

# CLEARANCE SURVEY PROTOCOL FOR THE MOJAVE DESERT TORTOISE

## 1. Objectives

- Locate as many desert tortoises as possible within the project site.
- Remove all desert tortoises encountered from the project site.
- Safely excavate, collect, and rebury desert tortoise eggs.

## 2. Applicability of Clearance Surveys

For projects located in occupied desert tortoise habitat (as evidenced by presence of live tortoises or recent sign), especially those projects with a permanent or linear disturbance (*e.g.*, pipelines, roads, transmission lines), a clearance survey may be required as part of the conditions of a biological opinion or incidental take permit. This survey is intended to reduce the likelihood that desert tortoises are killed or injured as a result of the proposed action. Clearance survey methods may include temporarily penning desert tortoises within the area surrounding its burrow, moving desert tortoises out of harm's way a short distance from the impact area, or translocating desert tortoises to a designated area outside its home range in accordance with a USFWS-approved translocation plan. Note that it is the project proponent's responsibility to obtain all other necessary authorizations from the applicable State wildlife agency and land management agency.

## 3. Methodology

Clearance surveys require 100% coverage of the project area, with a focus on locating all desert tortoises above and below ground within the project area. This survey should be conducted immediately prior to surface disturbance at each site within the project area or following construction of a desert tortoise-proof fence encompassing the project area that would ensure that tortoises cannot enter the project area after clearance surveys are completed.

Clearance surveys at the project site must consist of at least 2 consecutive surveys of the site, the second walked in a perpendicular direction to the first. Surveys will involve walking transects less than or equal to 15-ft (5-m) wide under typical conditions. In areas of dense vegetation or when conditions limit the ability of the surveyor's to locate desert tortoises, transects should be reduced in width accordingly. Clearance surveys should be conducted when desert tortoises are most active (April through May or September through October). The ultimate number of surveys required may depend on the scale of the project and the number of tortoises found on the last survey.

Desert tortoises often pace along new fences attempting to gain access to the other side or return to areas from which they were removed. After the desert tortoise exclusion fence has been installed, the fencing should be checked several times a day when temperatures are expected to exceed 95°F (35°C) to ensure tortoises are not trapped within the fence or are fence-walking; these animals may be exposed to lethal temperatures. If a suspected hyperthermic tortoise is found along a fence and temperatures are above 95°F (35°C), the tortoise should be moved to a climate-controlled area and re-hydrated.

All methods used for handling desert tortoises during the clearance surveys must be in accordance with the USFWS Desert Tortoise Field Manual or project-specific guidance contained in a biological opinion or incidental take permit. Anyone that handles desert tortoises during clearance activities must have the appropriate authorizations from USFWS.

During the clearance surveys, desert tortoises in burrows may be removed through tapping (Section 4) or careful excavation. Multiple visits may be necessary if desert tortoises are inaccessible in deep caves or burrows. During all handling procedures, desert tortoises will be treated in a manner to ensure that they do not overheat or exhibit signs of overheating (*e.g.*, gaping, foaming at the mouth, etc.), or are placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises will be kept shaded at all times until it is safe to release them. Ambient air temperature will be measured in the shade, protected from wind, at a height of 2 in (5 cm) above the ground surface. All clearance activities must be conducted under appropriate temperatures specified in the translocation guidance.

The area cleared and number of desert tortoises found within that area must be reported to the local USFWS and the appropriate State wildlife agency. The report should be made in writing, either by mail or email. Notification must be made in accordance with the conditions of the biological opinion or incidental take permit.

If a desert tortoise is encountered after clearance surveys have been completed, process the tortoise according to the methods described above.

## 4. Extracting Desert Tortoises from Burrows

Before touching a desert tortoise or using any instrument that comes into contact with a desert tortoise, implement procedures described in the USFWS Desert Tortoise Field Manual (Chapter 7). Examine the burrow for other occupants (*e.g.*, snakes, spiders, scorpions, wasps, Gila monsters, etc.). Firmly, pound the soil at the side of the “apron” or soil mound at the entrance of the burrow 5 to 6 times with an open hand then listen for desert tortoise movement; wait 30 seconds and repeat several times if repeat several times if the tortoise does not readily emerge. Avoid disturbing or pounding the center of the apron or entrance of the burrow where desert tortoises typically dig nests and lay their eggs. If the desert tortoise is visible deep in its burrow, the observer can gently tap the carapace 3 to 4 times with a stick (Medica et al. 1986). The observer should then remove the stick and move away from the burrow entrance. If tapping is successful, the desert tortoise will emerge, usually to the burrow entrance. If desert tortoise movements are not heard within a few minutes, discontinue tapping.

If the desert tortoise is within arm’s reach, firmly grasp the gular, plastron, or posterior edge of the carapace and gently pull the tortoise towards the burrow entrance. If the desert tortoise resists to the point where moderate pulling effort is unsuccessful, stop pulling while maintaining a grip on the tortoise; resume when the tortoise relaxes. Never use a hook or other instrument to remove a desert tortoise from a burrow or otherwise compromise the integrity of a burrow if the desert tortoise will remain in the project area.

If the area is to be cleared of all desert tortoises, excavate the burrow as described in Section 5. If the tortoise is in a deep caliche cave which cannot be excavated without potentially harming the desert tortoise, record the location and coordinate with the USFWS for further instructions.

## 5. Excavating Burrows

Desert tortoise burrows should be excavated only if they occur within a proposed disturbance area. As an alternative to excavation in certain circumstances, the immediate area surrounding a burrow occupied by a desert tortoise may be temporarily penned, if authorized by the USFWS and the appropriate State wildlife agency (Section 9).

Before excavation, feel for desert tortoise eggs by gently probing the soil in front of the burrow opening (*i.e.*, the mound) with a blunt instrument (*e.g.*, knitting needle) or similar instrument, and along the floor of the burrow as you excavate the burrow. The purpose of probing is to locate areas of excavated soil that are less compacted and may indicate a nest. Eggs have been found up to 6 ft (1.9 m) in front of burrow openings and up to 6 ft (1.9 m) within the entrance of a burrow; they may also occur in the mound at the burrow opening. To avoid crushing eggs, do not scrape the shovel across the bottom of the burrow, but continue to probe the area with your fingers as you proceed. Removal of the top 10 in (25 cm) of soil (or until a hard layer of soil is encountered) will typically ensure that you find any desert tortoise eggs. Be particularly careful from late April to mid-October when eggs are most likely present. If found, follow the USFWS's egg handling protocol (Section 6).

Excavators should wear leather or cloth gloves during burrow excavation to avoid being bitten or stung by venomous animals. Use blunt-nosed shovels or garden trowels. The preferred method involves two individuals, each with a shovel, to excavate a burrow. Place a shovel in the burrow entrance, or garden trowel for small burrows, and slice away the ceiling with the second shovel or trowel. Remove the soil with the first shovel or trowel as excavation proceeds and repeat. Excavate the burrow slowly and carefully and stop often to see if a desert tortoise is within reach. Do not collapse the burrow ahead of the shovel or trowel inside the burrow. You should feel the shovel contact the other shovel with each stroke to avoid striking a desert tortoise. It may take several minutes or several hours to excavate a desert tortoise burrow, depending on its length and other characteristics.

Always excavate the burrow to its absolute end(s), and then excavate an additional foot-or-so (0.3 m) of harder soil beyond the suspected end to ensure that a desert tortoise is not behind a dirt plug or mound. Search all side tunnels within the burrow for desert tortoises, especially in kit fox dens. If a desert tortoise is found, do not assume that it is alone. After removing the first desert tortoise encountered, return to the burrow and continue to excavate it looking for additional desert tortoises. After excavating the burrow, leave it collapsed so that no desert tortoise may reuse it easily.

When excavating a burrow, stop digging when a desert tortoise is encountered. If during the less-active period for desert tortoises (*i.e.*, during July - August, and November - February; in Arizona the less-active period may begin in late May or June), relocate the desert tortoise to

another suitable burrow and contact the USFWS for additional guidance and coordination. If it is during the most-active period (*i.e.*, when desert tortoises are most likely above ground; March - June, and September - October), place the desert tortoise in the shade of a shrub or near other natural cover sites (Section 7).

## 6. Nest and Egg Handling Protocol

Desert tortoises may lay eggs during the months of May through July and usually hatch July through October. Some eggs may not hatch, or hatchlings may not emerge until the following spring. Because desert tortoise eggs are also protected by the Endangered Species Act, examine burrows with evidence of digging in the burrow floor to look for eggs. Desert tortoise eggs will be moved to a similarly constructed artificial nest in the wild or to a USFWS-approved facility. If you encounter unemerged hatchlings, release into an unoccupied burrow in the wild unless otherwise directed by the USFWS.

Any nest that is found will be carefully excavated by hand at a time of day when the air temperature 6 in (15 cm) above the ground is approximately equal to the soil temperature at egg level. Excavate suspected nests by hand. Disposable rubber or latex gloves must be worn when marking and handling eggs. Before disturbance of nest contents, each egg will be gently marked with a small dot on the top using a felt-tipped pen to establish the egg's orientation in the nest. In handling nest contents, eggs must be maintained in this orientation at all times. Because egg shells become extremely fragile in the last few weeks before hatching, special care will be taken with eggs found from August to mid-October. Because the egg is very fragile, it may break during handling; this will be lethal to the developing tortoise inside. Broken eggs will be buried nearby and left in the field, or the contents preserved and made available for research projects. Report broken eggs to the USFWS and appropriate State wildlife agency as required for tortoise mortalities.

Measure and record the depth of the nest below the soil surface and the position of the nest relative to the burrow entrance (or other shelter cover). Place approximately 1 in (2.5 cm) of soil from the nest area in a bucket and carefully transfer the eggs to the bucket, maintaining egg orientation. Gently cover the eggs with soil that is free of cobbles and pebbles, to a depth equivalent to that of the original nest.

A nest will be prepared at the release site with the same depth and location in relation to the burrow entrance as the original nest. The eggs will be transferred to the new nest, maintaining their original orientation. The eggs will be replaced so that they touch one another. Gently cover with soil from which cobbles and pebbles have been removed so that all the air spaces around the eggs are filled.

## 7. Constructing Artificial Burrows

Constructing artificial burrows generally is not necessary when translocating desert tortoises, based on past experience demonstrating minimal use of such burrows by translocated tortoises. However, in the infrequent case that an artificial burrow may be needed (coordinate with USFWS), the information below provides a general description of the methods for constructing

artificial burrows taken from Tortoise Group's adoption and care pamphlet ([www.tortoisegroup.org](http://www.tortoisegroup.org)).

Create an artificial burrow that is the same orientation and size as the burrow from which the desert tortoise was taken. The burrow for a juvenile desert tortoise should be 3–4 ft (0.9–1.2 m) long, and an adult tortoise burrow should be 5–6 ft (1.5–1.8 m) long. Burrow construction involves digging a three-sided shelf upon which plywood will be placed to serve as the roof of the burrow. A channel is dug below the level of the shelf which approximates the width of the tortoise and functions as the actual burrow.

Determine the width and length to dig the shelf, and place the plywood on the ground. Use corner stakes and twine to delineate the perimeter. Dig the burrow in a downward slant 15–20° below the horizontal line of the ground (Figure 1). Place the plywood onto the shelf. Fit the plywood snugly and then remove it. Next, dig the channel and loosen the soil along the floor of the channel to a depth of 6 in (15.2 cm) to allow a tortoise to dig its way out should the plywood sag and possibly trap or pin it in the burrow. Replace the plywood and shovel dirt on top. Place rocks along the eave of the burrow roof, above the opening (Figure 1). Mound the dirt so that rain water will not puddle on top of the finished burrow.

We recommend that you cover the opening of the artificial burrow with rocks or wood for 2 or 3 days to ensure that the tortoise remains within the burrow and out of harm's way, or that it resumes hibernation or aestivation. Alternatively, the tortoise and its burrow may be temporarily penned (Section 8).

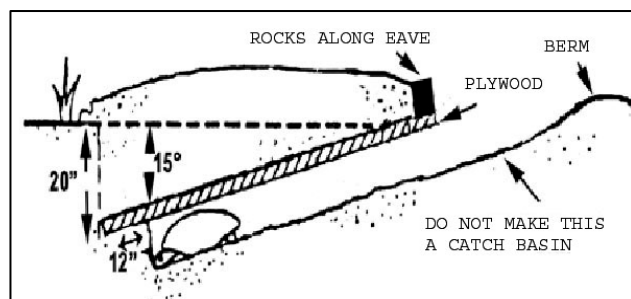


Figure 1

## 8. Temporarily Confining Desert Tortoises

Occasionally, desert tortoises may be found on the periphery of the project area that may need to be temporarily penned to prevent them from moving onto the project site and then needing to be physically moved. These situations should be coordinated with the USFWS, but tortoises will not be penned in burrows during extreme high temperatures (*i.e.*, above 95°F [35°C]), and construction activity will be carefully monitored in the area around the penned tortoise. The methodology for penning desert tortoises (U.S. Department of Defense 2005) is adapted from a methodology developed by Gilbert Goodlett (EnviroPlus Consulting, Ridgecrest, California). Generally, desert tortoises should not be penned in areas of moderate or heavy public use. Penning will be accomplished by installing a circular fence, approximately 20 ft (6 m) in diameter to enclose the tortoise/burrow. The pen should be constructed with durable materials (*i.e.*, 16 gauge or heavier) suitable to resist desert environments. Fence material should consist of ½-in hardware cloth or 1-in horizontal by 2-in (2.5 by 5.0 cm) vertical, galvanized welded wire. Pen material should be 24 in (50 cm) in width. Steel T-posts or rebar (2–3 ft or 0.6–0.9 m) should be placed every 5–6 ft (1.5–1.8 m) to support the pen material. The pen material should extend 18 in (45.7 cm) aboveground. The bottom of the enclosure will be buried 6–12 in (15–30 cm) or bent inward (towards the burrow), soil mounded along the base, and implement other

measures to ensure zero ground clearance. Care will be taken to minimize visibility of the pen by the public. An Authorized Biologist or Desert Tortoise Monitor will check the pen at least daily and ensure that the desert tortoise is in the burrow or pen, the desert tortoise is okay, and the pen is intact. All instances of penning or issues associated with penning will be reported to the USFWS within 3 days.

## Literature Cited

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