



**U.S. Fish and Wildlife Service**  
DESERT TORTOISE RECOVERY OFFICE  
1340 Financial Blvd., Suite 234  
Reno, Nevada 89502  
Ph: 775-861-6300 ~ Fax: 775-861-6301



**Desert Tortoise Science Advisory Committee Meeting**  
**March 16-17, 2006**  
**Tucson, AZ**

**Meeting Goals and Objectives**

- Review draft recovery criteria with respect to questions and comments from FWS staff

**Attendees**

Roy Averill-Murray, DTRO  
Kim Field, DTRO  
Sandy Marquez, DTRO  
Earl McCoy, SAC

Katherine Ralls, SAC  
Michael Reed, SAC  
Amy Salveter, DTRO  
Bob Steidl, SAC

**Meeting Summary**

This meeting focused on the SAC reviewing questions and comments from California-Nevada Operations staff on the draft objectives and criteria.

**Draft Recovery Objective 1:** Maintain well distributed, self-sustaining populations of desert tortoises into the future.

Draft Recovery Criterion 1a: The lower limit of the 90% confidence band around the slope of desert tortoise population growth rate ( $\lambda$ ), measured over a single tortoise generation (25 years), equals or exceeds 0 within each demographic study area.

Draft Recovery Criterion 1b: The lower limit of the 90% confidence band around the slope of desert tortoise density, measured over a single tortoise generation (25 years), equals or exceeds 0 within each demographic study area.

Draft Recovery Criterion 1c: The lower limit of the 90% confidence band around the slope of adult desert tortoise survival, measured over a single tortoise generation (25 years), equals or exceeds 0 within each demographic study area.

Draft Recovery Criterion 1d: The most recent five-year sliding average of desert tortoises below reproductive size (<180 mm carapace length) is at least 40% of the population age structure at the 90% confidence level within each demographic study area.

**Questions/Comments**

Criteria and rationale should be written to be “user friendly” and understandable to the public.

- The SAC concurs. Possibly write in scientific terms followed by explanation in “user friendly” terms.

Must the criteria be met for every “demographic study area (DSA)?”

- It is important to clarify initially that the species is in low numbers and declining in significant portions of its range; therefore, it is necessary to require criteria that show stable to increasing trends.
- DSAs are intended to be “signaling devices,” must be representative of the Recovery Units, and each DSA should be established with the expressed purpose to monitor trends.

- To allow for 10% sampling error,  $\leq 10\%$  of the DSAs within each Recovery Unit can fail to meet the criteria, PROVIDED that (1) all other criteria are met, and (2) additional evaluation fails to identify some deterministic factor causing continual declines in any DSAs that fail to meet the criteria.
- By incorporating interim evaluations (every 5 years) during the required 25-year period, it will be possible to statistically determine the probability of consecutive 5-year declines in the same DSA. This will better allow FWS to identify real declines versus statistical anomalies.

Is a “single tortoise generation (25 years)” necessary to monitor the parameters?

- Yes, one generation (25 years) is a biologically sound timeframe, however, any unusual increase or decrease within this timeframe should lead to reevaluation.
- As indicated above, the 25-year monitoring timeframe should be subdivided into 5-year increments, to allow for regular evaluation of potential trends.

Is the statistical power for these criteria acceptable? What about 80%? What is the consequence of being wrong?

- Statistical power will be re-evaluated when data are analyzed. With an expectation of a high degree of variation, we will need a lot of DSAs to maximize statistical power.
- The most serious consequence of being wrong would be to delist the species when recovery has not been achieved. The burden of proof is to demonstrate that the species is recovered (the precautionary principle).

Is it reasonable to expect the 40% proportion of juveniles required by Criterion 1d to be measured with 90% confidence over 5 years?

- The point is to document good recruitment. The challenge, based on difficulties of sampling/detecting juvenile tortoises, is how to best measure recruitment.
- 40% may not be realistic to measure; the number (proportion) should represent that in a healthy population, but that number is not known.
- Replace % with “increasing proportion of juveniles” over the 25-yr period (juvenile = prior to sexual maturity =  $< 180\text{mm}$  carapace length). Some size interval within the 30-180mm size class may be appropriate (e.g., 100-180mm) to maximize detectability in sampling. Evidence of positive recruitment may be all that can be hoped for with a recruitment criterion, due to sampling variability and detectability of small tortoises.
- This criterion may need to be made provisional, with a recovery task to refine the criterion through study. We need to estimate the stable age distribution, then a possible criterion would be based on the “proportion of juveniles being higher than the proportion indicated in a stable age distribution model.”

Is there a minimum threshold for demographic parameters below which stable populations are insufficient?

- Identifying a minimum threshold is not 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).

Should the demographic study areas be relatively hands-off?

- Yes. They should be representative of what's happening on the landscape, and should represent any 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.
- Experimental areas should be established separately from the demographic study areas, where intensive manipulation can occur, such as headstarting, supplemental watering, etc.

**Draft Recovery Objective 2: Maintain a broad and stable-to-increasing distribution of desert tortoises within each recovery unit (note that recovery units remain to be evaluated).**

**Draft Recovery Criterion 2a:** The lower limit of the 90% confidence band around the slope of desert tortoise occupancy across all public lands and private conservation lands below 4200-foot elevation in each recovery unit, measured over a single tortoise generation (25 years), equals or exceeds 0.

**Draft Recovery Criterion 2b:** The lower limit of the 90% confidence band around the slope of desert tortoise occupancy within each "geographic area" within each recovery unit, measured over a single tortoise generation (25 years), equals or exceeds 0.

#### Questions/Comments

How will "geographic areas" be defined?

- This does not really matter, because the intent is simply to ensure that the broad distribution of tortoises is not further reduced. "Geographic areas" could be defined based on the future habitat model or current patterns of tortoise distribution.

Given Criterion 2b, do we need Criterion 2a?

- No, but Criterion 2a is useful for emphasis and to illustrate the scale issue.

Do we want to establish "trigger points" below which more intensive management actions would be required?

- This should not be necessary with the incorporation of regular 5-year review and evaluation. *This review cycle is critically important.* Management should be adjusted, as necessary, based on these reviews. A 5-year review cycle is consistent with the required 5-year recovery plan review schedule and will benefit both managers and stakeholders by providing regular feedback on the effectiveness of management actions, regulation, etc.

We may need to better understand population "clumps" to design effective sampling strategy to obtain precise estimates of occupancy. Random sampling within crude stratification may minimize sampling problems with patchy distribution.

- The sampling design needs to be random across the RUs for occupancy across the landscape. Stratification is good, but it MUST be true stratification based on landscape attributes associated with clumps (if known), NOT just based on where known clumps of tortoises are.
- Research is needed identify features that cause clumping; clumping is important to understand.
- If we cannot do true stratification at this time, then random sampling is best, combined with analysis every 5 years for indicators for stratification.

**Draft Recovery Objective 3:** Ensure that enough habitat within each recovery unit is protected to allow long-term viability of desert tortoise populations.

**Draft Recovery Criterion 3a:** A GIS habitat model has been developed to identify minimum requirements for desert tortoise population persistence.

**Draft Recovery Criterion 3b:** A habitat-tracking system, based on the habitat model in Criterion 3a, is in place and implemented to monitor the status of desert tortoise habitat across the tortoise's range.

**Draft Recovery Criterion 3c:** The quantity of desert tortoise habitat is maintained with no net loss across the species' range, and the condition of tortoise habitat within demographic study areas is demonstrably stable or improving.

Questions/Comments

What about parcels within larger developed areas (e.g., HCPs)?

- HCPs should fit within the “no net loss” of habitat criterion.

What is the relationship of these criteria to critical habitat? Should sampling occur outside critical habitat?

- The GIS model to identify minimum requirements for desert tortoise persistence will be used to determine where “habitat” occurs on the landscape (and will test the existing “critical habitat model”). If “habitat” occurs outside of critical habitat, then it should be subject to Objective 3 (and Criterion 3c).

How much habitat is enough? Is “no net loss” of habitat realistic? Biologically necessary in all areas? ID areas where no net loss is of greatest importance vs. where there is more flexibility?

- We do not know how much habitat is “enough,” and in the face of uncertainty and already reduced populations and habitat, the working premise is *status quo or better*.
- The SAC does not want to get into directing on the landscape how Criterion 3c (“no net loss” of habitat) should occur. Given the premise stated above, identifying compromises for areas in which to allow a net loss of tortoise habitat is more of a political process than a scientific one.

Edit Recovery Objective 3 to read: “Ensure that habitat within each recovery unit is protected to allow long-term viability of desert tortoise populations.” (removed “enough” habitat)

Edit Criterion 3a to read: “A GIS model has been developed to identify desert tortoise habitat and non-habitat.”

Edit Criterion 3c to read: “The quantity of desert tortoise habitat across all public lands and private conservation lands under 4200-foot elevation is maintained with no net loss, and the condition of tortoise habitat within demographic study areas is demonstrably stable or improving.”

**Draft Recovery Objective 4:** Threats to desert tortoise population persistence are sufficiently mitigated to ensure the continued existence of the species.

**Draft Recovery Criterion 4:** Management plans or cooperative agreements have been implemented within each recovery unit to ensure the maintenance of Recovery Criteria 1-3.

Each plan or agreement must contain: a) explicit management actions that reflect the risks facing desert tortoise population persistence within that recovery unit, b) management strategies that ensure that the plan is evaluated and revised regularly, c) a system to track the implementation of management actions, and d) assurances that the plan will be implemented.

#### Questions/Comments

- Need information to better understand threats.

#### Field Trip

Bob Steidl and his grad student, Erin Zylstra, led a field trip to Saguaro National Park on the afternoon of March 17. Erin is studying differences in sampling and monitoring desert tortoises by 1) conducting line distance sampling and 2) surveying small plots to estimate occupancy across the same area. The group discussed Erin's preliminary findings and plans for additional work and evaluation. The study will be directly applicable to monitoring the Mojave population in order to document progress in meeting the recovery criteria identified by the SAC. To further extend this work and to provide more specific direction to the monitoring program, Roy, the DTRO's future Monitoring Coordinator, Earl, Michael, and Erin will be attending an Occupancy Estimation and Modeling workshop during May 31-June 2.

#### Action Items

The DTRO will revise the draft recovery criteria and associated rationale to make them more understandable to the lay public.

#### Next Meetings

- The next meeting will be held in conjunction with the Desert Tortoise Monitoring Committee on June 29-30 at the USGS office in Henderson, NV.
  - Objectives will include reviewing the draft recovery criteria with the Monitoring Committee; revisiting, clearly establishing, and prioritizing monitoring objectives, including scope and scale issues; and identifying the necessary elements of a monitoring strategy to meet those objectives.
  - Final adjustment to the draft recovery criteria following this meeting will lead to an open forum with the SAC, Desert Tortoise Management Oversight Group, and stakeholders to discuss the draft criteria. This forum would be held in Las Vegas.
- Future tasks include 1) outlining research needs as recovery actions (including guidance on captive propagation and headstarting), 2) specifically addressing disease issues (both research needs and management actions based on current knowledge), and 3) reviewing and delineating revised recovery units.