



2012
DESERT TORTOISE
MONITORING HANDBOOK



Recommended citation:

US Fish and Wildlife Service. 2012. 2012 Desert Tortoise Monitoring Handbook. Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada. Version: 25 February 2012.

ACKNOWLEDGEMENTS

This is the most recent incarnation of handbooks that have been used each year of the range-wide monitoring program. The University of Nevada, Reno and their collaborators at the U.S. Geological Survey were involved in earlier versions of the Handbook. Rohit Patil (UNR) updated data collection verification procedures for the 2012 field season and helped prepare related updates in this handbook.

2012 DESERT TORTOISE MONITORING HANDBOOK

Prepared by **Linda Allison**
Desert Tortoise Monitoring Coordinator
U.S. Fish and Wildlife Service

TABLE OF CONTENTS

Introduction.....	1
1. Distance Sampling And Desert Tortoises	3
Objective 1: Understanding How Data Collection Affects Precision and Bias of the Density Estimate	4
Objective 2: Understanding How Different Types of Field Data Contribute to Calculation of the Density Estimate	5
2. Desert Tortoise Handling	9
Objective 1: Compliance with State and Federal Desert Tortoise Handling Protocols.....	10
Objective 2: Accurately Measure, Mark, Identify the Sex of Tortoises, and Report their Health Status	12
Approaching and collecting data on desert tortoises	16
3. Compass and Navigational GPS	18
Objective 1: Basic Understanding of GPS.....	19
Objective 2: Understanding Compass Basics	25
4. Electronic Equipment Care and Maintenance.....	30
Objective 1: Understanding Basic Juno operations	32
Objective 2: Built-In GPS settings	39
5. Line Distance Protocols	43
Objective 1: Apply the Search and Detection Technique.....	45
Objective 2: Start and Complete Transects to Optimize Tortoise Detections.....	45
Objective 3: Measure the Local Bearing of a Transect and the Azimuth and Radial Distance to each Tortoise.....	48
Objective 4: Implement Appropriate Techniques for Standard 12km Transects	49
Objective 5: Implementing Protocols for Non-Standard Transects.....	52
6. Radio Telemetry and G ₀ Protocols	58
Objective 1: Locate Tortoises and Collect Activity Data	59
Objective 2: Implement the Daily G ₀ Protocol.....	70

7. Data Collection and Verification	72
Objective 1: Understanding of Database Structure	74
Objective 2: Working with Database Records.....	82
Objective 3: Understanding How to Enter Data on Juno	87
Objective 4: Using Built-In GPS and JUNO Together.....	88
Objective 5: Limit and Correct Data Entry Errors.....	92
Appendix I: Annotated Paper Data Sheets.....	95

INTRODUCTION

The overall goal of the USFWS recovery plan for the desert tortoise is the recovery and delisting of the tortoise. This monitoring project contributes annual population density estimates of the Mojave population of the desert tortoise - information that the USFWS will use to assess the status of the tortoise at various stages during recovery.

The original recovery plan (U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 73 pages plus appendices.) requires for delisting that “As determined by a scientifically credible monitoring plan, the population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years....” The recovery plan is currently under revision; the draft revised version includes a similar recovery criterion.

The USFWS coordinates this monitoring program to

- 1) Collect data range-wide that are scientifically credible,
- 2) Use these data to develop accurate and precise estimates of population densities in each recovery unit, and then
- 3) Update the design and annual implementation of this project to allow detection of meaningful population recovery after 25 years.

Training outlined in this manual addresses the specialized skills required to collect these data. Desert tortoise population monitoring relies on distance sampling to annually estimate the number of tortoises in managed areas of the Mojave Desert. Distance sampling has been implemented in a variety of settings; this project trains crews in the general approach to distance sampling as well as the specifics of how this is implemented for desert tortoises. Each chapter in this Handbook addresses a focal issue, stating the training objectives and standards, and providing written reference material. The following definitions apply:

Objective: statement of aim or purpose to be pursued; a priority, or an end, towards which significant effort is directed.

Standard: Statement of the necessary activities required to meet specific training objectives. By the end of training, each crew member should feel confident in their performance of these standards.

Metric: Quantitative or qualitative means used to gauge success or failure in performance. By the end of training, instructors will have evaluated all trainees using these metrics.

2011 MONITORING HANDBOOK