear to maintain or increase adverse effects to wildlife resources, some of which have been declining. Such proposals will not result in recovery, sustainability, or environmental quality for listed species and wildlife resources, particularly the desert tortoise.

The Public's Understanding of the Draft SEIS/Plan

Included in the Council's attached tables are 138 specific comments on the Draft SEIS that refer to numerous errors, inconsistencies, word omissions, and unclear language in the document. Because of these issues, we find it difficult to understand many of the proposed management actions in the Draft SEIS and the reason(s) for them. The general public is one of the target audiences of this Draft SEIS (40 CFR 1502.1, 40 CFR 1502.8). The Council, which has several years of experience reviewing EIS documents including BLM's, found it difficult to understand. If the Council had difficulties in understanding, we presume that it was as difficult or more so for the public to understand this Draft SEIS. Therefore, we request that BLM reissue the Draft SEIS for public review after revising the document so the public may review the alternatives with a clear understanding of what BLM is proposing in the Draft SEIS.

Implementation, Enforcement, Monitoring, and Mitigation Plans

We were unable to find an implementation plan, enforcement plan, or monitoring plan included in the any of the action alternatives. BLM needs to include these plans to show how, when, and where its management plan will be implemented and determine its effectiveness through monitoring as required by the Federal Land Policy and Management Act (FLPMA) and other laws, executive orders, and policies. An implementation schedule should be included in the implementation, enforcement, and monitoring plans to demonstrate to and assure the public that the management plan will be implemented, enforced, and monitored. In addition, we believe, there should be a mitigation plan to restore habitat damaged or destroyed from unauthorized surface disturbance including unauthorized off-highway vehicle (OHV) activities. Implementation of the mitigation plan would be commensurate with the impacts to the affected resources (e.g., desert tortoise and tortoise habitats). It would be funded, in part, by monies collected from recreation fees and from citations issued to unauthorized users. Appendix A provides an example of the need for these management plans with implementation schedules.

Information to Assist BLM in Making the Proposed Changes in the WEMO Plan

We believe that BLM's development of alternatives, selection and implementation of an alternative, and monitoring should comply with applicable statutes, regulations, executive orders, and policies such that the result is the sustained yield of the desert tortoise and environmental quality for this species (see Appendix A).Within this legal/regulatory framework, BLM should gather and analyze all applicable data from the scientific literature, and using the scientific process, develop alternatives, and select, implement, monitor and adaptively manage this alternative to achieve the legal, regulatory, and policy requirements. To assist BLM in these efforts, we have compiled a summary of some legal, regulatory, and policy requirements and relevant data, a summary of information, and references on the desert tortoise and the effects of roads and grazing, which are included in Appendix A.

Information on Agassiz's Desert Tortoise and Effects of OHVs and Livestock Grazing for BLM to Use When Designating Areas for OHV Use and Livestock Grazing

In Appendix A, the Council is providing information to BLM on the desert tortoise, OHV use, road density, and grazing that is relevant to the discussions BLM needs to expand in the Final SEIS. We request that BLM include this information in the Final SEIS so that it will be available to the public and the decision makers. In addition, we request that BLM use this information during their process of designating open, limited, and closed areas in the West Mojave Planning Area; in determining routes that will be open for use or for limited use or closed for motorized and mechanized vehicles in open and limited areas; and in locations it permits livestock grazing and the amount of use.

In Appendix A, we reiterate information from the desert tortoise recovery plans to show that the adverse effects of OHV use and livestock grazing on the desert tortoise and its habitat have been documented in the scientific literature for decades. Using this information, two recovery teams of scientists prepared a recovery plan (USFWS 1994b) and revised recovery plan (USFWS 2011) with management actions that would recover the tortoise. To date, most of these management actions have not been implemented on public lands in the California Desert Conservation Area (CDCA). Given BLM's mandates under FLPMA, section 7(a)(1) of the FESA, and other requirements, we believe BLM can and should be implementing the recovery actions on its lands regarding OHV use, livestock grazing, and habitat restoration.

Status and Trend for Agassiz's Desert Tortoise in the West Mojave:

The following statement given on page 3.4-112 of the Draft SEIS does not constitute a threats analysis: "Threats to desert tortoises within the WEMO Planning Area have not changed from the previous analysis provided by the 2005 WEMO Final EIS (BLM 2005) and associated 2006 Biological Opinion, except as discussed herein [then, with no apparent discussion]. For a discussion of these threats, please refer to the 2006 Biological Opinion in Appendix F." Readers unfamiliar with the literature on the impacts of roads on tortoise habitats and animals receive no pertinent information to help them judge the beneficial and adverse impacts of BLM's Preferred Alternative. Information given in Appendix A is intended to supplement an informed threats analysis, which is missing from the Draft SEIS.

BLM states there are "appreciable declines" (page 3.4-109) and "The population of desert tortoise in the West Mojave Recovery Unit, which encompasses the WEMO planning area, shows a downward trend" (3.4-110) without citing any recent USFWS trend data. In fact, in the planning area in critical habitat, tortoise populations have declined between 51 and 62% from the three westernmost critical habitat units. The truncated, generalized information given in the Draft SEIS in no way provides the level of analysis required for such an important project, and is considered to be deficient in the extreme. In general, the paucity and inaccuracy of information given in the Draft SEIS leads us to conclude that it was not written by knowledgeable biologists, or if so, they failed to review the current literature to draft these essential portions of the document.

As given in the attached tables and supplemental information included in Appendix A, we are very concerned that BLM has failed in this Draft SEIS to adequately address significant declines in Agassiz's desert tortoise populations in the planning area. Therefore, Tables 1 and 2 in Appendix A provide this missing information. In the West Mohave Planning Area, there are three tortoise populations and BLM has designated three desert tortoise Areas of Critical Environmental Concern (DT ACECs) that overlap these populations. In 2015, the USFWS reported that the population densities of the Fremont-Kramer, Ord-Rodman, and Superior-Cronese populations were 2.6, 3.6, and 2.4 tortoises per km^2, respectively (USFWS 2015). These densities are below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) reported in the recovery plan (USFWS 1994b). Between 2004 and 2014, these three tortoise populations declined by 50.6, 56.5, and 61.5 percent, respectively (USFWS 2015). Most of this period of decline occurred after the 2006 record of decision for the West Mojave Plan.

Request for Major Changes to the SEIS

The 1980 CDCA Plan (BLM 1980) stated, "All public lands are to be designated as open, limited, or closed to OHVs. These designations are to be based on the protection of the resources of the public lands, promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands."

In reviewing the alternatives in the Draft SEIS, we did not find information that showed that BLM's preferred alternative or the other alternatives would result in sustained yield of the desert tortoise and maintenance of environmental quality for it. We did not find that BLM's action alternatives were in compliance with the laws, regulations, executive orders, and policies regarding the tortoise and its conservation or the management of off-highway vehicles as summarized in Appendix A. We request that BLM clearly show in the Final SEIS how their alternatives comply with applicable federal laws, regulations, and policies regarding the desert tortoise and its habitats, especially at the population level.

By not using science, not considering all the available relevant data for the resources BLM is charged with sustaining, and not showing how these data are used to develop its management plan, BLM has not shown the path of reason or logic that it used to develop the alternatives in the Draft SEIS. This gives the appearance of favoring certain land uses/resources over others when there is no overarching legal requirement to do so, ignoring other legal requirements (e.g., biological resources – listed species), selectively using data while ignoring other data (e.g.,

providing acres of habitat with no information on the quality of that habitat, habitat connectivity, and a population's viability), and/or being arbitrary in its plan development. We request that BLM be open and transparent in the data that it used to develop the alternatives in the Draft SEIS, that it share these data with the public, and that it clearly show its path of reason or logic in developing the alternatives in the Final SEIS using all relevant scientific data for the resources to be affected as the foundation of this Draft SEIS. Again, a significant amount of information excluded from the Draft SEIS is given in Appendix A.

We request that BLM provide scientific data on how implementation of each of the alternatives it proposes in the Draft SEIS will result in the sustained yield of the desert tortoise and maintenance of environmental quality for this species. We presume that with the passage of FLPMA and the completion of the CDCA Plan in 1980 that this is the benchmark for measuring these requirements and that the purpose of FLPMA and establishing the CDCA was to, as a minimum, maintain or preferably improve sustained yield and environmental quality. We presume this because of Congress' declaration that "the California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed; the California desert environment and its resources, including certain rare and endangered species of wildlife, plants, and fishes, and numerous archeological and historic sites, are seriously threatened by air pollution, inadequate Federal management authority, and pressures of increased use, particularly recreational use, which are certain to intensify because of the rapidly growing population of southern California; and the use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations."

We believe the data we provide to BLM in Appendix A show that if BLM is to manage for the survival and sustainability of the desert tortoise in the four DT ACECs in the West Mojave Planning Area, BLM needs to close as much of the DT ACECs to OHV use as possible, enforce these closures, and restore habitat in these closed areas, BLM needs to implement the lessons learned from its cooperative agreement with the Desert Tortoise Preserve Committee at the Desert Tortoise Research Natural Area (DTRNA). Because of the tortoise's strategy for survival and the time the Mojave Desert soils and vegetation need to heal from degradation and destruction, the response to implementation of these management actions will take decades before producing positive results.

In the Draft SEIS "The designation of all acreage as Open, Limited, or Closed to OHV use is required as part of the Land Use Planning (LUP) process for each planning area. The CDCA Plan, which includes the WEMO Planning area, includes OHV area designations. No changes to these designations were proposed in the 2006 WEMO Plan or the recently adopted DRECP LUPA, and none are being considered in this current plan amendment effort." Given the available data on the status of the tortoise in the three DT ACECs, the status of the tortoise in the DTRNA, and the effects of OHVs and OHV routes on the desert tortoise and its habitat (including critical habitat), we believe these data clearly show the need to close as much of these DT ACECs routes and areas as possible, and that implementing the Preferred Alternative would fail to do that.

With proposals such as opening Cuddeback Lake in the Fremont-Kramer Critical Habitat Unit and Coyote Lake in the Superior-Cronese Critical Habitat Unit to unrestricted OHV use and introducing new competitive events into these and the Ord-Rodman Critical Habitat Unit, it is not clear that the BLM is aware that there have been significant decreases in tortoise populations, ranging from 51 to 62%, in these three areas (USFWS 2015) or that increasing recreational activity in critical habitat areas is counterproductive to tortoise recovery.

We contend that the Preferred Alternative given in the Draft SEIS will result in adverse modification of critical habitat by opening designated areas in the two basins encompassing Cuddeback Lake and Coyote Lake, introducing competitive vehicle events into these and other areas designated as critical habitat, and rescinding educational permits to recreational vehicle users in the Rand Mountains. We contend that the Preferred Alternative will exacerbate recovery in a population that has already decreased by half since the original West Mojave Plan record of decision was signed in 2006 (BLM 2006). And that, with or without knowledge of these declines, BLM staff writing the Draft SEIS now propose counterintuitive actions in the Preferred Alternative that will further contribute to these declines.

In reviewing and applying this information, we conclude that none of BLM's alternatives will result in sustained yield of or maintenance of environmental quality for the desert tortoise. In addition, we conclude that none of the alternatives will contribute to the recovery/show an improvement in the status of the desert tortoise. Consequently, BLM needs to develop new action alternatives for its travel management route designation that will meet the requirements of FLPMA, FESA, and the California Endangered Species Act (CESA). Such alternatives would need to eliminate or substantially reduce open motorized routes in the DT ACECs and to a lesser extent in linkage areas per the information in Appendix A and information provided by BLM in the Draft SEIS on the status of the tortoise in the DTRNA. Please consider this a formal request that BLM produce a new suite of action alternatives that comply with the requirements of FLPMA, FESA, CESA, executive orders, and the BLM manual.

BLM should revise the Draft SEIS such that the development and implementation of route designation plans and grazing management plans (1) follow law, regulation, and policy and (2) use science and relevant available data, implement the scientific process, and include these data/the process:

- as the basis for the development and implementation of its plans, decisions, and management actions;
- to identify/monitor problems with resources it is charged with managing, not using science to develop and implement solutions,
- to monitor the effectiveness of management actions to solve problems and improve/sustain resources, and
- to modify management actions when monitoring data show little or no effectiveness of the management actions (adaptive management).

On the inside of the front cover of the Draft SEIS is printed "The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving

natural, historical, cultural, and other resources on public lands." We request that BLM fully implement its mission and effectively manage outdoor recreation and grazing to conserve natural resources (e.g., the desert tortoise) for the use and enjoyment of future generations. BLM can do this by making changes to the Draft SEIS and using science and laws/regulations in the Final SEIS.

For all the reasons that we provided above, we request that BLM prepare and present only action alternatives in the Final SEIS that comply with laws, regulations, executive orders, and policies such that the travel and transportation plan and grazing plan contribute substantially to the conservation of the tortoise. This is critically needed because population numbers and habitats for the tortoise have declined substantially since the establishment of the CDCA from ineffective management not rooted in science. Rather than improving conditions that facilitate recovery, the tortoise has declined in status and trend such that it likely meets the definition of endangered.

Once an alternative is selected that meets the legal, regulatory, and policy requirements and uses science in its development, we request that BLM implement and enforce its goals, objectives and management measures, monitor the effectiveness of implementation especially those actions implemented to contribute to recovery and effectiveness of enforcement, and implement adaptive management based on monitoring results. The development of the alternatives and the implementation, enforcement, monitoring, and adaptive management of the selected alternative all must be supported by science and follow the scientific process. Herein and in the future, the Council offers our assistance to BLM regarding the desert tortoise in the development of science-based alternatives.

In reviewing Appendix A of the Draft SEIS, which includes scoping comments, we note that the comments provided by Sid Silliman on behalf of the Council are referenced, but that those submitted on 3 June 2015 by the Council are not listed in Appendix C, which is a subpart of Appendix A. In reviewing the current Draft SEIS, it is apparent that most of our 243 formal comments submitted to the BLM on 3 June 2015 are not addressed and that the current Draft SEIS has failed to consider our persisting concerns. As such, we consider the Draft SEIS to be deficient. We incorporate our earlier comments by reference and resubmit them here in a separate attachment to be considered, apparently for the first time, by BLM staff for the Final SEIS.

Whereas the above observations express our concerns in a generalized manner, we are attaching a series of tables that include 138 specific comments we expect the BLM to address. We expect the specific deficiencies identified in the attached tables to be addressed with new, supplemental data in the Final SEIS. It will not suffice for BLM staff to respond with "comment noted," as most of the attached comments identify specific data that are missing from the draft that must be included in the Final SEIS if the deficiencies are to be remedied.

We appreciate this opportunity to provide input and trust that our comments will further protect tortoises during authorized project activities. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other BLM projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this particular project is provided to us at the contact information listed above.

Regards,

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

Literature Cited

(Only references cited in the above cover letter by the Council are included in the following list. For those occurring within quoted text from the Draft SEIS, the reader is referred to Chapter 8 of the Draft SEIS for those references). Appendix A includes additional literature.

U.S. Bureau of Land Management (BLM). 1980. California Desert Conservation Area Plan, as Amended. Prepared by the Desert District, Riverside, CA.

U.S. Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan, a Habitat Conservation Plan and California Desert Conservation Area Plan Amendment. Dated January 2005. Moreno Valley, CA.

U.S. Bureau of Land Management. 2006. Record of Decision: West Mojave Plan, an Amendment to the California Desert Conservation Area Plan 1980. Dated March 2006. Sacramento, CA.

U.S. Fish and Wildlife Service (USFWS). 1994a. Endangered and threatened wildlife and plants; determination of critical habitat for the Mojave population of the desert tortoise. Federal Register 55(26):5820-5866. Washington, D.C.

U.S. Fish and Wildlife Service. 1994b. Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. Pp. 73, plus appendices.

U.S. Fish and Wildlife Service. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pp.

U.S. Fish and Wildlife Service. 2014. Status of the desert tortoise and critical habitat. Unpublished report available on the Desert Tortoise Recovery Office's website: "02/10/2014 Status of the Desert Tortoise and Critical Habitat (.704MB PDF)." Reno, NV.

U.S. Fish and Wildlife Service. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. 44 pages.

U.S. Fish and Wildlife Service. 2017. Status of the desert tortoise and critical habitat (dated 11 October 2017). Unpublished report prepared by the Desert Tortoise Recovery Office of the USFWS. Reno, NV. 24 pages.

Draft Environmental Impact Statement West Mojave Route Designation Draft Supplemental Environmental Impact Statement (Draft SEIS) Comment Tracking Form by Desert Tortoise Council – 13 June 2018					
Comment #	**Page Number**	**Section Number**	**Figure Number**	**Table Number**	**Comment and/or Reference** **Please see references given in the cover letter or Appendix A for literature citations that follow**
1	Inside front cover of EIS, 3.4-107	3.4.3.2.3 Desert Tortoise	-	-	On the inside of the front cover of the Draft SEIS is printed "The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands." At the end of this comment table, we have attached Table 1 from Linda Allison (USFWS 2015) that shows the trend for tortoise populations throughout its range from 2004 to 2014. For the West Mojave Planning Area, the Fremont-Kramer, Ord-Rodman, Superior-Cronese, and Pinto Mountain tortoise populations had a change in population density that declined 50 percent, 56 percent, 61 percent, and 60 percent, respectively, from 2004 to 2014. In comparison, the average change range-wide for the tortoise was a decline of 32 percent. The densities of the four West Mojave Planning Area tortoise populations were 2.6, 3.6, 2.4, and 2.4 tortoises per square km, respectively. These four tortoise populations have a density that is below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) (USFWS 1994). These data indicate that for the desert tortoise, BLM is not conserving this natural resource (Agassiz's desert tortoise) on its lands in the western Mojave Desert. We request that this information be added to the section on Population Status in the Planning Area for the tortoise (pages 3.4-109 to 112) in the Final SEIS. In the Final SEIS, we request that BLM use this information to reconsider routes that should be open and closed so that mortality of the tortoise associated with OHV use is minimized substantially more than it has been during the 2004 to 2014 period.
2		Abstract and 3.4 Biological Resources	-	-	In the Abstract of the 2018 Draft SEIS, BLM says that "Through this Resource Management Plan Amendment, the BLM is amending the 2006 West Mojave (WEMO) Plan to address specific issues raised in a federal court partial remand of the 2006 WEMO Plan and to consider new data and policies, emerging issues, and changing circumstances that have occurred since the 2006 WEMO Plan Record of Decision was signed." However, from the information and references provided in the Biological Resources section, it appears that BLM is using data on these species up to 2012. We wonder why BLM is providing information to the decision maker and the public that is at least six years old regarding these species. The use of dated information appears to contradict BLM considering new data and policies, emerging issues, and changing circumstances. We request that BLM add and use current information on the special status species, especially species listed under the Endangered Species Act and California Endangered Species Act. For example, because of this 2012 (arbitrary?) cutoff date, the listing of the federally threatened yellow-billed cuckoo by the USFWS (2014b) as threatened is not mentioned in this section. It, like the

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					least Bell's vireo and southwestern willow flycatcher, uses wildlife linkages of habitats in the plan area for migrating to habitats for nesting and wintering.
3	ES-3	Purpose and Need…	-	-	Second sentence – something is missing from the beginning of (4). Perhaps the words "provide for" would clarify the meaning.
4	ES-4	ES	-	-	We take exception with the statement on ES-4 that "the BLM has determined that a restriction of motorized routes to those that existed in 1980 does not comply with requirements of the following policy and regulations applicable to transportation planning," mainly because the three policies listed on pages ES-4 and ES-5 were formulated in a noncompliant manner with the California Desert Conservation Area (CDCA) Plan, which predates them. For example, on page 1-9, the Draft SEIS indicates "Since the development of the 2006 WEMO route network, new BLM policies, including BLM Manual 1626 (Travel and Transportation Management Manual) and BLM Handbook H-8342 (Travel and Transportation Handbook), have been developed." Again, the Council contends that these policies should have complied with the CDCA Plan and the 1980 limit, not vice versa.
5	ES-4	ES	-	-	The Draft SEIS then states, "In order to modify the CDCA Plan to comply with the regulations and policies cited above in the West Mojave Planning Area, BLM has identified a need to replace the existing CDCA Plan language." We do not believe that the CDCA Plan should be modified; rather, the noncompliant regulations developed since 2006 should be modified to comply with the CDCA Plan, which predates them.
6	ES-4	ES	-	-	We ask that the following paragraph on page ES-4 be amended in the Final SEIS to include the bold wording given in the following paragraph: "Future changes to the implementation plans, refinement of TMA boundaries, and additional implementation plan objectives may, **with full disclosure and mandatory public participation,** be considered based on changing needs and issues, subsequent activity-plan monitoring, and implementation focus within the TMA, consistent with the parameters adopted in the WMRNP plan amendment and in each specific implementation plan."
7	ES-7	ES	-	-	We find the three paragraphs at the top of page ES-7 to be incomplete and misleading. The Draft SEIS is in response to the Center for Biological Diversity's (CBD) lawsuit that required the BLM to develop an alternative with fewer than 6,000 linear miles of routes (Alternative 2 in the Draft SEIS). The Council finds that developing a Preferred Alternative that is greater than 6,000 linear miles, opening Cuddeback and Coyote lakes to unrestricted vehicle play, and providing for competitive vehicle events through tortoise habitats are opportunistic responses by the BLM to facilitate vehicle recreation while ignoring CBD's intent to minimize the designated route network.

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8	ES-8	ES	-	-	We ask that the Final SEIS include the following bold wording in the next-to-last bullet on page ES-8, which reads: "Those routes that conflict with management objectives or cause unacceptable resource damage will be given priority, **particularly in desert tortoise ACECs and critical habitat units**."
9	ES-10	ES	-	-	The document is unclear whether these goals are to develop these document plans or if they include implementation of these document plans. We think it is the latter and ask that BLM in the Final SEIS clarify this language.
10	ES-12 to 25	ES	-	-	In the Final SEIS, please include a discussion of the effects of the four alternatives on Wilderness Areas (e.g., noise, air quality, night sky visibility, daytime visibility, etc.).
11	ES-12	ES	-	-	BLM discusses the effects of the alternatives on climate change but does not discuss the effects of climate change on the proposed action and alternatives. Please add this information to the Final SEIS.
12	ES-13	ES	-	-	In the Final SEIS, under Geology, Soil, and Water Resources please add information on the difference in effects among the alternatives regarding fuel additives and nitrogen levels.
13	ES-14		-	-	In the Final SEIS, for Vegetation, please add information on indirect effects to native vegetation (e.g., transport of non-native plant propagules, soil disturbance favoring establishment of non-native plant species, probability of fire regarding frequency and acreage, etc.)
14	ES-15		-	-	In the Final SEIS, for Wildlife, please add information on acreage in the road effect zone.
15	1-6	1.1.3	-	-	We note on page 1-6 the following statement in summarizing the lawsuit that prompted the completion of the Draft SEIS: "(4) the EIS was flawed because its analysis of impacts on soils, cultural resources, **certain biological resources**, and air quality was incomplete (Remedy Order, January 28, 2011, p. 2) [bold emphasis added]." The Council finds that the current Draft SEIS is equally flawed as it does not document tortoise declines that have recently been published by the USFWS (2014, 2015, 2017).
16	1-19 to 1-21	1.6.1.2	-	-	We see on pages 1-19 through 1-21 that the Draft SEIS lists the pertinent USFWS biological opinions (BO) that range from November 30, 2007 through May 6, 2011. The January 9, 2006 BO was the one issued relative to the West Mojave Plan (BLM 2005, 2006). The most recent of these BOs is three years before USFWS' distance sampling project to census desert tortoises in critical habitat areas was published in 2014 (USFWS 2014). Given that the 2014 report documents a 51% decline in tortoise numbers in the West Mojave, the Council believes that the tortoise is closer to extinction now than when it was listed in 1990 (USFWS 1990). We appreciate, as given on page 1-19, that "A revised BO will be developed through re-initiation of formal

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					consultation with the U.S. Fish and Wildlife Service (USFWS) in relation to this Draft SEIS."
17	2-1	Alternatives	-	-	BLM states that a purpose and need of this Draft SEIS is to "(2) respond[s] to current and anticipated future transportation and travel needs…" We are not sure what this means. One interpretation is that BLM will continue to provide more routes of travel in the CDCA as demand by recreationalist increases. If this is a somewhat accurate interpretation, we request that it be eliminated as a purpose and need from the Final SEIS. The CDCA has limited resources, which BLM is supposed to be managing to sustain. For the desert tortoise, BLM needs to substantially improve its implementation of on-the-ground conservation actions (see Comment 1 in this table and in the Council's cover letter) so BLM may reverse the rapidly declining status and trend for the Mojave desert tortoise in California on public lands it manages and to achieve an upward population trend as may be happening at the Desert Tortoise Research Natural Area.
18	2-1	Alternatives	-	-	In the Draft SEIS - "The 2006 West Mojave Plan also made changes to grazing allotments to achieve conservation goals and objectives." Did BLM implement these changes on-the-ground and did they monitor to see if the conservation goals and objectives were achieved? Please provide information in the Final SEIS on BLM's on-the ground implementation and monitoring related to grazing and the 2006 WEMO Plan.
19	2.4	2.1.1	-	-	In the Draft SEIS – "BLM has adopted a Bureau-wide Transportation and Travel Management (TTM) System which provides for more inclusive travel management decisions. Finally, the CDCA Plan includes some mitigation measures for access impacts that are being revisited." In the Final SEIS, please explain what "more inclusive travel management decisions" means, and discuss what mitigation measures are "being revisited" and why.
20	2-7	2.1.1	-	-	In the Draft SEIS "For one thing, the 1980 route network continues to be in dispute due to the limitations of the source data." We contend that there are sufficient data available to determine accurately the number and location of routes in the CDCA in 1980 (see Comment #127). Rather the BLM has chosen not to collect and map the data even though it has had more than three decades of time and budgets to do so. We believe this gives the public the appearance that BLM is sidestepping a requirement and providing excuses rather than solutions.
21	2-8	2.1.2	-	-	In the Draft SEIS "In response, BLM proposes to revise the CDCA Plan to be consistent with current regulatory and management policy regarding designation of routes for motorized vehicle access, and to provide a mechanism for designating, limiting, or closing routes as new issues arise, on-the-ground information or needs change, and new public lands are acquired." In the Final SEIS, we request that BLM include non-motorized access in this sentence as the Travel Management Plans appear to be inclusive of both motorized and non-motorized access.
22	2-9	2.1.2	-	-	In the Draft SEIS "Alternatives 2 and 3 evaluate establishment of eight TMAs [travel management areas], while Alternative 4 evaluates establishment of nine TMAs." In the Final SEIS, please explain the need for having different numbers and boundary

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					designations for TMAs between alternatives.
23	2-9	PA III	-	-	In the Draft SEIS "The 2006 WEMO Plan eliminated two of the three remaining long-distance race courses in the WEMO Planning area: the Barstow-to-Vegas motorcycle race course and the Johnson Valley to Stoddard Valley race course. The Johnson Valley to Parker Race Course was left in place. The availability of these race courses for competitive events would be reconsidered and modified in light of the current on-the-ground situation and the loss of acreage from the Johnson Valley OHV Open Area, and in reconsideration of all 43 CFR 8342.1 minimization criteria." We strongly object to this reconsideration. The public has already been through this decision-making process. If the loss of part of a previously present resource (e.g., open area) is reason for BLM to reconsider, the Council would like BLM to reconsider the tortoise ACECs and make them larger in the Final SEIS. The substantial loss of desert tortoise densities in the West Mojave since implementation of the West Mojave Plan is a reason to implement this. Recall that the DWMA (now ACEC) sizes were determined using a population viability analysis. Key to that analysis and calculation of the DWMA/ACEC size is the population density at the time of the calculation. Because the density of the tortoise has declined, the size of the DWMAs/ACECs for the tortoise needs to be increased. In addition for the designations of DT ACECs to be effective, BLM should manage the tortoise ACECs following the reserve level of management in the Recovery Plan, as it used the science of conservation biology to determine the size of ACECs if densities of tortoises remained above a particular level and if managed as reserves. For the four tortoise ACECs in the West Mojave Planning Area, these densities have fallen below this level. This means that the size of reserves/DWMAs/ACECs must increase to offset the reduced number of tortoises.
24	2-9	2.1.2	-	-	We note on page 2-9 under PA III, "The availability of these race courses for competitive events [Barstow-to-Vegas motorcycle race course and the Johnson Valley to Stoddard Valley race course] would be reconsidered and modified **in light of the current on-the-ground situation** and the loss of acreage from the Johnson Valley OHV Open Area, and in reconsideration of all 43 CFR 8342.1 minimization criteria" [**bold emphasis added**]. We assert that part of the "current on-the-ground situation" is that tortoise populations in the West Mojave have declined by 51% but that BLM has limited its focus to the loss of recreational opportunities due to the expansion of the 29 Palms Marine Corps Base into the Johnson Valley Open Area. We content that the BLM has failed to consider the available biological baseline data that argues against establishing competitive recreational events that are known to result in tortoise mortality and habitat degradation.
25	2-9	2.1.2	-	-	Among the most bothersome proposals is PA IV given on page 2-9 stating that BLM's Preferred Alternative would designate Cuddeback Lake (located in the Fremont-Kramer CHU and ACEC) and Coyote Lake (located in the Superior-Cronese CHU and ACEC) for unrestricted vehicle recreation in the hearts of these two critical habitat areas. If adopted and implemented, these actions would violate the objective given on page ES-8, which states: "When revising the route network, pay particular

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					attention to tortoise critical habitat and identified sensitive locales." If this objective is to be achieved, BLM must not designate these two lakebed areas, which are designed tortoise critical habitat, for unrestricted vehicle use. Furthermore, implementing these decisions would violate 43 CFR 8342.1, which is stated on page 2-13 as follows: "Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats."
26	2-9	2.1.2	-	-	In the Draft SEIS "Four additional lakebeds are now being considered for lakebed-specific designations, based on changes in condition. The dry lakes are Koehn, Cuddeback, Coyote (the one northeast of Calico lakebed), and Chisholm Trail (also northeast of Calico lakebed off of Chisholm Trail Road)." We believe that Cuddeback Lake and the area around it was withdrawn for Navy use in 2015 or 16, which should be clarified in the Final SEIS. If so, BLM would not be considering is for lakebed-specific designations.
27	2-10	2.1.2	-	-	In the Draft SEIS "Under Alternatives 1 and 2, the area would be managed consistent with parameters outlined in 2.2.1.2.4 of the 2005 WEMO FEIS, including the continued implementation of a visitor use permit program for those desiring to use vehicles in the Rand Mountains. Under Alternatives 3 and 4, the permit system established for motor-vehicle access to the Rand Mountains-Fremont Valley Management area would be replaced with a limited designated network that is intensively managed." BLM does not provide information on why there would be differences in managing the Rand Mountains-Fremont Valley Management Area. Until BLM provides information on implementation, enforcement, monitoring, and adaptive management in the Final SEIS, there appears to be no reason to change the current management approach. We request that BLM provide data on its current management approach in the Final SEIS. We believe it is difficult to make a decision about future management when data on current management is missing from the Draft SEIS.
28	2-10	2.1.2	-	-	On page 2-10, with regards to eliminating the user education orientation program in the Rand Mountains, the BLM states "This was adopted as a trial measure to assess its effectiveness to minimize resource impacts in the area" and "In the intervening years, the use of this strategy has come under review." However, nowhere in the Draft SEIS does BLM document the results of this review. We provide the following information to demonstrate the importance of educating vehicle users in this area (Kristin Berry, personal communication): The El Paso Mountains (Western Mojave Recovery unit) has a higher density population of tortoises than does the adjacent Fremont Valley and Fremont-Kramer Critical Habitat Unit, at least in 2009. There are some substantial pockets left north-adjacent to the El Paso Mountains worth saving too. The El Paso Mountains are important as a corridor north, the only good possibility in the northwestern Mojave with climate warming. El Paso Mountains have the El Paso Wilderness Area, at higher elevations, important with climate warming. The west side of Indian Wells Valley has high potential as a corridor to two wilderness areas. Tortoises are still present in the valley.

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29	2-10	2.1.2	-	-	In the Draft SEIS, "Alternative 2 would establish a limit of 50 feet in non-DT ACEC and CDNCLs. Alternatives 3 and 4 would establish a limit of 100 feet within non-DT ACECs and CDNCLs." In the Final SEIS, we request that BLM determine the resulting footprint or direct area of impact if these limits for stopping, parking, and camping off designated routes occurred along their much or all of their lengths. In the Final SEIS, we request that BLM provide information on how it would enforce this requirement and monitor any changes in extent and effects to natural resources.
30	2-10 to 11	2.1.2	-	-	***Livestock Grazing Program Modifications in desert tortoise habitat*** The language in this entire section is unclear. In the Draft SEIS "The 2006 WEMO Plan modified the CDCA Plan Livestock Grazing Element to provide for desert tortoise recovery, by making livestock grazing unavailable or further restricting grazing in remaining DT ACEC and critical habitat." "No changes would be made in Alternatives 1, 3, or 4." Alternative 2 in the Draft SEIS appears to continue to implement the decision made in the 2006 WEMO plan. We do not understand what "no changes would be made in Alternatives 1, 3, or 4" means. Is it no changes from the decision in the WEMO Plan (2006) or no changes as it vacates the 2006 WEMO Plan and allows grazing? "These allotments would have their boundaries adjusted to remove the DWMA and CHU lands from the allotments." We can interpret this information two ways. One is that BLM would remove these land designations from the DWMA and CHU lands. A second is that the allotment boundaries would be removed from the DWMAs and CHUs. Please clarify in the Final SEIS. Until this language is clarified, we are unable to comment on what BLM is proposing. We also note that "making livestock grazing unavailable or further restricting grazing in remaining DT ACEC and critical habitat" does not "provide for desert tortoise recovery." Numerous measures need to be implemented to reduce or curtail the adverse effects of human activities that are causing the tortoise's decline in the West Mojave (see Comment #1 and Table 1 attached at end of these comments). It is one of a myriad of actions that have been identified in the desert tortoise recovery plans. In addition, the Final SEIS should document the adverse effects on soils; soil crusts; native vegetation composition, cover, and density; and dominance of non-native plant species, especially annual plants from decades of livestock grazing will not be reversed to pre-grazing conditions for more than a century. Thus, the benefits to the tortoise from removing grazing will not be realized for decades or longer.
31	2-11	2.1.3	-	-	In the Draft SEIS "In areas where disturbance caps have already been reached or exceeded, any new authorized uses resulting in new ground disturbance or designation of reroutes will be evaluated for mitigation, including rehabilitation of a required equivalent area in another location within the land unit." Rehabilitation does not result in replacement of lost or degraded habitat values. Any action that results in degradation or loss of habitat should be mitigated by including the temporal loss of the habitat value, the quality/importance of the area in which the habitat was lost/degraded, and the quantity or area of habitat that

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					is lost/degraded. When on BLM land that is managed for the public, the loss/degradation of soils or vegetation by an entity is the loss degradation of a public resource that should be fully mitigated. For soils and vegetation in the WEMO Planning area, this is an expensive and long-term process that Congress recognized in FLPMA when it declared "the California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed." We believe the Final SEIS should be amended to include this information.
32	2-13	2.1.4	-	-	In the Draft SEIS: "● OHV Area Designations (mandatory planning-level decision); ● Identification of Travel Management Areas (optional planning-level decision); ● Designation of the travel management network consisting of roads, primitive roads, and trails (mandatory implementation-level decisions), temporary routes, and identification of other linear features as transportation linear disturbances." Is the last bullet conducted at the planning level or another level? Please provide this information in the Final SEIS as it is unclear.
33	2-13	2.1.4	-	-	In 43 CFR 8342.1, the preamble and the four components used in route designation must be "based on protection of resources of the public lands, safety of all users, and minimization of conflicts among the various uses of the public lands, and in accordance with minimization criteria." Our understanding is that order implies priority, with protection of resources on public lands as the first priority in this CFR. However, in this Draft SEIS, we see that BLM is not protecting biological or other natural resources by its development and selection of its Preferred Alternative. We expect that the BLM will amend the Final SEIS to document how these four components would be implemented by creating *de facto* open areas within critical habitats on the two lake beds, introducing competitive events into critical habitats, and rescinding education programs from the Rand Mountains where tortoises have declined by more than 50% and there are no data to support this decision.
34	2-13	OHV Area designations	-	-	In the Draft SEIS "The designation of all acreage as Open, Limited, or Closed to OHV use is required as part of the Land Use Planning (LUP) process for each planning area. The CDCA Plan, which includes the WEMO Planning area, includes OHV area designations. No changes to these designations were proposed in the 2006 WEMO Plan or the recently adopted DRECP LUPA, and none are being considered in this current plan amendment effort." Given the available data that we provided in this comment letter to the BLM on the status of the tortoise in the four DT ACECs in the WEMO Planning Area, the status of the tortoise in the DTRNA, and the effects of OHVs and OHV routes on the desert tortoise and its habitat (including critical habitat), we believe these data clearly show the need to close roads in as much of the DT ACECs as possible, and that the Final SEIS should reconsider focused closure of routes in critical habitat areas, which the Draft SEIS fails to do.

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35	2-40 to 41	2.2.2	-	-	If the numerical order of Plan goals implies order of importance, then #7 should be moved up to #3 in the Final SEIS.
36	2-40	2.2.2	-	-	Current #3 of plan goals includes signs, maps, and published information. This has not worked in the past at the DTRNA, Rands, and Coolgardie Mesa area, to name a few. If BLM is serious about obtaining and enforcing compliance, enforcement actions need to be implemented and they need to produce results for both the offenders and for restoring the habitat that is degraded or lost, which should be expanded in the Final SEIS.
37	2-44	2.2.4	-	-	Without restating the objectives here, we find that opening these lakebeds to unrestricted vehicle use also violates Objectives 2, 8, and 9 (page 2-44). Our impression, similar to that for the 2015 Draft SEIS (see Desert Tortoise Council 2015 comment letter), is that the current Draft SEIS is recreation-centric without giving equal importance to biological considerations. Since our 2015 comments have yet to be addressed, we again ask the BLM to identify the biologists actively involved in formulating and drafting the current document. As given in our 2015 comment letter, although BLM biologists Larry LaPré and Lorenzo Encinas were listed as authors of the 2015 Draft SEIS, when asked, both biologists stated that they were not involved. Inaccuracies such as referring to Mohave ground squirrel as "*Spermophilus*" rather than "*Xerospermophilus*" on page 3.11-22 leads us to conclude that expert, informed biological input into this Draft SEIS is lacking.
38	2-48 to 49	2.3.2.2.	-	-	In the Draft SEIS, "Ground-disturbing activities in ACECs and NCLs are subject to disturbance caps. In ACECs and NCLs, for ground-disturbing activities occurring outside of the current route prism, the area of disturbance needs to be calculated and included in future disturbance totals." The Final SEIS should define "route prism?" When conducting a search for "prism," it is first used on this page with no definition. We believe the Final SEIS should be supplemented with recent literature on the pervasive effects of roads beyond the footprint of the road. As such, ground disturbance from roads could cover less than 10 percent of an area but impact 100 percent of the area because of the road effect zone associated with roads and other linear features.
39	2-48	2.3.2.1	-	-	With regards to the following wording on page 2-48, "If linear features are found on the ground that show signs of use but were missed in the inventory process, and through document review can be determined to have existed at the time of initial project development, they will be added to the route inventory, and evaluated through the route designation process to determine whether they should be designated as available for use or not," again, the BLM is favoring recreation by allowing the designated route network to be expanded (see also next-to-last bullet on page 2-63 and 5 on 2-65 and 2-66). We do appreciate that "ghost routes" described on page 2-49, even if designated as open, would be closed when discovered (see also 3 on page 2-65).

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40	2-49	2.3.2.3	-	-	The following statement is given on page 2-49: "For restored linear travel features, the features shall be moved to a proprietary dataset of restored travel features, and removed from the route inventory." If such reclaimed routes are removed from the dataset and inventory, how will BLM be able to identify them for future monitoring to ensure illegal use of them has not resumed and that remedial actions need to be applied? We believe that BLM must maintain a database of reclaimed closed routes and implement longitudinal monitoring in perpetuity that would determine if new remedial actions are needed.
41	2-58 to 64	2.3.2.9 and 2.3.2.10	-	-	We were unable to find a law enforcement plan, maintenance plan, or monitoring plan in the Draft SEIS, which should be remedied in the Final SEIS. Such plans would have clearly stated goals, objectives, study designs with statistical validity, implementation methods, procedures, and schedules. Absent this information, we do not know whether the BLM's minimization and mitigation measures are being implemented or are achieving their intended results. We do not know what and when thresholds are for making management changes (e.g., adaptive management) are or if they are being monitored or reached because predicted results from plan implementations are not being achieved. Given the area that BLM must enforce, maintain, and monitor, we believe that BLM should employ remote sensing (e.g., high-resolution imagery, drones, etc.) and verify information obtained this way with ground truthing. We strongly recommend that BLM consult with its sister agency, U.S. Geological Survey, to design a scientific effective approach for enforcement, maintenance, and monitoring.
42	2-58 to 59	2.3.2.8	-	-	Remote sensing tools would be helpful in providing efficient and effective law enforcement with reasonable costs. Drones could be used to cover a large area during a short time, send images to the operator while flying its programmed course, and send real-time imaging to law enforcement personnel. If off-highway vehicles were required to have license plates, the imaging could identify offenders and citations could be issued. We believe that this proposal should be considered in the Final SEIS.
43	2-67	2.3.2.11	-	-	With regards to *Provisions for New Route Construction or Adaptation/Relocation of Existing Routes outlined* on page 2-67, when lands are newly acquired a the result of compensating for projects that authorize take of tortoises, it is essential that a minimal number of routes are designated as "open" on such lands. This section should be amended in the Final SEIS to indicate: "On private lands acquired and deeded to the BLM as the result of formal Section 7 consultations and issuance of 10(a)(1)(B) permits for the take of desert tortoises, a minimum number of routes will be maintained and designated as open, and closed routes will be prioritized for eradication."
44	2-51 to 2-52	2.3.2.5	-	-	We appreciate that a thorough list of route restoration and revegetation actions is given on pages 2-51 and 2-52. We would refer BLM managers to Abella and Berry (2016), which is a recently published article funded by the Council that may help BLM implement route restoration techniques.
45	2-107	2.3.6	-	-	PA IV on page 2-107 states "Alternative 4 would add Koehn, Cuddeback, Coyote, and Chisholm Trail Lake lakebeds to the list of designated Lakebeds, and would designate Koehn lakebed as 'Closed to Motor Vehicle Access, except by Authorization,

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					including Special Recreation Permit,' and designate the other three lakebeds as 'Open' to motorized vehicles." We do not believe that the Draft SEIS foresees or even begins to analyze the following impacts and issues associated with designating Cuddeback and Coyote lakes, which are in critical habitat, as open to motorized vehicle use: • The BLM does not consider the ancillary impacts of cross-country vehicle travel, much of it from Highway 395, which is the most proximate paved road, located eight miles west of Cuddeback Lake. Getting to the lake is likely to be a significant impact, particularly when existing cross country vehicle travel is already rampant in the area that is currently designated as "Limited." • Similarly, if Cuddeback Lake is open to unrestricted vehicle recreation, recreationists using the nearby Spangler Hills Open Area are very likely to travel between the two areas, including cross country vehicle travel. What title does BLM intend to apply to these lakes to attract unrestricted vehicle use? Will they be called "Open Areas? • It is naïve to assume that recreationists are going to stay on the lakebed; rather, it is likely to be used as a focal staging area with adjacent tortoise habitats suffering from vehicle impacts associated with the new concentration of people and vehicles. • Given the new use of the lakebed, we are concerned that a future event, like the "King of the Hammers," which attracts 30,000 to 40,000 people each year into Johnson Valley, will be staged in the new lakebed recreation areas. The Draft SEIS fails to clearly outline how this new designation would allow or disallow various vehicle uses in the region. • Disruption of the lakebed soils are more than likely to result in wind-blown dust accumulating in tortoise habitats to the east of the lake. This was an observed impact resulting from filming Disney's "Holes" on the Cuddeback lakebed in 2003. • Currently designated as critical habitat, the BLM has been unable to control vehicle impacts along Lockheed Road south of Cuddeback Lake and the vehicle concentration area just east of Highway 395 along 20 Mule Team Road. Given that, how will they control impacts after the lakebed has been designated for unrestricted vehicle recreation? The Draft SEIS does not indicate that ranger patrols would be increased in the area to prevent cross-country vehicle use in this designated Limited Use Area. Nor does the Draft SEIS indicate if the Limited Use designation would be rescinded from the lake bed area. • The Draft SEIS fails to anticipate that the increased human use of the Cuddeback and Coyote lake areas will serve as new food sources for common ravens. Campers will unknowingly provide food materials to ravens while they are away from their camps recreating, and the increased raven presence in the areas is likely to adversely affect hatchling and subadult tortoises. • The Draft SEIS fails to anticipate that increased human presences around the two lakebeds will predictably result in collection of tortoises for pets and release of pets by visitors. The tortoise shown below was observed beside Cuddeback Road

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					on 30 April 2018 within a mile of the barren area pictured above. The tortoise's scutes show slight evidence of pyramiding, which is indicative of captive tortoises. Even if it is not a released pet, the Council contends that the likelihood of releasing pet tortoises into the area will increase with an increased human presence.
46	2-107	2.3.6	-	-	PA III on page 2-107 states the following: "This alternative would specify a Johnson Valley race or speed-controlled route-connector loop between non-connecting portions of the remaining Johnson Valley OHV Recreational Area [**and where?**] to provide a loop corridor that enhances organized vehicle riding opportunities within the Open Area, subject to additional consultations. This may require additional coordination with the Twenty-Nine Palms Marine Corps. Staging and pit areas would be limited to within the Johnson Valley OHV Recreation Area." Given the proximity of this area to the adjacent Ord-Rodman CHU and ACEC, the Council finds it unacceptable that a proposed route is not being identified; (i.e., hence the "and where" comment given above).
47	2-107	2.3.6	-	-	Similarly, until which time the route(s) is/are identified, the Council cannot tell if BLM will be avoiding areas where hundreds of desert tortoises were recently displaced by the Marine Corps. These translocated tortoises are already likely enduring stresses associated with displacement and should not be subjected to additional stresses resulting from establishing competitive routes in these translocation areas.
48	2-108	2.3.6	-	-	It is counterintuitive that PA VII is part of Alternative 2, minimal route alternative that would eliminate cattle grazing from critical habitats (Ord Mountain, Cantil Common, and Shadow Mountain). Eliminating grazing from tortoise critical habitat should become part of the Preferred Alternative and not be summarily dismissed because it was associated with Alternative 2, which will be widely opposed by the strong recreation lobby.
49	2-114	2.3.6	-	-	The following statement is made on page 2-114: "Identify "C" routes for competitive use, as a specific designation for routes so authorized outside of OHV Open Areas. The designation of "C" routes requires an environmental analysis, appropriate consultations, and must be consistent with "C" route requirements outlined in the Programmatic Agreement for protection of cultural resources. *These routes provide OHV opportunities to partially offset activities impacted by the reduction in OHV Area acreage as a result of the Twenty Nine Palms Marine Corps Air Ground Combat Center (MCAGCC) Expansion, commonly known as the 29 Palms Marine Base* [emphasis added]." Again, BLM's intent to "offset activities impacted by the reduction in OHV Area acreage" favor recreation at the expense of tortoise conservation. The Council contends that the 56% reduction of tortoise densities in the Ord-Rodman CHU and ACEC provides another reality that BLM is ignoring; competitive "C" routes, in particular, should not be established in habitats where tortoises are already stressed.
50	2-115	2.3.6	-	-	Without identifying Special Recreation Permits as "SPCs," the following statement is made on page 2-115: "Competitive motorized events would be allowed to occur outside of OHV Open Areas under Special Recreation Permit on routes specified

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					for such use as identified in the TMP route network strategies." The unidentified SPC acronym is then subsequently used in the following statement on page 2-116: "Identify a SPC designated area along Hoffman Road in the Fremont-Kramer DT ACEC, and consider one or more designated areas within the Superior-Cronese DT ACEC in the Coolgardie subregion and the Black Mountain subregion." What does one or more mean? One or 20? Again, without any specified routes identified, the BLM is facilitating the establishment of competitive vehicle events through critical habitat and ACEC areas where that use is simply not compatible with tortoise recovery. And, the public has no opportunity to comment on those currently unidentified routes because they exist only in theory.
51	2-116	2.3.6	-	-	Although the following prescription given on page 2-116 promises to be protective, "Any race staging and pitting areas for (C) routes would continue to be limited to OHV Open Area lands," we note that there are no BLM open areas along Hoffman Road or adjacent to the Superior-Cronese ACEC, so where exactly does BLM intend to establish staging and pitting areas for these newly established SPCs? In the absence of this specific information, the Draft SEIS is deficient and fails to assess the impacts of this proposal.
52	3.4-1	3.4.1 Wildlife Linkages	-	-	In the Final SEIS, we suggest that BLM add the western yellow-billed cuckoo to this narrative section and the table. Critical habitat has been proposed (USFWS 2014c).
53	3.4-89 to 3.4-93	3.4.3.2.1 Mammals Mohave ground squirrel	-	-	We remind BLM that it has information on the presence of Mohave ground squirrels in the Lancaster subregion (see Mohave ground squirrel Technical Advisory Group March 10-11, 2015 meeting and LaRue 2014) of which BLM is an active participant. In the Final SEIS, please add this information to this section and table.
54	3.4-88		-	-	The Draft SEIS states that "Additionally, 20 species were not included in the 2005 WEMO Final EIS (BLM 2005), but are in this SEIS since they are considered to potentially occur within the planning area based on recent documentation (Dudek and ICF International 2012) and consultation with BLM biologists. These species include the: ….tricolored blackbird." However, we were not able to find information on the tricolored blackbird (*Agelaius tricolor*) in the narrative portion of the document including its status as a California threatened species, nor could we find information on BLM's participation in the implementation of the Conservation Plan for the tricolored blackbird. This should be remedied in the Final SEIS.
55	3.4-91	3.4.3.2.1	-	-	The following statement fails to recognize that the latest status information is included in Leitner (2015): "Leitner (2008) provides the most current status of the Mohave ground squirrel based on compilation of a database, including unpublished field studies, surveys, and incidental observations for the 10-year period from 1998 through 2007." This more recent publication covers surveys between 2008 and 2012 and is a significant addition of information to that which BLM uses in the Draft SEIS.

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56	3.4-90	3.4.3.2.1	-	3.4-6	Given that the BLM is relying on dated information, the following statement must be supplemented by recently published information: "USFWS also stated in the 12-month finding that the range of the Mohave ground squirrel may be larger than defined in the finding or previously published based on recent sightings such as in an interior valley of the Tehachapi Mountains and in the Panamint Valley about 8 kilometers (5 miles) north of the defined range (76 FR 62214–62258)." In this regard, Leitner (2015) provided the following updated information: "there is no solid evidence that the generally accepted boundaries of the Mohave Ground Squirrel geographic range should be expanded. However, a review of the 1998–2012 distributional data suggests that the species may no longer be present in six distinct regions within its currently mapped range. First, there have been no Mohave Ground Squirrel records in the Fremont Valley west of California City since 2002. Second, no Mohave Ground Squirrels have been trapped or observed in the western portion of EAFB since a single record in 1994, in spite of regional trapping surveys at 22 randomly selected sites. Third, there have been very few recent Mohave Ground Squirrel detections in the northeastern portion of Los Angeles County where it was commonly reported from 1920 until 1989. The only sites in Los Angeles County where the species has been trapped or observed since 1991 are on or very close to EAFB where the species is known to be widespread. The fourth area of concern is east of the Mojave River Victorville to Lucerne Valley where there have been no Mohave Ground Squirrel records since 1977. The fifth region where Mohave Ground Squirrels seem to be absent is around Barstow and west to Hinkley Valley. Finally, the current range boundary as mapped includes much of Fort Irwin, but the only recent records here are in the extreme western part of the installation." The Council contends that the Draft SEIS does not rely on the latest available data, and that many of the conclusions given in Section 3.4.3.2.1 are outdated and do not reflect current science. Though the figures given in Table 3.4-6 may have been accurate as of 2008, they are not accurate as of 2012. The inaccuracy of the information must be rectified in the Final SEIS and may also affect the conclusions derived by the BLM from outdated information.
57	3.4-92	3.4.3.2.1	-	3.4-7	We believe that the figures given in Table 3.4-7 are questionable and may actually underestimate the "Sum of Acres" published therein. As one example, the Desert Tortoise Research Natural Area (DTRNA) is 39.5 square miles or 25,280 acres large. Logan (2016), whose research is not referenced by the BLM, detected Mohave ground squirrels throughout the DTRNA, so we question why BLM claims that only 16,969.7 acres of the 25,280-acre area are habitat, which brings into question the validity of the other cited acreages.
58	3.4-109 to	3.4.3.2.3	-	-	BLM states, "historical information for the Mojave population densities or abundance does not exist to provide a baseline for population trends," which is simply not true. USFWS (2014, 2015, 2017) using results of distance sampling surveys that are

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	110				designed to track population trends have shown the following trends: • Ten of 17 populations of the Mojave desert tortoise declined from 2004 to 2014. • Eleven of 17 populations of the Mojave desert tortoise are no longer viable. These 11 populations represent 89.7 percent of the range-wide habitat in CHUs and Tortoise Conservation Areas (TCAs). • Eight of 10 populations of the Mojave desert tortoise in California declined from 29 to 64 percent from 2004 to 2014 with implementation of tortoise conservation measures under BLM management in CHUs. • Eight of eight populations of Mojave desert tortoise on lands managed by the BLM in California declined from 2004 to 2014. • The only population of Mojave desert tortoise in California that is not declining is on land managed by the National Park Service. It increased 178 percent in 10 years.
59	3.4-110	3.4.3.2.3	-	-	With regards to the following statement, "…specific management actions over a 23-year monitoring program have not demonstrated a substantial positive effect on populations," Berry *et al*. (2014) have demonstrated that tortoise populations within the fenced DTRNA are substantially better protected compared to those outside the fenced area, including adjacent critical habitat lands in the Rand Mountains where BLM intends to rescind existing educational requirements.
60	3.4-110	3.4.3.2.3	-	3.4-10	This table provides the quantity of acres within a critical habitat boundary for tortoises. It does not provide information on how much of that area provides the quality of habitat needed by the tortoise for feeding, breeding, shelter, and movements to sustain a tortoise population, that is, the physical and biological features and primary constituent elements. In the Final SEIS, please provide this information given the impacts that the land within the critical habitat boundaries received and will receive in the future from various forms of human use facilitated by adopting the Preferred Alternative in the Draft SEIS.
61	3.4-112	3.4.3.2.3	-	-	The Draft SEIS makes the following statement: "It [DTRNA] has one of the highest known densities of desert tortoises per square mile in the species' geographic range (California, Utah, Nevada, Arizona and northwest Mexico). Tortoise populations **are** from 100 to 200 per square mile in some parts of the DTNA [sic; bold emphasis added]." In fact, the last time such densities were observed there were in the 1970s and early 1980s, "…ranging from 110 to 147" (Berry *et al* 2014), and are only a fraction of that now.
62	3.4-112	3.4.3.2.3	-	-	The Council strongly disagrees with the following statement: "Threats to desert tortoises within the WEMO Planning Area have not changed from the previous analysis provided by the 2005 WEMO Final EIS (BLM 2005) and associated 2006 Biological Opinion, except as discussed herein." In fact, Section 1.14 makes the following statement: "This total [16,000 linear miles of routes in the planning area] is approximately 8,000 miles more than the WEMO Plan inventory which was based on the data collected in 2001 (and analyzed in 2005) for the 2006 WEMO Plan." The Final SEIS must actually analyze the effects

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					of roads on damage to tortoise habitats, mortality to animals, subsidizing raven populations with road-killed animals, increased incidence of fire, proliferation of non-native weed species, etc.
63	3.4-112	3.4.3.2.3	-	-	The following statement does not constitute a threats analysis: "Threats to desert tortoises within the WEMO Planning Area have not changed from the previous analysis provided by the 2005 WEMO Final EIS (BLM 2005) and associated 2006 Biological Opinion, except as discussed herein. For a discussion of these threats, please refer to the 2006 Biological Opinion in Appendix F." Readers unfamiliar with the literature on the impacts of roads on tortoise habitats and animals receive no pertinent information to help them judge the advantages and disadvantages of BLM's Preferred Alternative. The uninformed public relies on information given in this section to judge if the Environmental Consequences given in Chapter Four are sufficiently detailed. In the absence of this information and significant deficiencies that characterize the Affected Environmental information given in Chapter 3 of this Draft SEIS, the reader cannot make informed decisions about the consequences. For example, one must know that tortoises have declined by 51 to 62% in the West Mojave to know that opening dry lake beds to unrestricted vehicle use in critical habitats constitutes a poor management decision. There are analyses in the revised recovery plan (USFWS 2011a) and recently released annotated bibliography (Berry 2017) that must be included in the Final SEIS to amend the deficiencies in the Draft SEIS.
64	ES-3 and 3.4-112	3.4.3.2.3	-	-	In the Draft SEIS, "The Desert Tortoise [Research] Natural Area (DT[R]NA) is "managed to protect this unique habitat in its natural state, free from conflict with other land uses. Located in the western Mojave Desert in northeastern Kern County, the DTNA was designated as an ACEC in 1980 through the California Desert Conservation Area Plan. The total area encompasses over 25,000 acres of public land. Approximately 22,216 acres of the DTNA ACEC are located within the Rands subregion of the planning area (Figure 3.4-68). It has one of the highest known densities of desert tortoises per square mile in the species' geographic range (California, Utah, Nevada, Arizona and northwest Mexico). Tortoise populations are from 100 to 200 per square mile in some parts of the DTNA." Thus, the BLM has, perhaps intentionally, conducted an experiment and has determined the land management prescriptions that are necessary to manage for the desert tortoise and that will increase population densities (i.e., implement conservation – see sections 2, 3, and 7(a)(1) of the ESA). In the Final SEIS and in future planning efforts, the BLM should use these data and replicate this management prescription in the Fremont-Kramer, Ord Mountain, Superior-Cronese, and Pinto Mountain ACECs/CHUs for the tortoise when designing and implementing its transportation and travel network and livestock grazing on BLM lands. On page ES-3 of the Draft SEIS, "The MVA [motor-vehicle access] goal of the 2006 WEMO Plan is to provide appropriate motorized vehicle access to public lands for commercial, recreational, and other purposes in a manner that is compatible with

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					species conservation." Given that BLM knows how to do this for the tortoise, we recommend that BLM in the Final SEIS develop and implement a new alternative that uses the land management strategies of the DTRNA, which, importantly, includes fencing extensive tracks of land.
65	4.4-1	4.4	-	4.4-1	Given that 8,000 more linear miles of trails occur than were envisioned by the 2006 West Mojave planning effort, BLM cannot effectively rely on that assessment to also serve as the one here: "Table 4-26 of the 2006 WEMO Plan presented general assumptions regarding the impact of motorized vehicle access on wildlife, with a focus on the desert tortoise." The Final SEIS must perform an actual analysis of the level of impacts associated with the currently known number of roads and trails.
66	4.4-1	4.4	-	4.4-1	The Council contends that every one of the Desired Results and Function and Importance of DT ACECs, would be seriously undermined by opening Cuddeback Lake and Coyote Lake to recreational vehicle activities and creating competitive vehicle corridors in these and other critical habitat areas. Furthermore, the Impacts to Wildlife and Vegetation will all be realized by authorizing these uses.
67	4.4-37 to 44	4.4.2.2	-	-	In the Final SEIS, we request that this section provide information on the effects of designating a motorized vehicle access network at the population level for sensitive wildlife species, specifically the desert tortoise. The Draft SEIS discusses the impacts to individuals of a species. In the Final SEIS, we request that BLM include analysis from the sciences of conservation biology and road ecology in their analysis of effects at the population level from implementation of the four alternatives. To assist BLM in this analysis, we have included information in Appendix A that accompanies this comment table.
68	4.4-39 to 40	4.4.2.2	-	-	Contrary to the following statement, Kristin Berry has found tortoise populations to be depressed even along lightly-used roads in the Fremont Valley (personal communication): "…along lightly used roads, no significant difference exists in the distribution of desert tortoises."
69	4.4-39 to 40	4.4.2.2	-	-	Whereas we find that the generalized threats reported in this section would help to educate an uninformed reader, the specific threats of the Preferred Alternative are not documented. For example, of the 16,000 linear of miles of existing roads in the planning area, how many of these occur in critical habitats and ACECs, and were relatively more roads closed in these TCAs than in other areas?
70	4.4-40		-	-	In the Draft SEIS "At some point, vehicle use on roads (and other activities that accompany vehicle use) would likely reduce the number of desert tortoises to a point where the level of mortality also decreases, simply because fewer desert tortoises live in the region." Unfortunately, at this level, fewer desert tortoises would likely mean the population is no longer viable and would be extirpated. Such a result would violate FLPMA, ESA, and CESA. Please see the summary of literature on the effects of roads that is included in Appendix A that accompanies this comment table.

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71	4.4-41	4.4.2.2	-	-	In the Draft SEIS "The USFWS notes that neither the BLM [n]or the USFWS has definitive information on how differing route networks affect the desert tortoise (USFWS 2002a); obviously roadless areas would have the least adverse effect on desert tortoises and their habitat; it follows that with increasing amounts of open routes within the planning area, the greater the impact to the desert tortoise and its habitat. However, the use patterns on the open route network may be as important, particularly in areas where tortoises are more likely to be found." Since 2002, there have been numerous journal articles published on the effects of roads on individual species and on wildlife populations that are not included in this Draft SEIS that should be included in the Final SEIS. Some authors recognized that it is not possible to obtain definitive information on the number of roads in an area before they result in negative effects to the population. They do have solutions to this situation. (Please see our information in Appendix A – specifically information from Jaeger *et al*. 2005a, 2005b, Roedenbeck *et al*. 2007, Fahrig and Rytwinski 2009, and van der Ree *et al*. 2011) .
72	4.4-48, 4.4-52, 4.4-54 to 55, and 4.4-57		-	-	We believe the area of impact from stopping, parking, and camping should be somewhat proportional to the miles of open routes. We do not understand why the area from stopping, parking, and camping is the same for alternatives 1, 2, 3, and 4 when the miles of open routes are different. Please explain in the Final SEIS.
73	4.4-48, 4.4-52, 4.4-54 to 55, and 4.4-57		-	-	In the Final SEIS, we ask that BLM provide their analysis of effects to the desert tortoise in the DT ACECs and tortoise linkage areas that demonstrates that the impacts from the uses allowed on these roads and the road configurations will not result in further declines of tortoise populations and will result in increases in tortoise populations in these areas. Because BLM is charged with sustained yield of natural resources and environmental quality in FLPMA and contributing to the recovery of the tortoise in the ESA, we are looking for BLM to supply information that supports their premise that its Preferred Alternative will improve the status of the tortoise populations given the population data from the USFWS shows that the tortoise populations in the West Mojave continued to decline substantially from 2004 to 2014 in the three DT ACECs the West Mojave and Pinto Mountains ACEC (see Table 1 below).
74	4.4-49	4.4.2.4	-	-	In the Draft SEIS "The goal is to designate and implement a route network throughout DT ACECs that would provide for public access, authorized uses, and the following desired results: • Fewer losses of tortoises to crushing, poaching, pet collection, intentional vandalism, and similar activities requiring vehicle access; • Less degradation and loss of occupied habitat (first priority) and suitable habitat (second priority);

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					• Larger blocks of unfragmented habitat, which would be achieved if vehicle use is prevented on closed routes, does not result in increased cross-country travel in adjacent areas, and promotes recovery of suitable habitats more quickly than would naturally occur; • Route closure in higher density tortoise areas is likely to provide the most benefit in terms of avoiding mortalities and other losses; • Route closure in lower density tortoise areas would alleviate losses of animals that are critically important to natural repatriation and population recovery." Please add at the top of this list: "Management of routes that allows for increases in tortoise populations so that these populations will be sustained, have functional connectivity between populations, and contribute to recovery." Given the survival strategy of the tortoise (please see information provided in Appendix A under U.S. Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan. 1994. Region 1, Portland, Oregon, pp. 27 and 28), fewer losses of tortoise and less degradation and loss of habitat are likely to slow down the tortoise's current path toward extinction (see Table 1). In the Final SEIS, the BLM must demonstrate how its Travel Management Plan through its implementation, enforcement, monitoring, and adaptive management will contribute to the recovery of the tortoise.
75	4.4-53 to 55	4.4.2.5	-	-	Same comment but for Alternative 3 (see Comment 74)
76	4.4-55 to 58	4.4.2.6	-	-	Same comment but for Alternative 4 (see Comment 74)
77	4.4-56	4.4.2.6	-	-	It is not clear if such omissions are intentional or not, but there are numerous places where the Draft SEIS makes a partial statement but fails to reveal the complete situation and associated impacts. For example, the following statement is given on page 4.4-56: "The Stoddard Valley-to-Johnson Valley and Johnson Valley North Unit-to-South Unit Competitive Event Connectors would also be available…[and BLM] would identify a specific route for the speed-controlled connector between the remaining Johnson Valley OHV Area and the Stoddard Valley OHV Open Area, with appropriate mitigation measures." However, the reader is not informed that this corridor would bisect the Ord-Rodman CHU and ACEC, or that there has already been a 56% reduction in the tortoise population within the relatively small CHU.
78	4.4-56	4.4.2.6	-	-	A similar omission is made in the next paragraph with regards to opening Cuddeback and Coyote lakes to vehicle use: "In general, the lakebeds do not support wildlife, and are not associated with wildlife corridors or **special-status wildlife** [bold emphasis added]. Therefore, this decision would not have any direct effect on wildlife resources on the lakebeds." In fact, both

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					of these lake beds are designated as desert tortoise critical habitat. As per the many bulleted comments given above in Comment #74, it is naïve to assume that recreationists will restrict this influx of new vehicle activity to the lakebed, that hill-climbs in adjacent areas, for example, will not increase, that massive events such as "King of the Hammers" in Johnson Valley will not be allowed, etc. in response to this new designation. BLM identifies no mitigation measures to increase ranger patrols or clean up dumps that will predictably occur if this designation is implemented.
79	4.4-56	4.4.2.6	-	-	With regards to PA V, neither here nor in the Affected Environment of Chapter 3 does BLM provide any data with regards to the implementation of the educational permit in the Rand Mountains area. How many permits have been issued? Has compliance (e.g., cross-country vehicle use) increased or decreased as a result of issuing these permits? What is the rationale for eliminating the permits, other than making it less burdensome on the vehicle user? None of these questions is answered, and we are left with the feeling that the BLM just wants to do this without providing the reasons for doing so. The decision seems arbitrary and capricious, and the Draft SEIS is deficient in providing any monitoring data that would support the decision.
80	4.15-15	4.15.3	-	-	In the Draft SEIS "The alternatives being evaluated as part of the WMRNP would not result in any increase or decrease in the total amount of direct motorized GHG emissions in the planning area." We do not believe that BLM has provided data in the Draft SEIS to make this statement. We believe that BLM should propose an alternative that would result in a reduction in greenhouse gas emissions.
81	4.2-27 and 4.15-15 to 16	4.15.3	-	-	GHG emissions – BLM states "Quantifying indirect GHG emissions from potential route uses is not possible. The motorized vehicle GHG emissions occurring within the plan's route network will most frequently be insubstantial, short-term, and dispersed." There are also group events that may not be "organized" but occur on an annual or seasonal basis. We presume that BLM has monitoring or enforcement data that provides an indication of the types, numbers, and frequency of OHV uses that can be used to calculate GHG emissions, which should be published in the Final SEIS. Then, using statistics, BLM can set limits in the Final SEIS that demonstrate changes in these emissions based on factors such as changes in the economy, population, and OHV demand.
82	4.15-21	4.15.3	-	-	In this section, BLM provides their assumptions of effects but provides little or no science references to support their assumptions. We request that BLM provide science to support their assumptions in the Final SEIS.
83	4.15-23 to 24	4.15.3	-	-	In this section, BLM provides their assumptions of effects but provides little or no science references to support their assumptions. We request that BLM provide science to support their assumptions in the Final SEIS.

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84	4.15-23	4.15.3	-	-	In the Draft SEIS "Grazing utilization measures the proportion of degree of the current years forage production that is consumed or destroyed by livestock (ITR-Utilization Studies 1996)." This sentence is difficult to understand. Should it say the "proportion or degree?" Should "of degree" be omitted? Please review and change as needed to clarify in the Final SEIS.
85	4.15-26	4.15.3	-	-	In the Draft SEIS "WEMO implemented the tortoise Recovery Plan's recommendation that up to four tortoise DWMAs be established in the West Mojave Recovery Unit." While this "establishment of DWMAs" occurred in the WEMO Planning document, the implementation of on-the-ground management as recommended in the Recovery Plan was marginally implemented. For the reserve design to be effective it was to be implemented with "reserve level" management or a reserve level protection (USFWS 1994b, page 36) or ecosystem protection as described in section 2(b) of the Endangered Species Act (similar to that of the DTRNA). This implementation would reduce human-cause sources of mortality so recruitment exceeds mortality (that is, lambda > 1) (USFWS 1994b, page C46). While BLM designated the four reserves (Fremont-Kramer, Ord-Rodman, Superior-Cronese, and Pinto Mountains) as ACECs in the West Mojave Plan, it did not implement reserve level management. Hence, in the West Mojave Desert, tortoise recruitment is less than human-caused mortality (lambda is <1) and population numbers and densities declined substantially between 2004 and 2014 (see USFWS 2015 and Table 1 below). This should be clarified in the Final SEIS.
86	All	Appendix B	-	-	When describing the acres of critical habitat for the Agassiz's desert tortoise (desert tortoise) in this appendix, do the acreage figures reflect critical habitat under BLM management or all critical habitat in the subregion regardless of land ownership? Please clarify this issue in the Final SEIS.
87	All	Appendix B	-	-	In the Final SEIS, please include all areas where translocation and relocation/movements of Agassiz's desert tortoise onto BLM managed land occurred as mitigation for other projects. Also, please show in the Final SEIS how these mitigation efforts and areas were considered when developing the travel management plan.
88	B-4	Appendix B, B.1	-	-	"The Barstow subregion is bounded by Interstate 40 to the North." In the Final SEIS, we believe this should say "…Interstate 15 to the North" or "…Interstate 40 to the South" when we view Figure 2.1-1.
89	B-6 and B-7	Appendix B, B.1	-	-	Under Mojave Trails National Monument subregion, page B-6 says "This subregion also includes approximately 1,197 acres of Critical Habitat for the desert tortoise." Three paragraphs later in the same section, the document says "Within the Mojave Trails National Monument subregion, the CNDDB documents the occurrence of ten special status species (desert tortoise, golden eagle, pallid bat, fringed myotis, Mojave monkeyflower, burrowing owl, gray vireo Mojave fringe-toed lizard, southwestern pond turtle, and Nelson's bighorn sheep) and/or suitable habitats. Although present, only a small amount (approximately 2 acres) of desert tortoise Critical Habitat is found within this subregion." These figures on critical habitat do not agree and we find this information confusing. In the Final SEIS, please clarify the amount of critical habitat in the Mojave

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					Trails National Monument subregion and the presence of desert tortoise habitat or linkage habitat for the species. Please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
90	B-9 to B-11	Appendix B, B.2	-	-	The description of the South Searles subregion (between the two parts of China Lake Naval Air Weapons Station) does not mention the presence of the desert tortoise or its habitat. The species occurs in both reservations of the China Lake Naval Air Weapons Station, and was subject to a recent study by Berry *et al*. 2013 in the nearby foothills of the southern Argus Range and at the edge of Salt Wells Valley. By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
91	B-11 to B-12	Appendix B, B.2	-	-	The description of the Sierra subregion does not mention the presence of the desert tortoise or its habitat. The species occurs north of the Sierra subregion to an area near Olancha (FHWA and Caltrans 2017). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
92	B-12 to B-15	Appendix B, B.3	-	-	The description of the Juniper Flats subregion does not mention the presence of the desert tortoise or its habitat. The species occurs in the Lucerne Valley south of SR 18 (BLM 1999, Arnold 2011). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
93	B-16 to B-17	Appendix B, B.3	-	-	The description of the Sand to Snow National Monument does not mention the presence of the desert tortoise or its habitat. The species occurs on the southeast side of the San Bernardino Mountains (Lovich *et al*. 2014). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
94	B-17 to B-19	Appendix B, B.3	-	-	The description of the Wonder Valley subregion does not mention the presence of the desert tortoise or its habitat. The species occurs in this subregion (e.g., LaRue 2008). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.

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95	B-19	Appendix B, B.4	-	-	The description of the Jawbone subregion does not mention the presence of the desert tortoise or its habitat. The species occurs in this subregion (e.g., Berry *et al*. 2008). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
96	B-19 to B-20	Appendix B, B.4	-	-	The description of the Middle Knob subregion does not mention the presence of the desert tortoise. The species occurs in this subregion (e.g., Beacon Solar 2008). By not mentioning the presence of the tortoise, the Draft SEIS implies that the tortoise is not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
97	B-24 to B-25	Appendix B, B.5	-	-	The description of the Harper Lake subregion does not mention the presence of the desert tortoise. The species occurs in this subregion (e.g., USFWS 2011b). By not mentioning the presence of the tortoise, the Draft SEIS implies that the tortoise is not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
98	B-26	Appendix B, B.5	-	-	The description of the Cronese Lake subregion does not mention the presence of the desert tortoise or the locations of translocation efforts as mitigation for other projects. The species occurs in this subregion (e.g., Charis Corporation 2005). By not mentioning the presence of the tortoise or the translocation mitigation, the Draft SEIS implies that the tortoise is not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
99	B-33 to B-34	Appendix B, B.8	-	-	The description of the Johnson Valley subregion does not mention the presence of the desert tortoise. By not mentioning the presence of the tortoise, the Draft SEIS implies that the tortoise is not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise (e.g., Sanson 2016), please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
100	B-34	Appendix B, B.8	-	-	The description of the Stoddard Valley subregion does not mention the presence of the desert tortoise or its habitat. The species occurs in this subregion (e.g., BLM 2018b). By not mentioning the tortoise, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
101	B-34 to B-	Appendix B, B.9	-	-	The description of the El Paso subregion does not mention the presence of the desert tortoise or its habitat throughout much of this region. The species occurs in this subregion (e.g., Desert Gazette 2018). By not mentioning the tortoise or its habitat, the

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	35				Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
102	B-35	Appendix B, B.9	-	-	The description of the Ridgecrest subregion does not mention the presence of the desert tortoise or its habitat throughout much of this region. The species occurs in this subregion (e.g., BLM 1999). By not mentioning the tortoise or its habitat, the Draft SEIS implies that the tortoise/tortoise habitat (including linkage habitat) are not present within this subregion. Please clarify in the Final SEIS. Given the presence of the tortoise/tortoise habitat, please include this information in the Final SEIS and show how it was considered when developing the travel management plan.
103	C-4 to C-11	Appendix C	-	-	Most information provided about the status of birds is on their breeding locations/habitats. However, some species winter in southern California and most migrate and rely on migratory habitats to get from wintering habitats/locations to breeding/habitats/locations. This table should provide information on the migratory and wintering habitats of these birds and the Final SEIS should include information whether migratory or wintering habitats occur in the vicinity of the proposed action.
104	C-6	Appendix C	-	-	In the Final SEIS, please change the information in this table to reflect that the willow flycatcher (all subspecies) is endangered under the California Endangered Species Act and southwestern willow flycatcher is endangered under the Endangered Species Act.
105	C-7	Appendix C	-	-	BLM says the status of the western yellow-billed cuckoo is "FC." We assume this means "federal candidate," as FC is not a code provided in the footnote for Table C.1. Please note the western yellow-billed cuckoo was listed as endangered under the Endangered Species Act in 2014 (USFWS 2014b). As such, there should be biological and regulatory information on the species that should be updated from the 2005 WEMO Final EIS (BLM 2005). Please update this information in the Final SEIS, including any surveys that BLM or adjacent landowners have conducted to determine the occurrence/number of cuckoos and the area/condition of their habitats for migration and breeding.
106	C-8	Appendix C	-	-	"The occurrences in the planning area generally occur north of Independence at the northern end of the planning area, and south in Inyo, near Lancaster." In the Final SEIS, please clarify where "south in Inyo" is and how it is "near Lancaster."
107	C-9	Appendix C	-	-	Please note in the table that the status of the Least Bell's vireo and Arizona Bell's vireo are endangered under the California Endangered Species Act. If BLM has not conducted recent surveys, it is possible that Arizona Bell's vireos are in the project area. Pertinent changes should be given in the Final SEIS.
108	C-10	Appendix C	-	-	The tricolored blackbird is a threatened species under the California Endangered Species Act. Please make this change throughout the Final SEIS.

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109	C-14 to C-43	Appendix C	-	-	In the Final SEIS, we suggest adding the California Native Plant Society's Rare Plant Ranking to the Status column of Table C.1.
110	C-40 to C-41	Appendix C	-	-	"TBD" is given as the status of some plants but this acronym in not in the footnote at the end. In the Final SEIS, please update the table and footnote to explain this acronym.
111	C-43	Appendix C	-	-	In the Final SEIS, please add a designation in the Status Column for the protections given to the bald and golden eagles under the Bald and Golden Eagle Protection Act.
112	C-43	Appendix C	-	-	"SR" is given as the status on a plant species but this acronym is not in the footnote at the end. In the Final SEIS, please update the table and footnote to explain this acronym.
113	E-1	Appendix E Purpose	-	-	The information in the Draft SEIS says that the latest route inventory was completed in 2012. That is 6 years ago. We are concerned that the information in the Draft SEIS is outdated and inaccurate regarding the number, location, density, and impacts of routes, especially in special management areas such as ACECs and critical habitat for the Mojave desert tortoise and other listed/sensitive species. According to the Draft SEIS, in 2006 there were a reported 8,000 miles of roads and in 2012 more than 15,000 miles in the West Mojave Plan area. Since 2012, the number of routes could have nearly doubled again as reported by BLM between 2006 and 2012.
114	E-1	Appendix E Pre-CDCA Plan			Referring to E.O. 11644, the Draft SEIS states: "The Order also required the development of operating conditions, public information, appropriate penalties for violations of regulations adopted pursuant to the order, and the monitoring of the effect of the use of [sic] OHV's on lands under their jurisdiction." We were unable to find this information in the Draft SEIS and request that it be included in the Final SEIS. We are especially concerned about appropriate penalties. Public natural resources have been degraded or destroyed by unauthorized OHV use since adoption of the CDCA Plan in 1980 with little enforcement. Restoration, if it occurs, takes decades or centuries. We strongly encourage BLM to develop and implement operating conditions, public information, appropriate penalties for violations of regulations adopted pursuant to the order, and the monitoring of the effect of OHV use on lands under their jurisdiction.
115	E-1	Appendix E Pre-CDCA Plan			From the Draft SEIS: "Executive Order 11989 – Off-Road Vehicles on Public Lands to amend Executive Order 11644 by adding Section 9. Section 9(a) directs that if a determination is made that OHV use will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources of an area or trail on public lands, that the agency immediately close the area or trail to the type of vehicle causing the damage, until such time as it is

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					determined that such effects have been eliminated and that measures have been implemented to prevent future recurrence." We strongly urge BLM to monitor the effects of OHV use in the West Mojave Planning Area since the adoption of the CDCA Plan in 1980 and use this information with other scientific information to implement section 9(a) of this Executive Order. The Council is available to assist with this effort.
116	E-2	Appendix E 1980 CDCA Plan			From the Draft SEIS: "All public lands are to be designated as open, limited, or closed to OHVs. These designations are to be based on the protection of the resources of the public lands, promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands." Given the history of route designation that BLM provided in this appendix, it is apparent that these designations by BLM are "paper designations;" that is they are in a management plan but are not implemented or effectively enforced. Thus, we request that BLM develop and implement appropriate measures to enforce route designations.
117	E-3	Appendix E 1980 CDCA Plan			From the Draft SEIS: "These designations are displayed on CDCA Plan Map Number 10 – Motorized-Vehicle Access." We note that in our electronic copy of the 1980 CDCA Plan, which was downloaded from the BLM website, we were unable to find a map labeled Map 10. We found no mention of Map 10 in the Table of Contents for the 1980 CDCA Plan. On page 93 of the 1980 CDCA Plan, we found a map with the title "Motorized Vehicle Access." Is this the map the Draft SEIS is referring to? Please clarify in the Final SEIS.
118	E-3	Appendix E Amendments to the CDCA Plan			From the Draft SEIS: "It was recognized at the time of writing that it [1980 CDCA Plan] could not be cast in concrete and therefore provided for the ability to be amended as needed to adjust to needed changes and to acknowledge better ways of doing things in the future." Despite the data collected by BLM and others on route proliferation in violation of the CDCA Plan and its amendments since 1980 and the adverse effects of this activity on natural resources including the Mojave desert tortoise and its habitats, BLM still proposes in the Draft SEIS to do little to enforce the designations for motorized vehicles, to implement appropriate penalties to restore the damage to public resources from unauthorized use, and/or monitor the effects of OHV use on the natural environment. In the Final SEIS, please explain why BLM is taking this position when law, regulation, and executive orders direct BLM to do otherwise.

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119	E-6 to E-8	Appendix E 2003 Western Appendix E Mojave Desert ORV Designation Project			From the Draft SEIS: "…11 of the 21 subregions were selected for detailed updating in the Designation Project." "Nine subregions were not selected for new field inventories." "In these nine subregions, the existing 1985 and 1987 route networks were retained." "10 subregions encompass about 774,000 acres of public lands, which is 33 percent of the Limited access portions of the overall West Mojave (WEMO) Planning area." This language is unclear to us; does this mean that BLM was interested in gathering information to determine routes in Class L areas and did not gather information in other Class areas [e.g., Class C (Controlled Use), Class M (Moderate Use), Class I, and unclassified]? If not, why not given requirements outlined in Executive Orders 11644 and 11989 and requirements in the CDCA Plan? Please clarify in the Final SEIS.
120	E-10	Appendix E Vehicle Access Decisions in WEMO ROD	-	-	In the Draft SEIS: "Speed Regulators (MV-3): Within DWMAs, there is no proposal to install speed regulators; however, if monitoring or studies show that certain unimproved roads are causing increased tortoise mortality, the BLM will consider ways, including speed regulators, to reduce or avoid that mortality." In the Final SEIS, BLM should provide the results of their monitoring and/or studies on the effects of unimproved roads on tortoise mortality that it has implemented to date. We suspect that BLM has collected little scientific data regarding monitoring of the effects of OHV activities on the desert tortoise, its habitats, and other sensitive species. In the Final SEIS, please provide the information that BLM has on monitoring since the adoption of the CDPA Plan in 1980.
121	E-11	Appendix E West Mojave Route Network Plan Supplemental EIS	-	-	In the Draft SEIS: "In the 34 years since the original adoption of the CDCA Plan, the population of CA has grown by 57.4 percent (2010 U.S. Census compared to 1980 U.S. Census). During the same time the number of OHV registrations grew by 337.3 percent, from 235,003 to 1,027,612. These changes result in a greater demand for the limited space and resources found on the public lands." These increases are likely contributing to the proliferation of unauthorized routes in the West Mojave Desert on BLM land with more vehicles using routes on a daily basis (i.e., more routes and more frequent use of routes - both important factors in road effects on wildlife). According to the Draft SEIS, in 2006 there were a reported 8,000 miles of roads and in 2012 more than 15,000 miles of roads in the West Mojave Plan area (page E-1 of the Draft SEIS). We note that BLM is under no obligation to supply an increasing number of OHV routes to meet the demands of OHV users in ACECs. BLM's absence of data in the Draft SEIS on monitoring and enforcement in the Draft SEIS indicates this is what BLM is doing. BLM needs to include these data in the Final SEIS.
122	E-12	Appendix E Compliance with new travel management	-	-	In the Draft SEIS: "All forms of travel are now being considered in the designation process including Motorized, Mechanized as well as Non-motorized; not just OHV use as it was in 2006 and before. Additionally, this concept change means that travel for all forms of public land users are now considered in the process including rights of way holders, mining claimants, grazing permittees, as well as casual recreational users." For all forms of travel to be considered and their effects on public resources, including the Mojave desert tortoise and its habitats, BLM will need data on the numbers and frequency of these forms of

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		policy & compliance			travel. Otherwise, BLM is making unsupported assumptions. BLM should provide data in the Final SEIS to support its analysis of effects for all forms of travel.
123	E-10 to E-13	Appendix E Issues & concern 1 - 5	-	-	We concur with the five issues and concerns presented by BLM regarding past route designation efforts in the West Mojave planning area. We add that BLM's development of alternatives and record of decision must be based on the best available information including that in the scientific literature. The scientific literature contains an abundance of information on the effects of roadways/routes of travel on the Mojave desert tortoise and wildlife species with similar behaviors and survival strategies when faced with an immediate threat (i.e., slow-moving, rely in cryptic coloration and staying still rather than fleeing/moving out of the way, etc.). In addition, it contains information on the effects of roadways/routes of travel on tortoise habitats. In the Final SEIS, BLM should evaluate the available data on the effects of roads on tortoises and their habitats before making a decision on route designations in the West Mojave planning area.
124	E-14	Appendix E 2017 Temporary Street-Legal Route Designations	-	-	In the 2018 Draft SEIS: "An Environmental Assessment (EA) will be released in late 2017 regarding the temporary restriction of street-legal only routes." This information should be updated in the Final SEIS.
125	E-13	Appendix E DRECP first bullet	-	-	In the Draft SEIS: "Land use designations throughout the WEMO Planning Area were modified. This included designation of new ACECs, modification of the boundaries of existing conservation areas, establishment of new categories of land use designations, elimination of previous categories of land use designations, and modification of the goals and objectives for development, use, and conservation of resources within designated areas. A description of the changes to land use designations is provided in Section 2.1.1." Because of these changes, we would expect BLM to make a significant reduction in the travel routes in these areas. In addition, we would expect these substantial reductions because of wording in BLM's (2018) Travel and Transportation Management Strategy (TTMS), specifically addressing protection of sensitive species, effects on wildlife and wildlife habitat, and to manage access and impacts to vegetation, sensitive species and their habitats, soils, and air quality. We believe that "sensitive, threatened or endangered species or related habitats" (in TTMS) should be a priority for the BLM's West Mojave Route Designation Draft SEIS as it a concern addressed in Congress' findings regarding the California desert and a supporting purpose for establishing the CDCA (see Title VI of Federal Land Policy and Management Act (1976) sections 601(a) and (b)). The Final SEIS must address these concerns.
126	E-10	Appendix E	-	-	In the Draft SEIS: "A court Remedy Order of January 2011, remanded the 2006 WEMO Plan to the BLM and directed the

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	and E-12	West Mojave Route Network Plan Supplemental EIS			BLM to prepare a revised OHV route network that complies with the designation criteria in 43 CFR 8342.1." It is not clear from BLM's wording on page E-12 ("BLM decided that 100 percent of the inventory in the planning area would be reviewed, and that the entire area would be considered for new route designations during the 2015 WEMO SEIS process. One of the first steps to be undertaken to reach the final goal of a designated travel network was to develop a base inventory of what at the current time (2013) exist out on the public lands.") It appears that BLM intends the base inventory in 2013 to be the baseline from which to determine the routes to remain open and routes to be closed. We are concerned that using 2013 as a base inventory is rewarding past unauthorized activity by OHV users since 1980 and promoting a pattern of ineffective enforcement by BLM of closed or limited use routes. While there should be an inventory of the route network conducted periodically as part of BLM's monitoring and enforcement of its lands, it sets a precedent that as long as an agency keeps changing its methodology, it can manage using a sliding baseline. We believe BLM should use available computerized methods to enhance aerial and satellite imagery from 1978 to 1980 (e.g., LANDSAT, etc.) to determine the actual 1980 baseline of routes in the CDCA when the CDCA Plan was adopted. The baseline should be 1980. The year the CDCA Plan was adopted.
127	E-16	Appendix E	-	-	These aerial photographs and the legends with colors selected for types of route designations are confusing and should be clarified in the Final SEIS. Some routes in the legend are labeled non-BLM but there is no BLM boundary on the photographs. The neutral colors (e.g., black, white, gray) selected for the route designations are difficult to delineate. However, it is apparent from the E-1 and E-2 photographs that routes that are clearly visible on the imagery are not delineated using a color from the legend. It is also apparent that there are substantially more routes on the 2012 (E-2) photograph than the 2005 (E-1) photograph. We conclude that there was no QA/QC during the digitizing process of the 2005 imagery. We hope that BLM ensured that a more stringent QA/QC process was implemented during the latest digitizing effort.
128	92 to 290 of the appendix	Appendix F-4	-	-	We presume that BLM included the 2006 Biological Opinion issued to the BLM for implementation of the West Mojave Plan to show compliance with section 7 of the Endangered Species Act. To demonstrate full compliance, the Final SEIS should include information on how the BLM implemented the activities related to OHV use as described in the biological opinion in the description of the proposed action, minimization measures, reasonable and prudent measures, terms and conditions, reporting requirements, and desert tortoise mortalities. We request that the BLM provide this information in the Final SEIS.
129	125 of Appendix F, 33 of BO	Appendix F-4	-	-	The 2006 Biological Opinion (BO) issued to the BLM for implementation of the West Mojave Plan, the USFWS specifically says that it did not consider route designations for the El Paso and Ridgecrest regions. In the Final SEIS, we would like to know what actions BLM implemented, including monitoring, to ensure that casual use by recreational vehicles did not resulted in take of the desert tortoise during the time this action was not covered.

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130	125 of Appendix F, 33 of BO	Appendix F-4	-	-	The 2006 Biological Opinion states that "The Bureau [BLM] proposes to work with the general public, special interest groups, schools, government agencies, and development and commercial interests through a variety of media to make them aware of the resource values of the western Mojave Desert." Given a recent real estate purchase and excavation activity near Barstow, we conclude that this proposal has not been implemented with the Board of Realtors. We consider realtors to have development and/or commercial interests. In the Final SEIS, we would like the BLM to report on their efforts to make the general public, special interest groups, schools, government agencies and development and commercial interests aware of resource values in the western Mojave Desert and the effectiveness (using science) of their efforts This would include the off-highway vehicle community.
131	214 of Appendix F, 122 of BO	Appendix F-4	-	-	We note that the miles of designated routes in critical habitat for the desert tortoise in the West Mojave has increased from 1985-87, when 492 miles were reported within critical habitat and 2,810 miles were outside critical habitat to 2005 when 2,231 and 3,233 miles, respectively, were reported. This is a 500 percent increase in critical habitat and 50 percent increase outside critical habitat. While these numbers may not be precise, they indicate a pattern that does not correspond with the intended management of critical habitat or habitat for the tortoise, demonstrate compliance with the purpose and intent of the California Desert Conservation Act, or demonstrate compliance with sections 2 and 7(a)(1) of the Endangered Species Act. In the Final SEIS, we ask that BLM explain the measures they will be implementing (including enforcement, monitoring of effects, habitat restoration, and adaptive management) to ensure that miles of routes and their densities are substantially reduced in critical habitat and in linkage areas between critical habitat units, and that their use is substantially reduced.
132	268 in Appendix F, 177 of BO	Appendix F-4	-	-	In the Final SEIS, we request that the BLM include signed copies of its annual reports to the USFWS with information specified in the 2006 biological opinion, including information on OHV use, tortoise injury and mortality, and on-the-ground activities to recover the tortoise.
133	269-271 of Appendix F, 177-179 of BO	Appendix F-4	-	-	In the Final SEIS, we request that the BLM provide information on the conservation recommendations in the 2006 biological opinion on the West Mojave Plan that it has implemented regarding the tortoise, particularly the extended fee program for recreational use.

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134	3.4-40 to 43	**Lane Mountain Milk-vetch** *(Astragalus jaegerianus)* and Appendix F-4	-	-	The CDCA Plan provides the BLM with management direction for much or all of the geographic range of the Lane Mountain milk-vetch and desert tortoise, and thereby has a profound effect on their survival and recovery. The importance of the California desert to the conservation of these species magnifies the importance for the CDCA Plan and the collective effects of its implementation to reflect the recovery goals or needs of listed species, as described in approved recovery plans. However, in its current configuration, the CDCA Plan is structured to a great degree to rely on section 7(a)(2) consultation to avoid jeopardy or adverse modification of critical habitat, rather than to establish a program that promotes recovery of listed species in conformance with section 7(a)(1) of the Act. (excerpted from the February 27, 2002 CDCA biological opinion 1-8-01-F-18). Sixteen years later, this remains true, in part because of ineffective and/or unfunded implementation, enforcement, monitoring, and adaptive management of the OHV program on BLM land. This ineffective/unfunded action could be remedied by implementing a fee program for recreational use and an appropriate monetary penalty as part of enforcement actions. restitution for. In the Final SEIS, we request that BLM implement a fee program for recreational use. The fee would be commensurate with the number, extent, and severity of the impacts. Specifically for OHV use, there is a wealth of data to show that OHV use occurs in unauthorized areas including critical habitats and Wilderness Areas (see BLM 2005). There is also a wealth of data that shows that the adverse effects of OHV use in the desert result in long-term direct and indirect adverse effects to the desert tortoise, its habitats, and other species/habitats, yet BLM does not require mitigation for this activity. The fee program would be sufficient to fund enforcement of BLM's travel management plan, monitoring of its effects (as required under FLPMA), and mitigation of all adverse effects. BLM implements a fee program on other BLM lands in California and other states and should do so in the WMP planning area for consistency.
135	271 of Appendix F, 179 of BO	Appendix F-4 and 3.4-40 to 3.4-43	-	-	The status of the Lane Mountain milk-vetch has declined considerably since the issuance of the 2006 biological opinion for the West Mojave Plan. We recommend that BLM use the data in the USFWS' (2014a) 12-month finding for the milk-vetch and any information since then as the basis for making route determinations within and adjacent to the plant's known range. Given its declining numbers, and Congress' direction to BLM in the purpose and intent of the California Desert Conservation Act and sections 2 and 7(a)(1) of the Endangered Species Act, we ask that BLM explain in the Final SEIS the measures they will be implementing (including enforcement, monitoring, habitat restoration, and adaptive management) to ensure that miles of routes and their densities are substantially reduced within and adjacent to the range of Lane Mountain milkvetch, and that routes be eliminated on lands given to BLM by the Army as mitigation (e.g., Catellus lands) for expansion activities at Fort Irwin.

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136	271 of Appendix F, 179 of BO, 3.4-107	Appendix F-4 and 3.4.3.2.3	-	-	The status of the desert tortoise has declined considerably since the issuance of the 2006 biological opinion for the West Mojave Plan. In the Final SEIS, we recommend that BLM use the data in Linda Allison's (USFWS 2015) range-wide monitoring report for 2013 and 2014 (see Table 10) and any information since then as the basis for making route determinations within and adjacent to the tortoise's distribution, critical habitat, and linkage areas. Given its declining numbers, and Congress' direction to BLM in the purpose and intent of the California Desert Conservation Act and sections 2 and 7(a)(1) of the Endangered Species Act, we ask that BLM in the Final SEIS explain the measures they will be implementing (including enforcement, monitoring, habitat restoration, and adaptive management) and how they will determine their effectiveness in ensuring that miles of routes and their densities are substantially reduced in and adjacent to critical habitat and linkage areas, and that routes be eliminated on lands given to BLM as mitigation for the tortoise and other wildlife species (e.g., Catellus lands). Please note that Agassiz's desert tortoise is now on the list of the world's most endangered tortoises and freshwater turtles. It is in the top 50 species. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers Agassiz's desert tortoise to be Critically Endangered (Turtle Conservation Coalition 2018). It is one of three turtle and tortoise species in the United States that is critically endangered. It is not evident that BLM was aware of this information in the Draft SEIS when determining how planning, implementing/enforcing, monitoring, and adaptively managing the transportation and travel network and livestock grazing in the West Mojave Planning Area, which should be remedied in the Final SEIS.
137	N/A	N/A	-	-	In the 2006 biological opinion for the West Mojave Plan and in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and: "(a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action." We refer BLM to the USFWS' (2014a) 12-month finding on Lane Mountain milk-vetch and Allison's (USFWS 2015) Range-wide monitoring of the Mojave desert tortoise (*Gopherus agassizii*) - 2013 and 2014 Annual Reporting (from USFWS) and request why BLM did not reinitiate formal consultation when these documents provided new information under 50 CFR 402.16(b)for the West Mojave Plan?

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Comment #	**Page Number**	**Section Number**	**Figure Number**	**Table Number**	**Comment and/or Reference** **Please see references given in the cover letter or Appendix A for literature citations that follow**
138	N/A	N/A	-	-	Please provide information in the Final SEIS about BLM's compliance with the California Endangered Species Act in authorizing actions that are likely to result in take for the state listed desert tortoise and other state-listed species.

Appendix A. Literature Review for Impacts of Roads and Grazing

Implementation, Enforcement, Monitoring, and Mitigation Plans

We were unable to find an implementation plan, enforcement plan, or monitoring plan included in the any of the action alternatives. BLM needs to include these plans to show how, when, and where its management plan will be implemented and determine its effectiveness through monitoring as required by the Federal Land Policy and Management Act (FLPMA) and other laws, executive orders, and policies. An implementation schedule should be included in the implementation, enforcement, and monitoring plans to demonstrate to and assure the public that the management plan will be implemented, enforced, and monitored. In addition, we believe, there should be a mitigation plan to restore habitat damaged or destroyed from unauthorized surface disturbance including unauthorized OHV activities. Implementation of the mitigation plan would be commensurate with the impacts to the affected resources (e.g., desert tortoise and tortoise habitats). It would be funded, in part, by monies collected from recreation fees and from citations issued to unauthorized users.

The U.S. Fish and Wildlife Service's (USFWS) (2008) 5-year review of the endangered Lane Mountain milk-vetch (*Astragalus jaegerianus*) recognized the majority of threats that 10 years later continue to adversely affect Lane Mountain milkvetch, but recommended down-listing to threatened because of anticipated future implementation of management and conservation measures that were in BLM's WEMO Plan (BLM 2005). In the WEMO Plan, BLM designated two areas containing the milk-vetch as Areas of Critical Environmental Concern (ACEC) on BLM land (the entire Coolgardie Mesa population and approximately 10 percent of the Paradise Valley population). The USFWS anticipated the prescribed management actions in the WEMO Plan associated with the ACEC designations would be fully implemented and would significantly abate threats to Lane Mountain milk-vetch. However, management and conservation measures prescribed for the species on BLM lands have not been fully implemented as expected nor have they had the anticipated effect. For example, in the 2008 5-year review USFWS anticipated BLM's actions would result in a decrease in OHV use, but analysis of BLM data indicates OHV use has increased (USFWS 2014a). If BLM had implementation, enforcement, and monitoring plans for these ACECs, BLM would have known within a few years that their ACEC designations for Coolgardie Mesa and Paradise Valley were not producing the results that BLM and USFWS expected. Rather, they learned this from USFWS in 2014.

Effectiveness of Signing, Route Maps, and Education

BLM is proposing to use signing, maps, and education of the public to achieve compliance with the use of open and closed routes. Below are three locations where BLM has used this approach before in the West Mojave Planning Area and the results.

Coolgardie Mesa contains one of four locations or populations of the endangered Lane Mountain milk-vetch. Off-highway vehicle use had increased in one portion of the Coolgardie site since 1998, creating a barren area of approximately 20 acres (8 hectares) where Lane Mountain milk-vetch used to occur (Hessing, 2006, as cited in USFWS 2008). In the West Mojave Plan (BLM 2005), BLM identified minimizing vehicle routes of travel, fencing, education, and enforcement

as conservation measures to help the Lane Mountain milk-vetch and its habitat. However, activities such as fencing, signing, and closing areas have had limited success in managing access or controlling new unauthorized routes for the milk-vetch (USFWS 2014a). BLM installed prominent signs at the south entrance to Coolgardie Mesa to educate the public about the milk-vetch and about staying on designated roads. In 2006, the USFWS funded the acquisition of equipment and materials for BLM to install 2 miles (3.2 kilometers) of fencing to secure sites from additional damage and to initiate restoration activities (USFWS 2008) for the milk-vetch. In 2012, staff from the USFWS visited the Coolgardie Mesa and reviewed BLM route data. They observed that the signs had been defaced and were not readable, and identified an increase in OHV routes in the Coolgardie Mesa area from about 67 miles (mi) [108 kilometers (km)] in 2005 to 134 mi (216 km) in 2012. The unauthorized OHV activities included development of new roads and establishment of camping and staging areas in previously undisturbed areas. Apparently, BLM did not fully implement the fencing (fenced a short linear area), did not maintain the signs to educate the public, and did not enforce the route designations in the ACEC for the Lane Mountain milk-vetch.

When BLM established the Desert Tortoise Research Natural Area (DTRNA) and closed it to OVH use and grazing, it posted signs to mark the boundary of the DTRNA to control the unauthorized use and published maps showing the area as closed to vehicles. Despite these efforts, trespass continued. BLM fenced the DTRNA to exclude these unauthorized uses. Over the years, fencing has been cut but the frequency of fence cutting tends to reduce over time (Estrada 2017).

BLM designated the Western Rand ACEC in the 1980 California Desert Conservation Area Plan to protect and restore the habitat and populations of the desert tortoise in the Rand Mountains and adjacent portions of the Fremont Valley. The area is designated critical habitat for the tortoise and was once home to large numbers of desert tortoise. This desert tortoise ACEC (DT ACEC) plays an important role in connecting the tortoises of the DTRNA to those in the east in the Fremont-Kramer DT ACEC and Superior-Cronese DT ACEC.

The BLM's 1993 Management Plan for the Rand Mountains - Fremont Valley Management Area included areas that have been popular with OHV enthusiasts for a few decades (Desert Tortoise Preserve Committee 2002). A vehicle route system was established under the 1993 Plan; BLM posted signs to inform recreational users that vehicle use was restricted to specific routes and areas and other education methods. This educational approach to achieve compliance did not work. The habitat had undergone severe degradation due to this human impact. BLM closed a portion of the ACEC and fenced it for six years. It was reopened for one year and closed again because of non-compliance with route signing by OHV recreational users (Berry *et al*. 2014).

In this situation, BLM experimented with using education through signing and other methods to achieve compliance from OHV recreational users; BLM expended years of effort (e.g., Goodlett and Goodlett, 1992; BLM, 2002, 2006; U.S. District Court, 2009, as cited in Berry *et al*. 2014) but compliance was not achieved and impacts to habitat degradation continued. As a result, BLM closed and fenced a portion of the critical habitat in 2002, and this area remained closed with the

exception of a year (2008–2009), when the area was reopened. Because of continued non-compliance by off-highway vehicle users, the area was closed again in 2009 (Berry *et al*. 2014).

While many OHV recreation users may try to comply with route designations and confine their activities to open routes, BLM's approach to compliance by signing open and closed routes is problematic.

- BLM assumes that riders will be self-enforcing if they know (using signs and maps) where the open and closed routes are.
- Signs are problematic; with some effort, can be removed or damaged so their information is unclear. OHV drivers are travelling frequently at fast rates and concentrating on the terrain in front of them, not low narrow signs with tan colors that blend in with the surrounding area.
- Many riders are repeat recreationists to an area. They have a habit or ritual of driving in particular areas. Closing an area that has been used in the past for OHV recreation means effectively communicating this change to the users, changing their habits, and enforcing this change until it becomes a new habit. These tasks are not easy to accomplish.
- Once a few people venture off an open route, they have created a new route and others tend to follow. The damage to the environment from creating these unauthorized routes takes decades or longer to restore. The issue of who is responsible to restore that damage is not addressed.

Therefore, BLM's proposed action in the action alternatives to return to compliance/ enforcement methods (i.e., signing and mapping/education) that have been ineffective will likely continue to be ineffective and result (based on past experience) in route proliferation, additional damage to natural and cultural resources, and no mitigation for the damages to these resources that are managed for the public by BLM. Until new effective methods are developed that result in a high level of compliance/enforcement of closed routes and closed areas, we believe BLM should provide a physical barrier such as a fence that was constructed and maintained for the DTRNA and part of the Western Rand ACEC to help OHV recreationists comply.

Legal and Regulatory Authorities and Directives Applicable to BLM's Management of Resources Affecting the Desert Tortoise and Off-highway Vehicles

Federal Land Policy and Management Act: The California Desert Conservation Area (CDCA) was created by order of Congress with the passage of the FLPMA of 1976. A purpose of FLPMA and in establishing the CDCA is "to provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." The term "sustained yield" means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. "Environmental quality**"** is not defined in FLPMA, therefore, we rely on the definition in the dictionary. Environmental quality is a set of properties and characteristics of the environment, either generalized or local, as they impinge on human beings and other organisms. It is a measure of the condition of an environment relative to the requirements of one or more species and or to any human need or purpose.

Endangered Species Act: The FESA of 1973 directs all federal agencies to " …utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…" In FESA, Congress defined an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range…" The California Endangered Species Act (CESA) contains a similar definition. In CESA, the California legislature defined an "endangered species" as a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant, which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes. (California Fish and Game Code § 2062.)

Executive Order 11644 - Use of off-road vehicles on the public lands - This Order also required BLM to develop operating conditions, public information, appropriate penalties for violations of regulations adopted pursuant to the order, and the monitoring of the effect of the use of OHVs on lands under its jurisdiction.

Executive Order 11989 – Off-Road Vehicles on Public Lands to amend Executive Order 11644 - This Order added Section 9. Section 9(a) directs that if a determination is made that OHV use will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat, or cultural or historic resources of an area or trail on public lands, that the agency immediately close the area or trail to the type of vehicle causing the damage, until such time as it is determined that such effects have been eliminated and that measures have been implemented to prevent future recurrence."

Executive Order 13195 – Trails for America in the 21st Century - Section 1 directs federal agencies to protect, connect, promote, and assist trails of all types throughout the United States. This will be accomplished by: (a) Providing trail opportunities of all types, with minimum adverse impacts and maximum benefits for natural, cultural, and community resources; (b) Protecting the trail corridors associated with national scenic trails and the high priority potential sites and segments of national historic trails. Section 4 states that "nothing in this Executive Order shall be construed to override existing laws, including those that protect the lands, waters, wildlife habitats, wilderness areas, and cultural values of this Nation."

BLM Manual

2930 - Recreation Permits and Fees

02. Objectives

Section E. Establish a permit and fee program that provides needed public services; satisfies recreation demand within allowable use levels; minimizes user conflicts; and protects and enhances public lands, recreation opportunities, and sustainable healthy ecosystems. This includes managing recreation programs and facilities in a manner that protects the resources, the public and their investment, and that also fosters pride of public ownership.

Section F. Assure that recreational users assume an appropriate share of the cost of maintaining recreation programs and facilities and protecting the resources

Section G. Issue recreation permits in an equitable manner for specific recreational uses of the public lands and related waters as a means to manage visitor use; provide for visitor health, safety, and enjoyment; minimize adverse resource impacts;

1613 – Areas of Critical Environmental Concern

.6 Monitoring and Management of ACECs - FLPMA requires BLM to give priority to the designation and protection of ACECs. Protection is afforded by implementing management prescriptions set forth in the approved Resource Management Plan or plan amendment. Follow-up monitoring is also essential for ensuring the protection of ACEC values and resources Given FLPMA's mandate that BLM give priority to designation and protection of ACECs, implementation and monitoring of ACECs is subject to the following requirements and guidelines:

.61 ACEC Implementation Schedules – An implementation schedule must be prepared for each ACEC. Such schedules shall identify the priority, sequence, and costs of implementing activities associated with protection of the ACEC resources or values, including monitoring activities. The ACEC implementation schedule shall be maintained and used as the basis for tracking and reporting on ACEC implementation.

.62 ACEC Activity Plans – Site-specific activity plans may be prepared but are not required.

.63 ACEC Monitoring – Resources in an ACEC are assumed to be sensitive. Therefore, essential monitoring is critical to ensure that protection of the identified resource values occurs and to keep the managing official aware of how well the Resource Management Plan provisions are accomplishing their objectives. If needed, modification to the RMP will be identified early so that protection is accomplished.

.65 Annual Status Reports on ACECs – annually report on the progress made in implementing and monitoring ACECs to track accomplishments in managing ACECs. The report includes management measures undertaken and completed as well as proposed management measures for the next fiscal year.

6840 – Special Status Species Management

.01 Purpose. The purpose of this manual is to provide policy and guidance for the conservation of BLM special status species and the ecosystems upon which they depend on BLM-administered lands. BLM special status species are: (1) species listed or proposed for listing under the Endangered Species Act (ESA), and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as Bureau sensitive by the State Director(s).

.02 Objectives. The objectives of the BLM special status species policy are: A. To conserve and/or recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer needed for these species. B. To initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA.

.04 Responsibility.

E. District Managers and Field Managers are responsible for implementing the BLM special status species policies and program within their area of jurisdiction by:

1. Implementing conservation strategies for BLM special status species as contained in approved recovery plans, cooperative agreements, and other instruments the BLM has cooperatively participated in the development of.
2. Conducting and maintaining current inventories of BLM special status species on BLM-administered lands.
3. Ensuring that all actions undertaken comply with the ESA, its implementing regulations, and other directives associated with ESA-listed and proposed species.
4. Ensuring that the results of formal Section 7 consultations, including mandatory terms and conditions in incidental take statements that are consistent with 50 CFR 402 regulations, are implemented and documented in the administrative record.
7. Monitoring populations of Bureau special status species to determine whether management objectives are being met. Records of monitoring activities are to be maintained and used to evaluate progress relative to such objectives. Monitoring shall be conducted consistent with the principles of adaptive management as defined in Department of the Interior policy, as appropriate.

Status and Trend for Agassiz's Desert Tortoise in the West Mojave:

Agassiz's desert tortoise (=Mojave desert tortoise) was listed as threatened under the federal Endangered Species Act in 1990 and California Endangered Species Act in 1989. Listing was warranted because of ongoing population declines throughout the range of the tortoise from multiple human-caused activities. Since these listings, population numbers and densities of the tortoise continue to decline substantially (see Table 1).

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA) for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise). The table includes the area of each Recovery Unit and Critical Habitat Unit (CHU)/Tortoise Conservation Area (TCA), percent of total habitat for each Recovery Unit and Critical Habitat Unit/Tortoise Conservation Areas, density (number of breeding adults/km^2 and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red. (From USFWS 2015, available at https://www.fws.gov/nevada/desert_tortoise/documents/reports/2013/201314_rangewide_mojave_desert_tortoise_monitoring.pdf)

Recovery Unit Designated Critical Habitat Unit/Tortoise Conservation Area	Surveyed area (km^2)	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km^2 (SE)	% 10-year change (2004–2014)
Western Mojave, CA	**6,294**	**24.51**	**2.8 (1.0)**	**–50.7 decline**
Fremont-Kramer	2,347	9.14	2.6 (1.0)	–50.6 decline
Ord-Rodman	852	3.32	3.6 (1.4)	–56.5 decline
Superior-Cronese	3,094	12.05	2.4 (0.9)	–61.5 decline

Colorado Desert, CA	**11,663**	**45.42**	**4.0 (1.4)**	**–36.25 decline**
Chocolate Mtn AGR, CA	713	2.78	7.2 (2.8)	–29.77 decline
Chuckwalla, CA	2,818	10.97	3.3 (1.3)	–37.43 decline
Chemehuevi, CA	3,763	14.65	2.8 (1.1)	–64.70 decline
Fenner, CA	1,782	6.94	4.8 (1.9)	–52.86 decline
Joshua Tree, CA	1,152	4.49	3.7 (1.5)	+178.62 increase
Pinto Mountain, CA	508	1.98	2.4 (1.0)	–60.30 decline
Piute Valley, NV	927	3.61	5.3 (2.1)	+162.36 increase
Northeastern Mojave	**4,160**	**16.2**	**4.5 (1.9)**	**+325.62 increase**
Beaver Dam Slope, NV, UT, AZ	750	2.92	6.2 (2.4)	+370.33 increase
Coyote Spring, NV	960	3.74	4.0 (1.6)	+ 265.06 increase
Gold Butte, NV & AZ	1,607	6.26	2.7 (1.0)	+ 384.37 increase
Mormon Mesa, NV	844	3.29	6.4 (2.5)	+ 217.80 increase
Eastern Mojave, NV & CA	**3,446**	**13.42**	**1.9 (0.7)**	**–67.26 decline**
El Dorado Valley, NV	999	3.89	1.5 (0.6)	–61.14 decline
Ivanpah, CA	2,447	9.53	2.3 (0.9)	–56.05 decline
Upper Virgin River	**115**	**0.45**	**15.3 (6.0)**	**–26.57 decline**
Red Cliffs Desert	115	0.45	15.3 (6.0)	–26.57 decline
Total amount of land	**25,678**	**100.00**		**–32.18 decline**

The Council has serious concerns about sources of human mortality for the tortoise given the status and trend of the desert tortoise range wide and in West Mojave Planning Area (Tables 1 and 2). A few years after listing the Mojave desert tortoise under the FESA, the USFWS published a Recovery Plan for the Mojave desert tortoise (USFWS 1994b). It contained a detailed population viability analysis. In this analysis, the minimum viable density of a Mojave desert tortoise population is 10 adult tortoises per mile^2 (3.9 adult tortoises per km^2). This assumed a male-female ratio of 1:1 (USFWS 1994b, page C25). Populations of Mojave desert tortoises with densities below this amount are in danger of extinction (USFWS 1994b, page 32).

In the West Mohave Planning Area, there are three tortoise populations and BLM has designated four ACECs that overlap these populations. In 2015, the USFWS reported that the population densities of the Fremont-Kramer, Ord-Rodman, and Superior-Cronese populations were 2.6, 3.6, and 2.4 tortoises per km^2, respectively (USFWS 2015). These densities are below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) reported in the recovery plan (USFWS 1994b). Between 2004 and 2014, these three tortoise populations declined by 50.6, 56.5, and 61.5 percent, respectively (USFWS 2015). Most of this period of decline occurred after the 2006 record of decision for the West Mojave Plan.

Table 2. Summary of 10-year trend data for the Western Mojave Recovery Unit and four Critical Habitat Units (CHU)/Tortoise Conservation Areas (TCA) for Agassiz's desert tortoise, *Gopherus agassizii* (=Mojave desert tortoise*)*. The table includes the area of the Recovery Unit and Critical Habitat Unit (CHU)/Tortoise Conservation Area (TCA), percent of total habitat for each Recovery Unit and Critical Habitat Unit/Tortoise Conservation Areas, density (number of breeding adults/km^2 and standard errors = SE), and the percent change in population density between 2004-2014. Populations below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red. (From USFWS 2015, available at https://www.fws.gov/nevada/desert_tortoise/documents/reports/2013/201314_rangewide_mojave_desert_tortoise_monitoring.pdf)

Recovery Unit Designated Critical Habitat Unit/Tortoise Conservation Area/ACEC	Surveyed area (km^2)	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km^2 (SE)	% 10-year change (2004–2014)
Western Mojave, CA	**6,294**	**24.51**	**2.8 (1.0)**	**–50.7 decline**
Fremont-Kramer	2,347	9.14	2.6 (1.0)	–50.6 decline
Ord-Rodman	852	3.32	3.6 (1.4)	–56.5 decline
Superior-Cronese	3,094	12.05	2.4 (0.9)	–61.5 decline
Colorado Desert				**–36.25 decline**
Pinto Mountain	508	1.98	2.4 (1.0)	–60.3 decline

Data on population density alone does not indicate population viability. The area of protected habitat or reserves for the subject species is a crucial part of the viability analysis. The USFWS' analysis included population density and size of reserves and population numbers and size of reserves. The USFWS' analysis reported that as population densities for the Mojave desert tortoise decline, reserve sizes must increase, and as population numbers for the Mojave desert tortoise decline, reserve sizes must increase (USFWS 1994b, page C53). In 1994, reserve design (size and locations of reserves or Desert Wildlife Management Areas) (USFWS 1994b) and subsequent designation of critical habitat (USFWS 1994a) were based on the population viability analysis from numbers and densities of populations of the Mojave desert tortoise in the early 1990s. Inherent in this analysis is that the lands be managed with reserve level protection (USFWS 1994b, page 36) or ecosystem protection as described in section 2(b) of the Endangered Species Act (similar to that of the DTRNA), and that sources of mortality be reduced so recruitment exceeds mortality (that is, lambda > 1)(USFWS 1994b, page C46). While BLM designated the four reserves (Fremont-Kramer, Ord-Rodman, Superior-Cronese, and Pinto Mountains) as ACECs in the West Mojave Plan, it did not provide for reserve level management. Hence, in the West Mojave Desert, tortoise recruitment is less than human-caused mortality (lambda is <1) and population numbers and densities continue to decline.

Agassiz's desert tortoise is now on the list of the world's most endangered tortoises and freshwater turtles. It is in the top 50 species. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers Agassiz's desert tortoise to be Critically Endangered (Turtle Conservation Coalition 2018).

The IUCN places a taxon in the Critically Endangered category when the best available evidence indicates that it meets one or more of the criteria for Critically Endangered." These criteria are 1) population decline - a substantial (>80 percent) reduction in population size in the last 10 years; 2) geographic decline - a substantial reduction in extent of occurrence, area of occupancy, area/extent, or quality of habitat, and severe fragmentation of occurrences; 3) small population size with continued declines; 4) very small population size; and 5) analysis showing the probability of extinction in the wild is at least 50 percent within 10 years or three generations. Numbers 2, 3, and 5 apply to Agassiz's desert tortoise (see Table 1). Therefore, Agassiz's desert tortoise is facing an extremely high risk of extinction in the wild in the foreseeable future.

In the FESA, Congress defined an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range…" In CESA, the California

legislature defined an "endangered species" as a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant, which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes. (California Fish and Game Code § 2062). In reviewing the data in Table 1 above, all tortoise populations in California declined from 2004 to 2014 except one; it is on lands managed by the National Park Service. Thus, the data indicate that the threatened desert tortoise may now meet the definition of endangered.

The DTRNA was established in 1976 by the BLM, with assistance from the Desert Tortoise Preserve Committee. The DTRNA's management goal is to protect the habitat in its natural state, without direct conflict from human activities such as livestock grazing, recreational vehicle use, and mining. It was designated an ACEC in 1980 under the CDCA Plan. Located in the western Mojave Desert in northeastern Kern County, the total area encompasses more than 25,000 acres of public and private lands and is adjacent to the Fremont-Kramer ACEC for the desert tortoise. The DTRNA has one of the highest known densities of desert tortoises per square mile in the species' geographic range (California, Utah, Nevada, and Arizona,). Tortoise densities are from 100 to 200 per square mile in some parts of the DTRNA (BLM 2018a). This is in contrast to the tortoise densities in the Fremont-Kramer ACEC, which are 2.6 per square kilometer or 6.7 per square mile. The difference in management between the DTRNA and adjacent Fremont-Kramer DT ACEC is that livestock grazing, recreational vehicle use, and mining have been excluded and on-the-ground management actions (e.g., fencing) have been implemented to ensure that the exclusions are maintained and enforced at the DTRNA, whereas these uses continue in the Fremont-Kramer DT ACEC.

Literature Review and Discussion of Impacts Associated with Roads and Grazing

Information from Desert Tortoise Recovery Plans: Our intent in providing the information below from the desert tortoise recovery plans is to show that the adverse effects of OHV use and livestock grazing on the desert tortoise and its habitat has been documented in the scientific literature for decades. Using this information, two recovery teams of scientists prepared a recovery plan (USFWS 1994b) and revised recovery plan (USFWS 2011a) with management actions that would recover the tortoise. To date, most of these management actions have not been implemented on public lands in the CDCA. Given BLM's mandates under FLPMA and section 7(a)(1) of the FESA, we believe BLM can and should be implementing the recovery actions on its lands regarding OHV use, livestock grazing, and habitat restoration.

Information from: U.S. Fish and Wildlife Service. 1994. Proposed desert wildlife management areas for recovery of the Mojave population of the desert tortoise. An addendum to: U.S. Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan. 1994. Region 1, Portland, Oregon.

- The current estimated average regional density of adult desert tortoises is 35 per square mile with stable populations occurring away from roads and highways (p. 9).
- With growing recreation pressures in the East Mojave Scenic Area, desert tortoise mortality rates from collecting, vandalism, and road kills can be expected to rise (p. 9).
- Areas designated as wilderness can offer significant protection for desert tortoises (p.11).

- Fremont-Kramer DWMA (currently ACEC)
  Population declines since the late 1970s and early 1980s have been catastrophic and appear to be due almost entirely to human-related activities and Upper respiratory Tract Disease (URTD) (Berry and Nicholson 1984, Berry 1984). In addition to declines in abundance, the proportion of juvenile and immature desert tortoises declined between the 1970s and 1980s, apparently due to excessive raven predation (BLM *et al.* 1989, Berry 1990, as amended). Collecting, vandalism, road kills, disease, raven predation, OHV activity, and other related human impacts have contributed to significant population declines (p. 65).

  Paved and unpaved roads, some of which are maintained by the counties, exist throughout the DWMA and are significant sources of mortality (p. 67).

  Table 12. Fremont-Kramer DWMA
  Management actions identified in the Recovery Plan for the Fremont-Kramer DWMA
  Sign and Fence Boundaries
  Restore Habitat
  Close Roads
  Withdraw Grazing (p. 70)

- Ord-Rodman DWMA (p. 74)
  Collecting, vandalism, road kills, disease, OHV activities, livestock grazing, and other, human-related impacts have contributed to significant population declines.

  Within the DWMA, human uses include shooting, paramilitary activities, OHV use, general recreation, mining, powerline corridors, and hunting for upland game birds. Trails and routes from OHV use are common in the Johnson Valley Open Area, but not as common elsewhere (estimate of about 36 linear miles per township) (p. 74).

  Table 13. Ord-Rodman DWMA
  Management actions identified in the Recovery Plan for the Ord-Rodman DWMA.
  Sign and Fence Boundaries
  Restore Habitat
  Close Roads
  Withdraw Grazing
  Establish Ecological Reserve and Research Natural Area

- Superior-Cronese DWMA (p. 78)
  Several roads create barriers and inhibit movement of desert tortoises
  Other unpaved roads dissect or fragment the DWMA, including Black Canyon, Opal Mountain, Coolgardie, Copper City, Indian Springs, Fossil Bed, Pipeline, and Arrowhead Trail roads.

  OHV use is expected to increase with population growth in the Barstow area and the north Victorville-Helendale area. With increased human use, the desert tortoise population will be exposed to increased collection for pets and commercial uses, vehicle kills, and vandalism (p. 81).

Table 14. Superior-Cronese DWMA
Management actions identified in the Recovery Plan for the Superior-Cronese DWMA
Sign and Fence Boundaries
Restore Habitat
Close Roads
Withdraw Grazing (p. 82)

- Pinto Mountains DWMA [originally part of the Joshua Tree DWMA]
  Most of the proposed DWMA lands … are managed by the BLM as part of the CDCA. BLM is mandated to manage these lands for multiple use and sustained yield and to conserve desert tortoise habitat (p. 87).

  Because this DWMA is isolated from other DWMAs, it should be as large as possible to maximize the long-term survival of desert tortoise of this desert tortoise population (p.86).

  Significant barriers exist outside or on the edges of the Joshua Tree DWMA which prevent movements of desert tortoises from this DWMA to the Chuckwalla DWMA or other DWMAs (p. 86).

  Urban development, highways, agricultural fields, and military and industrial complexes have severely fragmented and restricted adjacent tortoise habitats (p. 87).

  This DWMA is currently affected by a variety of human uses occurring both within and adjacent to its borders. Some uses include numerous urban developments, light industrial developments, military ground and air training, OHV use, mining, landfills, garbage dumps, grazing, and moderate and major vehicle traffic. Additional concerns include increased human access and use of the area (collection, vandalism, road kills of desert tortoises), the effects of accidental spills or derailments and clean-up efforts (degradation and loss of desert tortoise habitat), maintenance of the rail line, and the effects of noise on desert tortoise physiology and behavior, including movements (pp. 88-89).

  Desert tortoise habitats not protected within the DWMA would likely experience rapid degradation from many types of uses, including military ground training, OHV use, increased vehicle traffic, general recreation, grazing, mining, landfills, urban development, collecting, vandalism, and increased predation from wild and domestic predators (p. 89).

Table 15. Joshua Tree DWMA (includes Pinto Basin DWMA)
Sign and Fence Boundaries
Restore Habitat
Close Roads
Withdraw Grazing (p. 90)

Information from: U.S. Fish and Wildlife Service. 1994b. Desert Tortoise (Mojave Population) Recovery Plan. 1994. Region 1, Portland, Oregon.

P. 5: Table 1.Partial summary of references relating to effects of human activities, off-highway vehicles, and grazing of domestic cattle and sheep on desert tortoise habitat and on the desert tortoise.

The summary of effects of human activities, OHVs, and grazing on desert tortoise habitat and on the desert tortoise includes effects to tortoises from dirt roads, human vandalism (facilitated by road access), collection and trade (facilitated by road access), loss of soil, loss of annual native vegetation, loss of perennial vegetation, loss of tortoise burrows, crushing tortoises, long-term loss of soil, soil compaction, long-term loss of native vegetation, introduction of nonnative vegetation.

P. 6: Desert tortoises are often struck and killed by vehicles on roads and mortality of desert tortoise due to… off-highway vehicles is common in parts of the Mojave region.

P. 6: Between 1981 and 1987, 40 percent of desert tortoise found dead on a study plot in Fremont Valley, CA were killed by gunshot or vehicles travelling cross-country or on trails.

P. 8: Habitat Destruction, Degradation, and Fragmentation: Habitat fragmentation is a major contributor to population declines. Desert tortoise require a great deal of space to survive. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and may make forays of more than 7 miles at a time.

In drought years, desert tortoise forage over larger areas and thus have a greater probability of encountering potential sources of mortality.

P. 27-28: Desert Tortoise Life History, Population Dynamics, and Other Factors: The life history strategy of the desert tortoise depends on longevity and iteroparity (reproduction many times per lifetime). Because adults normally live long enough to have multiple opportunities to reproduce, populations can grow or at least remain stationary (neither growing nor declining) if long periods with unsuccessful reproduction are punctuated occasionally with a few successful years. This life history strategy is advantageous where availability of resources is unpredictable and juvenile survival rates are highly variable, but even moderate downward fluctuations in adult survival can result in rapid population declines. Thus, sustaining high survivorship of adult desert tortoise is the key factor in the recovery of this species.

No populations with rates of growth as low as these [i.e., 0.5% to 1.0 % per year] can stand loss rates of breeding adults as high as those reported in the population shown in Figure 1 [~50% in 13 years] without serious threat of extinction. The desert tortoise is extremely vulnerable to extinction in areas in which the probability of adult survival has been significantly reduced [below the 98% normal survival rate per year]. Other species with similar life history strategies (e.g., California condor, black rhinoceros, blue whale) have been caught in altered environments in which the probability of adult survival has decreased dramatically. These species are all in danger of extinction.

Other factors also affect recoverability of this species. For example, desert tortoises have complex social behaviors and intimate familiarity with their home ranges. Desert tortoise

recovery is further complicated by the large area involved. There is considerable genetic and ecological variability within the desert tortoise throughout the Mojave region. Maintaining this variability is necessary for desert tortoises to adapt to these varied environmental conditions and possible future changes in the environment.

P. 33: Comprehensive Considerations in Population Viability: The 1994 Recovery Plan recommended DWMAs at least 1,000 square miles as the target size. Reserves of this size will likely provide sufficient buffering from demographic stochasticity and genetic problems at low population densities and they are large enough to support recovered populations that have reasonable probabilities of persistence into the future.

[definition of a reserve is a protected area; A site where human uses are restricted or prohibited and where conservation of biodiversity is a primary goal.
http://sites.sinauer.com/groom/article21.html]

P. 34: Reserve Architecture: Principles of reserve design indicate that the shape of DWMAs is also very important.

P. 49: Blocks of habitat that are roadless or otherwise inaccessible to humans are better than blocks containing roads and habitat blocks easily accessible to humans.

P. 50: Develop Reserve-level Management within DWMAs: Because the factors causing the decline of the desert tortoise are primarily human-related (see Section I.B.), many human activities within DWMAs will need to be strictly regulated or eliminated. Recommended management actions should be tailored to the needs of specific DWMAs and include activities such as eliminating burro, horse, and domestic livestock grazing; limiting vehicular access, including prohibiting new vehicular access and reducing existing access; and prohibiting new surface disturbances, except to improve the quality of wildlife habitat, watershed protection, or improve opportunities for non-motorized recreation…

P. 51: Implement Reserve-level Management within DWMAs: Specific actions are recommended in Section II.E. and include activities such as partial fencing of DWMA boundaries to control livestock, burros, and horses; increased law enforcement; closure of vehicle routes and designation of vehicle ways; and construction of barrier fencing and highway underpasses that can be used by desert tortoises, thus reducing mortality of animals on and near roads and railroad tracks.

Appendix F-32: Designate the Ord-Rodman DWMA as an Ecological Reserve or Research Natural Area.

Appendix F-35: Fence the periphery of the DWMA as needed to enforce regulations and protect desert tortoises from human impacts.

Information from: U.S. Fish and Wildlife Service. 2011a. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. 222 pp.

P. 6: Between 1978 and 1983, BLM conducted desert tortoise triangular transects. To make efficient use of resources for the planning effort, most transects were placed in areas with vegetation and slope characteristics that were expected to support desert tortoises. Transects were spaced to cover larger areas fairly evenly, and were set away from dirt roads and even farther from paved roads. Thus, as early as 1978, BLM knew that where there were dirt roads nearby, these area were not likely to support desert tortoises.

P. 15: Since the 1800s, portions of the desert southwest occupied by desert tortoises have been subject to a variety of impacts that cause habitat loss, fragmentation, and degradation, thereby threatening the long-term survival of the species (USFWS 1994a). Some of the most apparent threats are those that result in mortality and permanent habitat loss across large areas, such as urbanization, and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle activity, poor grazing management, and habitat invasion by nonnative invasive species (Berry *et al.* 1996; Avery 1997; Jennings 1997; Boarman 2002; Boarman and Sazaki 1996).

P. 15: Off-highway vehicle activity, roads, livestock grazing, agricultural uses, and other activities contribute to the spread of non-native species (or the displacement of native species) and the direct loss and degradation of habitats (Brooks 1995; Avery 1998).

P. 70: The following is a list of illegal activities known to negatively affect the desert tortoise and warrant increased enforcement: Unauthorized off-road vehicle travel. Across all recovery units, this aspect of law enforcement is the most important. Impacts from off-highway vehicle use include mortality of desert tortoises on the surface and below ground; collapsing of desert tortoise burrows; damage or destruction of plants used for food, water, and thermoregulation; damage or destruction of the mosaic of cover provided by vegetation; damage or destruction of soil crusts; soil erosion; proliferation of weeds; and increases in numbers and locations of wildfires. Unauthorized off-highway vehicle use also results in increased human access and associated impacts such as deliberate maiming, killing, and removal of tortoises.

Effects of OHVs: PP. 71-73: **Restrict, designate, close, and fence roads.** Paved highways, unpaved and paved roads, trails, and tracks have significant impacts on desert tortoise populations and habitat. In addition to providing many opportunities for accidental mortality, they also provide access to remote areas for collectors, vandals, poachers, and people who do not follow vehicle-use regulations. Substantial numbers of desert tortoises are killed on paved roads. Roads also fragment habitat and facilitate invasion of non-native vegetation. Collectively, the actions described below are of relatively high priority in all recovery units.

● Establishment of new roads should be avoided to the extent practicable within desert tortoise habitat within tortoise conservation areas; tortoise conservation areas should have a minimum goal of no net gain of roads.
● Existing roads should be designated as open, closed, or limited. This action is especially pertinent for closed or limited designations, which can help mitigate impacts mentioned above. Maintenance of route designation signs may also be required due to vandalism. Route

designation is a particularly high priority in all recovery units except Upper Virgin River (moderate priority).
● Non-essential or redundant routes should be closed, especially within tortoise conservation areas. Emergency closures of dirt roads and routes may also be needed to reduce human access and disturbance in areas where human-caused mortality of desert tortoises is a problem. Road closures are a particularly high priority in all recovery units except Upper Virgin River (moderate priority).

Consideration should also be given to posting speed limits on appropriate rural paved and all unpaved roads at 40 kilometers per hour (25 miles per hour). This speed limit will reduce the likelihood of vehicles hitting tortoises on the road, reduce the need for road grading due to wash-boarding, and allow law enforcement to cite people for speeding or driving off-road in conservation areas.

PP. 75-76 **Restrict off-highway vehicle events within desert tortoise habitat**. This action refers to large- or small-scale competitive races or non-competitive events involving up to thousands of motorcycles and other recreational off-highway vehicles. Prior to the implementation of current permitting and management practices (see for example BLM 1998), competitive off-highway vehicle events led to the widening of old routes, creation of new routes, camping and staging by race participants and observers in unauthorized areas, littering, and inability of race monitors to prevent unauthorized activities.

This action entails prohibiting or demonstrably minimizing the effects of such events within tortoise habitat; limiting the number of events per year, limiting events to the winter season, and limiting the number of participants per event; and ensuring all participants stay on designated roads. Event planning should avoid existing tortoise conservation areas to the extent practicable.

PP. 127 – 136: Increasing human populations result in corresponding increases in impacts to desert tortoise habitat not only through direct habitat loss. Impacts to desert tortoise habitat also occur as more people recreate in or otherwise spread into the desert and as greater infrastructure is needed to support growing communities and increased desire for access. Lovich and Bainbridge (1999) identified various types of anthropogenic impacts from which desert ecosystems may take 50 to 300 years to recover to pre-disturbance plant cover levels.

2. Paved and Unpaved Roads, Routes, Trails, and Railroads. Vehicular roads, routes, and trails are the most common type of human disturbance observed in desert ecosystems, and much emphasis has been placed on understanding the impacts these linear features have on arid environments (Brooks and Lair 2005). Brooks and Lair (2005) cite vehicular routes as one of the biggest challenges to land managers in the desert southwest, especially as they relate to the conservation status of the desert tortoise.

Direct and indirect impacts of roads and railroads on desert tortoise populations are well documented and include habitat and population fragmentation and degradation as well as mortality of individual tortoises (USFWS 1994a, Boarman 2002). Paved and unpaved roads serve as corridors for urbanization and dispersal of invasive species and provide access to recreation; railroads also facilitate urbanization and the spread of non-native plants. Roads and

railroads also act as barriers to movement. Railroads are similar to roads as sources of mortality for desert tortoises, as tortoises can become caught between the tracks causing them to overheat and die or be crushed by trains (U.S. Ecology 1989).

Direct effects to desert tortoise habitat from roads, routes, trails, and railroads also occur during initial stages of construction or off-highway vehicle route/trail establishment when vegetation and soils are lost or severely degraded. Construction of these features can result in physical and chemical changes to soils within unpaved roadways as well as in adjacent areas (Brooks and Lair 2005). In addition, roadside vegetation is often more robust and diverse because water that becomes concentrated along roadside berms promotes germination, which attracts tortoises and puts them at higher risk of mortality as road-kill (Boarman *et al.* 1997). Raised roadbeds or other types of linear human infrastructure also affect water runoff patterns across the landscape, decreasing soil moisture on upland areas between channels downslope of the linear structure and resulting in lower shrub density and biomass (Schlesinger and Jones 1984; Brooks and Lair 2009).

Hoff and Marlow (2002) demonstrated that there is a detectable impact on the abundance of desert tortoise sign adjacent to roads and highways with traffic levels from 220 to over 5,000 vehicles per day. The extent of the detectable impact was positively correlated with the measured traffic level; the higher the traffic counts, the greater the distance from the road reduced tortoise sign was observed (Hoff and Marlow 2002). This supports LaRue (1992) and Boarman *et al.* (1997), wherein depauperate desert tortoise populations were observed along highways. Subsequent research shows that populations may be depressed in a zone at least as far as 0.4 kilometers (0.25 miles) from the roadway (Boarman and Sazaki 1996). Hoff and Marlow (2002) also surmised that unpaved access roads with lower traffic levels may have significant effects on tortoises.

Desert tortoise populations may also be indirectly affected by road corridors that fragment habitat and limit an animal's ability to migrate and disperse (Boarman *et al.* 1997). Subsequently, populations may become isolated and at higher risk of localized extirpation from stochastic events or from inbreeding depression (Boarman *et al.* 1997; Boarman and Sazaki 2006). Data suggest fences may reduce mortality of desert tortoises as well as other wildlife species (Boarman *et al.* 1997), and tortoises have been documented to use culverts to cross beneath roadways (Boarman *et al.* 1998), although the degree to which this use mitigates population-fragmenting effects has not been investigated.

(a) Spread of Invasive Plants. Construction and maintenance of roadways facilitates changes in plant species composition and diversity. Non-native, invasive species and edge associated species often become dominant along these linear features, which serve as corridors for weed dispersal (Boarman and Sazaki 2006; Brooks 2009). Vegetation removal and manipulation and addition of soils in preparation for road construction, as well as grading of unpaved roads, create areas of disturbance that allow weedy species to become established and proliferate (Gelbard and Belnap 2003). Brooks and Berry (2006) found that the density of dirt roads was the best predictor of non-native plant proliferation as measured by non-native species richness and biomass of *Erodium cicutarium*. Vehicles serve as a major vector in dispersal of non-native species along roadways (Brooks and Lair 2005).

Near Canyonlands National Park in Utah, cover of the non-native grass *Bromus tectorum* (cheat-grass) was three times greater along paved roads than four-wheel-drive tracks, and richness (the number of species) and cover of non-native species were more than 50 percent greater and native species richness 30 percent lower at interior sites along paved roads than four-wheel-drive tracks (Gelbard and Belnap 2003). There also appears to be a correlation between the level of road improvement (*i.e.*, paved, improved, unpaved) and the level of invasion by non-natives (Gelbard and Belnap 2003). As previous studies show (LaRue 1992; Boarman *et al.* 1997; Hoff and Marlow 2002; Boarman and Sazaki 2006), the greater the distance from the road, the more desert tortoise sign is observed. Similarly, the cover and richness of non-native species decreases as distance from the road increases (Boarman and Sazaki 2006).

As natural areas are impacted by linear features such as roads, routes, trails, and railroads, previously intact, contiguous habitats become degraded and fragmented, and non-native invasive species play a more dominant role in ecosystem dynamics. For instance, increases in plant cover due to the proliferation of non-natives have altered fire regimes throughout the Mojave Desert region (Brooks 1999; Brooks and Esque 2002; Esque *et al.* 2003; Brooks *et al.* 2004) (see sections A(4)(b) and A(5) on Invasive Species and Increasing Fuel Load and Fire).

(b) Predator Subsidies. In the desert southwest, common raven populations have increased over the past 25 years (greater than 1000 percent), probably in response to increased human populations and anthropogenic changes to the landscape, including roads, utility corridors, landfills, and sewage ponds (Knight and Kawashima 1993; Boarman and Berry 1995; Boarman *et al.* 1995; Knight *et al.* 1999; Boarman *et al.* 2006). See section C(3), Predation, for a detailed description of the effects of predator subsidies on the desert tortoise.

3. Off-Highway Vehicles. Off-highway vehicle activities take many forms, from organized events, small- or large-scale competitive races involving up to thousands of motorcycles, to casual family activities. Organized events and off-highway vehicle tours are now reviewed and permitted by land managers. Generally, an education component and speed limitations are requirements of the permit. Nonetheless, unauthorized off-highway vehicle use continues to be of concern, for instance south of Interstate 10 in the Colorado Desert and adjacent to the Johnson Valley Open Area in the Western Mojave Recovery Unit, and present a variety of threats to the desert tortoise. Repeated off-highway vehicle trail use leads to new routes that are not included in road databases (Brooks and Lair 2009), a difficulty we found in trying to compile these data for the spatial decision support system described elsewhere in this plan.

Impacts from off-highway vehicle use include mortality of tortoises on the surface and below ground, collapsing of desert tortoise burrows, damage or destruction of annual and perennial plants and soil crusts, soil erosion and compaction, proliferation of weeds, and increases in numbers and locations of wildfires (Brooks 2009; Lei 2009). Despite the many observations that have been documented and reported, statistical correlation between off-highway vehicle impacts and reduced desert tortoise densities continues to be lacking (Boarman 2002). However, it is evident that off-highway vehicle activities remain an important source of habitat degradation and could result in reductions in desert tortoise densities (Boarman 2002).

Damage to or destruction of shrubs and burrows can lead to disruption of desert tortoises' water balance, thermoregulation, and energy requirements, and the loss of annual plants reduces the availability of food (USFWS 1994). One of the most significant ecological implications of off-highway vehicle routes is the exacerbation of erosion and changes in drainage patterns (Brooks and Lair 2005).

Bury and Luckenbach (2002) compared habitat, abundance, and life history features of desert tortoises on one unused, natural area and a nearby area used heavily by off-highway vehicles. The unused, natural area had 1.7 times the number of live plants, 3.9 times the plant cover, 3.9 times the number of desert tortoises, and 4 times the number of active tortoise burrows than the area used by off-highway vehicles. The two largest tortoises in the off-highway vehicle use area weighed less than would be expected based on what is known about season-to-season fluctuations. Despite the lack of pre-disturbance data for the off-highway vehicle area and the patchy distribution of tortoises, the areas furthest from concentrated off-highway vehicle activity (pit areas) still reflected the least amount of habitat impact and supported more tortoises (Bury and Luckenbach 2002).

Jennings (1997) found that desert tortoises are vulnerable to negative effects from off-highway vehicles because of their habitat preferences. Tortoises in a study at the Desert Tortoise Natural Area spent significantly more time traveling and foraging in hills and washes than on the flats. Tortoises use washes for travel, excavation of burrows, and foraging, and at least 25 percent of their forage plants were found to occur within washes. Hills and washes are also favored by users of motorcycles, trail bikes, all-terrain vehicles, and other four-wheel vehicles. Because tortoises prefer washes and hills, they are more vulnerable to direct mortality from off-highway vehicles. Additionally, off-highway vehicle use in these habitats causes degradation of vegetation and loss of forage species important in the desert tortoise diet (Jennings 1997).

Surface disturbance from off-highway vehicle activity can cause erosion and large amounts of dust to be discharged into the air. Recent studies on surface dust impacts on gas exchanges in Mojave Desert shrubs showed that plants encrusted by dust have reduced photosynthesis and decreased water-use efficiency, which may decrease primary production during seasons when photosynthesis occurs (Sharifi *et al.* 1997). Sharifi *et al.* (1997) also showed reduction in maximum leaf conductance, transpiration, and water-use efficiency due to dust. Leaf and stem temperatures were also shown to be higher in plants with leaf-surface dust. These effects may also impact desert annuals, an important food source for tortoises.

Off-highway vehicle activity can also disturb fragile cyanobacterial-lichen soil crusts, a dominant source of nitrogen in desert ecosystems (Belnap 1996). Belnap (1996) showed that anthropogenic surface disturbances may have serious implications for nitrogen budgets in cold desert ecosystems, and this may also hold true for the hot deserts that tortoises occupy. Soil crusts also appear to be an important source of water for plants, as crusts were shown to have 53 percent greater volumetric water content than bare soils during the late fall when winter annuals are becoming established (DeFalco *et al.* 2001). DeFalco *et al.* (2001) found that non-native plant species comprised greater shoot biomass on crusted soils than native species, which demonstrates their ability to exploit available nutrient and water resources. Once the soil crusts

are disturbed, non-native plants may colonize, become established, and out-compete native perennial and annual plant species (D'Antonio and Vitousek 1992; DeFalco *et al.* 2001).

Invasion of non-native plants can affect the quality and quantity of plant foods available to desert tortoises (see section A(4)(a), Invasive Plants and Nutrition) and can contribute to increased fire frequency (see sections A(4)(b) and A(5), Increasing Fuel Load and Fire). Brooks and Lair (2009) provide a comprehensive overview of the ecological effects of various types of vehicular routes in the Mojave Desert.

4. Invasive Plants. Proliferation of invasive plants is increasing in the Mojave and Sonoran deserts, largely as a result of human disturbance, and is recognized as a significant threat to desert tortoise habitat (Brooks 2009). Many species of non-native plants from Europe and Asia have become common to abundant in some areas, particularly where disturbance has occurred and is ongoing. As non-native plant species become established, native perennial and annual plant species may decrease, diminish, or die out (D'Antonio and Vitousek 1992).

Land managers and field scientists identified 116 species of non-native plants in the Mojave and Colorado deserts, including *Erodium cicutarium* (red-stem filaree), *Bassia hyssopifolia* (bassia), *Ambrosia acanthicarpa* (sand bur), *Ambrosia psilostachya* var. *californica* (western ragweed), *Hemizonia pungens* (common spikeweed), *Matricaria matricarioides* (pineapple weed), *Amsinckia intermedia* (fiddleneck), *A. tessellata* (bristly fiddleneck), *Descurainia sophia* (flixweed), *Sisymbrium altissimum* (tumble mustard), *S. irio* (London rocket), *Salsola iberica* (Russian thistle), *Eremocarpus setigerus* (turkey mullein), and *Marrubium vulgare* (horehound) (Tierra Madre Consultants, Inc.1991; Brooks and Esque 2002). Annual grasses include: *Bromus rubens* (red brome), *B. tectorum*, *Hordeum glaucum* (smooth barley), *H. jubatum* (foxtail barley), *H. leporinum* (hare barley), *Schismus barbatus* (split grass), and *S. arabicus* (Arab grass). *Brassica tournefortii* (Sahara mustard) and *Hirschfeldia incana* (Mediterranean mustard) are rapidly spreading, non-native winter annuals invading the desert southwest, especially in sandy soils (LaBerteaux 2006).

Brooks and Berry (2006) found that while non-native plant species comprised only a small fraction of the total annual plant flora (*i.e.*, a small fraction of the total number of plant species), they were the dominant component of the annual plant community biomass. For instance, in 1995, a high rainfall year in the Mojave Desert, non-native species comprised 6 percent of the flora and 66 percent of the biomass; in 1999, a low rainfall year, non-natives comprised 27 percent of the flora and 91 percent of the biomass. Annual species dominate the non-native flora, with *Bromus rubens*, *Schismus barbatus*, and *Erodium cicutarium* comprising up to 99 percent of the non-native biomass.

Increased levels of atmospheric pollution and nitrogen deposition related to increased human presence and combustion of fossil fuels can cause increased levels of soil nitrogen, which in turn may result in significant changes in plant communities (Aber *et al.* 1989; Allen *et al*. 2009). Many of the non-native annual plant taxa in the Mojave region evolved in more fertile Mediterranean regions and benefit from increased levels of soil nitrogen, which gives them a competitive edge over native annuals. Studies at three sites within the central, southern, and western Mojave Desert indicated that increased levels of soil nitrogen can increase the

dominance of non-native annual plants and promote the invasion of new species in desert regions. Furthermore, increased dominance by non-native annuals may decrease the diversity of native annual plants, and increased biomass of non-native annual grasses may increase fire frequency (Brooks 2003).

(a) Nutrition. Nutritional intake affects growth rates in juvenile desert tortoises (Medica *et al.* 1975) and female reproductive output (Turner *et al.* 1986, 1987; Henen 1992). Invasion of non-native plants can affect the quality and quantity of plant foods available to desert tortoises, and thereby affect nutritional intake. Desert tortoises are generally quite selective in their choices of foods (Burge 1977; Nagy and Medica 1986; Turner *et al.* 1987; Avery 1992; Henen 1992; Jennings 1992, 1993; Esque 1992, 1994), and in some areas the preferences are clearly for native plants over the weedy non-natives.

As native plants are displaced by non-native invasive species in some areas of the Mojave Desert, non-native plants can be a necessary food source for some desert tortoises. However, non-native plants may not be as nutritious as native plants. Recent studies have shown that calcium and phosphorus availability are higher in forbs than in grasses and that desert tortoises lose phosphorus when feeding on grasses but gain phosphorus when eating forbs (Hazard *et al.* 2010). Nagy *et al.* (1998) conducted feeding trails on four plant species (native and non-native grasses *Achnatherum hymenoides* [Indian ricegrass] and *Schismus barbatus* [split grass] and native and non-native forbs *Malacothrix glabrata* [desert dandelion] and *Erodium cicutarium* [red-stemmed filaree]) to compare the nutritional qualities for the desert tortoise. The digestibility of the nutrients in the two forbs were similar. The dry matter and energy digestibility of the two grasses were much lower than the forbs, providing little nitrogen, and tortoises lost more water than they gained while processing grasses. Results of these feeding trials suggest that the proliferation of non-native grasses such as *Schismus* to the exclusion of forbs (D'Antonio and Vitousek 1992) places desert tortoises at a nutritional disadvantage. Furthermore, if, instead of eating to obtain a given volume of food, tortoises consume just enough food to satisfy their energy needs (as commonly noted in other vertebrate groups), then the native forbs provide significantly more nitrogen and water than the non-native forbs (Nagy *et al.* 1998).

Changes in the abundance and distribution of native plants also may affect desert tortoises in more subtle ways. In the Mojave Desert, many food plants are high in potassium (Minnich 1979), which is difficult for desert tortoises to excrete due to the lack of salt glands that are found in other reptilian herbivores such as chuckwallas (*Sauromalus obesus*) and desert iguanas (*Dipsosaurus dorsalis*) (Minnich 1970; Nagy 1972). Reptiles are also unable to produce concentrated urine, which further complicates the ability for desert tortoises to expel excess potassium (Oftedal and Allen 1996). Oftedal (2002) suggested that desert tortoises may be vulnerable to disease as a result of physiological stress associated with foraging on food plants with insufficient water and nitrogen to counteract the negative effects of dietary potassium. Only high quality food plants (as expressed by the Potassium Excretion Potential, or PEP, index) allow substantial storage of protein (nitrogen) that is used for growth and reproduction, or to sustain the animals during drought. Non-native, annual grasses have lower PEP indices than most native forbs (Oftedal 2002; Oftedal *et al.* 2002). Oftedal *et al.* (2002) found that foraging juvenile tortoises favored water-rich, high-PEP, native forbs. Much of the nutritional difference between available and selected forage was attributable to avoidance of abundant, non-native split grass

(*Schismus* spp.) with mature fruit, which is very low in water, protein, and PEP. Of the species eaten, *Camissonia claviformis*, a native Mojave desert primrose, accounted for nearly 50 percent of all bites, even though it accounted for less than 5 percent of the biomass encountered, and was largely responsible for the high PEP of the overall diet. Impacts to vegetation (such as livestock grazing, invasion of non-native plants, and soil disturbance) that reduce the abundance and distribution of high PEP plants may result in additional challenges for foraging desert tortoises (Oftedal *et al.* 2002).

Tracy *et al.* (2006) also quantified the rates of passage of digesta (food in the stomach) in young desert tortoises in relation to body size and diet quality. They observed that, compared to adults, young, growing tortoises need higher rates of nutrient assimilation to support their higher metabolic rates. Juvenile desert tortoises also forage selectively by consuming plant species and plant parts of higher quality (Oftedal *et al.* 2002) and pass food through the gut more quickly (Tracy *et al.* 2006). Hence, these findings of differential passage rates suggest that it is beneficial for young tortoises to specialize on low-fiber diets, as this would allow for more efficient uptake of nutrients. In addition, habitat disturbances (*e.g.*, invasion of annual grasses) that favor species with little nutritional value and preclude access to low-fiber foods may negatively impact the physiological and behavioral ecology of young desert tortoises. Adults, on the other hand, may be better adapted to tolerate low-quality foods for a longer period of time because of their lower metabolism, more voluminous guts compared to subadults, and consequent longer retention times (Tracy *et al.* 2006).

(b) Increasing Fuel Load. The proliferation of non-native plant species has contributed to an increase in fire frequency in tortoise habitat by providing sufficient fuel to carry fires, especially in the inter-shrub spaces that are mostly devoid of native vegetation (Brown and Minnich 1986; USFWS 1994b; Brooks 1998; Brooks and Esque 2002). Invasive, non-native annual grasses and forbs increasingly spread over the desert floor, resist decomposition, and provide flash fuel for fires. Brooks (1999) found that non-native annual grasses contributed most to the continuity and biomass of dead annual plants and to the spread of summer fires compared to native forbs. Red brome in particular has contributed to significant increases in fire frequency since the 1970s (Kemp and Brooks 1998; Brooks *et al.* 2003).

Fire also appears to affect the spread of non-native plants. Brooks and Berry (2006) found that proliferation of non-native plants was best predicted by disturbance, specifically frequency and size of recent fires for biomass of *Bromus rubens*. Once fires occur, opportunities for invasion and proliferation of non natives increase because they regenerate on burned areas more quickly than native plants (Brown and Minnich 1986). Changes in plant communities caused by non-native plants and recurrent fire negatively affect the desert tortoise by altering habitat structure and species composition of their food plants (Brooks and Esque 2002) (see also section A(5), Fire).

5. Fire. Fire has the potential to be an important force governing habitat quality and persistence of desert tortoises. Tortoises can be killed or seriously injured by burning and smoke inhalation during fire events. The extent of the direct impacts experienced by tortoises is influenced by tortoise activity at the time of fire (whether inside or outside burrow), depth of burrow (to afford through an area), and patchiness (extent of an area burned) (Esque *et al.* 2003). Early-season

fires may be more threatening than summer fires because desert tortoises are active above ground and more vulnerable to direct effects of fire at that time. Fire can also compromise the quality of tortoise habitat by reducing the vegetation that provides shelter, cover, and nutrition (key forage plants) for tortoises (Brooks and Esque 2002; Esque *et al.* 2003).

Natural fire regimes have been altered due to profuse invasions of non-native grasses throughout much of the range of the desert tortoise. The biomass of weedy species has increased remarkably in the desert Southwest as a result of disturbance from vehicles, grazing, agriculture, urbanization, and other human land uses (Brooks and Berry 1999; Brooks and Esque 2002; Brooks *et al.* 2003; Brooks and Berry 2006; Brooks and Matchett 2006). Fuel loads that consist of dense annual grasses rather than sparse cover of native species make it more likely for fire to become hot enough to damage native shrubs, which are poorly adapted to survive and/or regenerate quickly after fire and are poor colonizers (Tratz and Vogl 1977; Tratz 1978). Ultimately, recurrent fire can result in conversion of shrublands to annual grasslands, which can be devastating for desert tortoises that depend upon shrubs for cover (Brooks and Esque 2002). Conversion to grassland also tends to create a self-perpetuating grass/fire cycle as fuels continuously reestablish in burned areas (D'Antonio and Vitousek 1992).

Years of high rainfall promote the growth of invasive annuals that increase the fine fuel loads, but high rainfall also increases food and water availability for desert tortoises. Desert tortoise reproduction also increases in high rainfall years. Small hatchlings are more vulnerable to fire than larger tortoises, and tortoises in general are more vulnerable to fire when they are above ground foraging. Thus, the high rainfall episodes that are important to maintaining healthy desert tortoise populations may also create the highest fire risk (Brooks and Esque 2002). Plant litter produced by non-native annual grasses decomposes more slowly than native annuals and accumulates during successive years, thus providing an excess of fine fuels that sustains and spreads fires throughout the desert ecosystem (Brooks 1999). Historical fire intervals of 30 to greater than 100 years have been shortened to an average of 5 years in some areas of the Mojave Desert, due to the invasion of non-native grasses. Additionally, fires can increase the frequency and cover of non-native annual grasses within 3 to 5 years of a fire event, thus promoting the continuity of this grass/fire cycle that shortens the fire interval (Brooks *et al.* 1999; Brooks and Esque 2002; Brooks and Minnich 2006). Increased levels of surface-disturbing activities, rainfall, and atmospheric nitrogen and carbon dioxide may also increase the dominance of non-native plants and frequency of fires in the future (Brooks and Esque 2002; Brooks *et al.* 2003).

The most striking changes in fire frequency in the Mojave Desert have been observed in the middle elevations dominated by *Larrea tridentata* (creosote bush), *Yucca brevifolia* (Joshua tree), and *Coleogyne ramosissima* (blackbrush), at the upper limits of desert tortoise distribution, where most of the fires occurred between 1980 and 2004 (Brooks and Matchett 2006). The combination of enough cover of native vegetation to carry a fire and the accumulation of fuels from non-native annual grasses following years of above average rainfall may result in significantly larger fires at shorter return intervals than normally expected in this zone. Bureau of Land Management, U.S. Forest Service, and California Department of Forestry geospatial data of the extent of fires in 2005, the wildfires burned over 58,208 hectares (140,000 acres) of critical habitat that year (Table A-2). The Bureau of Land Management's geospatial fire data depict slightly different acreages than have been reported elsewhere. According to McLuckie *et al.*

(2007), 3,191 hectares (7,885 acres) burned within the Red Cliffs Desert Preserve, which encompasses the majority of the Critical Habitat within the Upper Virgin River Recovery Unit.

Effects of Grazing: PP. 136-137. **6. Grazing.** Impacts of grazing on arid lands are well documented (Fleischner 1994; Jones 2000). Recovery from these impacts is variable, but can take decades, will likely require significant management effort beyond excluding livestock, and will be affected by other factors such as drought (General Accounting Office 1991; Friedel 1991; Laycock 1991). Livestock grazing (sheep and cattle as well as horses and burros) is known to have direct and indirect impacts on desert tortoises and their habitats through trampling that results in direct mortality, either while above ground or in burrows, and degradation of vegetation and soils, including the spread of non-native plants or the displacement of native plants (Brooks 1995; Avery 1998; Boarman 2002). The magnitude of the threat on desert tortoise populations remains unclear, and the degree of impact depends on a number of factors including, but not limited to, resiliency of soil and vegetation types, type of livestock, stocking rates, season of use, and years of use with and without rest (USFWS 1994b). Other factors can interact with livestock grazing and can affect the degree and extent of impacts to desert tortoises (e.g., introduction and spread of weeds [Brooks 2009], changes in vegetation due to grazing, fire, drought, and other land uses [USFWS 1994b]).

Oldemeyer (1994) suggests that the primary evidence that grazing adversely affects desert tortoises relates to an overlap in food habits of livestock and tortoises. Grazing is thought to reduce cover of shrubs and annual forbs. Studies in the eastern Mojave Desert on foraging behavior and food preferences of range cattle and desert tortoises showed that a dietary overlap (spatial and temporal) exists and that this overlap is greatest in the spring when fresh annual plants preferred by both desert tortoises and livestock are at their peak biomass and densities. Competition for these food plants is expected to be greatest when annual plants start to dry in the spring, before cattle and tortoises switch to other forage plants (Avery and Neibergs 1997).

Avery and Neibergs (1997) observed direct and indirect interactions between cattle and tortoises. Their study indicates that grazing during winter may destroy a large percentage of active tortoise burrows. They noted that tortoises outside an ungrazed cattle exclosure spent more nights outside of burrows than tortoises within the exclusion area, because more burrows were destroyed in the grazed area than in the ungrazed area. Almost 200 tortoise burrows were recorded as trampled during a survey of the 2.6-square-kilometer (1-square-mile) East Bajada (of the Black Mountains), Arizona, study plot in 1997 (Woodman *et al.* 1998). The presence of cattle dung, tracks, and trails suggested that most trampled burrows were caused by livestock, but some may have been due to horses or burros. In a study on translocated tortoises in the northwest Mojave Desert, one tortoise was found alive in its hibernation burrow even though the burrow had been crushed by cattle. It had skin lesions and had been parasitized by fly larvae. The tortoise was removed from the study because it was assumed that it would have died if it had been left in the crushed burrow (Nussear 2004). Tortoises with home ranges located in areas of poorly-managed cattle grazing may experience increased risk of mortality, increased energetic costs, and changes in activity time budgets (caused by additional time and effort required to build new burrows).

Comparative studies of historically grazed and never-grazed grasslands in southeast Utah (Neff *et al.* 2005) showed that grazing can continue to impact soil biogeochemical characteristics three

decades after grazing had been removed. Reduced soil nutrient levels in the historically grazed site compared to the never-grazed site were attributed to erosion of nutrient-rich fine soil materials due to disturbance caused by grazing practices. Soil organic matter, carbon and nitrogen content, and microbial biomass were also lower in the grazed site. The decline of organic matter content may be attributed to the destruction of biological soil crusts or long-term changes in vegetation cover/composition resulting from grazing. This study illustrates the sensitivity of arid land biogeochemical processes to land use change and the need for a better understanding of potential long-term impacts from grazing practices in the southwestern United States. Furthermore, wind erosion may contribute significantly to loss of soil nutrient content and should be considered in management of arid land ecosystems (Neff *et al.* 2005).

Unmanaged livestock grazing, especially where plants are not adapted to large herbivorous mammals or where the non-native species are less palatable than the natives, can preferentially remove native vegetation, leaving non-native plants to grow under reduced competition (Wittenberg and Cock 2005). Studies at the Desert Tortoise Natural Area showed that both abundance and diversity of native plants and animals is higher inside than outside of the protected desert tortoise habitat (Brooks 2000). It should be noted that the Desert Tortoise Natural Area has received limited protection since 1973, but has been effectively protected from sheep grazing and off-highway vehicle use through the installation of exclusion fencing for the last 10 years (Brooks 2000). Similarly, grazing (and simulated grazing treatments) negatively impacted native plant species, while non-native species were unaffected and demonstrated superior competitive abilities, at Carrizo Plain National Monument, California (Kimball and Schiffman 2003).

Effects of Roads on Wildlife and Wildlife Populations

Roads have a generally negative overall impact on native biological diversity and ecological integrity (Brocke *et al.*, 1988, Jalkotzy *et al.* 1997, Gucinski *et al.* 2001). This includes the deterioration/loss of wildlife habitat, hydrology, geomorphology, and air quality, increased competition and predation (including by humans), and the loss of naturalness or pristine qualities (Forman *et al.* 1997, Jalkotzy *et al.* 1997). Roadless areas and areas with low road density are more likely to have greater ecological integrity and/or wildlife habitat value than similar areas with more roads (Noss 1995, Rudis 1995, as cited in Beazley *et al.* 2004).

Though roads comprise only 1 percent of surface area, an estimated 19 percent of the total land within the United States is ecologically affected by roads due to indirect effects that extend 100–800 meters beyond the physical footprint of the road (Forman, 2000, as cited in Nafus *et al.* 2013).

Roads have been described as the single most destructive element in the process of habitat fragmentation (Noss 1993), and their ecological effects are considered the sleeping giant of biological conservation (Forman 2002, as cited in van der Ree *et al.* 2011).

There are five major categories of primary road effects to wildlife: (1) wildlife mortality from collisions with vehicles, (2) hindrance/barrier to animal movements thereby reducing access to resources and mates, (3) degradation of habitat quality, and (4), habitat loss caused by

disturbance effects in the wider environment and from the physical occupation of land by the road, and (5) subdividing animal populations into smaller and more vulnerable fractions (Jaeger *et al.* 2005a, 2005b, Roedenbeck *et al.* 2007). Road establishment is often followed by various indirect effects such as increased human access causing disturbance of breeding sites, increased exploitation via activities such as hunting (McLellan and Shackleton 1988, Kilgo *et al.* 1998), and the spread of invasive species (Parendes and Jones 2000). For the tortoise, increased human access includes encounters with vehicles that result in collection or vandalism as this removes the tortoise from the populations = mortality, spread of invasive species (e.g., non-native plants affecting nutrition, plant species cover and density, fire frequency and size; increase in roadkill that subsidizes tortoise predators increasing predator numbers and increasing tortoise mortality).

Certain Animals Are Vulnerable to Road Mortality. Certain characteristics or behaviors make animals vulnerable to road mortality. In one study, the combination of the Northern Leopard Frog's apparent inability to avoid roads and their slow rate of movement make them highly vulnerable to road mortality (Bouchard *et al.* 2009, as cited in van der Ree *et al.* 2011). Roads pose the greatest risk to species that are highly vagile, have large home ranges, large body mass, low reproductive rates, and long generation times (Carr and Fahrig, 2001; Gibbs and Shriver, 2002; Karraker and Gibbs, 2011; Rytwinski and Fahrig, 2011, 2012). Road effects may be particularly damaging to species with low reproductive rates and long generation times because such species have a low intrinsic ability to recover from population declines (Gibbs and Shriver, 2002; Rytwinski and Fahrig, 2012, as cited in Nafus *et al.* 2013). Species with life history traits tied to low lifetime reproductive rates do appear to be at the greatest risk for road-related declines (Nafus *et al.* 2013).

Effects of Roads on the Desert Tortoise. Tortoise mortality along unfenced roads has been well documented (Boarman 2002). Boarman and Sazaki (1996) compared fenced and unfenced sections of Highway 58 and found that fencing with tortoise-proof materials reduced the number of road-killed tortoises by 93 percent (Boarman and Sazaki 1996). Radio-transmittered tortoises making long-distance movements were not able to cross the fence (Sazaki *et al.* 1995), supporting the interpretation that reduced road kill was due to the reduction in tortoises crossing the road.

Reduced densities of tortoises along roads suggest that road mortality is sufficient to affect population sizes (von Seckendorff Hoff and Marlow 2002). The size classes of tortoises killed by traffic include larger, reproductive individuals (Boarman *et al.* 2005) which are most important for population viability in this species (Doak *et al.* 1994). Support for considering roads a threat to desert tortoises, therefore, is strong at the individual and population levels (Boarman and Kristan 2006).

Road Configuration and Animal Behavior: Jaeger *et al.* (2005a) examined whether or not the configuration of road networks has an influence on the degree to which roads detrimentally affect wildlife populations and identified characteristics of road network configurations that make road networks less detrimental to the persistence of animal populations. They found that for animals that do not very strongly avoid roads (e.g., desert tortoise), it is more important to preserve core habitats at a sufficient distance from roads (e.g., individuals located in the habitat patches far away from any road (i.e., located in core habitat) would survive during their next

movement because they cannot encounter a road). Even though a population may show no negative response to a certain number or density of roads, a different configuration of the road network (with the same total length of roads) may cause the extinction of the population. Note that density is different from configuration.

The degree to which a road network affects a wildlife population depends on the configuration of the road network and the behavior of the animals at roads (Jaeger *et al.* 2005b). In general, if a species is affected by road mortality, its core habitat should be maximized; large un-dissected areas of habitat should be protected from [the presence of] roads. If animals do not avoid roads but are often killed by traffic (e.g., amphibians), minimize the number of roads. For animals exhibiting low road avoidance (e.g., desert tortoise), the effect of roads is determined by the density of roads and the shape of the habitat patches (Jaeger *et al.* 2005b).

A population very sensitive to traffic mortality (or any form of additional mortality) will be most vulnerable to roads if individuals do not avoid crossing roads (Jaeger et al 2005b). Because tortoises do not avoid crossing roads, they are sensitive to traffic mortality. For wide-ranging species (e.g., desert tortoise), their persistence depends on cumulative management of road effects over expansive areas. Wider-ranging animals require analysis over larger areas.

Applying Ecological Research When Planning Roads. Although there is a growing body of evidence of the negative impacts of roads on wildlife (Trombulak and Frissell 2000, Underhill and Angold 2000, Forman *et al.* 2002, Sherwood *et al.* 2002, Spellerberg 2002, as cited in Roedenbeck *et al.* 2007), ecological research has had comparatively little effect on decision making in transportation planning (OECD 2002, UBA 2003, as cited in Roedenbeck *et al.* 2007). In part, this reflects the fact that, in the face of compelling economic and social arguments for road siting, design, and construction, the effects on ecological values are usually considered of secondary importance (Caid *et al.* 2002, Bratzel 2005, as cited in Roedenbeck *et al.* 2007).

For questions concerned with landscape-scale ecological effects and long-term consequences, a control-impact (CI) design study may be the best one can do in these situations (Roedenbeck *et al.* 2007). A control-impact (CI) design can be used in which the population is surveyed in sites with and without a road present (Roedenbeck *et al.* 2007).

For road ecology, and especially those issues relevant to landscape-level planning and management, a strong weight of evidence or the standard of proof required for consideration in the planning process must be comparatively low. The task of the road ecologist is to provide scientific answers with the highest inferential strength possible; the task of decision makers is to recognize and make decisions in the face of the inherent limitations and uncertainties in these answers (Roedenbeck *et al.* 2007).

The synergistic effects of roads and other factors that operate simultaneously need to be investigated and considered. This lack of knowledge is often used as a justification to create more roads by arguing that not enough is known and more research is needed before road construction may slow down. This constitutes a fragmentation spiral (Jaeger 2002), because research has been unable to catch up with the ecological effects of the rapid increase in road

densities. This situation is contrary to the precautionary principle and flies in the face of the principles of sustainability (all from van der Ree *et al.* 2011).

BLM has an ongoing control-impact experiment on landscape-scale ecological effects and long-term consequences from roads (and from grazing) on the desert tortoise. The DTRNA serves as the control area and nearby Fremont Valley serve as the impact area. The DTRNA, about a 25,000-acre area, has been mostly protected from OHV activity and grazing for a few decades because BLM fenced the DTRNA to exclude these uses in 1978-79. Near to the date it was established, the DTRNA had an estimated tortoise density of 50 tortoises per square kilometer in 1979 and the adjacent Fremont Valley has 43 tortoises per square kilometer 1980 (Berry *et al.* 2014). Currently the DTRNA has a tortoise density of 14.8 tortoises per square kilometer and the Fremont Valley critical habitat has a density of 2.4 tortoises per square kilometer (Berry *et al.* 2014). This experiment indicates that an area of 25,000 acres or more that is secured on the ground from OHV and livestock use will have substantially more tortoises and greater tortoise densities (in this case, six times greater density). It also indicates that despite environmental impacts (e.g., climate change) densities of tortoise remained viable with effective land management practices that eliminated OHV activities and grazing. We recommend that BLM use information from this experiment when designating open and limited use routes and grazing in DT ACECs.

Reducing the negative effects of roads and traffic will only be possible if more dialogue is achieved between the scientific community and the planners and political decision makers (van der Ree *et al.* 2011).

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