



Solar Energy Development and Desert Tortoise Translocation Protocols

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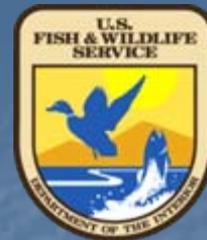
Desert Tortoise Recovery Office



Translocation

■ DRECP Science Advisors (Oct 2010)

*In general, moving organisms from one area to another—for example, out of an impact area into a reserve area—is not a successful conservation action and **may do more harm than good** to conserved populations by spreading diseases, stressing resident animals, increasing mortality, and decreasing reproduction and genetic diversity. Transplantation or translocations should be considered a **last recourse** for unavoidable impacts, should never be considered full mitigation for the impact, and in all cases **must be treated as experiments** subject to long-term monitoring and management.*

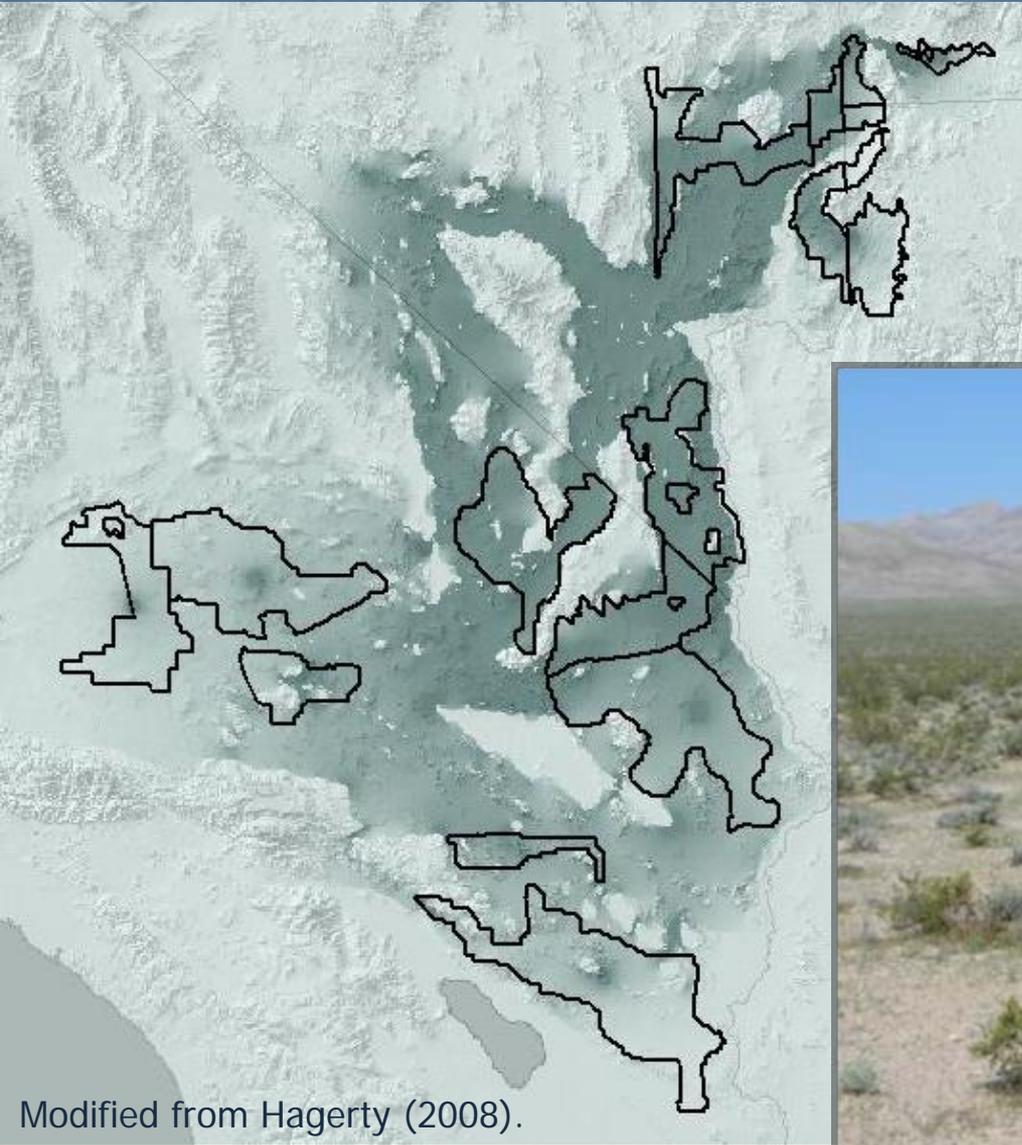


Development Issues

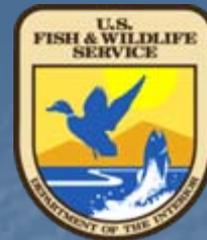
- Project site
 - Location
 - Abundance estimation
- Translocation
 - Efficacy
 - Recipient site
 - Health and disease
 - Timing



Population connectivity



Modified from Hagerty (2008).



Abundance Estimation

- Cryptic behavior (up to 95% time underground)
- Low densities (as low as 1.2 adults/sq. km in some critical habitat units)
- Patchy (uneven) distribution
- Intensive survey effort (100s km of transects needed to obtain adequate sample size)

Translocation



- Short-term studies show promise
- But ... experimental
- Ongoing research

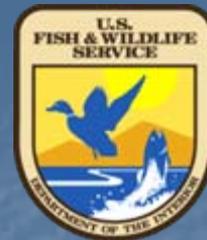


Data Quality



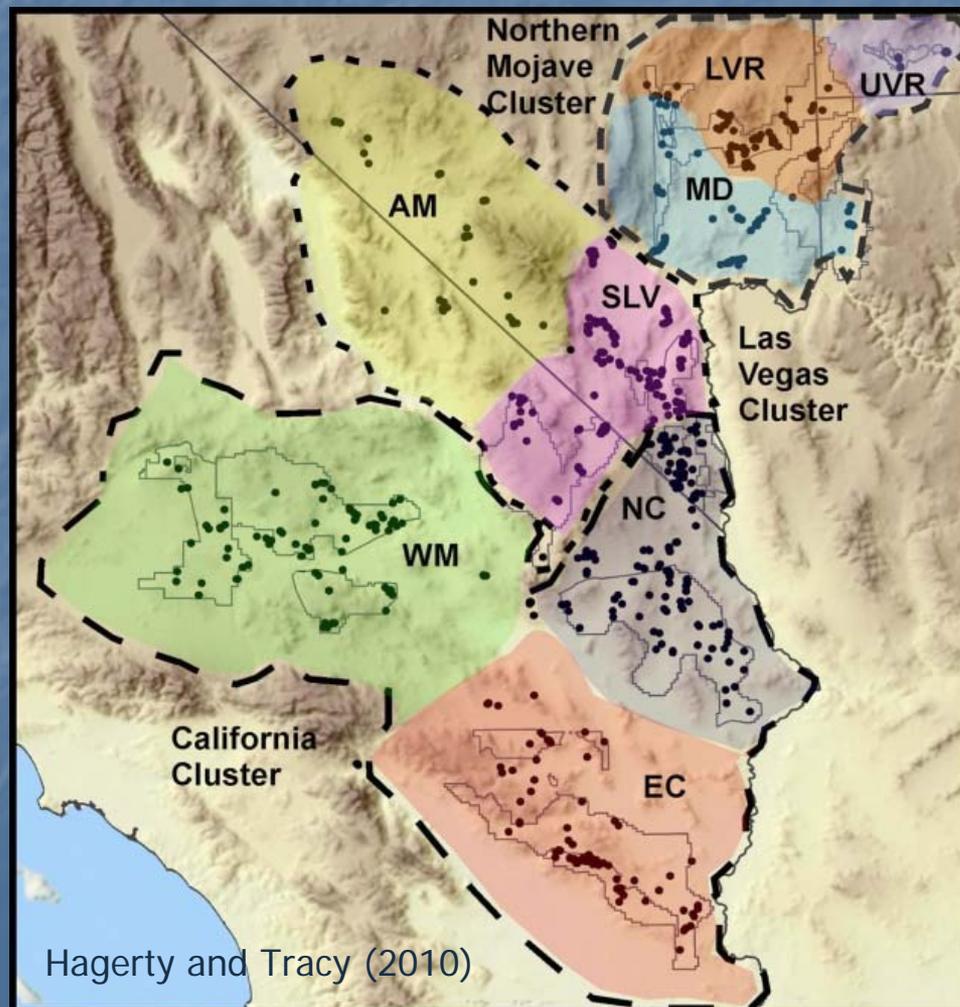
- Qualifications
- Standardized data



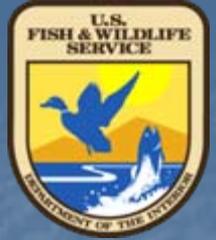


Recipient Site

- Genetics
- Carrying capacity



Recipient Site



- Proximity to habitat impacts
- Long-term protection



Health and Disease



- URTD + other health conditions
- Project site + Recipient site + Control site



Disease Diagnostics



- Specialized training
- Standardized across range/
multiple projects

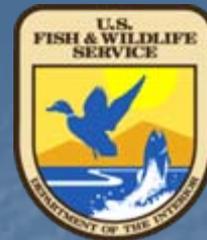


Disease Uncertainties



- Imperfect diagnostics
- Removal of tortoises with antibodies?

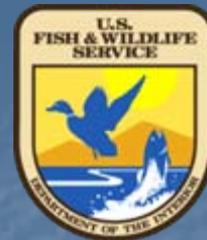




Disease Detection

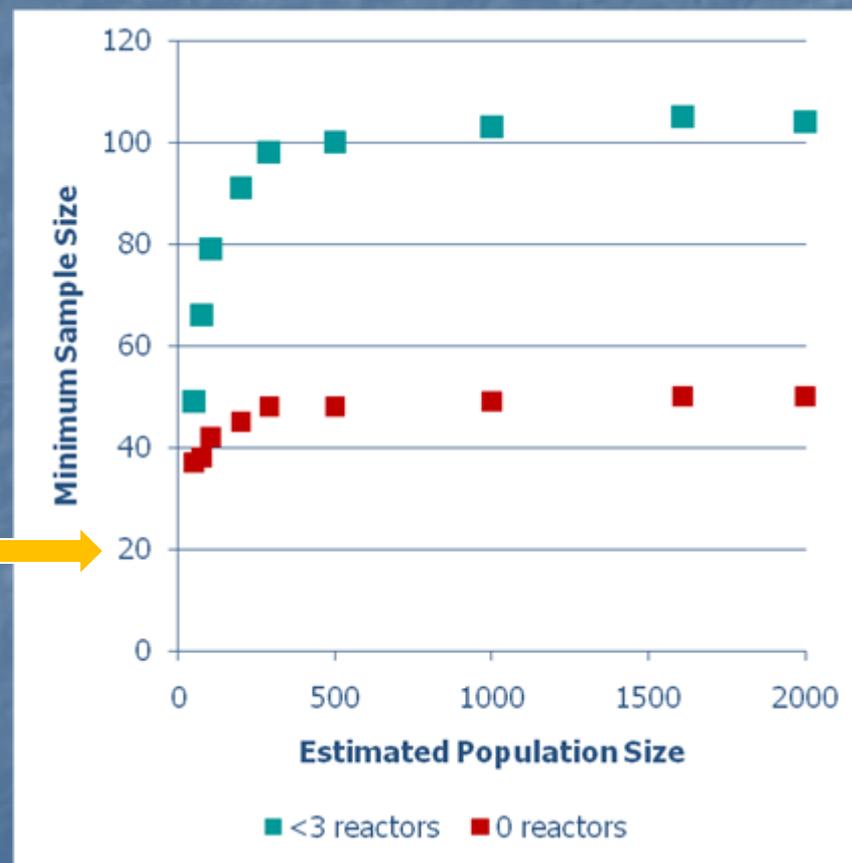
- Intensive survey effort
 - ~3600 acres
 - ~450 km to detect ≥ 20 tortoises for abundance estimation
 - Estimate ~290 tortoises
 - Need 48 tortoises (all negative) to ensure population is disease-free





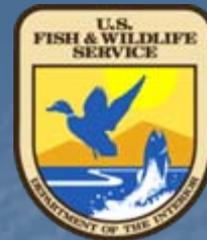
Disease Detection

- Number of samples required
 - 95% confident that disease prevalence is $\leq 5\%$ in the population



Waiting for Health Results





Conclusion

- Project siting
 - Abundance estimation
 - Population connectivity
- Translocation
 - Efficacy
 - Recipient site
 - Health and disease
 - Timing



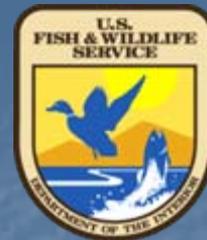


SAC "hierarchy of preference"

1. Distributed solar development proximate to energy consumers
 2. Utility development on previously disturbed lands
 3. Development of occupied DT habitat outside of conservation areas and associated habitable matrix
 4. Development of "softer" footprints within occupied DT habitat (research)
- ...

Softer footprint?





SAC "hierarchy of preference"

1. Distributed solar development proximate to energy consumers
2. Utility development on previously disturbed lands
3. Development of occupied DT habitat outside of conservation areas and associated habitable matrix
4. Development of "softer" footprints within occupied DT habitat (research)
5. Development of occupied habitat w/ **translocation** to depauperate populations (research)
6. Translocation to currently occupied habitat not recommended

