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Memorandum

To: David Harlow, Director, Desert Renewable Energy Conservation Plan

From: Laura Crane, The Nature Conservancy

Date: July 11, 2012

Subject: Comments on the Materials under Review by the Independent Science Panel, dated June 19, 2012

Docket No. 09-RENEW EO-01

On behalf of The Nature Conservancy, we are writing to provide comments to the *Materials under Review by the Independent Science Panel*, released on June 19, 2012. As a stakeholder in the Desert Renewable Energy Conservation Plan (DRECP) process, our organization fully supports this critical plan and we thank you for the opportunity to review the documents and submit the following recommendations.

Our comments are organized into General Comments and Detailed Comments to Individual Documents (Attachment A).

1. Conservation Planning Process Methodology

1.1. Our principal comment is that the methodology provided thus far for the conservation planning process, including analysis and identification of the conservation reserve design and renewable energy Development Focus Areas (DFA), still remains vague. Without a clear and transparent explanation of the conservation strategy, its pathways and components, and the interfaces and exchanges between these components, there is the risk of creating a Plan that will be challenging to implement consistently, and may not achieve required conservation planning objectives.

1.2. Chapter 3 (Conservation Planning Process) will benefit from further editing to improve the presentation of conservation strategy framework. While we appreciate the recently released documents, including the *Conservation Strategy Roadmap and Memorandum*, there are still many aspects of conservation strategy, and interfaces and exchanges within these important concepts, which are not clear. For example, the overview provided in the first six pages of Chapter 3 fails to discuss the relationship between the Reserve Design and mitigation for permitted development, and inadequately covers the importance of including the maintenance of ecosystem processes among the Biological Goals and Objectives (BGOs). We

do note that the relationship is presented in a general way in figure 3.2.-3, but this figure will benefit from further details. Secondly, it still remains unclear how and why the Development Focus Areas have been developed "somewhat independent of the development of the conservation strategy." The conservation strategy pathways and renewable energy DFA identification and analysis are interdependent and the interactions between the two will greatly influence the outcome of the DRECP conservation strategy.

1.3. Overall, the current draft of Chapter 3 provides a fair description of a planning process that for the most part follows a path that we are comfortable with, but there are a few notable exceptions:

1.3.1. The Development Focus Areas and Conservation Reserve System Design should not overlap.

1.3.2. We recommend that the current threshold of 500 acres for road-bounded acres, used to define rural areas (areas generally not suitable for conservation), is revised. The current threshold will omit much of the western Mojave, despite the fact that this sub-region contains a number of populations of target species that are at or near their range edges, and which appear to have distinctive genetic or behavioral adaptions to these conditions.

1.3.3. The Reserve Design needs to put greater emphasis on the importance of ecosystem processes. For example, the importance of sand movement for a variety of covered species, and the sand dune and sand field communities, is given scant mention within the text of Chapter 3, but is noted in the Appendix, Table B-1.

1.3.4. We remain concerned that the Revised Biological Goals and Objectives are too general. The BGOs need to clearly articulate the specific goals and objectives that lay out the hypothesis for what it will take to protect and recover the species and natural communities in the plan area. What is needed is a clear conceptual model that describes interactions and stressors, and how conservation actions will address stressors. Figure 3.2-2 ("Hierarchical Representation of Biological Goals and Objectives") is not adequately explained, and consequently, the interface and relationships between landscape-level, community, and species goals remains unclear.

1.3.5. Lastly, presenting the conservation planning process without providing an introductory framework or overview for how renewable energy siting and development will be implemented within the DFAs, presents an incomplete picture. For purposes of analysis, it will be beneficial for all stakeholders to understand the conceptual implementation process. For example, will implementation process and requirements remain the same for all DFAs? (i.e., will there be differences in permitting timeframe, mitigation requirements, or Avoidance and Minimization Measures between DFAs? Will there be differences within DFAs, depending on habitat quality, natural communities or species present?).

1.4. DRECP Marxan Process

1.4.1. The Nature Conservancy has experience with using Marxan modeling in our ecoregional planning processes. In general, the Marxan methodology used was in line with standard operating procedures for the tool, and consistent with how TNC has approached species and natural community goals in our landscape-scale ecological analyses, however there are some exceptions:

1.4.1.1. In an effort to create goals that are clearly defined and implementable, we recommend that the authors review the percentages that have been selected for the natural community goals and evaluate in consideration of that community's rareness, distribution, and patch-size within the Plan Area.

1.4.1.2. In line with the previous comment, we request that the authors clarify their definition of "bat habitat" in the conservation goals for Western Red bat and Pallid bat. For example, is bat habitat in reference to discreet locations, such as caves, hibernacula and maternal roosts, or general roosting and foraging habitat? The latter definition of bat habitat is very nebulous, and if conservation goals are set based on this definition, they may prove difficult to quantify and implement.

1.4.1.3. The goals that are proposed for the species targets are generally sound in the "Rules of Thumb" table, but the specific application falls short, for species like:

1.4.1.3.1. Amargosa Vole – should be 100%
1.4.1.3.2. Tehachapi Pocket Mouse – should be 75% or higher
1.4.1.3.3. Amargosa Niterwort – should be 100%
1.4.1.3.4. Lane Mountain Milkvetch – should be 100%
1.4.1.3.5. Parish's Alkali Grass – should be 100%
1.4.1.3.6. Red Rock Tarplant – should be 100%
1.4.1.3.7. Sodaville Milkvetch – should be 100%
1.4.1.3.8. Thorne's buckwheat – should be 100%
1.4.1.3.9. Tehachapi Slender Salamander – should be 100%

1.4.1.4. To improve clarity and transparency, it would be helpful if the authors shared the tables that quantify the differences between the Marxan outputs and the subsequent results of the Iterative Reserve Design Analysis, so that stakeholders can assess the impacts of the additions that were made during that process.

1.4.1.5. Consistent with the previous comment to improve clarity and transparency, detailed information should be provided about how the results of the individual Marxan runs were, or if at all, combined to create a final Marxan-based reserve design.

1.4.1.6. Figures 3.4-3 to 3.4-7 ("Marxan Scenarios") need better supporting information. It is unclear from the current description which lands are of highest priority for accomplishing the DRECP biological goals and objectives, and particularly which lands will provide the most progress towards the BGOs given the existing protected lands system (National Parks, preserves, monuments, BLM wilderness, etc.). Instead these maps depict large blocks of primarily public lands with a checkerboard of excluded private properties, as having equal priority. While we support the designation of large blocks of land as important for conservation, these maps provide little insight into priorities for protection at least in the eastern two-thirds of the plan area. In contrast, the maps appear to write-off the western Mojave, which as noted above, contains some very important populations of target species, as well as unique and distinctive communities.

2. Conservation Reserve Design

2.1. The Nature Conservancy has developed and used science-based tools to achieve lasting conservation based on landscape-scale ecological analysis. As a stakeholder to the DRECP process, one of our priorities is to advise on development of a Conservation Reserve Design that can meet regional conservation goals. With this in mind, we provide the following recommendations to strengthen the framework and approach to DRECP's Reserve Design.

2.1.1. The goals of the Conservation Reserve Design or reserve network design should include protection of the full spectrum of biological diversity present in the entire plan area and of the ecological and environmental (ecosystem) processes necessary to sustain native species, populations, and communities for the long term. The plan must first identify and clearly articulate the conservation and other goals the reserve design seeks to accomplish.

2.1.2. The goals should include the protection of populations of endangered, threatened and rare species that contain the full breadth of their genetic diversity. It should also include the protection of other target species selected because of their vulnerability to known threats present or projected for the California deserts or because they can serve as umbrella species for the protection of suites of other species, communities, and ecosystem processes.

2.1.3. The goals should include the protection of communities that serve as habitat for many of the more common species in the California deserts, as well as some of the rare and target species.

2.1.4. The goals should also include the protection of all important ecosystem processes, such as hydrology, pollinator relationships, seed dispersal, etc.

2.1.5. The plan should be representative, complimentary, and redundant:

2.1.5.1. It should provide for the protection of all species, populations, genotypes, communities and ecosystems that represent the biodiversity of California's Deserts (and the area of the Tehachapi Range included in the DRECP area).

2.1.5.2. It should include a suite of protected areas that compliment one another in terms of the species, communities, linkages and genetic variety they protect.

2.1.5.3. It should protect multiple examples of each target to help ensure that none are wiped out by a single major disturbance event such as a wildfire, flash flood, or landslide.

2.1.6. Where all other factors are equal, large, unfragmented blocks of land (reserve units) are better than smaller blocks.

2.1.7. Lands and waters included in the reserve network design should contain a diverse representation of physical and environmental conditions present across the California deserts.

2.1.8. Reserve lands should be contiguous or at least connected by linkages wherever and whenever possible. This will allow plants and animals to move to new areas over short and long timespans as needed to adjust to relatively short-term weather conditions such as droughts or floods, dearth of prey or abundance of forage, and to adjust to longer-term and more permanent changes in climate and other environmental parameters.

2.1.8.1. Where it is not possible to link blocks of land with protected corridors, buffer-lands that are permeable to the movement of target plants and animals should be identified and given adequate protection to ensure they will remain permeable.

2.2. We assume and request confirmation that the authors will update the Conservation Reserve Design as the expert reviews of the species models are incorporated. Again, this is of critical importance because accuracy of the Reserve Design is key to ensuring the DRECP achieves biological goals and objectives and sites renewable energy resources in the most appropriate places.

3. Technical Appendix on Climate Change

3.1. Overall, the Technical Appendix on Climate Change presents some valuable information, and the vulnerability assessment has many good parts to it, but we have identified some significant problems that should be addressed to avoid the credibility of the approach being compromised, especially the use of only one climate model.

3.2. We have concerns and caution the use of only one climate model (Page 42). There is a significant variation amongst climate models, and the rationale provided, does not satisfy our concerns about the use of only one. Given the large range among the climate models, and no good evidence that one is correct, we strongly recommend that the DRECP plan use more than

one climate model.

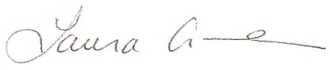
3.3. The overall vulnerability assessment approach is reasonable, but the assessment of exposure (page 34-35) is unclear and potentially problematic. For example, we do not understand why a wetland or riparian system is necessarily high exposure and rocky low exposure. In this example, it seems that sensitivity is being addressed, more so than exposure.

4. Monitoring and Management Program

4.1. The information in the chapter outline for the DRECP Reserve System Monitoring and Management Program is good, but far from complete or adequate to cover the topic. One of the largest gaps is the lack of information and guidance on how to design and implement a monitoring program to cover such a huge area. The DRECP study area covers greater than 20 million acres and will be by far the largest NCCP/HCP developed and implemented to date. People charged with coordinating and carrying out the monitoring and data analysis for well-established NCCP/HCPs covering extensive but much smaller areas have had difficulty determining how to structure monitoring programs that will cover the entire plan area, allow agencies to share and compare important data, coordinate monitoring carried out on at least three scales (Plan-Area-wide (i.e. study-area wide), clusters of conservation areas, and single conservation areas) and provide the most important information necessary to implement an adaptive management program. For example, the San Diego County South Sub-Area Multi-Species Conservation Plan (582,243 acres) partners and consultants have struggled with these very issues. These issues will almost certainly be at least as difficult for the much larger DRECP area. The chapter should at least address this difficulty squarely, and would ideally provide recommendations from monitoring and management program leaders for other HCPs on how to avoid, minimize and address these issues.

Thank you for your consideration of our comments. We look forward to continuing to work collaboratively on the Desert Renewable Energy Conservation Plan.

Sincerely,



Laura Crane
The Nature Conservancy

Attachment

Attachment A –
Detailed Comments to Individual Documents

5. Chapter 3 – Conservation Planning Process

5.1. Page 3-2, "The conservation targets are the species and natural communities, (add: *and ecosystem processes necessary for the long-term viability of these species and communities*), that the conservation strategy is focused on protecting. (Add: *As well as large, unfragmented blocks of land and water, with corridors or linkages to other blocks*)."

5.2. Page 3-4, In an effort to improve clarity and transparency, we recommend that the authors share the methodology and results of the noted "operational effects analysis".

5.3. Page 3-5, "The conservation analysis is an iterative process that involves the potential for refinements to the reserve design and/or additional conservation actions if the initial evaluation concludes that a particular BGO is likely not to be met. Additional conservation actions can also include more stringent criteria to avoid or minimize impacts to species and communities outside of the plan-wide reserve system, including biologically sensitive areas that may occur within a DFA." Conservation analysis should also assess whether the design incorporates lands and waters adequate to ensure continuation of ecosystem processes vital to the long-term viability of the genotype, population, species and community targets.

5.4. Page 3-5, "These eight major elements of the DRECP conservation strategy development process culminate in the creation of the conservation strategy consisting of a final plan-wide reserve design, final conservation actions, an adaptive management and monitoring program, and a process to mitigate the development and operational effects of covered projects and to contribute to the overall DRECP conservation plan implementation." This is the first mention of mitigation. Mitigation should be more integral to both the conservation reserve design and the DFAs and should follow the mitigation hierarchy of avoid first, then minimize, then restore (if technically feasible), and then finally offset through compensatory mitigation. The avoid component of mitigation is tied to the conservation reserve and clearly identifying those areas must be avoided to meet the biological goals and objectives. Prioritizing the investment of compensatory offset mitigation (i.e., where and what) should also be planned using a RAMP approach - (Regional Area-wide Mitigation Program); in this case we recommend the DRECP area be sub-divided into sub-ecoregions that have an biological/watershed/geological basis, and sites for potential mitigation projects prioritized within each sub-ecoregion.

5.5. Section 3.1, Page 3-1 to 3-6. Conceptual Conservation Planning Principles. This section needs a more thorough discussion of ecosystem processes (flood events and fire covered lightly, but fire is likely an abnormal occurrence in most of the California desert). Clear mention of sand dune and sand field formation and maintenance should be made in this chapter. Long-term viability of many sand dune and sand field species depends on maintenance of sand sources and sand transport pathways. Likewise, maintenance of groundwater flows will be required to ensure the long-term viability of many spring, seep and riparian species.

5.6. Page 3-4, 3.2.1 Goals and Objectives Development Process, “factors critical to species and community conservation (Appendix B).” The text in Section 3 is vague; we suggest adding one or two examples to clarify.

5.7. Page 3-4, 3.2.1, Goals and Objectives Development Process, “Statistical- and expert-based habitat models (Appendix A).” In addition to the “Statistical- and expert- based habitat models”, please confirm and identify any species distribution models that were used

5.8. Figure 3.2-2. Hierarchical representation of Biological Goals and Objectives. This figure will be improved by adding a legend that describes the meaning of the colors and their applications to certain cells. The current methodology is unclear.

5.9. Page 3-7, 3.2.1 Goals and Objectives Development Process. In reference to the “questions that were considered to estimate an amount of habitat as a quantitative goal for each species”, we recommend the authors incorporate the following questions: What are the habitat needs of the species? Does it have special requirements for the following - nesting sites, soil characteristics, pollinators or seed dispersers, prey or forage availability?

5.10. Page 3-3, Table 3.3-1, (“Conservation Status Designation in the Plan Area”). *Type 1: Managed Conservation Lands Protected in Perpetuity*. We recommend the authors add: National Monuments, National Preserves, University of California Reserves, Central for Natural Lands Management Lands (e.g., Coachella Valley Preserve) and Audubon Preserves. We question the inclusion of CA State Parks as Managed Conservation Lands, as the primary objective of many is recreation.

5.11. Page 3-1, 3.4 Plan-wide Reserve Design Process, 3.4.1 Overview of Stepwise Planning Process, “The DRECP Plan-wide Reserve Design is a critical element of the Conservation Strategy because it identifies those areas where DRECP conservation and management actions would occur to meet the Plan BGOs. The Plan-wide Reserve Design process occurred in four primary steps.” Please describe how this differs from the eight primary steps listed earlier in the document.

5.12. Page 3-4, 3.4.2 Reserve Design Methods, *Identification of the Primary Marxan Scenarios.* Use of the term, “Conservation Target.” We recommend that the authors reconsider use of the word target, as traditionally, “Conservation Targets” are species, plant communities or habitat types, not energy development.

5.13. Page 3-12, Iterative Reserve Design Analysis, “To function properly, a reserve system must include multiple ecologically relevant spatial levels and represent natural communities to maintain the ecological integrity of large habitat blocks, ecosystem function, and biological diversity (see conservation planning principles in Section 3.1)”. We suggest re-phrasing to improve clarity.

5.14. Comments to **“Supporting Information for the DRECP Conservation Strategy Methodology”**

5.14.1. Page 2, “Review and inspection of the pattern, as well as correspondence of polygon size to evidence of rural land use on aerial images, indicated that most rural land uses occur where the road-bounded polygons were 500 acres or smaller in size. Therefore, road-bounded polygons of

500 acres or smaller that occur on private land were classified as rural." Areas where developments were proposed may have been broken into road-bounded polygons of <500 acres, but where the development was never really begun high conservation values may remain.

5.14.2. Page 76, Planning Unit Cost: We request that the authors define their use of the term "best." This does not seem to be quantified anywhere in the document, and so it would be very helpful to quantitatively and qualitatively define this term. A sensitivity analysis would be helpful, to show the differences between different cost values used. Also, the "cost" function is often used in conservation planning to reflect real, on the ground impacts to conservation, such as roads and development. Here, cost is applied equally to all cells, which does not have the same impact on the output. It would be informative to develop a cost layer for the DRECP region and apply a cost value based on this layer, and compare those results with the approach current used.

5.14.3. Page 76, Boundary Cost: We request that the authors describe the quantitate methods that were used to distinguish the results from the different cost values applied.

6. Chapter 5 – Monitoring and Management Program

6.1. The chapter does not make a clear distinction between management goals and objectives on the one hand and monitoring goals and objectives on the other. For example, Figure 5-1 makes no mention of monitoring goals and objectives. Monitoring goals and objectives should be selected to ensure that monitoring data and analyses provide information that enables managers to determine if management goals have been reached, are being approached, or are being missed by a biologically significant margin. Monitoring goals and objectives are set to specify the power of the sampling design and associated data to detect significant changes, the minimum rates of change or differences between "treatments" (time periods, management treatments) to be detected and the level of confidence that such trends will be detected where they do in fact exist.

6.2. The Chapter 5 outline notes that monitoring and adaptive management will be particularly important for species most vulnerable to climate change but it fails to note that there is uncertainty about how climate will change (e.g. how much average temperatures will increase, how much temperature extremes will increase, how much annual precipitation and the timing of precipitation will change, etc.) and that there is also uncertainty about how these changes will affect different species of plants, animals and other taxa found in the DRECP area.

6.3. The chapter correctly states that monitoring and management will need to occur at the landscape level (e.g., landscape linkages, broad ecosystem processes), natural community level, and species level. It fails to clearly state that monitoring will also almost certainly have to be scaled by a range of management unit sizes. For instance some agencies with spatially small areas of critically important habitat for narrowly distributed species will likely monitor these areas relatively intensively, but also monitor more extensive species and communities across much larger areas of their wider holdings. There will also be species and communities which range across much of the DRECP area and which should be monitored at a Plan-wide scale and in a highly coordinated manner that allows for data

sharing and comparisons. Monitoring at these different spatial scales should be nested to get the most out of the data.

6.4. The chapter 5 outline also does not adequately account for the fact that the federal, state, county and local land-management and research agencies with lands and ongoing studies in the area will continue to take the leading roles in establishing management goals that meet their agency mandates, carrying out monitoring that illuminates whether these goals are being met, and "adapting" where they are not. These same agencies and people will play major roles in monitoring the DRECP reserve system. On the other hand, the Implementing Entity is likely to have a very small staff, few if any of whom will be available to collect and analyze monitoring data. The Implementing Entity's most effective and important role is therefore likely to be in coordinating monitoring across the DRECP area, establishing a certain number of target species and communities, commonly used measures and indicators, standard sampling designs and methods, standard data fields for key variables, and standard analyses for key measures.

6.5. We recommend that the following are added to the list of elements included in long term adaptive management action plans: Management objectives, monitoring objectives and species, communities, ecosystem processes and other indicators to be monitored/measured, whether monitoring will be for trends or to ascertain management thresholds.

6.6. We recommend that the following are added to the list of items to be included in annual monitoring reports: statements of whether monitoring data indicate any management thresholds have been crossed, and if so, what actions are planned in response (this can include “no action” or “stay the course with current treatments”).

6.7. Section 5.7, we suggest that instead of using active and passive adaptive management, that the authors consider using management treatments and no-action alternatives. In both cases key measures of species abundance, condition, and/or distribution, or measures of other indicators (e.g. community composition and structure, ecosystem processes and states) will be monitored and analyzed to determine whether management goals and objectives are being satisfied or approached. Adaptive management signifies the use of systematically gathered data to ascertain the effects of various management decisions and actions (including the no-action alternative) and the recognition that if measured trends are running contrary to management objectives or if thresholds are exceeded it will trigger changes in management designed to change the trend or move the measured condition back "below" the threshold.

7. Technical Appendix on Climate Change

7.1. The downscaling technique used by the Climate Change, Agriculture and Food Security (CCAFS) data from CIAT uses a very simple downscaling technique and is inferior to many other downscaling techniques. We recommend that the authors consult the report mentioned at the beginning of the chapter (Page 23): *PROBABILISTIC ESTIMATES OF CALIFORNIA CLIMATE CHANGE BY THE 2060s USING STATISTICAL AND DYNAMICAL DOWNSCALING. David W. Pierce, Tapash Das, Daniel R. Cayan, Edwin P. Maurer, Norman Miller, Yan Bao, M. Kanamitsu, Kei Yoshimura, Mark A. Snyder, Lisa C. Sloan, Guido*

Franco, Mary Tyree.

7.2. We do not agree with the following comment from Page 43, ""Maurer et al. 2007 conducted a study that supports the HadCM3 predictions, suggesting that mid-century annual precipitation under the A1B emission scenario is about 25% drier than the IPCC climate-model ensemble average. These biases of slightly cooler and drier conditions exhibited by the HadCM3 model are to some degree accounted for during the downscaling process (Ramirez-Villegas and Jarvis 2010)"

7.2.1. We understand that the HadCM3 is dryer and cooler than other models, but don't understand or agree that the downscaling technique accounted for this during the downscaling. This is not a bias of the model, it is how the model predicts the future (a bias is some systematic error you want to remove from the model).

7.3. The authors should take care not to overstate the case that desert species are especially susceptible to climate change. The Archer and Predick article states, "Plants and animals in this region [arid desert ecosystems of the western United States] live near their physiological limits for water and temperature stress." There is no indication of which species, or what percentage of species, are included in this vulnerable category. In addition, Archer and Predick do not cite any literature to support this claim. Therefore, for the DRECP technical appendix to state that "Many of the plants and animals of desert ecosystems live close to their physiological limits and are therefore particularly vulnerable to climate change" is an unsupported claim.

7.4. Page 1. Because climatically-driven changes in temperature and moisture availability can occur in concert or separately, climate change is complex and multi-directional in regard to how it may alter the niche space for different species. The introduction should acknowledge this, and underscore the difficulty in predicting and understanding how communities will respond to climate change.

7.5. Page 9. This report states that "only the Mojave Desert has experienced a consistent increase in seasonal maximum temperatures". A rise in seasonal maximum temperatures has not been observed in the Sonoran Desert. The justification for concern about desert species relates to their existence "close to their physiological limits" (see comment #1). Therefore, it appears in the Sonoran Desert, changes in climate that may constitute a threat are not adequately captured by monitoring seasonal maximum temperatures.

7.6. Page 9. In region with huge gradients in elevation, seasonal and annual average temperatures may not provide the information necessary to determine if significant changes in climate are occurring that could induce ecological change. Only by comparing the background average temperatures of this region with other regions known to be significantly different in terms of vegetation or community type can we know how meaningful these changes in the average temperature of the desert could be.

7.7. Page 15. This report states "Warmer nights and projected declines in mountain snowpack will reduce water supply and lengthen the dry season in Southwestern deserts." This may or may not be the case, depending on what is meant by "dry season". Much of the Mojave Desert is dry year-round, and vegetation is dependent on groundwater. Reduction in mountain snowpack may or may not reduce the amount of water that filters through the soil and is stored belowground.

7.8. Page 16. This report states “There is significant variability in the precipitation projections by individual model and emissions scenario. Individual simulations suggest that there could be up to a 10 to 20% decrease in total annual precipitation (Luers et al. 2006).” The Luers report also states that “one of the three climate models projects slightly wetter winters”. This statement should be included in this report to avoid bias towards considering only drier (and not wetter) scenarios.

7.9. Page 17. We request that the authors define use of the phrase “extremely hot day”. For example, are these based on an average of temperatures taken from across the region, at various elevations?

7.10. Page 18. Please describe the basis for predicting that precipitation in the Plan Area is likely to decrease. The twentieth century trends in seasonal precipitation averages shown on pages 14 and 15 indicate either increases or no change in precipitation. Is this prediction based solely on the Bell (2004) model? If so, how do the authors reconcile the model with the observed trends in precipitation? What role does the PDO play? These more recent studies use regional climate models and show little predicted change in precipitation:

7.10.1. Snyder MA, Sloan LC (2005) Transient future climate over the western United States using a regional climate model. Earth Interact 9: 1–21 (http://es.ucsc.edu/~msnyder/papers/snyder2005_ei.pdf)

7.10.2. Cayan D, Maurer E, Dettinger M, Tyree M, Hayhoe K (2008) Climate change scenarios for the California region. Climatic Change 87: 21–42 (http://tenaya.ucsd.edu/~dettinge/cccc08_scenarios.pdf)

7.11. Page 18. It is important to note that the Bell (2004) modeling study used hydrologic basins adapted to a 40-km regional climate model grid, and the area represented as the “South Lohantan” includes portions of the Sierra Nevada that are not part of the Mojave Desert Ecoregion or the DRECP planning area. Likewise, the “Colorado River” planning area used in the Bell model is not synonymous with the portion of the Sonoran Desert of California. The inclusion of areas that are not within the desert may have influenced the outcome of the model. Also, it is important to note that for precipitation, the only result of the Bell model that were statistically significant at a 95% confidence level was a decrease in extreme rainfall days of 2.6/yr within the “Colorado River” planning area.

7.12. Page 18-19. This report should be revised to reflect a better understanding of watersheds within the Plan Area and how changes in snowpack may influence runoff patterns. For example, runoff from the Sierra Nevada does not feed into the Mojave River. It feeds into Owens Valley.

7.13. Page 19. The report should cite the primary literature, as opposed to presentations that include figures from the primary literature. For example, cite Cayan et al. (2010), PNAS instead of Gershunov et al. (2011).

7.14. Page 23. Changes in seasonal precipitation totals and patterns can impact a wide variety of plant species, because their growth is tied to seasonal patterns in precipitation (Weltzin et al. 2003). In addition, increased levels of atmospheric carbon dioxide may alter the competitive relationships

between native and non-native species, through influences on plant productivity (Ziska 2008). Referenced sources:

7.14.1. Weltzin J.F., M.E. Loik, S. Schwinning, D.G. Williams, P. Fay, B. Haddad, J. Harte, T.E. Huxman, A.K. Knapp, G. Lin, W.T. Pockman, M.R. Shaw, E. Small, M.D. Smith, S.D. Smith, D.T. Tissue, and J.C. Zak. 2003. Assessing the response of terrestrial ecosystems to potential changes in precipitation. BioScience 53:941–952.

7.14.2. Ziska, L.H. 2008. Rising atmospheric carbon dioxide and plant biology: the overlooked paradigm. DNA and Cell Biology 27:165–172.

7.14.3. Also, see Appendix B of TNC's Mojave Desert Ecoregional Assessment (2010): Methods for Calculating the Landscape Resilience Index

7.15. Page 26. The authors should endeavor to ensure that the literature cited is applicable to the Plan Area. The National Park Service Sonoran Desert Network Information Brief (2010) refers to grassland communities that may not be found (or may not be very common) within the California portion of the Sonoran Desert that is included in the DRECP Plan Area. The same goes for citations of studies completed in the Chihuahuan Desert, which includes fire adapted vegetation. With few exceptions (i.e. Antelope Valley in the west Mojave), the Mojave and Sonoran Deserts contain vegetation which is not adapted to fire.

7.16. Page 27. The Mojave Desert's boundaries are not defined by Joshua trees, but Joshua trees are only found within the Mojave Desert Ecoregion. Joshua tree varieties were used to delineate the subregions of the Mojave in conjunction with desert tortoise genetic subunits at that time (they have since been remodified).

7.17. Page 30. Only the older versions of TNC's Sonoran and Mojave Desert Ecoregional Assessments were included in the list of sources. The newer versions can be found here:

7.17.1. http://conserveonline.org/workspaces/mojave/documents/mojave-desert-ecoregional-2010/@@view.html

7.17.2. http://static.consbio.org/media/reports/files/Sonoran_Framework_January_20091.pdf

7.18. Page 36-39. The vulnerability screening procedures appear thorough, but there is a dearth of data to fully characterize all factors for all species. Will further research be able to fill these data gaps?

7.19. Page 42. The report states that "Vegetation data were not used because they are not of adequate scale or detail to be predictive of Mohave ground squirrel distribution". Please clarify how data that have recently been collected in the west Mojave will be incorporated.

8. Revised Biological Goals and Objectives

8.1. Page 17, Objective L3.3: The issue of grazing and toad ecology is evolving in favor of managed grazing to provide the necessary periodic disturbances that toads need to maintain open water habitats for

breeding purposes. All grazing is not bad for this species - it just has to be controlled and removed during the sensitive egg strand deposition and tadpole development stages. Also, see Miller et al 2012 Journal of Animal Ecology.

8.2. Page 31, Objective WETC2.3: Is the Red Swamp Crayfish (*Procambrus clarkii*) not present in this system? It is a major threat in many nearby desert aquatic systems.

8.3. Page 39, Objective DUPL1.2: Are the full suite of pollinators known for these species? Protection of plant locations may not be adequate if the usually plant-specific pollinators are occupying different habitats for egg deposition and larval development (different host plants probable).

8.4. Page 47, Coast Horned Lizard: Goal CHLI1 (SPEC1): Roads are particularly detrimental to horned lizards – should have a goal that addresses holding the line on new road creation within known CHL habitats and the reduction through restoration/rehabilitation actions and the control of vehicular access on existing roads (especially dirt roads).

8.5. Page 48, Objective DETO1.4, Third Bullet: This should read "eliminate" OHV events within conserved lands - if these events are occurring within DT habitat then they cannot be considered "conserved" lands from a tortoise recovery perspective. This should include not only mass-vehicle speed based events, but also the multiple vehicle non-speed, non-competitive uses of these lands (such as Poker Runs).

8.6. Page 50, Objective RAPT1.4, Second Bullet, Third sub-bullet: Subsidizing alfalfa farmers may be in direct conflict with groundwater protection efforts for aquatic and wetland riparian communities in adjacent areas. This is an especially water intensive crop in a desert environment and may not be compatible with conservation of native desert species or natural communities.

8.7. Page 58, Objective BISH2.3: Regarding “artificially high” predation by Mountain Lions. We recommend that you remove this objective. Artificially high predation can be a very subjective determination.