



U.S. Fish and Wildlife Service
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Desert Tortoise Science Advisory Committee Meeting
Meeting Summary
March 13, 2009
San Diego Wild Animal Park
Escondido, CA

Meeting Goals and Objectives

- Finalize SAC charter
- Refine disease white paper based on latest information
- Outline concepts/approach for implementing monitoring of demographic study areas (i.e., Recovery Criterion 1b)
- Brainstorm opportunities and new directions at the Desert Tortoise Conservation Center (in coordination with the San Diego Zoo, as new managers of the DTCC)

Attendees

Kristin Berry, SAC-USGS	Kim Field, DTRO
Peter Hudson, SAC-Penn State (chair)	Jody Fraser, DTRO
Earl McCoy, SAC-Univ. South Florida	Barbara Durrant, ZSSD
Kathy Ralls, SAC-Smithsonian Institution	Nadine Lamberski, ZSSD
Michael Reed, SAC-Tufts Univ.	Alan Lieberman, ZSSD
Bob Steidl, SAC-Univ. Arizona	Matt Milnes, ZSSD
C. Richard Tracy, SAC-Univ. Nevada, Reno	Jeff Opdyke, ZSSD
Roy Averill-Murray, DTRO	Bruce Rideout, ZSSD
Linda Allison, DTRO	Cindy Wallace, ZSSD
Cat Darst, DTRO	

Meeting Summary

The San Diego Wild Animal Park hosted the meeting at the Beckman Center, and several members of the Zoological Society of San Diego (ZSSD) participated.

1. SAC Charter

The SAC discussed changes in committee composition that will go into effect now that a draft revised recovery plan has been produced. The committee will subsequently be composed of scientists who have not played significant roles in Mojave desert tortoise research or management prior to accepting positions on the SAC as part of the recovery plan revision process. From this point forward, Dr. Berry and Dr. Tracy will no longer be members of the SAC, and the remaining members will retain their appointments. This will eliminate perceptions of conflicts of interest or undue influence of recommendations that could benefit ongoing research programs, while emphasizing the importance of soliciting diverse scientific expertise outside the desert tortoise research community. Importantly, the SAC is directed to closely coordinate with current desert tortoise researchers and other scientists as appropriate to topics under discussion. Furthermore, the SAC is encouraged to collaborate actively, including



soliciting funding, on new research projects of high recovery priority. Composition of the SAC will be re-evaluated concurrent with future five-year reviews of the recovery plan.

Action Item: DTRO will edit the draft charter to reflect the decision on membership and circulate to the SAC for review.

2. Disease white paper and recommendations

The disease white paper is considered generally complete with the recognition that management recommendations, particularly related to translocation warrant ongoing evaluation. There continues to be much scientific debate surrounding disease issues, but the SAC agreed that their responsibility was to consider the published literature on its own merits and not delve into ancillary arguments outside the published literature.

Most of the discussion centered around disease recommendations relative to translocation. As such, consensus (if not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing “good” habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of “depleted” (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations if the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition.

Modifications of the white paper include addition of a threshold within which tortoises to be translocated need not be tested for disease (i.e., lab tests of blood samples) if they lack clinical signs of infection. The SAC agreed that 5 km was a reasonable threshold for this purpose with the rationale that an individual tortoise interacts regularly with tortoises within and immediately adjacent to its home range and likely interacts occasionally with tortoises several home ranges beyond its own. A home range is considered here as the area occupied by an adult tortoise during a 1-2 year period, conservatively estimated as 5 ha, recognizing that tortoises use increasing areas over time. Five hectares per home range multiplied by 10 home ranges results in a 5km-radius area within which we expect tortoise contact rates to be high enough to warrant movement of tortoises without extensive laboratory diagnostic tests.

The topic of culling diseased individuals from natural populations was briefly discussed. Caution should be applied before using culling as a management action to deal with sick individuals in desert tortoise populations. For example, a large-scale field trial found that localized badger culling not only fails to control but also seems to increase tuberculosis incidence in cattle (Donnelly et al. 2003. Nature 426:834-837).

Action Items

- DTRO will outline key points made by the SAC regarding translocation.

- The SAC will expand upon the outline and produce a short white paper that describes their position on translocation.
- DTRO will edit the disease white paper according to the SAC's discussion and circulate to the SAC for review.

3. Monitoring for Recovery Criterion 1b

To summarize previous SAC discussions on this topic (especially on March 16-17, 2006, and February 10-11, 2007), demographic study areas (DSAs) are intended to be "signaling devices" of demographic processes underlying patterns observed through monitoring Recovery Criterion 1a (measuring population lambda extensively, but indirectly, through the range-wide distance sampling program). They should be representative of the recovery units (i.e., they should represent management occurring in the region, but they should not include intensive interventions such as headstarting/translocation - the intent is to monitor the "natural" demographic profile). They should be placed in areas where tortoises are currently known to be present in order to obtain sufficient sample sizes for demographic estimation, but logistical or financial reasonableness will also have to be considered. Any experimental areas (where intensive manipulation can occur, such as headstarting, supplemental watering, etc.) should be established separately from the DSAs. One objective of the DSAs is to document good recruitment. The challenge, based on difficulties of sampling juvenile tortoises, is how to best measure recruitment. The number (proportion) of juveniles estimated on a DSAs should represent that in a healthy population, but that number is not known. We should look for an "increasing proportion of juveniles" over the 25-yr period (juvenile = prior to sexual maturity = <180mm carapace length). Some size interval within the 30-180mm size class may be appropriate (e.g., 100-180mm) to maximize detectability in sampling.

General discussions at previous meetings suggested that to allow for 10% sampling error, $\leq 10\%$ of the DSAs within each Recovery Unit can fail to meet the criterion, PROVIDED that (1) all other recovery criteria are met, and (2) additional evaluation fails to identify some deterministic factor causing continual declines in any DSAs that fail to meet the criterion. With an expectation of a high degree of variation, we will need a lot of DSAs to maximize statistical power. The 25-year monitoring timeframe should be subdivided into 5-year increments, to allow for regular evaluation of potential trends. Identifying a minimum threshold below which stable populations are insufficient was not deemed necessary, because the cumulative set of recovery criteria should ensure that delisting only occurs when the populations are not at risk of extinction through random chance (i.e., populations maintained at a stable level so close to zero that they risk being extirpated by chance alone).

At the current meeting, it was agreed that existing study plots within each tortoise conservation area should be used as DSAs where possible and new plots designated where needed. The USGS habitat model may be useful in selecting additional DSA locations. The SAC reiterated that DSAs should be generally representative of habitat within tortoise conservation areas/recovery units, but population and sample size considerations will prevent plots from being randomly located across the landscape; this is not viewed as a problem because monitoring population lambda on DSAs is considered a confirmatory, back-up measure of Recovery Criterion 1a. Both impacted areas (where visible signs of recovery are especially expected to occur as recovery actions are implemented) and unimpacted areas should be included where possible. It may be

desirable or possible to identify adaptive management triggers whereby specific action would be recommended if population declines exceed some level between successive surveys. The SAC will continue this discussion at the next meeting.

4. Research opportunities/priorities at the DTCC and in coordination with ZSSD

ZSSD gave a presentation on their International Animal Care and Use Committee (IACUC) requirements that will be enforced for all activities occurring at the Desert Tortoise Conservation Center (DTCC).

With the ZSSD assuming management of the DTCC in collaboration with the DTRO, an opportunity exists to organize a team of pathologists, ecologists, physiologists, nutritionists, epidemiologists, and other specialists to identify priority projects and research funding. Workgroups will be formed to address the topics of disease and translocation, and potentially reproduction, nutrition, and studies of methodological techniques. Studying the total spectrum of diseases in tortoises at the DTCC and in the wild would allow for a more thorough risk analysis of particular diseases relative to each other and other threats. Focused long-term monitoring would help identify risk factors for negative outcomes and favorable conditions for positive outcomes. The disease workgroup will identify high-priority disease research projects in order to refine management recommendations for natural populations and translocation applications. The translocation workgroup will develop specific recommendations on this topic as described above. This group may also include a member of the IUCN Re-introduction Specialist Group.

Other research priorities should focus on how desert tortoise population dynamics are affected by changing anthropogenic and environmental factors. Translocation in depleted populations can be a tool for such studies. We need to recover data from past research and management activities where possible. Future manipulations (i.e., management activities) should be treated as experiments; effectiveness monitoring is needed to evaluate tortoise population responses. Surveying and monitoring projects, with consistent methods and data collection across the range, need to be used to create a spatial and temporal background against which to evaluate actions on the ground (apply adaptive management). The SAC would like to review the current range-wide monitoring data along with spatial layers of anthropogenic impacts and management actions. The SAC will also provide input and feedback on recovery action effectiveness experiments for the top-priority recovery actions identified during the regional Recovery Implementation Team process.

Action Items

- SAC, ZSSD, and DTRO initiate formation of a disease workgroup, development of projects, and searches for funding.
- SAC, ZSSD, and DTRO initiate formation of translocation workgroup, which will work on the translocation white paper described above.
- DTRO will organize spatial layers of anthropogenic impacts and management actions for SAC review with range-wide monitoring data.

Next meeting

The next meeting will be scheduled in approximately 6 months (August), potentially at the San Diego Wild Animal Park in Escondido. A spring meeting in 2010 is planned at the DTCC.