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*Working to protect and restore Western Watersheds*

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Dear Mr. Williams:

On behalf of Western Watersheds Project, California Turtle and Tortoise Club, and myself, here are our written comments on the August 2008 Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise [hereafter referred to as DRRP]. Many of these points were also raised in Western Watersheds Project's comments on the October 16, 2007 Agency/Stakeholder Review Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise which we have attached and submit as part of our comments on the DRRP.

Western Watersheds Project works to protect and conserve the public lands, wildlife and natural resources of the American West through education, scientific study, public policy initiatives, and litigation. Western Watersheds Project and its staff and members use and enjoy the southwestern desert's wildlife, public lands, and its other natural resources for health, recreational, scientific, spiritual, educational, aesthetic, and other purposes. Western Watersheds Project has a particular interest in desert tortoise conservation and co-authored a recent petition to list the Sonoran desert tortoise population under the Endangered Species Act (ESA).

The California Turtle & Tortoise Club (CTTC) has over 1,500 members in 13 Chapters and Branches located throughout California. CTTC was founded in 1964 with the purpose of preserving and conserving the world's turtles and tortoises, and to educating the public about these species. CTTC operates the permitting process for captive desert tortoises in the State of California. CTTC members are extremely concerned about the continued survival and recovery of the desert tortoise, the California State reptile.

Most desert tortoise biologists and agencies such as the California Department of Fish and Game recognize that the desert tortoise is a species in decline. The reclassification of the recovery priority number from 8C down to 5C indicates that the Service also recognizes that the desert tortoise is in a worse state than it was in 1994 [DRRP at 1]. Clearly, then this is not the time to weaken agency management. Instead, this is the time to recommend tough, concerted action to recover the species. Unfortunately, despite the clear decline of the species this draft weakens the 1994 Plan's management recommendations in favor of yet more "stake-holder" driven regional planning efforts. The DRRP has dropped the science and hypothesis-driven

strategy based on reserve level “DWMA” management of the 1994 Plan but has failed to replace it with a coherent strategy or even a clear set of recommendations. This draft document effectively reduces agency accountability and is a set back for desert tortoise recovery efforts.

The DRRP marks a strong and unsettling departure from the science- and hypothesis-driven 1994 Plan. Instead, the DRPP is apparently relying on a managerial overhaul and the delegation of recovery actions to non-scientist “implementation teams” for which it provides little in the way of specific guidance. Significant issues include the DRRP’s focus on uncertainty and failure to use best available science, unclear recovery goals with no threat reduction criteria, lack of firm management recommendations, over-emphasis on unpredictable planning efforts and unpredictable research outcomes, increased bureaucratic control but lack of accountability, action planning by regional implementation groups and, a woolly “no-net loss” of habitat proposal that seems to ignore current mitigation practice.

For convenience, we have laid out our specific comments under the following schema:

1. Endangered Species Act
  - 1.1 Recovery Planning
  - 1.2 Best Available Science
  - 1.3 Uncertainty
2. GAO Report & Recovery Plan Assessment
  - 2.1 GAO Report
  - 2.2 Recovery Plan Assessment - Recovery Units/DPS
3. DRRP – Recovery Objectives
  - 3.1 Need for Threats Based Criteria
  - 3.2 Monitoring  $\lambda$
  - 3.3 Recovery Objective 1
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  - 3.5 Recovery Objective 3
4. DRRP- Recovery Units
  - 4.1 DPS
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5. DRRP – Components
  - 5.1 Threats & Threat Management
  - 5.2 Planning to Plan
  - 5.3 Adaptive Management
  - 5.4 Implementation Teams
  - 5.5 “Augmentation”
  - 5.6 Conservation Areas
  - 5.7 SAC and Need for Independent Scientific Review
6. Conclusions

## 1. Endangered Species Act

The ESA requires the Services to make biological decisions based upon the best scientific and commercial data available. These decisions involve listing, reclassification, and delisting of plant and animal species, critical habitat designations, and recovery planning and implementation. [*Federal Register* for Friday, July 1, 1994 (Vol. 59), p. 34270]

### 1.1 Recovery Plans

With respect to Recovery Plans, the ESA states: “The Secretary, in development and implementing recovery plans, shall, to the maximum extent practicable—

(B) incorporate in each plan

(i) a description of such site-specific management actions as may be necessary to achieve the plan’s goal for the conservation and survival of the species;

(ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and

(iii) estimates of the time required and the cost to carry out those measures needed to achieve the plan’s goal and to achieve intermediate steps toward that goal.” [ESA at Section 4 (f)(1)]

### 1.2 Best Available Science

The FWS is required to base its listing decision “solely on the basis of the best scientific and commercial data available . . .” 16 U.S.C. § 1533(b)(1)(A). The best available science standard prohibits an agency from disregarding available scientific evidence that is “somehow better than the evidence [it] relies on.” *Kern County Farm Bureau v. Allen*, 450 F.3d 1072, 1080 (9th Cir. 2006) (citation omitted). The agency must consider the evidence presently available and may not insist upon conclusive scientific evidence. *Defenders of Wildlife v. Babbitt*, 958 F. Supp. 670, 680 (D.D.C. 1997).

### 1.3 Uncertainty

Science seeks to further our knowledge by proposing and testing hypotheses to narrow uncertainty. A given hypothesis may be reinforced or modified when appropriate data becomes available. If there is any area of uncertainty, the DRRP should be proposing testable hypotheses that can provide the basis for expanding our understanding.

We know that desert habitat takes many decades to recovery from disturbances and degradation. For example, Carpenter et al. (1978) studied abandoned homestead sites in the Lanfair Valley. They found that 65 years later, secondary succession in creosote bush scrub is apparently approaching climax but succession at higher elevations (Joshua Tree grassland) may require twice as many years. The desert tortoise is a long-lived species that requires 15-20 years to reach maturity and relies on producing multiple offspring across multiple seasons (iteroparity) of which only a small number reach adulthood. These two factors, the slow recovery of habitat

and the life cycle of the desert tortoise ensure that even under favorable circumstances it will take a long time for measurable recovery of the desert tortoise to occur. Thus for any given recovery action, measurable benefits in terms of local population change or habitat improvement may take decades to become measurable.

The 1994 Recovery Plan identified a number of threats to the tortoises and recommended restricting anthropogenic disturbances. Recently, some of these restrictions have been implemented with the completion of decade long land management planning processes such as the BLM California Desert District's NECO (2002), NEMO (2002) and WMP (2006) planning efforts. While those plans failed to implement all the recommendations of the 1994 Plan (the BLM did not choose the Recovery Plan based alternatives in any of the plans) some restrictions on anthropogenic activities have been implemented. For example, two cattle allotments in desert tortoise critical habitat in the West Mojave Recovery Unit have been closed within the last 5 years.

Unfortunately, the DRRP seems to have taken the tack that because we don't yet know the outcomes of some threat-reduction actions and for some reason the DRRP was not able to rank the threats, that the threats themselves are uncertain (for example see DRRP at 1 "based on current uncertainties about various threats and our ability to manage them.).

Despite knowledge of the slow recovery of habitat, the life history of the desert tortoise, and the fact that recovery actions proposed in 1994 have only been implemented recently, the DRRP suffers from an undue focus on the effectiveness of the 1994 plans recommendations. The DRRP translates the agency's own failure to document recovery actions, the paucity of effectiveness monitoring data, and the obviously inadequate timeframe over which impacts of threat reduction could be manifest, into the notion that not only is the effectiveness of recovery actions unclear but that the threats that propelled the listing of the tortoise and are continuing to impact tortoise populations are themselves uncertain. This conclusion is unsupported; absent from the DRRP is a satisfactory explanation of how new information has changed the 1994 Recovery Team's finding of significant threats to the desert tortoise and to its habitat that needed to be addressed by conservation measures to if the species was to recover. The DRRP's focus on uncertainty is used as a smokescreen to avoid using best available science in making recommendations.

## **2. General Accounting Office (GAO) Report & the 1994 Recovery Plan Strategy**

### **2.1 GAO Report**

In 2002, the GAO issued its report "*Research Strategy and Long-Term Monitoring Needed for the Mojave Desert Tortoise Recovery Program*"<sup>1</sup> in response to a Congressional request from then Representative J. V. Hansen. The GAO's objectives were to 1) identify the costs of the Recovery program, 2) identify the information that has been used in developing and updating the Tortoise recovery plan and making mitigation decisions, and 3) determine results of recovery efforts to date. The GAO's review found that the 1990 listing, critical habitat designation, and the 1994 Plan were based on best available science. It questioned the apparent

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<sup>1</sup> Report (GAO-03-23) available online at: <http://www.gao.gov/products/GAO-03-23>.

absence of effectiveness monitoring for agency actions taken, the absence of a long term monitoring strategy, and the failure of FWS to report expenditures on threatened and endangered species. The report made the following recommendations:

- Develop and implement a coordinated research strategy that would link land management decisions with research results. To develop such a strategy, the Director should evaluate current efforts to consolidate scientific information and existing proposals for integrating scientific information into land management decisions.
- Periodically reassess the desert tortoise recovery plan to determine whether scientific information developed since its publication could alter implementation actions or allay some of the uncertainties about its recommendations.
- To ensure that needed long-term monitoring of the desert tortoise is sustained, we recommend that the Secretary of the Interior work with the Secretary of Defense and other agencies and organizations involved in tortoise recovery, to identify and assess options for securing continued funding for rangewide population monitoring, such as developing memorandums of understanding between organizations.
- To provide for more timely reporting of expenditures for endangered species, we recommend that the Secretary of the Interior direct the Director of the Fish and Wildlife Service to issue the annual expenditure reports as required by the law, and to advise the Congress if reports are incomplete because not all agencies have provided the information requested.

Bullet points 1, 3 and 4 are recommendations that the FWS should have implemented immediately and did not require either assessment or revision of the 1994 Recovery Plan to implement. Bullet point 2 is also relevant. It provides direction to the FWS to do what is required under the ESA (i.e. periodically reassess the 1994 Recovery Plan) and to do what it can to allay some of the uncertainties about the 1994 Plan's recommendations. The DRRP does not follow the GAO's advice "to allay some of the uncertainties about the 1994 Plan's recommendations" but rather, adds to the uncertainty by simply abandoning its requirement to make such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species.

## **2.2 Recovery Plan Strategy**

The 1994 Recovery Plan described a hypothesis-driven strategy for the recovery and delisting of the Mojave population of the desert tortoise based on (1) identification of six recovery units within the Mojave region, (2) establishment of a system of Desert Wildlife Management Areas (DWMA) within recovery units, and (3) development and implementation of specific recovery actions within DWMA's. As with the DRRP, it included adaptive management and pledged that the "recovery strategy will be revised as recovery actions are implemented and new information becomes available from research and monitoring." [1994 Recovery Plan at 36]. The specific recovery actions were recommendations to minimize specific threats identified to the species and its habitat.

This hypothesis-driven strategy is not refuted but rather supported by the GAO report and the DRTPAC assessment. The DRRP itself appear to support it, but in fact abandons the threat reduction approach that is central to the strategy:

We recognize that the most significant challenge in the implementation of the 1994 Recovery Plan was not the number or types of actions implemented, but rather the coordination, description, documentation, and evaluation of implementation of the actions. As a result, the revised strategy described herein emphasizes partnerships to direct and maintain focus on implementing recovery actions and a system to track implementation and effectiveness of recovery actions. [Page 31]

...the recovery program does not provide a “cookbook” of prescriptions that will ensure recovery of the desert tortoise. Instead, this program establishes a process by which recovery can be achieved. [Page 31]

So instead of a hypothesis-driven strategy for the recovery and delisting of the Mojave population of the desert tortoise based on (1) identification of six recovery units within the Mojave region, (2) establishment of a system of DWMA's within recovery units, and (3) development and implementation of specific recovery actions within DWMA's the DRRP would replace this with a strategy based on manager “partnerships” headed up by the MOG that will somehow ensure existing populations and habitat are protected through stakeholder implementation teams.

The DRRP relies on the following six elements, described as “strategic elements”:

1. Develop, support, and build partnerships to facilitate recovery.
2. Protect existing populations and habitat, instituting habitat restoration where necessary.
3. Augment depleted populations in a strategic manner.
4. Monitor progress toward recovery.
5. Conduct applied research and modeling in support of recovery efforts within a strategic framework.
6. Implement a formal adaptive management program.

But partnerships (element 1) already exist and the MOG has headed up coordination of recovery efforts since 1989, and provisions for adaptive management (element 6) and monitoring (element 4) are present in the 1994 Plan. Elements 3 and 5 are research focused, and were also raised in the 1994 Plan. Hence, the only significant change in the DRRP is with element 2. This element intends to “protect” populations and habitat but never defines “protect” and provides no coherent strategy to do so. Thus, the DRRP no longer presents a science-based recovery strategy, but simply offers current land management bereft of the benefits of the science of the 1994 Plan. This is an appalling step backwards.

### **3. Recovery Objectives**

### 3.1 Need for Threats Based Criteria

The goals of the recovery plan are recovery and delisting of the desert tortoise. [DRRP at 57] We are extremely concerned therefore that none of the stated objectives refers to threat reduction even in the “conservation areas”. Without this, the Secretary will not be able to make a determination of whether the tortoise is no longer threatened “because of the present or threatened destruction, modification, or curtailment of its habitat or range”. Desert tortoises have been and continue to be impacted by the many threats that are clearly listed in the 1994 Plan. Since then, new threats to tortoise populations have arisen, such as direct and indirect impacts from Global Climate Change that will certainly require concerted action. Military base expansion and development have been allowed even in the so called “conservation areas”. It is unclear, then, why the Service has removed threats-based criteria from the DRRP when they have not disappeared from, and in fact have increase in, the habitat of this species.

On page 56, the DRRP seems to imply that there is too much uncertainty to do this difficult task even though this was the clear approach taken in 1994.

Importantly, recovery criteria should also include the management or elimination of threats, addressing the five statutory (de-)listing factors. However, even though a wide range of threats affect desert tortoises and their habitat (and some such as disease and fire have attracted much recent attention), very little is known about their demographic impacts on tortoise populations or the relative contributions each threat makes to tortoise mortality (Boarman 2002; Tracy et al. 2004). As described previously, the facts that desert tortoises require over a decade to reach maturity, they have temporally variable reproduction, and juveniles have low survival rates, make it difficult to tease apart relative impacts of individual threats (although some impacts, such as habitat loss, are fairly straightforward in that they eliminate populations completely). Therefore, specific and meaningful threats-based recovery criteria cannot be identified at this time. For example, we lack quantitative data on the specific contribution of raven predation, disease, or other individual threats on tortoise population declines. A specific criterion to reduce raven predation by a specified amount may ultimately be unnecessary as we learn more about, and better manage, other particular threats.

The Service attempts to rely on uncertainty to justify the little consideration it gives to making specific recommendations to manage threats. This is unwarranted. Firstly, the FWS mandate is to use best available science, not “conclusive science”. Secondly, subsequent research and monitoring has confirmed and significantly added to our knowledge base of the impacts of many of the same threats that were already well documented in 1994.

Despite repeatedly expressing uncertainty about threats and their relative impacts, the DRRP knows that, “Habitat restoration is a countermeasure to many of the impacts discussed above, such as grazing, military operations, off-highway vehicle use, roads and trails, construction, mining, horses and burros, invasive species, fire, environmental contaminants, and utility corridors.” [Page 70] The Service is trapped in its own double-speak: if the science no longer justifies restrictions on activities that threaten tortoises and their habitat, how does the

DRRP know enough about these impacts to be able to determine how much habitat restoration is required as a countermeasure? This is more evidence of the subjective, arbitrary and non-scientific approach taken throughout the DRRP.

The courts have frequently ruled over the issue of requiring “scientific certainty” versus the ESA mandate to use “best available science” and have firmly rejected the need for certainty. The FWS should heed its own rules and include the management or elimination of threats to address the five statutory (de-)listing factors in the DRRP. Best available science should be driving any revised plan, as it did the 1994 Plan.

While we appreciate the considerable technical difficulties that are involved in estimating desert tortoise populations and determining population trends, documenting threat reduction is comparatively simple. Indeed, the land management agencies can easily eliminate categories of threats such as livestock grazing within conservation areas and with minimal economic and social consequences should they choose to do so. It is apparent that the Service is unwilling to try this approach, even as the species continues to decline.

### **3.2 Monitoring $\lambda$**

At the same time, the Science Advisory Committee proposed using a 90 percent confidence band ( $\alpha = 0.10$ ) to describe population trends. For an increasing trend, the lower 90 percent confidence limit for each estimate of  $\lambda$  should exceed 1. This precision level makes it possible to distinguish a small (less than 2 percent per year) trend from a non-growth trend, but is still fairly conservative. Although a convention exists to use 95 percent confidence intervals ( $\alpha = 0.05$ ) for many statistical tests, setting  $\alpha = 0.10$  has the conservative effect of guarding against incorrectly concluding a decline in tortoise density has not occurred at the expense of a slightly increased possibility that an increasing or declining trend is “detected” when, in fact, the population is stable (Shrader-Frechette and McCoy, 1993). [DRRP at 59]

We are extremely concerned that the proposed statistical significance level would double the probability of making an incorrect call on recovery and increase the risk of a Type II error. With all due respect to the authors, Shrader-Frechette and McCoy’s 1993 book is important, albeit somewhat dated, but is considered somewhat controversial - for example see Odenbaugh 2001 (“Shrader-Frechette and McCoy argue that theoretical ecology does not provide important resources for developing environmental policy.”) “Shrader-Frechette and McCoy, 1993” was not included in the list of references. It should be added and the relevant pages cited. The explanation given for DOUBLING the risk of incorrectly concluding that tortoise density has increased remains inadequate. Neither natural variability nor inadequate survey technique are reasons to double the risk of reaching an incorrect conclusion. At a minimum, the FWS should provide a mathematical analysis to explain how great a population increase or decrease is needed for the current methodologies to detect the trend at both the 95% and 90% confidence intervals.

“Natural variability in population size and inherent measurement error make it extremely difficult to detect realistic natural increases (i.e., less than two percent per year) in desert tortoise

populations in as few as 25 years (USFWS 2006a)” DRRP at 59. The 25-year time constraint time is unexplained and unsupported. The Service should provide estimates of times to recovery based on expected and measurable population changes using rigorous statistical models.

The concluding statement of the above quoted passage “The Science Advisory Committee also noted that combined use of independent measures of recovery (population trends, habitat quantity and quality, threat abatement) provides additional assurance that detected trends are meaningful,” raises significant scientific concern given the absence of a threat based recovery criterion.

Recovery criterion 1 b) “direct monitoring and estimation of vital rates (recruitment, survival) from demographic study areas within each recovery unit” will also be used to determine if rates of population change ( $\lambda$ ) for desert tortoises are increasing. Surprisingly, given the checkered history of technical glitches that have marred the massive line-distance sampling effort, the DRPP states:

“Recovery Criterion 1a is based on data that are relatively easy to gather over large areas using range-wide monitoring with counts of individuals (i.e., line distance sampling), while Recovery Criterion 1b is based on data that are more difficult to gather but that may give us a more precise indication of population change using vital rates such as recruitment and survival from demography study areas, as described more fully below.”

That data for Recovery Criterion 1b is “more difficult to gather” than range-wide monitoring is not reassuring given the trials and tribulations of the line-distance sampling program that have taken several years to fix. The DRRP provides no real explanation of where or how vital rate data will be gathered. The 1999 Plan included a substantial appendix addressing desert tortoise population viability that included three modeling exercises in the demography section. The 1994 Plan also proposed adding study plots inside and outside the DWMA to test the hypothesis that DWMA management is effective. But what is being proposed in the DRRP? What is the basis for the “dynamic models” that will independently estimate  $\lambda$ . Why are not all the established study plots going to be incorporated? Dr. Kristin Berry’s work on study plots in California has been the source of almost all of the demographic data (and indeed usable trend data) available for the important California desert tortoise populations with data sets collected over three decades. The document states, “Existing permanent study plots may be incorporated into the set of demographic study areas within each recovery unit, if appropriate.” The DRRP neither defines “appropriate” nor indicates whether the new study sites to be identified will have representative threats. The DRRP should indicate whether the new study sites will be randomly chosen. If they are not randomly chosen, then the DRRP should indicate what objective criteria will ensure that the “implementation teams” get it right since they (and not scientists) will select them. Figure 13 shows “hypothetical demographic study areas.” It is not clear why the DRRP includes this figure, or why the demographic study plots are only proposed for conservation areas if the objective is to maintain well-distributed populations of desert tortoises throughout each Recovery Unit. This is also a prime example of the FWS ignoring the best available science as required by the ESA and Data Quality Act, with the DRRP remaining silent on Dr. Berry’s keystone demographic work.

The addition of new study plots to determine demographic and population trends is laudable but objective criteria need to be specified in order to assure selected sites will provide useful information, and to avoid selecting sites where there are no tortoises and where there are no historic data.

### 3.3 Recovery Objective 1

We reiterate many of the same points we made in our comments on the October 16, 2007 Agency/Stakeholder Review Draft. We are concerned that the Recovery Objectives do not fulfill the ESA requirement that “Recovery Plans shall incorporate, to the maximum extent practicable... (ii) objective, measurable criteria which, when met, would result in a determination... that the species be removed from the list”:

Objective 1 (Demography). Maintain self-sustaining populations of desert tortoises within each recovery unit into the future.

Recovery Criterion 1. Rates of population change ( $\lambda$ ) for desert tortoises are increasing (i.e.,  $\lambda > 1$ ) over 25 years (a single tortoise generation), as measured

- a) by extensive, range-wide monitoring across tortoise conservation areas within each recovery unit, and
- b) by direct monitoring and estimation of vital rates (recruitment, survival) from demographic study areas within each recovery unit.

The Recovery Objectives do not consider the population declines that have continued over the 19 years since the desert tortoise was listed. The DRTPAC Report independently reviewed data from study plots in California and confirmed that monitored populations had significantly declined since 1994. Given the declines portrayed in the Recovery Plan Assessment, even if the rate of population change ( $\lambda$ ) within each recovery unit were to exceed 1 over the next 25-years the population may still be significantly lower than in 1989 when the desert tortoise was listed or even when the Recovery Plan was approved in 1994. The species cannot be considered for delisting under the ESA if it has not even reached the population density at its initial listing. This is particularly galling considering the absence of threats-reduction criteria.

The DRRP states, “The original listing of the desert tortoise was based on documented downward trends in a number of populations rather than on absolute numbers of tortoises being below a threshold level (USFWS 1990).” As the FWS is certainly aware this is true for many of the species protected under the ESA – the decline of monitored populations is often the trigger for listing. Accordingly, being listed under the ESA is the only stimulus that has led to rangewide population estimates for many species.

The DRRP argues that basing the criteria on trends has an important advantage over setting specific target numbers because of, for example, ecological differences between geographic areas that may underlie different initial population levels in those areas so a single target density would not apply to both areas. In our comments on the Agency/Stakeholder

Review Draft we asked “But following that logic, why does the Service not set targets for each recovery unit?” The answer in the DRRP is as clear as mud. The FWS responded by adding the following curious statement:

There is no reason to think that a single target density should be applied to all recovery units, yet attempting to set unique targets for each recovery unit would not be prudent given the lack of data on both historic population numbers and what numbers would constitute sustainable populations in the current environment. [DRRP at 58]

There is every reason to set targets for individual Recovery Units or DWMA (as subunits of recovery units) since this indeed provides a way to address the issue of the ecological variables between them. In contrast, given the uncertainty of “what numbers would constitute a sustainable population in the current environment,” applying a universal rate of change of  $\lambda > 1$  over 25 years (a single tortoise generation) could not possibly work as a criterion for de-listing. Knowing  $\lambda > 1$  over a single tortoise generation does not imply that a sustainable population has been achieved. This is why the 1994 Plan established the goal of establishing at least one viable population with a minimum density within each of the recovery units. The DRRP has abandoned this safety net and sets its reliance on results of rangewide monitoring that it only becomes feasible by reducing the statistical precision.

Setting the population trend as the criterion and failing to take into account the degree of loss of the population biases the trend determination by starting at an unnaturally low density. Under this criterion, areas that have the capacity to support much higher densities could be delisted because they only have to show the same marginal trend as in areas with less capacity.

### **3.4 Recovery Objective 2**

Recovery Objective 2 (Distribution). Maintain well-distributed populations of desert tortoises throughout each recovery unit.

Recovery Criterion 2. Distribution of desert tortoises throughout each tortoise conservation area is increasing over 25 years (i.e.,  $\psi > 0$ ).

We certainly support the need for maintaining well-distributed populations of desert tortoises throughout each recovery unit. However, we see no mechanism proposed in the DRRP to achieve this since the document focuses only on “conservation areas”. The DRRP states:

“The purpose of Criterion 2 is to prevent range contraction of the desert tortoise. To detect changes in desert tortoise distribution, we will monitor the ratio of sampling points at which tortoises are detected across tortoise conservation areas within each recovery unit (Figure 13).”

It is quite obvious from Figure 12 of the DRRP that the “conservation areas” in the West Mojave Recovery Unit are not distributed throughout the Recovery Unit but are focused on the southeast. Since the West Mojave Recovery Unit covers the entire western range of the species focusing

only on conserving tortoises in these conservation areas will not prevent a considerable range contraction for the species. The problem here seems to be that the DRRP is abandoning the DWMA based, preserve level, threat-minimization management of the 1994 plan but at the same time is attempting to retain the DWMA as the basis for conservation. It can't have it both ways. To avoid a range contraction with management geared to minimal threat abatement requires both increasing the conservation areas and monitoring across the range.

As we requested in our comments on the October 16, 2007 Agency/Stakeholder Review Draft, the DRRP should specify which of MacKenzie's occupancy models (or derivatives thereof) the FWS proposes to use.

### **3.5 Recovery Objective 3 (Habitat)**

Recovery Objective 3 (Habitat). Ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations.

Recovery Criterion 3. The quantity of desert tortoise habitat within all desert tortoise conservation areas is maintained with no net loss until tortoise population viability is ensured. When parameters relating habitat quality to tortoise populations are defined and a mechanism to track these parameters established, the condition of desert tortoise habitat should also be demonstrably improving.

Ensuring that adequate habitat within each recovery unit is protected and managed to support the long-term viability of desert tortoise populations is not just a laudable goal but rather an absolute imperative for recovery of any species. In 1994 the FWS designated critical habitat for the species, habitat designated as essential for its recovery and survival. This habitat was based on the broad DWMA's identified in the 1994 Plan.

Criterion 3 proposes a "no net loss" of desert tortoise habitat within existing desert tortoise conservation areas. However, many of these conservation areas and critical habitats have significant inholdings of private land. Elsewhere, the DRRP identifies habitat development as one of the major threats to the species. Development on these inholdings threatens the integrity of conservation areas, and may have associated access roads that fragment habitat and cause other impacts. According to the DRRP, "land acquisition is an expensive, time consuming task" [DRRP at 27]. From personal experience, land acquisition is not always easy but it is much simpler, more certain, and more permanent than habitat restoration. A concerted land acquisition program is the simplest way to deal with important inholdings and allows landholders the opportunity to purchase suitable development land outside conservation areas. Currently, most of the public land management agencies especially the BLM, require the acquisition of compensation lands based on formulas developed by the MOG in 1991 (Hastey et al, 1991). For DWMA areas in California, this typically requires a 5:1 compensation ratio. A number of HCPs, including the still developing West Mojave Plan HCP, rely on habitat acquisition in the DWMA to satisfy compensation requirements.

The BLM and a number of non-profit agencies have worked with developers in order to take a systematic approach to land acquisition to establish larger contiguous blocks of habitat

thus adding considerable value to mitigation-compensation programs. Unfortunately, the DRRP is largely silent on this important habitat acquisition process. Instead, it presents a woolly balancing act that would somehow credit acreage from habitat loss on public lands within the tortoise conservation areas with new, restored, or enhanced acreage of habitat, that meets the minimum conditions for desert tortoise occupation. Nowhere are these minimum conditions defined. It is entirely unclear if mitigation acquisitions within conservation areas would be added to the baseline for calculating “no net loss”. Certainly they would have to be. Lands acquired as mitigation for existing projects cannot be used as grounds for allowing new development elsewhere. In addition, a number of agencies such as the National Park Service are acquiring inholdings donated to them by conservation groups. Again, this goodwill gesture by publically supported groups cannot be used to balance private and government development elsewhere. If route restoration is considered in “no net loss” calculations, then the Service must also debit all those thousands of miles of cross-country tracks across habitat that were identified for example in Heaton, 2007.

According to Box 5 “No net loss of habitat may be relaxed under special circumstances in which we determine greater recovery benefits can be achieved through other means.” This is tantamount to the DRRP facilitating adverse modification of critical habitat, as such, is completely outrageous. The DRRP provides no special provisions for adding habitat and yet allows unspecified special circumstances to contribute to net loss. This is counter to the letter and intent of the ESA.

It is unacceptable that Criterion 3 depends in part on some yet-to-be determined definition for habitat quality. Once this is defined, the DRRP informs that, “the condition of desert tortoise habitat should also be demonstrably improving”. Again there is an absence of an identified goal. “Demonstrably improving” is meaningless and vague in the context of the slow rates of growth and recovery that are characteristic of desert habitat and the biota that depend on it.

Land acquisitions for conservation purposes within conservation areas should be considered a priority but should not be the basis of making other parts of the conservation areas available for disturbance. High quality habitat should be targeted for acquisition. Without these assurances, the objective to “Ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations,” cannot be achieved.

## **4. Recovery Units**

### **4.1 Distinct Population Segments (DPS)**

The ESA defines the term “species” as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature. The 1994 Plan identified six Recovery Units based on genetics, ecology, behavior, morphology, and threats. The Recovery Team clearly recognized that the tortoise populations of each Recovery Unit constituted DPS [cf. – *Genetics, morphology, behavior, ecology, and habitat use define six distinct population segments or recovery units within the range of the Mojave population: northern Colorado, eastern Colorado, upper Virgin*

*River, eastern Mojave, northeastern Mojave, and western Mojave* [1994 Plan at (i)], and provided a detailed explanation of these Distinct Population Segments (DPS) at length in appendix F1.

Since that time, published studies have looked at fine structure within these populations (Britten et al., 1997; McLuckie 1999; Edwards et al., 2006; Murphy et al, 2007). The validity of the 1994 Plans original six DPS were supported by Murphy et al. 2007 in their detailed genetic analysis.

In 2004, the Desert Tortoise Recovery Plan assessment committee (DTRPAC) released its draft report (DTRPAC 2004). This document reviewed the DPS as outlined in the Recovery Plan in the context of both research between 1994 and 2003 and the 1996 “Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act” (FWS 1996) that had been published two years after the 1994 Plan. The DTRPAC identified at least five DPS in its draft assessment. These findings were reiterated in the DTRPAC’s final report (DTRPCA 2006). However, it qualified this by stating that “DPSs may not officially be designated in a recovery plan, but revision of the 1994 Plan should lay sufficient groundwork so that DPSs may be formally proposed in future delisting proposals as delisting criteria are met for each DPS” (DTRPAC 2006).

This qualification is reiterated in the DRRP - “Designation of DPSs can only be done through a formal rule-making process.” [DRRP at 38] So, although the 1994 Plan treated the Recovery units as DPS, and the DTRPAC proposed a list of DPS, the Service is adopting the position in this plan that somehow DPS designation is both independent of the Recovery Plan revision and somehow irrelevant to the revised plan itself. This is unsupportable. The 1996 Policy clearly states:

*The appropriate application of the policy will also be considered in the 5-year reviews of the status of listed species required by section 4(c)(2) of the Act. [FWS 1996]*

The FWS is ignoring its own DPS policy directive. Designating DPS is not simply a delisting mechanism but an integral component of recovery. The agency should have acted on the basis of the recommendations of its science panels and instituted a formal rule-making. The FWS has not done this, nor explained its failure to do so in the DRPP.

## **4.2 Recovery Units**

The 1994 Plan identified six Recovery Units/DPS based on genetics, ecology, behavior, morphology, and management/threat issues. In 2007, a detailed study of desert tortoise genetics across the species range provided new data supporting the validity of the 1994 Recovery Units (Murphy *et al.* 2007)<sup>2</sup>.

The DRRP proposes reducing the six Recovery Units to five. The scientific basis for this action is not made clear in the document. The DRRP references an unpublished study by Hagerty and Tracy (referenced as Hagerty and Tracy 2007) that it implies shows that the

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<sup>2</sup> The DRRP at 40 erroneously cites Murphy *et al.* 2007 as unpublished.

Northern and Eastern Colorado Recovery Units are genetically homogenous. The DRRP provides no usable summary of this unpublished data. However, the DRRP states,

“What little genetic variation that has been observed between former Northern and Eastern Colorado recovery units is likely due to an absence of sampling from populations in the central part of the combined unit, south of Highway 62 and east of Highway 177 (cf. Allendorf and Luikart 2007:400; Figures 7 and 11). Patchy habitat southeast of the Cadiz Valley appears to provide some linkage between the northern and southern halves of this recovery unit (Figure 11). As a result, we merged these two recovery units.” [DRRP at 50]

This statement in the DRRP appears to be based on the unpublished work of Hagerty and Tracy. But Figure 7, which includes the sample points from the unpublished Hagerty and Tracy (2007) manuscript, suggests that they did not sample the linkage area either so the basis for the conclusion is unclear. Murphy et al (2007) found measurable genetic distances in tortoises sampled from the Northern and Eastern Colorado Recovery Units (see their Figure 5). In an assignment test, 89.2% of the samples were correctly assigned to the Eastern Colorado Recovery Unit and 72.2% correctly were assigned to the Northern Colorado Recovery Unit. However, their genetic assignments did not support a separation between the Eastern Mojave and the Northern Colorado Recovery Units. In this respect, Murphy et al note, “The close geographic proximities of the sample groups [i.e. the sample sites in the Eastern Mojave and the Northern Colorado Recovery Units] are unlikely to reflect the potential diversity occurring along a 250 km north-south axis. Until more data are gathered along the north-south axis, we do not recommend treating the two recovery units as one, because of major differences in climate, forage availability, and seasonal activities. These distinctions may be exactly the kind of ecological/adaptive differences worthy of conservation management, independent of the units delimited by neutral molecular variation (Crandall et al. 2000; Allendorf and Luikart 2007).”

Clearly then, the statement “What little genetic variation that has been observed between former Northern and Eastern Colorado recovery units is likely due to an absence of sampling from populations in the central part of the combined unit, south of Highway 62 and east of Highway 177 (cf. Allendorf and Luikart 2007:400; Figures 7 and 11)” is either unwarranted or the subject of scientific disagreement and needs to be resolved. Because this will have profound management implications, we recommend the Service directly address this issue before moving forward.

We take issue with the statement “Patchy habitat southeast of the Cadiz Valley appears to provide some linkage between the northern and southern halves of this recovery unit (Figure 11).” We presume that DRRP meant the current Northern and Eastern Colorado Recovery Units since this sentence is evidently meant to be an argument for uniting the two recovery units. The two recovery units are about 40 miles apart. Between them are mountain ranges, desert sand fields, extensive playas, and human intrusions particularly agriculture (alfalfa) and Interstate 10 and its diversion dikes. It would seem unlikely that desert tortoises could navigate these obstacles and it is unclear if any tortoises survive in the “patchy habitat” identified in the unpublished USGS habitat model but these are interesting hypotheticals that should be tested. They are not facts.

The Northern Colorado Recovery Unit includes elements of both Colorado Desert and Mojave Desert floras, and has higher precipitation than the Eastern Colorado Unit. The Eastern Colorado Unit plant communities are typical of the Colorado Desert (FWS 1994). These differences are obvious on a casual visit even to the untrained eye and these gross distinctions should have informed the DRRP.

Recently, the BLM completed a decade long planning exercise to complete 3 major revisions (the NECO, NEMO and WMP planning efforts) to the CDCA Plan that relate to land management within the West Mojave, Northern Colorado, Eastern Colorado, Northern Mojave and Eastern Mojave Recovery Units. The Northern and Eastern Colorado (NECO) Plan clearly outlines the different threats faced by tortoises in the two units. For example, livestock grazing continues in the Northern Colorado Recovery Unit but sheep are no longer turned out on the Chuckwalla DWMA, the only DWMA in the Eastern Colorado Recovery Unit. However, the Chuckwalla DWMA includes 186,423 acres of the Chocolate Mountain Aerial Gunnery Range, which has its own suite of threats.

Under section 3 of the Endangered Species Act, critical habitat is defined as the specific areas supporting those physical and biological features that are essential for the conservation of the species, and that may require special management considerations or protection. A number of species would benefit if the “patchy habitat southeast of the Cadiz Valley” was designated as critical habitat or as a conservation area. We are completely supportive of any attempts by the agencies to conserve these areas to provide potential linkage between the Recovery Units.

In summary, by seeking to combine the Northern and Eastern Colorado Recovery Units the DRRP is ignoring best available science, ecological conditions, geographic constraints, and existing agency management. The DRRP simply provides no reasonable basis for this proposed merging of the two Recovery Units and is unwarranted.

The creation of additional Recovery Units have been proposed but are not considered in this plan. Murphy et al, 2007 found strong isolation by distance effects in the West Mojave Recovery Unit and could differentiate tortoises within it into Western, Southern and Central Mojave units. These are important subdivisions not just because they are genetically distinguishable but because on-the-ground-management issues vary between the units. For example, 50% of the Ord-Rodman DWMA (the only protected area in the central Mojave Unit) is grazed by cattle. The treatment of this proposal in the DRRP is distorted and very poorly done.

“There also may be some sub-structuring within the Western Mojave Recovery Unit (Murphy et al. 2007), which may be an artifact of discrete sampling within generally continuous habitat (Allendorf and Luikart 2007:400). In addition, up to 40 percent of individuals were incorrectly assigned to the appropriate subpopulation in assignment tests; habitat in California was well connected prior to human development, allowing gene flow to occur over long geographic distances and multiple vegetation types (Murphy et al. 2007).”[DRRP at 51]

We note that assignment rates for the Western, Southern and Central Mojave units were 84.8%, 68.0% and 59.6%. The Southern Mojave Unit was separated historically from the other two by the Mojave River. This section of the DRRP should be rewritten to reflect the actual contents of Murphy et al., 2007.

## **5. DRRP – Components**

### **5.1 Threats**

Above, we challenged the FWS’s decision to not propose threats-based criteria in the DRRP. Desert tortoises have been and continue to be impacted by the many threats that are clearly listed in the 1994 Plan. Since then, new threats to tortoise populations have arisen, such as direct and indirect impacts from Global Climate Change that will certainly require concerted action. Military base expansion and development have been allowed even in the so called “conservation areas”. The DRRP itself admits, “The vast majority of threats to the desert tortoise or its habitat are associated with human land uses. The threats identified in the 1994 Recovery Plan, and that formed the basis for listing the tortoise as a threatened species, continue to affect the species.” [DRRP at v]. Yet, the DRRP declines to propose threats reduction criteria based on claims, discussed above, of “uncertainty” about the threat rankings or and what conservation measures are most effective.

Although “a description of such site-specific management actions as may be necessary to achieve the plan’s goal for the conservation and survival of the species” is an ESA requirement, the DRRP has failed to even describe the extent of threats in Recovery Units (for example, basic facts such as the number and size of extent grazing allotments; the number and density of dirt roads; miles of highway that are fenced versus unfenced).

Threats are often site-specific. For example, threats to a desert tortoise population in a Wilderness Area might include livestock grazing but off-road vehicles would be expected to be less of an issue there since vehicles are precluded from wilderness. However, the impacts from livestock grazing could potentially impact every tortoise found on that allotment. Other highly site-specific impacts include military activity and mining.

However, the document doesn’t just ignore the need for site-specific recommendations but tends to avoid making management recommendations entirely. For example, on page 120 the threat from livestock grazing is described as:

“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 1994).”

Computing the scale of the threat is simple. The DRRP just needs to tabulate the currently and previously grazed areas of desert tortoise habitat.

Recovery Action 2.16. is “Minimize livestock grazing”. The DRRP does not define “Minimize” but there is no data showing that any level of grazing other than zero is compatible with desert tortoise recovery. The word “Minimize” should be replaced by “eliminate” or “end” or “phase out” instead.

This confusing word-use goes on elsewhere in the DRRP. “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...” [DRRP at 119] This is unclear. Is the DRRP implying that livestock have degraded the habitat to such a degree that additional measures are needed to reverse this? If so, exclusion of domestic livestock should be listed as a prime objective since this one threat that can be completely removed.

The Decision Support System should consider both competitive and non-competitive off-highway vehicle events within desert tortoise habitat (Table C-5). Noncompetitive events such as “dual sport” rides may involve five hundred vehicles or more. Impacts from these events are similar to those described for competitive events - widening of routes, creation of new routes, camping and staging by race participants and observers in unauthorized areas, littering, and inability of event monitors to prevent unauthorized activities. The 1994 Plan proscribed noncompetitive as well as competitive motorized events in DWMA. There is no explanation given in the DRRP as to why the 1994 recommendation has been watered down.

We caution again, that the DRRP should be very cautious in the language it uses with respect to captive and pet desert tortoises. There is a large captive population of desert tortoises in California and Nevada. Any indication that tortoise ownership will be restricted may decrease registration rates and paradoxically could increase deliberate release of captives into the wild by owners concerned that animals may be confiscated at some future point. Some members of the public may perceive the discouragement of captive breeding but promotion of head-starting as a mixed message. The DRRP should also provide for appropriate and continued public education if any head-starting programs do go into effect.

We remain extremely concerned that the DRRP minimizes disease and disease issues. “Section 2.2. Reduce factors contributing to disease (particularly upper respiratory tract disease)” is almost entirely restricted to a discussion of removal or not of infected tortoises. There is no discussion of Brown’s environmental stressor hypothesis. The DRRP also fails to discuss quarantine measures that may be needed to localize disease outbreak. There are a number of proactive and administrative measures that could be instituted such as temporary quarantine fencing and a moratorium on translocation.

We raised a number of issues related to Global Climate Change in our comments on the Administrative Draft. We are pleased to see that the DRRP now includes an enhanced section on Global Climate Change. However, the discussion and analysis is incomplete in a number of areas. For example, the DRRP states:

Sex ratios of reptiles may be robust to moderate temperature increases as long as eggs experience daily fluctuating temperatures (Booth 2006). The heterogeneous

environment in which tortoises nest does provide opportunities among diverse potential nest sites with exposure to a variety of temperature regimes. The survival of reptile species with temperature-dependent sex determination through cycles of warming and cooling over the last 100,000 years suggests that changes in climate were such that species were capable of shifting the time of nesting, choice of nest sites, the range occupied, or even temperature at which the sexes were produced (Booth 2006). [DRRP at 134]

Booth, 2006 actually reviews models developed by Georges et al (2004) that seek to better explain the influence of fluctuating temperatures on turtle hatchling sex ratios and fitness, particular in shallow (<30 cm) nesting turtles such as those of the pig-nosed turtle. However, while desert tortoises may deposit eggs in relatively shallow nests, these are frequently excavated within their burrow (Roberson et al, 1985; Baxter et al 2008). In contrast to daily fluctuations in mean surface operative temperatures, mean operative temperatures in burrows typically varied less than 1°C per day, averaging 29°C in late August and steadily declining to 7°C in December (Zimmerman et al, 1994). Working at the Goffs study site, Roberson et al found 24 of 26 nests were located 1-60 cm (mean 24 cm) inside the burrow. Working at the FISS study site at fort Irwin, Baxter et al (2008) found that desert tortoises nested an average 0.7 m down the burrow and that positioning of the nest within the burrow influenced the sex of the offspring. They conclude that using nest date or the proportion of temperature observations above the pivotal temperature may be a better predictor of hatchling sex ratios in the Central Mojave Desert. Based on this, we do not place much faith in the DRRP's rosy view of Booth, 2006. The DRRP concentrates only on existing conservation areas. Under this constraint, the desert tortoise will have little opportunity to shift its range. For example, the conservation areas in the West Mojave Recovery Unit are found in the BLM DWMA at the south end of the unit only. The DRRP needs to identify habitat to the north of the DWMA that may be important in future recovery efforts.

## 5.2 Planning to Plan

The ESA requires Recovery Plans to provide “a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species”.

Contrary to the ESA and in lieu of providing site-specific management actions, the approach taken in the DRRP is to propose a series of new planning efforts. These include:

- Developing step-down recovery-action plans and implementing those actions on the ground by Regional Recovery Implementation Teams. These teams will work under the “executive-level” support and direction of the Desert Tortoise Management Oversight Group (MOG) and will include a member of the Desert Tortoise Recovery Office. The MOG has been in existence for 20 years. During that time, its members have lead multiple planning efforts. The DRRP provides no explanation as to why using implementation teams requires a Revised Recovery Plan. Since the DRRP has not incorporated a threats-based criterion in its Recovery Objectives what are these action plans supposed to tier off? What are the benchmarks that will assure that these Action Plans do promote recovery? What measures will avoid

redundancy in the vast areas where enormous resources have already been devoted to planning efforts?

- Identify sets of threats that contribute to a greater number of mortality mechanisms or affect size structure or fecundity.

“The vast majority of threats to the desert tortoise or its habitat are associated with human land uses. The threats identified in the 1994 Recovery Plan, and that formed the basis for listing the tortoise as a threatened species, continue to affect the species.” [DRRP at v] However, despite recognition of the ongoing threats the DRRP states, “As quantitative information on threats and tortoise mortality is obtained, more specific threats-based recovery criteria may be defined during future recovery plan review and revision.”

Addressing threats is the core of recovery planning. The desert tortoise population cannot wait for a future Recovery Plan revision to address threats.

- Demographic study areas  
The number, size, and sampling frequency of demographic study areas remain to be defined in coordination with the Science Advisory Committee and Recovery Implementation Teams.
- Develop and Occupancy Model  
“Occupancy estimation, if feasible, would also provide another estimate of population growth rate,  $\lambda$ ”
- Develop the desert tortoise habitat model
- Revise and continue development of a recovery decision support system.

### **5.3 Adaptive Management**

“Adaptive management” is an administrative tool that intends to allow adjustments to management actions and strategies as knowledge is gained. It is not a recovery action in and of itself. A suitable monitoring strategy is a key requirement for any adaptive management approach (Williams et al 2007). Data collected from monitoring are used to test alternative models and measure progress toward management objectives. However, there are several situations in which an effective monitoring program cannot be established within an Adaptive Management Framework. One of these is when monitoring cannot provide useful information for decision-making. This is the case for desert tortoise recovery where populations can change only slowly over decade. Because of the pace of the response, feedback is not likely to be a significant component of recovery management over the life of this recovery plan.

The “decision support system” that is being developed is both experimental and based on highly subjective input. The “decision support system” is clearly a research exercise and should be recognized as such, but the recovery of the desert tortoise should not depend on this experiment.

### **5.4 Implementation Teams**

Instead of providing recommendations for the agencies to use in their respective regions, the DRRP proposes adding yet another layer of regional stakeholder groups to the mix in the form of “Implementation Teams”.

“Implementation of this recovery plan throughout the four-state range of the desert tortoise is a daunting prospect. However, if approached from a regional or local level, recovery becomes much more possible feasible.” [Page 64]

The DRRP does not explain how the proposed implementation teams make recovery more feasible. It does not explain the difference between this proposal and the approach taken by the land management agencies in their regional planning efforts of the last decade and half. The DRRP also does not explain how, if these Teams are so important, why they aren't being implemented immediately? Are they incompatible with the recovery strategy of the 1994 Recovery Plan? It is not clear that public input will be allowed in this process. There is no provision for monitoring the progress of the Implementation Teams or holding them accountable.

The Implementation Teams will:

- Develop “step-down recovery-action plans” (DRRP at 57)
- Identify tortoise conservation areas (DRRP at 57)
- Refine and recommend the geographic baseline for measuring no net loss of habitat, (DRRP at 62)
- Define the number, size, and sampling frequency of demographic study areas (DRPP at 60)

The Teams will be composed of agency representatives, consumptive user groups, a conservation group representative, and a “representative of the science community”. The DRRP states, “Unless decisions are adopted by all relevant parties, the Recovery Implementation Team is not making progress.” and “Independent facilitation should be secured, if necessary.” These statements are admissions that the process is likely to be neither objective nor science-based. This is a serious problem. Even simple decisions become highly problematic when the fox is guarding the hen house. The FWS is effectively delegating responsibility for making significant recovery-related decisions to stakeholder groups that lack the ability or the drive to make those decisions. We have serious doubts, based on direct experience of working with stakeholder groups, that these teams will benefit recovery of the desert tortoise. On the contrary, they are the perfect vehicles for the agencies to continue to follow policies and management practices that are incompatible with desert tortoise recovery.

We see the costs of implementing this implementation team process of both time and money as yet another set back to tortoise recovery.

## **5.5 “Augmentation”**

Strategic Element 3 is to Augment Depleted Populations through a Strategic Program (DRRP at 33). In reality, although the DRRP uses the word strategic twice in the header, it provides no augmentation strategy. It simply discusses desert tortoise translocation and “head-starting” projects. There is no attempt made to even outline the scale of the intervention that would be required to make any difference on the ground. Augmentation simply comes across as a “feel good” measure thrown in by the authors of the DRRP.

The reason for having strategic element 3 is given as “Because of the intractable nature of discriminating specific effects of threats on desert tortoise populations, we are placing an emphasis on proactively bolstering populations where possible.” We have no idea what this means. Does the FWS expect that it can move in tortoises from elsewhere or breed so many tortoises that it can flood the habitat and overwhelm threat impacts? This is absurd.

Head-starting of desert tortoises is an expensive and very limited, research tool. The recent fiasco in the Superior-Cronese DWMA where a large number of resident tortoises were lost in association with the Fort Irwin translocation demonstrates that translocation is not the simple process that the DRRP portrays. Threats must be minimized in areas where augmentation is to be attempted prior to augmentation or the purpose will be defeated. The need to minimize threats is part of the reason why the few head-starting projects that have been initiated are located on military bases. Any attempt to try to increase tortoise numbers by adding tortoises without first dealing with existing threats will not aid recovery.

The DRRP needs to explain the goals, objectives and constraints of augmentation. There is no evidence that headstarting can be used to augment desert tortoise populations. There is no data relating to the fitness of head-started tortoise hatchlings. There is very little long-term data on the ability of translocation to augment populations either. Without setting goals and objectives augmentation is another interesting area of research but it is not a recovery action.

## **5.6 Conservation Areas**

The 1994 Recovery Plan had s recovery strategy based on “DWMA” management. After many years of effort, most of the agencies have finally established DWMA. However, in the DRRP, the DWMA have no apparent role. Instead the document talks about “conservation areas”. These areas are not defined but appear to be based on critical habitat and DWMA boundaries where they exist. The “conservation areas” appear to be DWMA stripped of their management prescriptions. Given the decline in the tortoise population since the tortoise was listed and since the 1994 Recovery Plan was produced, if the FWS thinks it needs to reduce management restrictions to get buy in then it needs to drastically expand the boundaries of the conservation areas to mitigate for this.

## **5.7 SAC and Need for Independent Scientific Review**

Again we repeat our request for the need for independent scientific review. If the Science Advisory Committee (SAC) is to advise the DTRO objectively and comment on the myriad, future planning exercises that would occur, it must be independent of the DTRO. If this can be done then all proposed sub-plans should be submitted for independent review.

## **6. Conclusions**

- The Draft Revised Recovery Plan should be extensively revised to incorporate a science-based recovery strategy and to reflect best available science.
- FWS should explain why designation of DPS was not been considered during the assessment process, as required by the 1996 DPS policy.

- Recovery Units should be identified objectively based on genetic, ecologic, behavioral, morphologic, and management/threat issues.
- Threat-based criteria must be added to the recovery goals and objectives.
- The Draft Revised Recovery Plan should focus on reserve level management.
- The Draft Revised Recovery Plan should provide lists of activities that should and should not be allowed to occur in desert tortoise habitat and in desert tortoise reserve areas. Specific recovery actions can always be changed later through adaptive management.
- The Draft Revised Recovery Plan should include a table with a side-by-side comparison of the 1994 and 2007 recommendations.
- The Draft Revised Recovery Plan should provide for independent scientific review, independent of the DTRO and other management agencies.

Because of the scientific disagreement over data evident in the Plan such as combining two ecologically, managerially, geographically, and genetically distinct recovery units into a single unit, the FWS should implement the section B. Special Circumstances section of the 1994 Interagency Cooperative Policy for Peer Review in Endangered Species Act. This states:

Sometimes, specific questions are raised that may require additional review prior to a final decision, (e.g. scientific disagreement to the extent that leads the Service to make a 6-month extension of the statutory rulemaking period). The Services will determine when a special independent peer review process is necessary and will select the individuals responsible for the review. Special independent peer review should only be used when it is likely to reduce or resolve the unacceptable level of scientific uncertainty. [FR59-3470]

In the interim, the 1994 Recovery Plan would continue to provide the valuable guidance it has provided since 1994.

Western Watersheds Project and California Turtle & Tortoise Club thank you for the opportunity to present comments on this draft. We hope that you will consider all our comments and work to revise the draft document accordingly, or better still abandon the process and simply augment the existing recovery plan using input from the SAC and independent peer review.

If you would like more information or have any follow up questions on these comments I am happy to help. Please feel free to contact me by telephone at (818) 345 0425 or by e-mail at <mjconnor@westernwatersheds.org>.

Sincerely,



Michael J. Connor, Ph.D.  
California Director

Western Watersheds Project  
Chairman  
California Turtle and Tortoise Club Executive Board

## References

- Baxter, P. C., Wilson, D. S. and Morafka, D. J. 2008. The Effects of Nest Date and Placement of Eggs in Burrows on Sex Ratios and Potential Survival of Hatchling Desert Tortoises, *Gopherus agassizii*. *Chelonian Conservation and Biology*. 7(1): 52–59.
- Booth, D.T. 2006. Influence of incubation temperature on hatchling phenotype in reptiles. *Physiological and Biochemical Zoology* 79:274-281.
- Britten, H. B., Riddle, B. R., Brussard, P. F., Marlow, R. and Lee, Jr., T. E. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in the northeastern Mojave Desert. *Copeia* 1997: 523-530.
- Carpenter, D. E., Barbour, M. G. and Bahre, C. J. 1986. Old field succession in Mojave desert scrub. *Madrono* 33(2):111-122.
- D RTPAC 2004. Desert Tortoise Recovery Plan Assessment (Working Draft, March 15, 2004). 148 pp.
- Edwards, T., Murphy, R., Berry, K. H. and McLuckie, A. 2006. Molecular Support for the Established Recovery Units in the Mojave Population of Desert Tortoises (*Gopherus agassizii*). Desert Tortoise Council Symposium Abstracts.
- FWS 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices.
- FWS 1996. Fish and Wildlife Service & National Oceanic and Atmospheric Administration, Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act. Federal Register. Vol. 61, No. 26. Wednesday, February 7, 1996
- Hastey et al. 1991. Compensation for the Desert Tortoise. A report prepared for the Desert Tortoise Management Oversight Group by the Desert Tortoise Compensation Team. Approved by the MOG in November 1991. 15 pp., appendices.
- Heaton, J. S. 2007. Distance Sampling Perceived Threat Data Analyses, Submitted to USFWS, 29 January 2007.
- McLuckie A. M., Lamb T., Schwalbe C. R. and McCord, R. D.. 1999. Genetic and morphometric assessment of an unusual tortoise (*Gopherus agassizii*) population in the Black Mountains of Arizona. *Journal of Herpetology* 33(1): 36-44.
- Murphy, R. W., Berry, K. H., Edwards, T. and McLuckie, A. M. 2007. A Genetic Assessment of the Recovery Units for the Mojave Population of the Desert Tortoise, *Gopherus agassizii*. *Chelonian Conservation and Biology* 6(2): 229–251.

Odenbaugh, J. 2001. Ecological Stability, Model Building, and Environmental Policy: A Reply to Some of the Pessimism. *Philosophy of Science*, 68 (Proceedings), pp. S493-S505.

Roberson, J. B., Burge, B. L. and Hayden, P. 1985. Nesting Observations of Free-living desert Tortoise (*Gopherus agassizii*) and hatchling success of eggs protected from predators. *Desert Tortoise Council Symp. Proc.* 1985: 91-99.

Spotila, J. R., Zimmerman, L. C., Binckley, C. A., Grumbles, J. S., Rostal, D. C., List, A. Jr., Beyer, E. C., Phillips, K. M. and Kemp, S. J. 1994. Effects of incubation conditions on sex determination, hatching success, and growth of hatchling desert tortoises, *Gopherus agassizii*. *Herpetological Monographs* 8: 103-116.

Zimmerman, L.C., O'Connor, M.P., Bulova, S.J., Spotila, J.R., Kemp, S.J., Salice, C.J., 1994. Thermal ecology of desert tortoises in the eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. *Herpetol. Monogr.* 8, 45-59.



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*Working to protect and restore Western Watersheds*

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November 14, 2007

Roy C. Averill-Murray  
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Desert Tortoise Recovery Office  
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Reno, NV 89502

Dear Roy:

On behalf of Western Watersheds Project and myself, here are my written comments on the October 16, 2007 Agency/Stakeholder Review Draft Revised Recovery Plan for the Mojave Population of the Desert Tortoise [hereafter referred to as Draft]. Some of these points I raised at the November 6, 2007 "Open House" that was held in Redlands, California.

Most desert tortoise biologists and agencies such as the California Department of Fish and Game recognize that the desert tortoise is a species in decline. In reclassifying from recovery priority number 8C down to 5C, the Service also appears to be recognizing that the desert tortoise is in a worse state than in was in 1994 [Draft at 1]. Clearly, then this is not the time to weaken agency management. To the contrary, this is the time to recommend tough, concerted action to recover the species. Unfortunately, the administrative draft does what many of us feared it would do when this process was begun and despite the decline of the species waters down the 1994 Plan's management recommendations. By dropping emphasis on reserve level "DWMA" management and failing to bolster the clear set of recommended and prohibited actions that were laid down in the 1994 plan, this draft document reduces agency accountability and in our opinion will set back desert tortoise recovery.

With respect to Recovery Plans, the Endangered Species Act states: "The Secretary, in development and implementing recovery plans, shall, to the maximum extent practicable—  
(B) incorporate in each plan  
(i) a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species;  
(ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and  
(iii) estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal." [ESA at Section 4 (f)(1)]

We are concerned that the draft plan fails to follow the ESA guidelines and relies almost entirely on what are in essence administrative remedies such as "adaptive management" or actions that are simply unproven research exercises such "augmentation". While a decision

support system/GIS database might satisfy the accounting needs identified by the GAO in its 2002 report, it is not a recovery action. The draft should be reworked to clearly identify the recovery strategy and to recommend specific management actions that are necessary to achieve the plan's goal for the conservation and survival of the species as required by the Endangered Species Act.

Below are specific comments that I have grouped loosely by topic and numbered for convenience.

1. **Recovery Objectives:** For the following reasons, we are concerned that the Recovery Objectives do not fulfill the ESA requirement that "Recovery Plans shall incorporate, to the maximum extent practicable... (ii) objective, measurable criteria which, when met, would result in a determination... that the species be removed from the list":

(a) The Recovery Objectives do not consider the population declines that have continued over the 18 years since the desert tortoise was listed. Given the declines portrayed in the Recovery Plan Assessment, even if the rate of population change ( $\lambda$ ) within each recovery unit were to exceed 1 over the next 25-years the population could still be significantly lower than in 1989 when the desert tortoise was listed. How could the species possibly be considered for removal from the Endangered Species list if it has not even recovered to the population density at its initial listing?

(b) The document argues that basing the criteria on trends has an important advantage over setting specific target numbers because "it accounts for ecological differences between geographic areas that may underlie different initial population levels in those areas. For example, historic natural population densities probably differed between the Upper Virgin River and Colorado Desert recovery units (USFWS 2006a), so a single target density would not apply to both areas." But following that logic, why does the Service not set targets for each recovery unit?

(c) Setting the population trend as the sole criterion and failing to take into account the degree of loss of the population biases the trend determination by starting at an unnaturally low density. Under this criterion, areas that have the capacity to support much higher densities could be delisted because they only have to show the same marginal trend as in areas with less capacity. Under the situation where a population is reduced to 10 tortoises per square mile, having 11 per square mile after 25 years could be enough to trigger delisting. The fact that the historic population in that area may have been 200 per square mile and thus the population has not recovered is simply ignored.

2. Page 36 states:

"Recovery Criterion 1. Rates of population change ( $\lambda$ ) for desert tortoises within each recovery unit are increasing over 25 years (a single tortoise generation).

Recovery Criterion 1a. The lower 90 percent confidence limit for each recovery unit estimate of  $\lambda$  based on data from range-wide monitoring efforts exceeds 1.

All size classes of tortoises must be well represented to ensure adequate recruitment.

Recovery Criterion 1b. The lower 90 percent confidence limit for each estimate of  $\lambda$  based on data from vital rates (recruitment, survival) from demographic study areas within each recovery unit exceeds 1.”

We are extremely concerned that the proposed statistical significance level would double the probability of making an incorrect call on recovery. The explanation given for DECREASING the confidence intervals to 90% in the Rationale on page 38 is woefully inadequate. If the Service is going to flaunt accepted scientific methodology it better have a scientific basis to explain why. It is precisely because natural variability in population densities is high (as is the case for most things biologists measure) that we use 95% confidence intervals so that we can reasonably draw sound conclusions from our data. Natural variability is not a reason to double the risk of reaching an incorrect conclusion. The document does not even explain how large a population increase or decrease is needed for the current methodologies to detect the trend at either the 95% or 90% confidence intervals.

3. The explanation of Recovery Objective/Criterion 1 in the rationale on page 38 is confusing and contains errors. If the Service is going to estimate  $\lambda$  from occupancy data it must explain how. The explanation given on page 38 is clearly incorrect. The paragraph states: “This objective and associated criteria emphasize increasing desert tortoise populations over 25 years (a tortoise generation). The approach taken by these criteria is to estimate population change ( $\lambda$ ) on a recovery-unit-wide scale through measures of population size, density, occupancy (probability that randomly sampled sites are occupied by the desert tortoise; MacKenzie et al. 2006).” It is axiomatic that the probability that a site is occupied must be less than or equal to 1. It can never be greater than 1. Presumably what was meant was some function of the rate of change in occupancy or  $\Psi$ ? The document is unclear as to which occupancy model would be used. The explanation should be corrected and the specific pages in MacKenzie’s book should be cited.
4. Page 36 states: “Recovery Objective 1 (Demography). All size classes of tortoises must be well represented to ensure adequate recruitment.”  
What does "well represented" mean? The plan should present hypothetical or actual demographic or size class data to establish an objective, measurable criterion.
5. Recovery Objective 2 (Distribution).
  - (a) The explanation given for DECREASING the confidence intervals to 90% in the Rationale on page 38 is woefully inadequate especially given the fact that the Service has not yet developed a formal occupancy model.
  - (b) While tortoises might occur throughout a recovery unit they are not distributed evenly and a recovery unit may include small to large “hot spots” such as the area in the West Mojave Recovery Unit where the DTNA is located. Occupancy may well increase throughout a Recovery unit as the tortoise recovers but the actual distribution across the

Recovery Unit may or may not change. I suggest rewording the first sentence of Recovery Criterion 2 from “Distribution of desert tortoises throughout each recovery unit is increasing over 25 years” to something like “Increases in tortoise populations are occurring throughout the recovery unit over 25 years”.

6. Recovery Objective 3 (Habitat) is to “Ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations.”
  - (a) Criterion 3a refers to “no net loss” of desert tortoise habitat within all existing desert tortoise conservation areas. Many of the conservation areas and critical habitats have significant inholdings of private land (good examples are the DTNA and the Red Cliffs Preserve). These inholdings threaten the integrity of conservation areas, and may have associated access issues that cause habitat fragmentation and other impacts. Land acquisitions for conservation purposes within these conservation areas should be considered a priority and should not be considered grounds for making other parts of the Recovery Unit available for disturbance. Without this assurance being added to 3(a), the objective to “Ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations” cannot be achieved.

- (b) Habitat loss is the most significant threat faced by both the desert tortoise and most listed species. This is an ongoing threat witness the recent expansion of Fort Irwin into 100 square miles of the Superior-Cronese DWMA. Slogans such as “no net loss” do not encapsulate this threat unless specific objectives are added. I suggest deleting the slogan or amending it to “no net loss of habitat from 1989 levels”. The revised draft should also recognize that for purposes of determining “no net loss” tortoise habitat is tortoise habitat regardless of whether it is privately or publicly owned.

- (c) If route restoration is considered in “no net loss” calculations, then the Service must also debit all those thousands of miles of cross-country tracks across habitat that were identified for example in Heaton, 2007.

7. Recovery Objective 4 (Threats).

- (a) Criterion 4 states that “Each plan or agreement must contain: a) explicit management actions to address threats to the persistence of desert tortoise populations within that recovery unit”. This criterion should be modified to take into account current USFWS practice. In so far as the Service now ignores recovery units for purposes of determining jeopardy and adverse modification during consultation, land use plans are reviewed by the Service based on impacts to the species and its habitat on a rangewide basis. The language in the draft needs to be strengthened to include specific recommendations for each Recovery Unit that can be reiterated by the Service during consultation.

- (b) The rationale section on page 41 is vague and ignores the fact that land managers can reduce (such as off road vehicle impacts) or eliminate entirely (such as livestock grazing) threats to the species. Instead it places a woolly emphasis on the need for more research. The objective and rationale should be rewritten and focused on reducing impacts from known threats.

## 8. Adaptive Management

(a) Adaptive management is an administrative tool to allow adjustments to be made to existing management actions and strategies as knowledge allows. It is not a recovery action in of itself.

(b) The proposal by the DTRO to collect and collate data on outcomes of recovery actions is commendable. Using this data to update recommended actions may also be useful. However, as the Draft points out on page 30, improvements in understanding and management will only occur over extended learning cycles. Given this, it is difficult for this reader (and I am sure for the general public) to understand why “Implement an Adaptive Management Program” is listed as a recovery action let alone Recovery Action number 1. There is also an accountability issue. The strategy provides no mechanism to obligate Federal agencies to implement these management improvements.

(c) The “decision support system” referenced on page 42 and throughout the document is clearly in the developmental stages. The output of the current version lacks objectivity. For example, the sample made available at the open house had threats ranked by stakeholder voting and is subjectively based. The “decision support system” is clearly a research exercise and should be recognized as such.

9. **Recovery Strategy:** The 1994 Recovery Plan described a strategy for the recovery and delisting of the Mojave population of the desert tortoise based on (1) identification of six recovery units within the Mojave region. (2) establishment of a system of DWMA's within recovery units, and (3) development and implementation of specific recovery actions within DWMA's. As with the current draft, it included adaptive management and pledged that the “recovery strategy will be revised as recovery actions are implemented and new information becomes available from research and monitoring.” [1994 Recovery Plan at 36]. The specific recovery actions were recommendations to minimize specific threats identified to the species and its habitat.

What is the recovery strategy in the revised plan? The Endangered Species Act requires that Recovery Plans incorporate “a description of such site-specific management actions as may be necessary to achieve the plan’s goal for the conservation and survival of the species”. The current draft revised plan takes the tack of either using a very general range-wide approach or proposes delegating planning for site-specific management actions to other entities such as implementation teams. Although ostensibly recognizing that there are distinct desert tortoise recovery units, the plan has apparently been devised without actual knowledge of how many recovery units there are - let alone what the differences are between them. How can this situation square with the ESA requirement for “a description of such site-specific management actions as may be necessary to achieve the plan’s goal for the conservation and survival of the species”?

10. The recovery strategy mentions 6 strategic elements: 1: Implement a Formal Adaptive Management Program; 2: Protect and Manage Existing Populations and Habitat; 3: Augment Depleted Populations through a Strategic Program; 4: Monitor Progress toward Recovery; 5:

Conduct Applied Research and Modeling in Support of Recovery Efforts within a Strategic Framework; 6: Develop, Support, and Build Partnerships to Facilitate Recovery. However, elements 1 and 6 are administrative actions and elements 3 and 5 are research items. Elements 2 and 4 are the key components that need to be emphasized in the plan.

11. In truth, the document doesn't just ignore the need for site-specific recommendations but tends to avoid making management recommendations. The livestock grazing section is a typical example of this. Section 2.17 states

“Grazing by livestock (cattle and sheep) affects desert tortoises through crushing of their burrows, destroying or altering vegetation (which may introduce weeds and change the fire regime), altering soil, and competition for food (Boarman 2002). Many cattle and sheep allotments have already been retired within desert tortoise habitat, but this action entails continued exclusion of livestock grazing by fencing, removing trespass cattle, retiring allotments, and prohibiting supplemental feeding, especially where it still occurs within tortoise conservation areas. More flexible grazing practices, such as allowing or reducing grazing during specific times of the year (e.g., after ephemeral forage is gone or winter only) or under certain environmental conditions (e.g., following a specified minimum amount of winter rain) would be most appropriate outside conservation areas, but should be used experimentally to investigate the compatibility of grazing with desert tortoise populations.”

The vague language in the draft is in stark contrast to the 1994 plan that specified that livestock grazing should be prohibited in the DWMA because it is incompatible with desert tortoise recovery and conservation. The draft revised plan avoids mentioning how much of the so called conservation areas are still grazed and it fails to explain why it is not recommending prohibiting the livestock grazing that is continuing on millions of acres of tortoise habitat in the conservation areas. The draft revised plan provides no science to indicate that things have changed (but it couldn't do so anyway since recent data lends more credence to the 1994 recommendations) so what is the basis for the 1994 management recommendation being watered down? The ESA requires the Service to use best scientific data available in making its decisions. The desert tortoise is clearly in a worse state today. This is not the time to relax management or make ambiguous recommendations.

12. “Action 2.11 Restrict competitive off-highway vehicle events within desert tortoise habitat” is another example of the watering down of management actions. Races are not allowed in the DWMA although some competitive events (poker rides) still occur in tortoise habitats in BLM administered land in California. However, the 1994 Plan proscribed noncompetitive as well as competitive motorized events in DWMA. Noncompetitive events such as “dual sport” rides may involve five hundred vehicles or more. Impacts from these events are similar to those described in the draft for competitive events - widening of routes, creation of new routes, camping and staging by race participants and observers in unauthorized areas, littering, and inability of event monitors to prevent unauthorized activities. I suggest the DTRO ask the Barstow Field Office for copies of their dual sport ride monitoring reports. Again, there is no explanation given in the draft as to why the 1994 recommendation has been watered down.

13. The Draft should be revised to emulate the 1994 Recovery Plan and list those activities that should and should not be allowed to occur in desert tortoise habitat and in the desert tortoise conservation areas. Specific recovery actions can always be changed later through adaptive management. In addition, a table with a side-by-side comparison of the 1994 and 2007 recommendations would be helpful.
14. The document needs to separate monitoring, recovery actions and research. Monitoring and recovery actions are required components of recovery plans [ESA at Section 4 (f)(1)]. Research activities are potentially very valuable but the outcomes of research projects are unknowns that may or may not be useful in recovery. The fact that the Service has still not, after all these years, resolved significant monitoring issues does not absolve it of its obligation to monitor recovery.
15. Figure 2. “Conservation areas within the range of the Mojave population of the desert tortoise.” The tortoise habitat layer cuts off 10 miles east of the western range. This area includes the BLM’s Mohave Ground Squirrel Conservation Area which in so far as it protects the ground squirrels should offer some protection to the tortoises there and should be included. The Mojave Monkeyflower ACEC in the Brisbane Valley is occupied tortoise habitat and also should be included.

**16. Livestock Grazing in the National Parks:**

(a) As explained in the draft (page 23), grazing still occurs on Mojave National Preserve. The National Park Service (NPS) intends to buy out the remaining allottees, however until this happens the NPS needs to manage grazing to avoid impairing recovery. Recovery Action 2.17 needs to recognize this and NPS should be added to the responsible party entry.

(b) Similarly, according to “Appendix C-1. Threat Layers Used in the DTRO Decision Support System” the NPS grazing allotments were omitted from the threat layers. This needs to be corrected. A simple table showing acreages grazed in DWMA, other conservation areas, and tortoise habitat could have clarified these issues.

17. Throughout the draft, reference is made to retired BLM grazing allotments. The BLM has not officially retired any of the grazing allotments in California identified in the NECO, NEMO and WEMO Planning efforts and my understanding from CDD staff is that this may not happen for years. I suggest the DTRO consult with the California Desert District Office over the appropriate language to use in the document.
18. A number of times in the draft document reference is made to augmentation of depleted populations using headstarting and translocation. This emphasis is both inappropriate and highly misleading to the public. There is no paradigm for augmentation of desert tortoise populations. There is no evidence that headstarting can be used to augment desert tortoise populations. There is no data relating to the fitness of head-started tortoise hatchlings. There is no long-term data on the ability of translocation to augment populations either. Augmentation is simply another interesting area of research. It is not a recovery action and cannot be considered as a ‘strategic element’.

19. The draft needs to take a more constructive approach in its review of the effects of prior management/recovery actions and acknowledge the slow response of desert habitat to disturbance. In addition to desert tortoise life history issues (as mentioned on page 5 of the draft) there is much evidence that should be mustered that relates to desert habitat recovery rates from disturbance. For example, 65 years after agricultural fields in the Lanfair Valley were abandoned, the creosote canopy is now nearly re-established, however, other species such as yucca are still absent (Carpenter et al., 1986). The point is, elimination or reduction of a threat such as livestock grazing or off-road vehicle use may remove direct impacts but indirect impacts may persist for many, many decades. Combining this information with the desert tortoise life history issues reinforces public understanding that the population may take many decades to respond to management changes.
20. If the Science Advisory Committee (SAC) is to advise the DTRO objectively (Draft page 43) it should be independent of the DTRO. Why then is it to be chaired by the DTRO (Draft page 30/31) and not independent?
21. It is already illegal to breed captive tortoises in California and the adoption and registration programs are administered by nonprofits organizations such as the California Turtle and Tortoise Club at nominal costs. It is not clear what additional measures are intended in section 2.4.3 (Draft page 46) but the draft should be very cautious in the language it uses with respect to captives. There is a large captive population of desert tortoises in California and Nevada. Any indication that tortoise ownership will be restricted may decrease registration rates and paradoxically could increase deliberate release of captives into the wild by owners concerned that animals may be confiscated at some future point.
22. The draft proposes regional Recovery Implementation Teams. Given the distinctive nature of the recovery units, why are these teams not recovery unit specific?
23. The desert tortoise was listed in 1989 in part because of a disease epidemic. A number of infectious and noninfectious diseases and pathogens have been identified since then. Despite the clear threat of disease to recovery there is no proposal for disease monitoring as a specific recovery action in the draft. The draft also fails to discuss quarantine measures that may be needed to keep outbreaks localized. There are a number of proactive and administrative measures that could be instituted such as temporary quarantine fencing and a moratorium on translocation.
24. **Global Climate Change:** The draft pays lip service to global climate change. Given the lengthy generation time of the desert tortoise this is a major shortcoming of this draft. There are a number of specific impacts that should be addressed. The recent Intergovernmental Panel on Climate Change Report documented changes and likely trends in precipitation and temperature in the desert southwest and identified a drying trend. The draft should review desert tortoise recovery in the light of this. Will all the Recovery Units be impacted in similar ways? How does climate change relate to achieving objective 3 (habitat)? How will climate change impact the constituent elements of desert tortoise critical habitat. Do we need to rethink critical habitat/DWMA boundaries? How does climate change relate to achieving

objective 1? Desert tortoises have environmental sex determination (Spotila et al, 1994). Will climate change influence desert tortoise demographics? How does climate change relate to the environmental stressor hypothesis; are desert tortoise populations likely to be more susceptible to disease outbreaks?

25. **Best Scientific Data Available:** The ESA requires that the Service utilize the best scientific data available in making its determinations. The current draft document lacks such fundamental data as the number and location of Desert Tortoise Recovery Units. Until that data is incorporated there is no basis for making site-specific recommendations that take into the account the genetic, ecological, and behavioral characteristics of the desert tortoises in the different the Recovery Units and the degree of impact posed by various threats therein. As is mentioned in the draft, the first rangewide genetic study of the desert tortoise since 1989 is in press and should be published in the next few weeks. That data has been presented to the scientific community on a number of occasions including at the Annual Desert Tortoise Council Symposium in 2006 (See Edwards et al, 2006). We expect, and the ESA requires, the Service to make full use of that data in developing the revised recovery plan.

Western Watersheds Project thanks you for the opportunity to present comments on this administrative draft. We hope that you will consider all our comments and work to revise the draft document accordingly. At the November 6, 2007 open house you mentioned that you expected to complete the “public draft” by the end of November. We do not believe the end of November deadline is realistic in view of both the incompleteness of the draft and our comments and concerns outlined above. Science not calendar considerations should determine the release date for the public draft.

If you would like more information or have any follow up questions on these comments I am happy to help. Please feel free to contact me by telephone at (818) 345 0425 or by e-mail at <mjconnor@westernwatersheds.org>.

Sincerely,

A handwritten signature in black ink that reads "Michael J. Connor". The signature is written in a cursive style and is underlined with a single horizontal line.

Michael J. Connor, Ph.D.  
California Science Director  
Western Watersheds Project

cc. USFWS: Steve Thompson, Paul Henson, Bob Williams  
CDFG: Becky Jones, Denyse Racine

## References

Carpenter, D. E., Barbour, M. G. and Bahre, C. J. 1986. Old field succession in Mojave desert scrub. *Madrono* 33(2):111-122.

Edwards, T., Murphy, R., Berry, K. H. and McLuckie, A. 2006. Molecular Support for the Established Recovery Units in the Mojave Population of Desert Tortoises (*Gopherus agassizii*). Desert Tortoise Council Symposium Abstracts.

Heaton, J. S. 2007. Distance Sampling Perceived Threat Data Analyses, Submitted to USFWS, 29 January 2007.

Spotila, J. R., Zimmerman, L. C., Binckley, C. A., Grumbles, J. S., Rostal, D. C., List, A. Jr., Beyer, E. C., Phillips, K. M. and Kemp, S. J. 1994. Effects of incubation conditions on sex determination, hatching success, and growth of hatchling desert tortoises, *Gopherus agassizii*. *Herpetological Monographs* 8: 103-116.