NEVADA TEST AND TRAINING RANGE (NTTR)

Land Withdrawal Application Packages/
Case File and Legislative EIS

A REVIEW OF DESERT TORTOISE PROJECTS CONDUCTED ON THE NEVADA TEST AND TRAINING RANGE AND PROPOSED EXPANSION ALTERNATIVES

FINAL
October 2017

A REVIEW OF DESERT TORTOISE PROJECTS CONDUCTED ON THE NEVADA TEST AND TRAINING RANGE AND PROPOSED EXPANSION ALTERNATIVES
Final Report

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Contents

List of Figures

List of Tables

Acronyms and Abbreviations

ACEC	Areas of Critical Environmental Concern
BA	Biological Assessment
BLM	Bureau of Land Management
BO	Biological Opinion
CAFB	Creech Air Force Base
CBU	Cluster Bomb Unit
DNWR	Desert National Wildlife Range
DoD	U.S. Department of Defense
DOI	U.S. Department of the Interior
DT	Desert Tortoise
DWMA	Desert Wildlife Management Area
ESA	Endangered Species Act
GIS	Geographic Information Systems
GPS	Global Positioning System
HTTC	High Technology Test and Training Complex
INRMP	Integrated Natural Resource Management Plan
MSL	Mean Sea Level
NAFB	Nellis Air Force Base
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NNRP	Nellis Natural Resources Program
NPBO	NTTR Programmatic Biological Opinion
NTI	Nevada Training Initiative
NTTR	Nevada Test and Training Range. Also, the new name for 98th Range Wing
OHV	Off Highway Vehicle
SAR	Small Arms Range
TCS	Total Corrected Sign
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WTCRC	Weapons and Tactics Center Range Complex

Introduction

The U.S. Air Force (USAF) is in the process of renewing the withdrawal of land for military operations and training on the Nevada Test and Training Range (NTTR). Included in the withdrawal package are several potential expansion alternatives, which are discussed below in the "Study Area Description". The current withdrawal will expire on November 6, 2021, unless Congress enacts legislation to extend it. In accordance with Section 3016 of the Military Land Withdrawal Act (MLWA), the Department of the Air Force, in coordination with the Department of Defense (DoD), has notified Congress of a continuing military need for the NTTR withdrawal. Furthermore, the Air Force plans to submit a Legislative Environmental Impact Statement (LEIS) that supports a legislative proposal through the Department of the Interior (DOI) to extend the withdrawal. The National Environmental Policy Act of 1969, United States Code [USC] Sections 18 4321-4370h (NEPA) requires agencies to include an environmental impact statement (EIS) with any proposal for legislation that may significantly affect the quality of the human environment. The land withdrawal renewal includes actions that present potential impacts to the Mojave Desert tortoise (*Gopherus agassazii*) (DT) and its environment. Due to regulatory concerns and the federal listing of the species as "Threatened," summarization of the history and status of the species on the NTTR and potential expansion alternatives were warranted. This report provides a summary of the general background information on DT, historical surveys conducted in and around the NTTR, and regulatory actions taken to protect DT on the NTTR. Additionally, a synopsis of data that has been collected during field surveys conducted from 2010 to 2015 is provided to characterize DT habitat and populations on the NTTR.

Description of the Study Area

The study area for this report includes the NTTR and potential expansion areas designated as Alternatives 3A, 3B, and 3C. The NTTR consists of 2,949,603 acres contained in rural portions of Nye, Lincoln, and Clark Counties, Nevada (Figure 1). The potential expansion areas are shown in Figure 1 and consist of about 302,000 acres. Alternative 3A is 18,000 acres lying along the southwest boundary of the North Range of the NTTR. Alternative 3B is 57,000 acres located immediately south of the South Range of the NTTR. Alternative 3C is 227,000 acres immediately east of the South Range of the NTTR in the Desert National Wildlife Refuge (DNWR). Geology varies from limestone/dolomite in the south to volcanic fields in the north. The South Range Study Area lies in the eastern Mojave Desert, and the North Range Study Area lies in the southern Great Basin (Figure 2).

Natural sources of water are scarce across most of the study area. Annual precipitation ranges from 3 to 5 inches, in the basins, to 16 inches in upper elevations of mountains. Vegetation composition is strongly influenced by the levels of precipitation. Most of the active springs are found in the North Range Study Area, especially in the Kawich, Belted, and Cactus Mountain Ranges and Stonewall Mountain. Only five springs are found in the South Range Study Area. Most water sources for wildlife in the South Range Study Area are provided by wildlife water developments, which collect water from storm events and store it in water tanks.

The South Range Study Area is typical of the Mojave Desert. Except for the higher elevations, most of the mountains are covered by scattered populations of various desert brush and cactus species. Typical physiography of the area consists of mountain ranges which drain into bajadas (collections of alluvial fans) and which eventually drain into playas. Most of these areas are considered basins which are self-contained and do not drain into any of the major rivers in the area. Playas tend to have little or no vegetation while bajadas are often dominated by creosote bush (*Larrea tridentata*) and bursage (*Ambrosia dumosa*) in the lower bajadas and blackbrush (*Coleogyne ramosissima*) and Joshua tree (*Yucca brevifolia*) in the upper bajadas. Mountain ranges support scattered populations of bitterbrush (*Purshia spp.*), matchweed

(*Gutierrezia spp.)*, and shadscale (*Atriplex confertifolia*). At higher elevations, plant communities may be dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus monophylla*).

The North Range Study Area is typical of the southern portions of the Great Basin Desert. Again, the physiography of the area is comprised of mountains and closed basins similar to the South Range Study Area. However, rainfall is slightly higher in the North Range Study Area resulting in denser plant communities. Like the South Range Study Area, playas in the North Range Study Area contain little or no vegetation. From the boundaries of the playas to the base of mountains, plant communities are typically dominated by greasewood (*Sarcobatus spp.*) and shadscale (*Atriplex spp.*) in lower elevations and sagebrush (*Artemisia spp.*) in higher elevations. The upper elevations in the mountains are dominated by Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus monophylla*).

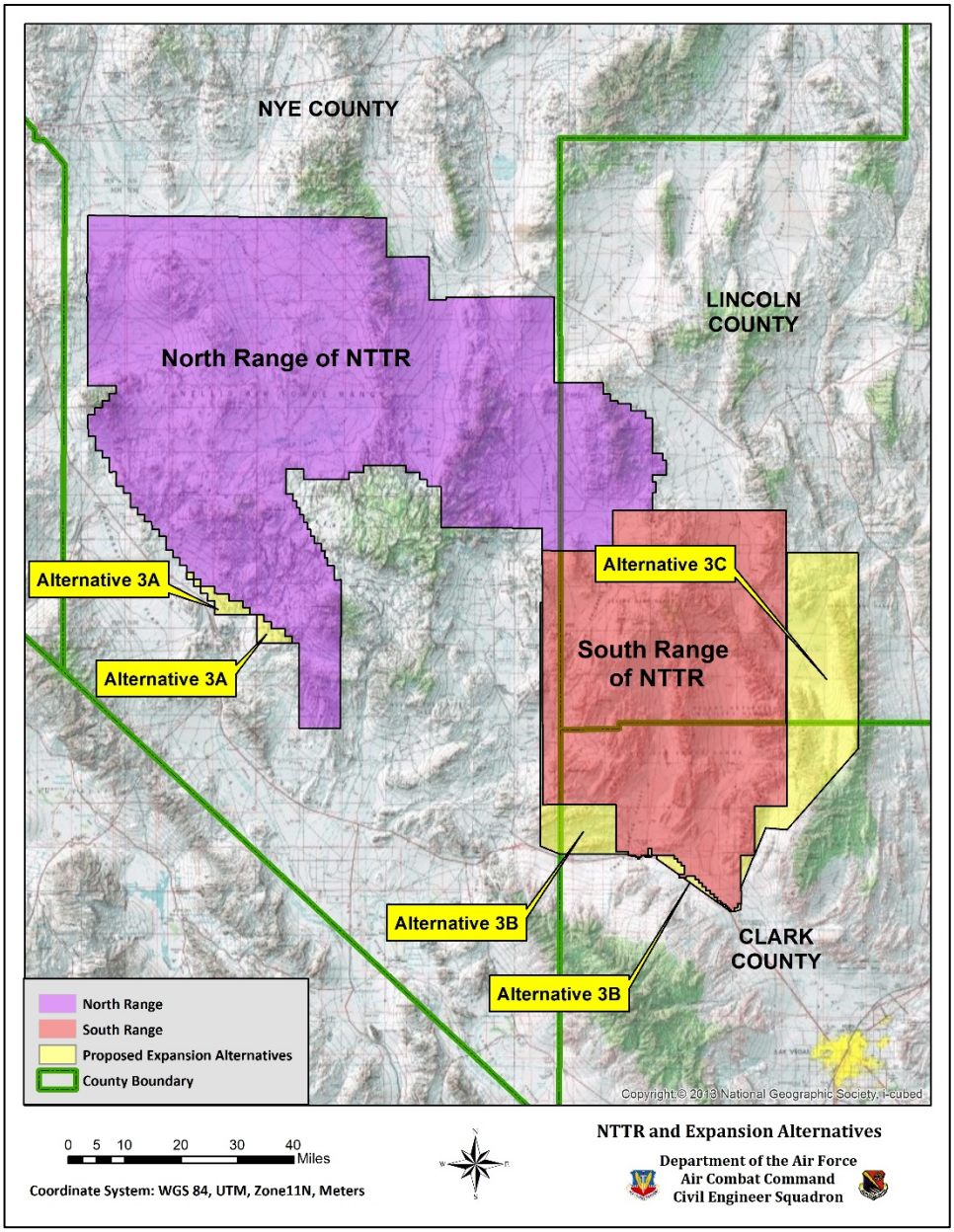


Figure 1. Location of the North and South Ranges of the NTTR as well as Alternatives 3A, 3B, and 3C

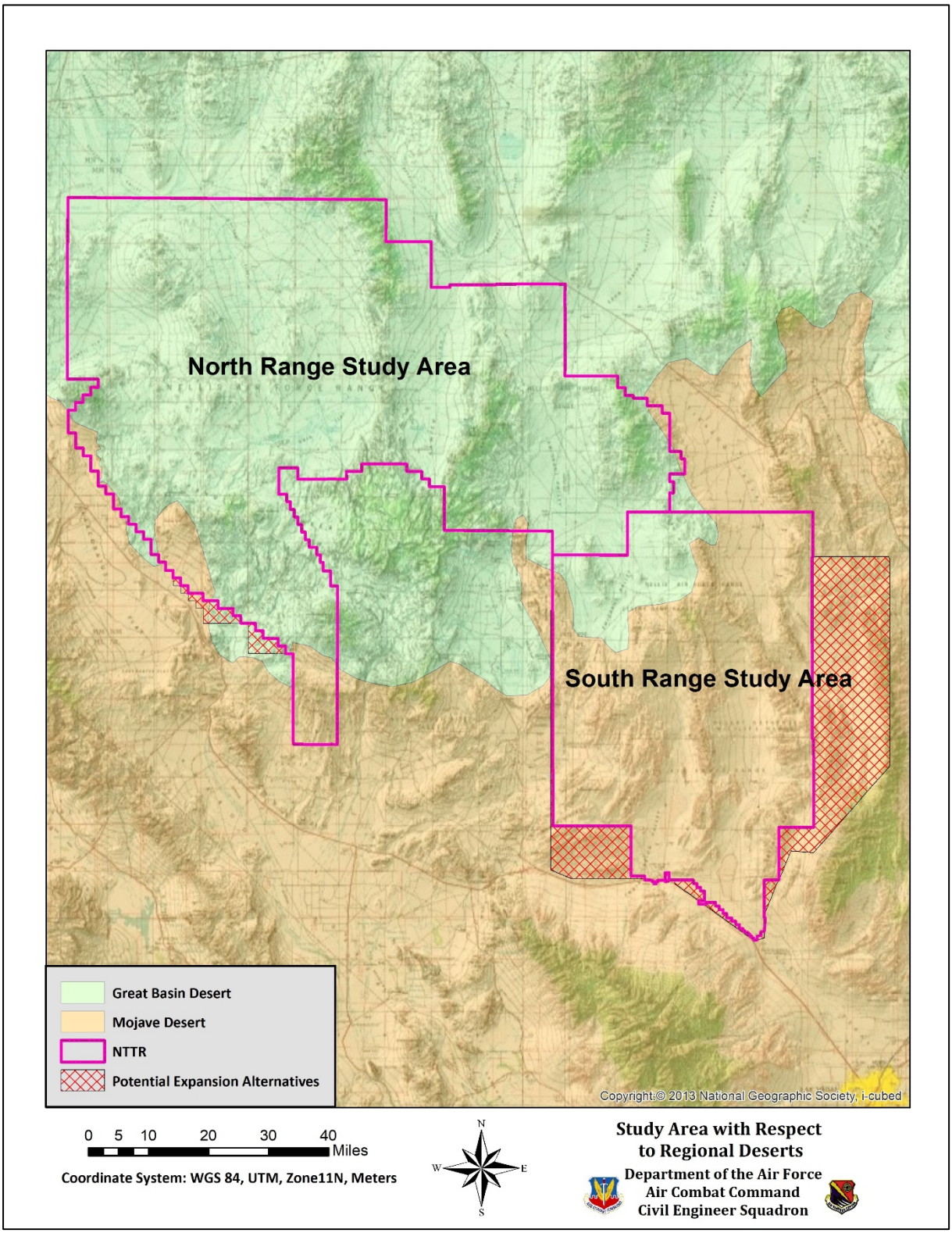


Figure 2. Location of the study area with respect to the Great Basin Desert and the Mojave Desert

Literature Review

General Information

This literature review is adapted directly from Nellis Natural Resources Program (2015) DT Habitat Project Report with some updates and changes. The Mojave DT (DT) is Nevada's official state reptile and is the largest reptile in the southwest. It is currently listed by the USFWS as "Threatened", and classified as a State Protected and Threatened Species by the Nevada Department of Wildlife (NDOW) (Nevada Department of Wildlife, 2012).

Male DT found on the South Range Study Area

The Mojave Desert population occurs in both the Mojave and Sonoran Deserts north and west of the Colorado River in southwestern Utah, southern Nevada, southeastern California, and northwestern Arizona (Nevada Fish & Wildlife Office, 2013). Currently, five recovery units for the DT have been designated by the USFWS based on geographic boundaries and genetic differences between DT populations. Although the species is listed as merely distinct population segments, it is possible that future regulations may apply to separate subspecies (Digital West Media, Inc., 1996-2013).

DTs are a long-lived species that have a carapace length of 1.4 inches at birth and reach 11-16 inches when mature. Adult DTs weigh over 10 pounds. Adults have a domed carapace and relatively flat, unhinged plastrons. Their shells are brown to dark brown in color with orange to yellow scute centers. A gular horn is located on the anterior end of the plastron (bottom of the shell) and is pronounced in males. Males tend to have shorter claws, longer and thicker tails, a concave plastron, and large chin glands compared to females (Boarman, 2002).

DT resting in the shade of a Mojave Yucca

DTs are slow growing, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner, Medica, & Lyons, 1984) (Bury, Esque, DeFalco, & Medica, 1994) (Germano, 1994). Growth rates are greater in wet years when annual plant production is higher (Medica, Bury, & Turner, 1975). The number of eggs (1-10) as well as the number of clutches (1-3) that a female DT can produce in a season is dependent upon a variety of factors including environment, habitat, availability of forage, drinking water, and physiological condition (U.S. Fish & Wildlife Service, 2011) (Turner, P.Hayden, Burge, & Robertson, 1986) (Turner, Berry, Rabdall, & White, 1987)

(Henen, 1997). As a desert species, DTs tolerate water, salt, and energy imbalances on a daily basis. This ability allows them to use unpredictable and ephemeral resources to meet nutritional requirements for survival (Peterson, 1996). However, these stresses can have long term reproductive consequences on individuals and populations.

DT found on South Range of the NTTR

The activity peak of Mojave DTs occurs in spring (Luckenbach, 1982), where they begin daily foraging around the last week in March or first week in April and are generally aestivating by mid to late June (Jennings, 2002). They are most active in April and May, with the level of summer activity being higher in eastern populations (Averill-Murray, Martin, Bailey, & Wirt, 2002). DTs in the western portion of its range likely spend more time aestivating during summer than those in eastern populations due to the lack of summer rains in the west (Devender, Averill-Murray, Esque, & Holm, 2002). DTs hibernate in their burrows during the winter. On a research site on the northern edge of the Mojave Desert in southwestern Nevada, 98% of individuals hibernated from mid-November to mid-February (Meyer, 2008). Nesting occurs in May and June in the Mojave Desert (Averill-Murray, Martin, Bailey, & Wirt, 2002) (Turner, P.Hayden, Burge, & Robertson, 1986) (Turner, Medica, & Lyons, 1984) (Wallis, Henen, & Nay, 1999), and slightly later in the Sonoran Desert (Meyer, 2008). Eggs hatch from September to October in the eastern Mojave Desert and August to September in the western Mojave Desert (Averill-Murray, Martin, Bailey, & Wirt, 2002).

Because the DT is ectothermic (cold blooded), ambient temperatures strongly influence DT activity level. Although DTs can survive body temperatures below freezing (Bailey, Schwalbe, & Lowe, 1995) (Vaughan, 1984) to over 104°F, most activity occurs when body temperatures are 79 to 93°F. The influence of ambient temperature is reflected in daily activity patterns, with DTs often active late in the morning during spring and fall, early in the morning and late in the evening during the summer, and occasionally becoming active during relatively warm winter afternoons (Rundel & Gibson, 1996) (Vaughan, 1984).

The herbivorous diet of the DT is also highly variable, but includes mainly grasses and forbs. Although non-native plant species generally do not comprise a major portion of their diet, some can be important components where populations have adapted to changes in vegetative communities. Native or non-native dominant plants found in any location will comprise over 60% of the DT diet with less common plants comprising the remaining 40% (Meyer, 2008). Forty-four plant species have been listed as part of the DT diet of the western Mojave Desert of California (Jennings, 2002), 50 or more plant species have been listed as part of the DT diet on sites in the Sonoran Desert of Arizona (Vaughan, 1984) (Martin & Devender, 2002), and 79 plant species have been listed as part of the DT diet in the blackbrush-dominated habitats in Utah (Esque, 1994). Most of these species are annuals and herbaceous perennials. The forage mainly consists of leaves, stems, flowers, fruits, and seeds of species. Within the Mojave Desert populations, diets may include plantains (*Plantago spp.*), milkvetches (*Astragalus spp.*), lupines (*Lupinus spp.*), threeawns (*Aristida spp.*), gramas (*Bouteloua spp.*), evening primrose (*Camissonia* and *Oenothera*), phacelia (*Phacelia*

spp.), desert dandelions *(Malacothrix spp.*), big galleta (*Galleta spp.*), and smooth brome (*Bromus tectorum*) (Jennings, 2002) (Vaughan, 1984) (Esque, 1994) (Martin & Devender, 2002) (Oftedal, Hillard, & Morafka, 2002) (Ernst, Lovich, & Barbour, 1994). Spurges (*Euphorbia spp*.) and narrowleaf silverbush (*Argythamnia lanceolata*), as well as desert shrubs and the pads or fruits of the prickly pear *(Opuntia spp.),* are occasionally important components of the DT diet (U.S. Fish & Wildlife Service, 2011).

DTs spend most of their time in shelter. However, movements of up to 660 ft. per day are common and long-distance movements do occur. The common, comparatively short-distance movements presumably represent foraging activity, traveling between burrows, and possibly mate-seeking or other social behaviors. Long-distance movements could potentially represent dispersal into new areas or use of outer edges of the home range (Meyer, 2008). Estimates of DT densities vary from less than 13 DT/sq.mi. on sites in southern California (Berry K. H., 1986) to over 800 DT/sq.mi. in the western Mojave (Meyer, 2008). The home ranges of DTs often overlap and generally average 10-100 acres. Variations in home range sizes are due to gender, season, and the availability of resources (Meyer, 2008).

Optimal habitat for the DT has been characterized as creosote bush (*Larrea tridentata*) scrub in which precipitation ranges from 2 to 8 inches. These plant communities have a relatively high diversity of perennial plants, and high productivity of herbaceous plants (Luckenbach, 1982) (Turner R. , Mojave Desert Scrub, 1982) (Turner & Brown, Sonoran Desertscrub, 1982). Soils must be sufficiently friable for digging burrows, but good structure to prevent collapsing of burrows (U.S. Fish and Wildlife Service, 2012). DTs occur from below sea level to an elevation of 7,300 ft. MSL, but most of the favorable habitat occurs at elevations of approximately 1,000 to 3,000 ft. MSL (Luckenbach, 1982). In addition, DT may be found in other habitats including cheesebush scrub, blackbrush scrub, hopsage scrub, shadscale scrub, Mojave saltbush-allscale scrub, and scrub-steppe vegetation types of the desert and semi-desert grasslands (U.S. Fish and Wildlife Service, 1994).

DT occupying a burrow

Within these vegetation types, DTs potentially can survive and reproduce where their basic habitat requirements are met. These requirements include a sufficient quantity and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and overwintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow (U.S. Fish and Wildlife Service, 2012). Throughout most of the Mojave Region, DTs occur most commonly on gently sloping terrain with sandy-gravel soils, scattered shrubs, and abundant inter-shrub space for growth of herbaceous forage plants. Throughout their range, however, DTs can be found in steeper, rockier areas (Gardner & Jr., 2000) (U.S. Fish and Wildlife Service, 2012) .

REGULATORY BACKGROUND

The Mojave DT is a federally listed threatened species under the Endangered Species Act and is found within the South Range Study Area. Reasons for designation as a threatened species (55 Federal Register 12718) include significant population level declines; loss of habitat from construction projects such as

roads, housing, and energy developments; and conversion of native habitat to agriculture. Livestock grazing and off-highway vehicle (OHV) use were identified as factors causing the degradation of additional habitat. Also, cited as potential negative impacts are illegal collection by humans for pets or consumption; upper respiratory tract disease; predation on juvenile DTs by common ravens, coyotes, and kit foxes; fire; and mortality by vehicles on paved and unpaved roads (U.S. Fish and Wildlife Service, 2012). Other recognized threats to local populations may include droughts (Longshore, Jaeger, & Sappington, 2003) and the proliferation of invasive plants (U.S. Fish and Wildlife Service, 2012).

Current Biological Opinions (BOs), which have been issued by the USFWS for the NTTR, list strict guidelines required for DT habitat management, conservation, protection, and mitigation specific to the NTTR. The Nellis Natural Resources Program (NNRP) continues to monitor mission activities and their potential impacts to the DT and its habitats, as authorized under the Sikes Act, Endangered Species Acts, and Biological Opinions.

At this time, the DT has been designated by various state and federal wildlife conservation agencies as the following:

- **United States Fish and Wildlife Service (USFWS):** Listed Threatened
- **United States Forest Service (USFS)**: Threatened
- **Bureau of Land Management (BLM)**: Threatened
- **Nevada Department of Wildlife (NDOW):** Threatened Reptile; Species of Conservation Concern in the Wildlife Action Plan.
- **NNHP Global Rank**: G3—Vulnerable, at moderate risk of extirpation in the jurisdiction due to restricted range, relatively few populations or occurrences, recent and widespread declines, threats or other factors.
- **NNHP State Rank**: S2S3 Imperiled due to rarity or other demonstrable factors and vulnerable to decline because rare and local throughout range, or with very restricted range.

Critical habitat has been designated for the DT, in the vicinity of the study area, but none has been designated within the boundaries of the study area. The nearest critical habitat lies in Pahranagat Valley about 4 miles east of the eastern boundary of the study area and separated from the study area by the Sheep Mountain Range. Critical habitat has not been designated for any of the land lying within the DNWR because, as a wildlife refuge, it affords full protection for the species within its management area boundaries. If the DNWR is incorporated into the withdrawn land and placed under the jurisdiction of the USAF, consultation with the USFWS would be required to determine if critical habitat should be designated within the current boundaries of the DNWR.

Endangered Species Act of 1973 (16 U.S.C. Section 1531 et seq)

The Endangered Species Act of 1973 (ESA), as amended, is administered by the USFWS and provides for the protection of plants and animals that are in danger of becoming extinct. The ESA is administered by the USFWS and was established to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. The ESA requires that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities to further the purpose of this Act. During 1995 and 1996, USFWS was directed by Congress to assess the legal protection levels provided by the ESA. The evaluation process led to a set of new protection policies for rare plants and animals in the United States. The current protection status for each of these species is reviewed in detail in Federal Register announcements.

Section 9 of the ESA explicitly restricts the "taking" of a listed species. "Take" is defined in the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. In addition to the protection of actual species of concern, the ESA provides protection for the habitats necessary for the viability of listed species. Incidental takes are permissible under Section 7 of

the ESA through: 1) formal consultation with the USFWS; 2) issuance of an incidental take permit (as in conjunction with issuance of a BO); or 3) issuance of a scientific collecting permit under Section 10 of the ESA.

Section 7(a)(2) provides an administrative mechanism for a federal agency to consult with USFWS to determine whether a proposed action is likely to adversely impact listed threatened and endangered species either directly or through destruction or modification of its habitat. Under such consultations, Biological Assessments (BA) are prepared to evaluate whether the proposed action will adversely impact listed species or their critical habitat. Following evaluation of the BA, the USFWS issues a Biological Opinion (BO), which includes a description and summary of the information used in developing the BO, a discussion of the potential effects to given threatened or endangered species that the proposed action may impact, and a written opinion regarding whether the proposed action is likely to adversely impact the survival of threatened or endangered species or their critical habitat. Provisions are also included in the BO which authorize incidental takes (if deemed by the USFWS that such takes will not jeopardize a species' survival), reasonable and prudent measures to minimize the impacts of incidental takes, terms and conditions for implementation of any reasonable and prudent measures (including mitigation and monitoring efforts), and protocols for handling captured, injured, or displaced individuals.

The USAF has consulted with the USFWS under Section 7 of the ESA for several projects that potentially impacted the DT at the NTTR. BA and BO have been prepared for these projects and are included in the Biological Opinions and Historic Reports sections of this report. These BOs have set a precedent for DT management on the NTTR. Currently, the NTTR is operating under a Programmatic BO which allows for formal and informal consultation for impacts that have been addressed.

1994 Desert Tortoise (Mojave Population) Recovery Plan

The 1994 DT (Mojave Population) Recovery Plan was the culmination of four years of work by a government-appointed panel of DT experts (academics and research scientists) from a diverse field of disciplines including genetics, biogeography, plant and animal ecology, veterinary science, conservation, and evolutionary biology. The 1994 plan presents conservation strategies for recovery of the DT population from the endangered status to delisting. Under the plan, six evolutionary groups, or recovery units, were identified and targeted for DT recovery efforts (within the Mojave population). Recovery units were established based on differences in population genetics, ecology, and/or behavior. Management zones where DT populations would be allowed to recover were established in each recovery unit and classified as Desert Wildlife Management Areas (DWMAs). DWMAs allow specific strategies to be applied to individual populations of DT and be uniquely tuned to each population. Therefore, a blanket approach, which may reduce the effectiveness of the overall DT population recovery effort, is avoided in favor of these precisely tuned recovery strategies. Additionally, Critical Habitat was established under the authority of the ESA, with portions of the established DWMAs overlapping with DT Critical Habitat. A major difference between DWMA and Critical Habitat is that the former is based on population genetics and scientific data, and afford no administrative protection. Critical Habitat, on the other hand, is an administrative protection under the ESA, and these areas are protected under the Act. There is no designated Critical Habitat on the NTTR. According to this recovery plan, the NTTR and the study area lie within the Northeastern Mojave Recovery Unit. No DWMA are located within the boundaries of the study area.

Using population viability analyses, the recovery team determined that a minimum population of 2,000-5,000 adults would be needed to sustain and recover the species over a period of 500 years. Using these analyses, the research team determined that a population at a minimum species density of 10.1 DT/sq.mi. would require a reserve size on the order of 193-502 sq.mi. The recovery team determined that a population growth rate[1] of 1.0 would be necessary to ensure DT recovery over the 500-year period. Although some fluctuation in the growth rate could be tolerated, a growth rate of less than 0.975 would be insufficient to ensure DT recovery over the designated time. As a safety factor, the recovery team recommended that preserve sizes be greater than 1,000 sq. mi. to ensure sufficient buffering from genetic or other population problems (i.e. disease).

Desert tortoise browsing on a beavertail cactus

Five criteria are stipulated by the 1994 Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994) that the species must meet to be eligible for delisting (obtained from http://www.DT-tracks.org/publications/berry2.html):

- The population must exhibit a statistically significant upward trend or remain stationary for at least 25 years (one DT generation); trends must be measured using a scientifically credible monitoring plan, with population estimates taken at five-year intervals.
- Sufficient habitat must be protected within a recovery unit (at least one DWMA of >1,000 miles^2) or, in unusual circumstances, the DT populations must be managed intensively enough to ensure long-term population viability.
- At each DWMA, population growth rates must be maintained at or above 1.0 into the future.
- Regulatory mechanisms, or land management commitments, must be implemented to ensure long-term protection of DT and their habitats.
- The population in the recovery unit should not need protection under the ESA in the foreseeable future (as determined by detailed genetic, demographic, physiological, behavioral, and environmental analyses).

Once populations meet all five criteria within a DWMA, the species may be considered recovering and possibly delisted for that area. Once all populations have recovered in the DWMAs, the species would be eligible for delisting on a national level.

2011 Desert Tortoise (Mojave Population) Revised Recovery Plan

In 2011, the 1994 Desert Tortoise Recovery Plan was revised to accommodate impacts caused by the implementation of renewable energy development. These impacts could potentially cause habitat fragmentation, isolation of DT conservation areas, and subsequent possibility of restricted gene flow between

[1] Growth rate, also called "lambda", is defined as the number of individuals in a population at the beginning of a monitoring period divided by the number of individuals in a population at the end of a monitoring period.

conservation areas. Some of the recommendations included in the revised recovery plan include the following:

- Locate solar project facilities outside of DWMAs and ACECs.
- Conserve and protect sensitive areas that potentially connect functional habitat or improve management capability of surrounding areas that may be open to renewable energy development.
- Connect blocks of DT habitat to maintain gene flow between populations.
- Quantify the lost or restoration of habitat as it relates to renewable energy and other projects.
- Evaluate the effects of core doors and barriers imposed by energy development and other infrastructure on DT movement and recovery.

The plan was created to ensure that the quantity of DT habitat within each conservation area is maintained with no net loss and that DT population viability is ensured. This could only be attained by a good definition of present DT populations and careful monitoring to track the condition of DT habitat.

According to the 2011 Desert Tortoise Revised Recovery Plan, the study area was moved into the Eastern Recovery Unit. No DWMAs were established within the boundaries of the study area. However, the DNWR is located within the boundaries of the study area and is important for the conservation of the species. The DNWR has not been designated as critical habitat due to the fact that, as a refuge, it inherently protects endangered species inhabiting the area.

BIOLOGICAL OPINIONS

This section summarizes the Biological Opinions that have been prepared for the study area.

U.S. Fish and Wildlife Service. July 19, 1994. *Biological Opinion for Continuing Current Weapons Testing/Training on the U.S. Department of the Air Force Weapons and Tactics Center Range Complex.*

On December 30, 1993, the USAF requested formal consultation with the USFWS pursuant to Section 7 of the Endangered Species Act of 1973 regarding continuing weapons training/testing on the USAF's Weapons and Tactics Center Range Complex (WTCRC) located on the Desert National Wildlife Range (DNWR). Specifically, this request outlined the possible impacts to potential DT populations and habitat within the WTCRC. Additionally, the USAF requested that formal consultation for development of the new Cluster Bomb Unit (CBU) target area be included under the scope of the BO. Mitigation efforts to minimize impacts to DT populations and habitat in WTCRC/DNWR, proposed by the USAF, included prohibiting off-road vehicle use within these areas; except for those activities necessary to clear and dispose of ordnance; developing a reclamation plan for unused or retired target areas and roads within DT habitat, restricting all traffic to roads (paved, gravel, or dirt), and a maximum speed limit of 25 mph.

The USFWS determined that an estimated 12 DT would be affected each year from continued operations in the WTCRC/DNWR, and that these operations would further degrade approximately 971 acres of previously disturbed DT habitat. However, the USFWS noted that the mitigation efforts proposed by the USAF to offset these losses would minimize these impacts.

USFWS' resulting BO indicated that the continued operations in WTCRC/DNWR would not likely jeopardize the DT population, and no critical habitat would be impacted. The BO authorized the incidental take of DT (2 killed per year and 10 captured, removed, or displaced) if appropriate measures were implemented to minimize the potential for incidental takes. These included: 1) measures to minimize mortality or injury due to weapons training and testing operations; 2) measures taken to minimize destruction of DT habitat due to weapons training and testing operations; and 3) measures taken to ensure compliance with prudent measures outlined in the BO (i.e. reporting requirements).

U.S. Fish and Wildlife Service, January 5, 1995. *Biological Opinion for Continuing Current Weapons Testing/Training on the U.S. Department of the Air Force Weapons and Tactics Center Range Complex (Amendment Letter).*

The USFWS issued BO Number 1-5-94-F-162 to the USAF on July 19, 1994. This BO amendment letter summarizes the results of a November 14, 1994, meeting between USFWS and USAF personnel to amend the July 19, 1994 BO. During the meeting, an alternate fence design differing from that described in the BO was proposed by the USAF and supported by the USFWS. This letter constitutes written concurrence from USFWS that the new fence design is approved.

U.S. Fish and Wildlife Service, June 5, 1995. *Biological Opinion for Continuing Current Weapons Testing/Training on the U.S. Department of the Air Force Weapons and Tactics Center Range Complex (Second Amendment Letter)*.

The USFWS issued BO Number 1-5-94-F-162 to the USAF on July 19, 1994. Term and Condition No. 2 of the BO required that the USAF submit a written vegetative rehabilitation plan for approval by the USFWS by July 19, 1995. However, it was later determined that review of the plan as well as the implementation of a pilot study and monitoring program would require more time than the deadline. Therefore, it was determined that this deadline should be adjusted. The USFWS concurred with the Air Force opinion, and this amendment letter served as a revision to Term and Condition No. 2. Under the revised Term and Condition, the vegetative rehabilitation plan would be due October 31, 1995, and the pilot study would begin June 1996 to end in December 2001. All other terms and conditions of the original BO were to remain in effect.

U.S. Fish and Wildlife Service, June 7, 1995. *Comments on the Draft Revegetation and Monitoring Plan, Nellis Air Force Base.*

The USFWS issued BO Number 1-5-94-F-162 to the USAF on July 19, 1994. Term and Condition No. 2 of the BO required that the USAF submit a written vegetative rehabilitation plan for approval by the USFWS by July 19, 1995. In January 1995, the USAF submitted the draft revegetation and rehabilitation plan. USFWS responded with comments in a letter dated June 5, 1995. The comments, both general and specific, were minor as the USFWS was in general agreement with the overall plan. Major amendments to the BO were the changes to the deadlines and implementation schedules outlined in the June 5, 1995, letter discussed above.

U.S. Fish and Wildlife Service. February 1997. *Biological Opinion on the Re-initiation of Formal Consultation for Continuing Current Weapons Testing and Training on U.S. Department of the Air Force Weapons and Tactics Center Range Complex.*

On July 8, 1996, the USAF requested formal consultation with the USFWS, pursuant to Section 7 of the Endangered Species Act of 1973, regarding continuing weapons training/testing for a five-year period on the USAF Weapons and Tactics Center Range Complex (WTCRC) located on the Desert National Wildlife Range (DNWR). Specifically, this request outlined the possible impacts to potential DT populations and habitats within the WTCRC/DNWR.

The BO summarizes the previous formal consultations between USFWS and USAF concerning the project location, specifically the BO issued July 19, 1994 (File No. 1-5-94-F-162), and the amended BO issued February 14, 1995 (File No. 1-5-94-F-162.AMD). Additionally, the BO notes that innovations in electronic

guidance equipment have refined ordnance delivery and reduced impact areas within WTCRC/DNWR by 10 percent, and DT information is now issued to all new WTCRC personnel, thus increasing DT awareness of on-site staff.

The USFWS BO stated that the continued operations in WTCRC/DNWR would not likely jeopardize the DT population, and no critical habitat would be impacted. The BO authorized the incidental take of DT (2 killed per year and 10 captured, removed, or displaced) if appropriate measures were implemented to minimize the potential for incidental takes. These included: 1) measures to minimize mortality or injury due to weapons training and testing operations; 2) measures taken to minimize destruction of DT habitat due to weapons training and testing operations; 3) a transfer of $50,000 into the DT Habitat Conservation Fund Number 730-9999; and 4) measures taken to ensure compliance with prudent measures outlined in the BO (i.e. reporting requirements).

U.S. Fish and Wildlife Service, December 3, 1999. *Request to amend the Biological Opinion for Weapons Testing/Training on the Weapons and Tactics Center Range Complex (Amendment Letter).*

The USFWS issued BO Number 1-5-94-F-278R to the USAF in February of 1997. This BO amendment letter summarizes the request of the USAF to place 11 borrow pits (four of which were in DT habitat) within the complex as outlined in the Final Environmental Assessment for Borrow Pits on the Nellis Air Force Range, Nevada. The pits were to be used to supply base material for road improvements. The Service responded that maintenance of the roads is consistent with the 1997 BO and is covered in that opinion. This letter constitutes written concurrence from USFWS that the request is approved and the 1997 BO is amended to cover the four borrow pits in DT habitat.

U.S. Fish and Wildlife Service, January 16, 2002. *Request to extend the term of the Biological Opinion for Activities on the Air Force's Weapons and Tactics Center Range Complex.*

This concurrence letter grants the Air Force request to extend the term of the February 1997 BO for six months to allow the USAF additional time to develop the Nevada Training Initiative and determine the needs of the NTTR for a 10-year period. The USFWS concurred with the request and extended the BO term from February 5, 2002, until August 5, 2002.

U.S. Fish and Wildlife Service. November 14, 2002. *Biological Opinion for Dogbone Lake/Target 62-1 Bypass Road, Lincoln County, Nevada.*

On July 2, 2002, the USAF requested concurrence through informal consultation with the USFWS that DT studies conducted in association with the proposed construction of three bypass roads (62-1, Dogbone Lake, and 64-10 bypass roads) would not adversely affect DT populations. Construction of these bypass roads were proposed to increase safety and reduce road degradation of existing facilities. No DT or DT sign were identified during the 64-10 survey, and the USFWS concurred that construction of this bypass road is "not likely to adversely affect" DT at this site. However, because DT sign was identified during their respective surveys, the USFWS did not issue concurrence with a "not likely to adversely affect" decision for the 62-1 and Dogbone Lake bypasses. In summary, the USFWS recommended formal consultation of the 62-1 and Dogbone Lake bypass roads to address the direct and indirect effects to DT that may occur due to project implementation. The BO summarizes the previous formal consultations between the USFWS and the USAF concerning the project area, specifically BOs No. 1-5-97-F-251 and No. 1-5-98-F-053.

Based on a review of information available for the project site, the USFWS concluded the following in the BO: "After reviewing the status of the DT, the environmental baseline for the action area, the effects of

the proposed road re-alignment, and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the DT. Critical habitat for the DT has been designated in portions of the Paiute and El Dorado Valleys, Mormon Mesa, Gold Butte, and Beaver Dam Slope areas of Nevada; however, this action does not affect those areas and no destruction or adverse modification of that critical habitat is anticipated."

The USFWS BO stated that construction of the bypass roads would not likely jeopardize the DT population, and no critical habitat would be impacted. The BO authorized the following amount of take: 1) No DT may be incidentally injured or killed by project activities; 2) No DT eggs are anticipated to be destroyed during construction activities; 3) No DT are anticipated to be taken in the form of indirect mortality through predation by ravens drawn to trash in the project area; and 4) an unknown number of DT may be taken indirectly in the form of harm through increased noise and ground vibrations associated with construction, use of heavy equipment, and other project activities.

The BO outlines reasonable and prudent measures to reduce the amount of take associated with DT on the project site. These included: 1) implementing measures to minimize injury or mortality of DT due to project-related activities; 2) implementing measures to minimize predation on DT by predators drawn to project areas; 3) implementing measures to minimize destruction of DT habitat, such as soil compaction, erosion, or crushed vegetation due to construction activities; and 4) implementing measures, terms and conditions, reporting requirements, and re-initiation requirements in this BO. Terms and conditions consistent with best management practices are also described in the BO.

U.S. Fish and Wildlife Service. June 17, 2003. *Programmatic Biological Opinion for Activities on the South Range of Nellis Air Force Base, Nevada Test and Training Range, and the Nevada Training Initiative, Clark and Lincoln Counties, Nevada.*

This programmatic BO was prepared and based on a review of programmatic and project specific activities proposed by the USAF at the South Range of the NTTR over a 16-year period. Specifically, this BO addresses the potential effect of mission activities on DT populations. The term of the BO terminates on March 1, 2019, which coincides with the NTTR land withdrawal from BLM control.

Based on a review of information available for the coverage area, the USFWS concluded the following: "After reviewing the current status of the DT, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the USFWS' BO that implementation activities on the South Range as described in the January 2003 BA, is not likely to jeopardize the continued existence of the threatened Mojave population of the DT. Critical habitat for this species has been designated within 14 Critical Habitat Units in Nevada, California, Arizona, and Utah; however, the proposed action does not affect any of those areas and no destruction or adverse modification of that critical habitat is anticipated."

This decision was based on the following reasons: "1) The South Range does not include any areas designated for recovery of the DT; 2) few DT are likely to be killed or injured by USAF actions which would be minimized by measures proposed by USAF; and 3) no new actions will proceed under this programmatic biological opinion until the USAF submits required information on each project that may adversely affect the DT and a response has been received from the USFWS in accordance with the USFWS's protocol for programmatic biological opinions."

The USFWS BO stated that, based on the minimization efforts employed on the South Range and an analysis of potential impacts, the following take of DT may occur:

1. To ensure that the protective measures are effective and being properly implemented, the USAF shall contact the USFWS immediately if a DT is killed or injured. Upon locating a dead or injured DT within the action area, notification must be made to the Ecological Services Division of the

USFWS. At that time, the USFWS and the USAF shall review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue pending the outcome of the review, provided the protective measures and any appropriate terms and conditions of this BO have been and continue to be fully implemented. It was estimated that no more than one DT may be killed or injured on the South Range, per year. For the Nevada Training Initiative (NTI) project, the USFWS estimates that no more than two DT may be killed or injured as a result of project activities.

2. All DT found in harm's way in work areas may be captured and moved to a safe location. Based on the incidental take associated with prior activities, no more than five DT will be taken on the South Range through capture and movement, per year. No more than 20 DT will be captured or moved during the NTI project.
3. An unknown number of DT eggs may be disturbed or destroyed during surface-disturbing activities on the South Range. However, the number of nests and eggs affected by the project would be no more than one over the term of the proposed action, including the NTI project.
4. An unknown number of DT may be taken in the form of indirect mortality through predation by ravens drawn to trash in the project area. The level of raven or subsidized predator predation on DT will be greater as a result of programmatic activities than the existing baseline conditions.

The BO outlines reasonable and prudent measures to reduce the amount of take associated with DT on the project site. These measures included: 1) implementing measures to minimize the incidental take of DT resulting from weapons testing and training activities, including minimizing attraction of DT predators to activity sites; 2) implementing measures to minimize harm to DT as a result of impacts to DT habitat such as soil compaction, vegetation damage and destruction, and erosion; 3) implementing measures to minimize the incidental take of DT that may result from project and road construction projects; and 4) implementing measures to minimize the incidental take of DT that may result from capture, handling, and relocation of DT, as required or authorized in this BO. Terms and conditions consistent with best management practices are also described in the BO.

US Fish and Wildlife Service. June 30, 2004. *Amendment to the Programmatic Biological Opinion for Activities on the South Range of Nellis Air Force Base, Nevada Test and Training Range (NTTR), and the Nevada Training Initiative, Clark and Lincoln Counties, Nevada.*

This amendment, File No. 1-5-02-F-522.AMD1, granted the USAF permission to implement DT monitoring and clearing on Nellis Air Force Base (NAFB), NTTR, and NTI in-lieu of constructing and maintaining DT barriers. The reasoning behind this change in techniques is that DT barriers were being rendered ineffective by target range impacts. The USFWS determined that a monitoring and clearing strategy would be equally or more effective than DT barriers. As such, Term and Condition (1.a and 1.d) were amended to reflect monitoring and clearing activities in accordance with Term and Condition 3.b as quoted below:

> *The Nevada Training Initiative Project (640 acres), Target* 62-6, *and new proposed projects that would involve surface disturbance will be cleared of DTs in accordance with Term and Condition 3.b. In addition to the project site clearance, on a case-by-case basis, a perimeter around the project area will also be cleared as determined by the Nellis AFB Natural Resources Manager and Service. The determination to conduct perimeter clearance will be based on the quality of DT habitat in the project area and/or likelihood of DTs appearing on the project site. DTs found and removed from the project site may be fitted with radio telemetry devices as determined on a case-by-case basis. Telemetered tortoises will be monitored and data collected at least until project construction is completed to deter-*

mine if tortoises return to the area of capture. Telemetry data will be provided to the Service within 30 *days of the conclusion of telemetry monitoring activities. Tortoises that return will be moved out of harm's way in accordance with Terms and Condition 3.b. Tortoise that are found in harm's way shall continue to be captured, moved, and released until surface disturbance ceases. Tortoises may be moved up to 1 mile from point of capture. A tortoise monitor will be present on the project sites during all project construction/earth-moving activities until the project is completed.*

Additionally, the USFWS acknowledged and commended the Air Force for its efforts to delineate and map all DT habitats on the NTTR and to develop a DT management plan as part of the INRMP.

Request for Concurrence with DT Habitat Delineation on the Nevada Test and Training Range, Clark and Lincoln Counties, Nevada (August 27, 2009).

The letter from the USFWS approved the DT habitat map for use in determining areas where clearance surveys and monitoring would be required on the South Range of the NTTR. USFWS recommended that Nellis use the map of potential DT habitat to guide where the protective measures (terms and conditions) of the BO should be implemented. The USFWS specified four measures in the BO that applied towards activities in DT habitat:

1. Provide DT awareness training. The training should be provided to anyone working in or traveling through potential DT habitat.
2. Impose a speed limit of 25 miles per hour in DT habitat. The USFWS recommended that speed limit signs be posted on roads that enter DT habitat and ensure that these speed limits are enforced.
3. Rehabilitate disturbances of DT habitat and/or pay a per-acre remuneration fee.
4. Conduct clearance surveys for DTs or construct DT exclusionary fencing for actions in potential DT habitat.

Request to Extend Timeframe for the Programmatic Biological Opinion for Nellis Air Force Base, Clark County, Nevada (June 22, 2012)

The letter from the USFWS, File No. 1-5-07-F-497, approved the request to extend the 5-year timeframe of the subject programmatic biological opinion issued to the Department of the Air Force on June 15, 2007, for a period of 5 years. The environmental baseline for the programmatic consultation action area is mostly unchanged since the biological opinion was issued. USFWS had also determined that the protective measures in the biological opinion are current and appropriate to minimize effects to the DT as a result of any future actions. With all of these items taken into consideration, USFWS extended the expiration date of the programmatic biological opinion to June 15, 2017.

HISTORIC REPORTS

Environmental Research Center, Barrick Museum of Natural History, UNLV-Las Vegas. May 1990. *A Desert Tortoise Investigation of the Dogbone Lake Site, Range 62, Nellis Air Force Range for the Nellis Air Force Base, USAF* (Pratt, 1990)

On May 5 and May 12, 1990, an approximate 720-acre area of the Dogbone Lake Site, Range 62, of the NTTR (located in Section 8, T13SA, R58E, Clark County, Nevada) was searched for the presence of DT activity. Search objects included live DT, DT scat, tracks, burrow entrances, pallets, and other evidence of

species activity. Results of the survey uncovered twenty-five active burrows and pallets, fifteen inactive burrows, and eleven disused burrows and pallets. Additionally, five live specimens (two in burrows and three active individuals) and three DT carcasses were observed. In total, 57 signs were identified for a relatively low density of 0.1 sign per acre for the 720-acre project area.

Science Applications International Corporation. March 1, 1991. *Mojave Desert Tortoise Survey at Range 63, Nellis Air Force Base, Nevada* (Weinstein, 1991)

A survey was conducted on February 9 and 10, 1991, to evaluate a 206-acre parcel of land located in Range 63 (South Range) of NAFB for the presence of DT sign. Range 63, located near Indian Springs, Nevada, is part of both the Desert National Wildlife Refuge (DNWR) and NAFB weapons testing grounds. The survey was conducted under the protocol recommended by the USFWS. Based on the results of the survey, no "live DT, burrows, carcasses, scat, or tracks" were identified within the surveyed area.

Revegetation Innovations. May 1992. *Fighter Weapons Center Range Complex Biological Assessment for the Desert Tortoise* (Revegetation Innovations, 1992)

Between December 1991 and May 1992, standard transect surveys for DT were conducted at the Tactical Fighter Weapons Center Range Complex. A total of 431 sections comprising 459 square miles (293,760 acres) were surveyed. The BA was conducted to evaluate if expansion of air-to-ground ordnance impact areas would adversely affect DT populations. Surveyors searched for sign of DT activity including live specimens, pallets and burrows, scat, eggshells, drinking and mating areas, and DT tracks. Of the 431 transects performed, evidence of DT activity was present along 110. This number should be considered with caution, however, as the survey transects were conducted during a period of relative DT inactivity, and the survey data may underestimate the presence of DT within the project area. Though the study was unable to determine the precise DT population densities within the project area, survey data indicated that the population densities appeared to be consistent with other areas in southern Nevada. Potential direct, indirect, and cumulative effects to DT populations were unclear from the study; therefore, absent of further data collection, it was concluded that negative and significant impacts would be realized by DT populations in association with the proposed action.

Dames & Moore. January 7, 1994. *Report: Desert Tortoise Survey South Range Disposal Sites for Nellis Air Force Base* (Dames and Moore, 1994)

In December of 1993, Dames & Moore personnel conducted DT surveys in association with site characterizations of waste disposal sites intended to ascertain whether the presence of waste burial pits had resulted in impacts to soil or groundwater media. Of the 15 total waste sites, it was determined that only 9 site characterizations (all on the NTTR South Range) had the potential to impact DT populations or habitat. Subsequent surveys and zones of influence surveys of these 9 areas were conducted by qualified biologists, and DT sign was recorded. The surveys did not find any live sign of DT or active burrows; however, possible burrows were identified on two of the zone-of-influence surveys. The condition of the possible burrows indicated that neither had been used for several years, and the overall results of the survey activities indicated that this portion of the South Range was not presently being used by DT. These findings agreed with previous surveys which indicated that this particular region is either low-density or unsuitable DT habitat.

Dames & Moore. January 11, 1994. *Biological Assessment of the Proposed CBU Target Site at the Nellis Air Force Base Range* (Dames and Moore, 1994)

Dames & Moore prepared a BA to address potential impacts to DT populations and habitat resulting from relocating the existing cluster bomb unit (CBU) target area approximately 1.5 miles southwest of its 1994 location. The report noted that previous studies identified in the literature review indicated that DT populations at the NTTR are low to moderate (0-99 animals per square mile) and relatively stable under normal base operations. Potential impacts identified by the assessment included: 1) removal or destruction of habitat from explosive detonations; 2) loss of habitat features (i.e. burrows); 3) actual loss of animals from bombing activities; 4) degradation of potential habitat from soil disturbances and noise increases; and 5) disturbance of animals by blast pressures and ground vibrations.

The report further advises that compensation for losses of DT habitat could be off-set by rehabilitating the retired CBU range. Additionally, the assessment recommended that a DT education program be implemented for all employees working at the site and a protocol be implemented for reporting dead DT and transporting injured or ill animals to a veterinarian.

U.S. Air Force. July 2002. *Biological Assessment for Desert Tortoise for a Section 7 Formal Consultation and Range-Wide Programmatic Biological Opinion* (U.S. Air Force, 2002)

This Programmatic Biological Assessment (BA) was prepared to support continuation of the NTTR operation over the remainder of the land withdrawal renewal and to determine if the operations during the time period would adversely affect the federally-listed DT or result in the loss or modification of critical habitat. The BA presented the current conditions of the NTTR and listed any major projects or initiatives that were not covered in the original BO.

U.S. Air Force. July 2002. *Biological Assessment for Desert Tortoise* (U.S. Air Force, 2002)

This BA was prepared to evaluate whether impacts to DT habitat and populations would occur from implementation of one of three alternatives involving construction of a High-Technology Test and Training Complex (HTTC). The HTTC would have a surface footprint of approximately one square mile. Two alternatives (Alternatives 1A and 1B), as well as a no-action alternative, were evaluated. Alternative 1A (869 acres) is located within Range 62B and Alternative 1B (946 acres) is located in Range 64B; both of which are near the western boundary of the South Range and within the Desert National Wildlife Range (DNWR).

Survey activities at the Alternative 1A location indicated that the site supports a low-density DT population. Surveying activities identified three live DT, tracks, 40 burrows, 14 pallets, and two carcasses. The estimated DT density for this location was 5-10 DT per square mile. Minimal sign was recorded at the Alternative 1B project location. Identified sign included only several inactive burrows; however, suitable DT habitat was identified on the project area.

The BA concluded that while some impacts to DT habitat and populations would occur from implementation of the proposed action; based on the results of survey activities, Nellis training initiatives, and planned mitigation activities, the DT population would not be significantly impacted.

U.S. Fish and Wildlife Service. June 30, 2003. *Comments on the Draft Environmental Assessment for the Predator Force Structure Changes at Indian Springs Air Force Auxiliary Field, Clark County, Nevada* (U.S. Fish and Wildlife Service, 2003)

This letter summarizes USFWS comments to the expansion of the Predator Fleet at Indian Springs Air Force Auxiliary Field. In regard to DT, the comments make reference that the DT habitat may be located in the vicinity of the project site. Also, the letter references that the terms of the programmatic BO for

the South Range may be applicable to activities at the Indian Springs site. The comments further describe when formal consultation with the U.S. Army Corps of Engineers (USACE) is required regarding potential impacts to DT and the mechanisms to initiate consultation.

L. Cunningham. May 26 to June 17, 2004. *Nellis Air Force Range Desert Tortoise Monitoring Report* (Cunningham, 2004)

Construction of a target by personnel from DynCorp on the "HTTC" site was monitored for DT from May 25, 2004, to June 17, 2004. Almost all DT and sign were found along the eastern area of the HTTC, where a fan sloped down from low hills and mountain bases, and strips of galleta grass (*Pleuraphis rigida*) alternated with desert pavement. Highest density appeared to be around the military barracks, where all live DT, active burrows, and a nest were observed. Tracks were common along canals on the east side and a few were observed on dirt roads to the south and to the north of the main city. No DT or sign were found around the playa to the west where an airport and runway were constructed. The following DT sign were recorded during the monitoring period: one adult female, one adult male, and one juvenile (live DT); one nest with five eggs; one dead DT; two areas of DT shell fragments; two active burrows; two inactive burrows; and seven sets of tracks.

2006. *DT clearance survey for construction of an equipment pad for monitoring mission activities on the NTTR in Range 63A.*
No formal report was written for this survey.

2006. *DT clearance survey for construction of an equipment pad for the Urban Combat Training Center in Range 62B.*
No formal report was written for this survey.

2007. *DT clearance survey for construction of the Creech Air Force Base (CAFB) bypass road.*
No formal report was written for this survey.

2008. *DT clearance survey for construction of new training facilities at Silver Flag Alpha.*
No formal report was written for this survey.

2008. *DT clearance survey for installation of Thunderbird training markers.*
No formal report was written for this survey.

2010. *DT monitoring for expansion of Silver Flag Alpha on the NTTR.*
No formal report was written for this survey.

2010. *DT monitoring for remediation of depleted uranium area on the South Range of the NTTR.*
No formal report was written for this survey.

Adams Ecology Inc. August 6-23, 2012. *Installation of a Fiber Optics Cable on BLM Land in Indian Springs, Nevada to Service CAFB* (Adams Ecology Inc., 2012)

The Indian Springs Fiber Optics Installation Project site was monitored for DT as required by the BLM for CAFB. Construction personnel were cooperative and alert to DTs during construction, and no negative incidents occurred. No live DTs or DT sign were observed within the bounds of the project during the time of the monitoring events. A preliminary survey of the project site indicated that the site did not appear

to support DT populations. However, monitoring was conducted since the site was located in viable DT habitat. On August 6, 2012, DT biologists conducted a clearance survey to ensure that no DTs were on the project site prior to any vehicles or equipment being moved onto the area. No DTs were observed. Prior to each day's construction activities, the project area was surveyed for DTs. All personnel working on the site were given formal DT training and were required to complete a check list to document the topics covered by the training session. During the entire project life from August 6 through August 23, no DTs or DT sign were observed. Several burrows were identified, but were found to be created by other mammals and not created or used by DTs.

Adams Ecology Inc. January 21, 2015. *CAFB Clearance Survey* (Adams Ecology Inc., 2015)

On January 21, 2015, NNRP conducted a DT and burrowing owl clearance survey of a project area just outside of the boundaries of CAFB that previously supported a casino, gas station, small strip mall, and RV park. These areas were scheduled for demolition and eventual development and incorporation into CAFB. The clearance survey concentrated efforts on DT and burrowing owls to ensure that these species would not be impacted by construction activities. Four qualified biologists conducted the clearance surveys in compliance with current U.S. Fish and Wildlife protocol. The biologists walked transects approximately 20 feet apart inspecting all ground surfaces for live DTs, DT sign, live burrowing owls, and burrowing owl sign. This clearance survey successfully covered 100% of the project area.

During this survey, no live tortoises, tortoise sign, live burrowing owls, or burrowing owl sign were observed. The project area was heavily impacted by public use and development. None of the project area would be considered habitat conducive to either of these species. It was concluded that this area did not support burrowing owl or DT populations, and any construction activity planned for this project area would not impact DT or burrowing owl populations.

Adams Ecology Inc. April 28 to May 20, 2015. *Mile Range Equipment Storage Area DT Monitoring* (Adams Ecology, Inc., 2015)

The NNRP provided DT monitoring for the installation of a new fence around the equipment storage area in Range 64C. The project began on April 28 and continued through May 20. Because the site was located in an area adjacent to DT habitat, a monitor was requested to ensure no take of DT. During the monitoring event, all workers were given DT training and the work areas were subjected to clearance surveys at the start of each work day. No tortoises were observed during the project and the work crew was cooperative and in full compliance with the Programmatic BO.

DT Relative Abundance Surveys

Methodology

Initiated in 2010 and continuing through 2016, transect surveys were conducted to determine the presence/absence and relative abundance of the DT population on the South Range of the NTTR, as required by the INRMP and the Programmatic Biological Opinion for the NTTR (NPBO). According to the NPBO, the action area for consultation included only the South Range and not the North Range because "the North Range occurs outside the range of the DT" (USFWS File No. 1-5-02-F-522). The goal of the project was to provide the USAF with a map showing the relative abundance of DT on the South Range. With the exception of project specific surveys, as required by the NPBO, the last comprehensive DT surveys that were conducted for the NTTR were located in the South Range in 1992. These surveys were relative abundance

surveys that indicated that the DT population was low density in areas that supported DT. The current relative abundance surveys are being conducted for the preparation of the Range Renewal in 2021 and to re-evaluate suitable habitat accordance with the NPBO. These surveys were a modification of the protocol issued by the USFWS DT Recovery Office, titled 2010 USFWS DT Pre-Project Survey Protocol using relative abundance transects as described by Berry and Nicholson (1984). The methodology was developed with informal coordination and approval by the Las Vegas Office of the USFWS and the Natural Resources Manager of NAFB. All surveys were conducted during the active season of DT (Table 1), but scheduling was unpredictable and was based on access due to security and safety issues inherent on a secured USAF facility.

The survey method is used to classify areas according to abundance categories, which are 0-20, 20-50, 50-100, 100-250, and greater than 250 DT/sq.mi. For the surveys on the South Range Study Area, the first class was further divided into 0-5 (DT may not be present) and 6-20 (Low abundance). Past surveys by Woodman indicate that this method is a reasonable measure of the actual abundance category for areas (Woodman, 2006; Berry & Nicholson, 1984). The method involves two steps:

1. Observing and recording the types and numbers of sign along a transect
2. Conversion of sign counts to DT density

For this method, two parallel 0.75-mile belt transects (30 ft. wide) about 100 ft. apart are walked by DT biologists. Thus, approximately 2.5 acres were surveyed per transect (Total of 5.0 acres). During the survey, all DT sign was recorded including live DTs, scat, burrows, pallets, and DT carcasses. Photographs of all live DT were taken, along with any other sign that was noteworthy. If necessary, an adjustment was made to convert total sign to Total Corrected Sign (TCS). For example, if a live DT was observed and it was in a burrow with scat, this was listed as three total sign (live DT; scat; burrow) and one TCS. This rarely occurred on the South Range Study Area. The project was designed to cover all mapped DT habitat and each group of two transects totaling 1.5 miles of transect were walked per square mile. The square miles covered by each transect was arranged by Section, Township, and Range; as designated on USGS topographic maps. Thus, within each section, 1.5 miles of transect was surveyed.

A Garman GPS unit was used to record the location of the start, middle, and end of each transect in WGS 1984 UTM Zone 11N Meters projection. Additionally, the location of any observed sign was recorded. The GPS was also used to ensure that the transect was walked in a relatively straight line, usually in a north to south direction. Some townships and ranges were smaller and oddly shaped if they occurred near the edge of the mapped DT habitat, usually near mountains. This resulted in the shape of the transect being modified to fit the area.

Calibration transects were not used for this study. According to Woodman (2006), most biologists have a range of calibration coefficients from 8.9 to 12.1. Woodman has been using a calibration coefficient of 10 since 1983 and the same coefficient of 10 was used for these studies. Estimated DT abundance was calculated by multiplying the TCS by the calibration coefficient, providing an estimate of DT per square mile. Transects were walked during the active season of DT (April to May; September to October) with the dates being modified each year to compensate for seasonal differences in temperature. Transects were initiated in 2010 and were nearly completed by 2015. Survey dates were often random due to access issues relative to USAF activities and safety. Table 1 and Figure 4 show the surveys conducted each year of the project.

To approximate the density of DT for the South Range, the length of transects (592.5 miles) was multiplied by the average width of the transect (30 ft.) to provide a total area surveyed (2,155 acres or 3.37 sq. mi.). Density was then estimated by dividing the total live DT observed by the area surveyed and adjusted by assuming 90% detection (U.S. Fish and Wildlife Service, 2016). This is a raw estimate that was used for a rough comparison to densities determined for the Eastern Mojave Recovery Unit. Methodology used for

this project did not provide the information required to calculate density using standard procedures described by the USFWS (U.S. Fish and Wildlife Service, 2016) because the study was not designed for that purpose.

Table 1. General information on the DT surveys conducted on the South Range of the NTTR

Year	Dates of Surveys	Miles of Transects Surveyed
2010	April 24-25 May 9 May 16 October 9-11	138
2011	October 9-10	67.5
2012	April 14-15 April 21-22 September 22-23 October 6-8	138
2013	April 28 September 21-22	57
2014	April 5 April 12 April 27 September 27-28	63
2015	April 4-5 April 12 April 18-19 May 23-25 September 26 October 10-12 October 24-25	129
Total	**40 Days**	**592.5**

Burrows were evaluated according to condition as follows:

1. Active w/live DT or recent DT sign
2. Good Condition; Definitely DT and recently used
3. Deteriorated; Definitely DT
4. Deteriorated; Possibly DT
5. Good condition; Possibly DT

Scat was evaluated as follows:

1. Wet or freshly dried; Obvious odor
2. Dried w/ glaze; Some odor; Dark brown
3. Dried, no glaze or odor; Signs of bleaching, tightly packed
4. Dried; Light, light brown to pale yellow loose material; Scaly appearance
5. Bleached; Or consisting only of plant fiber

Carcasses and time of death were evaluated using the following criteria as modified from Woodman and Berry (1984) and Averill-Murray (2000):

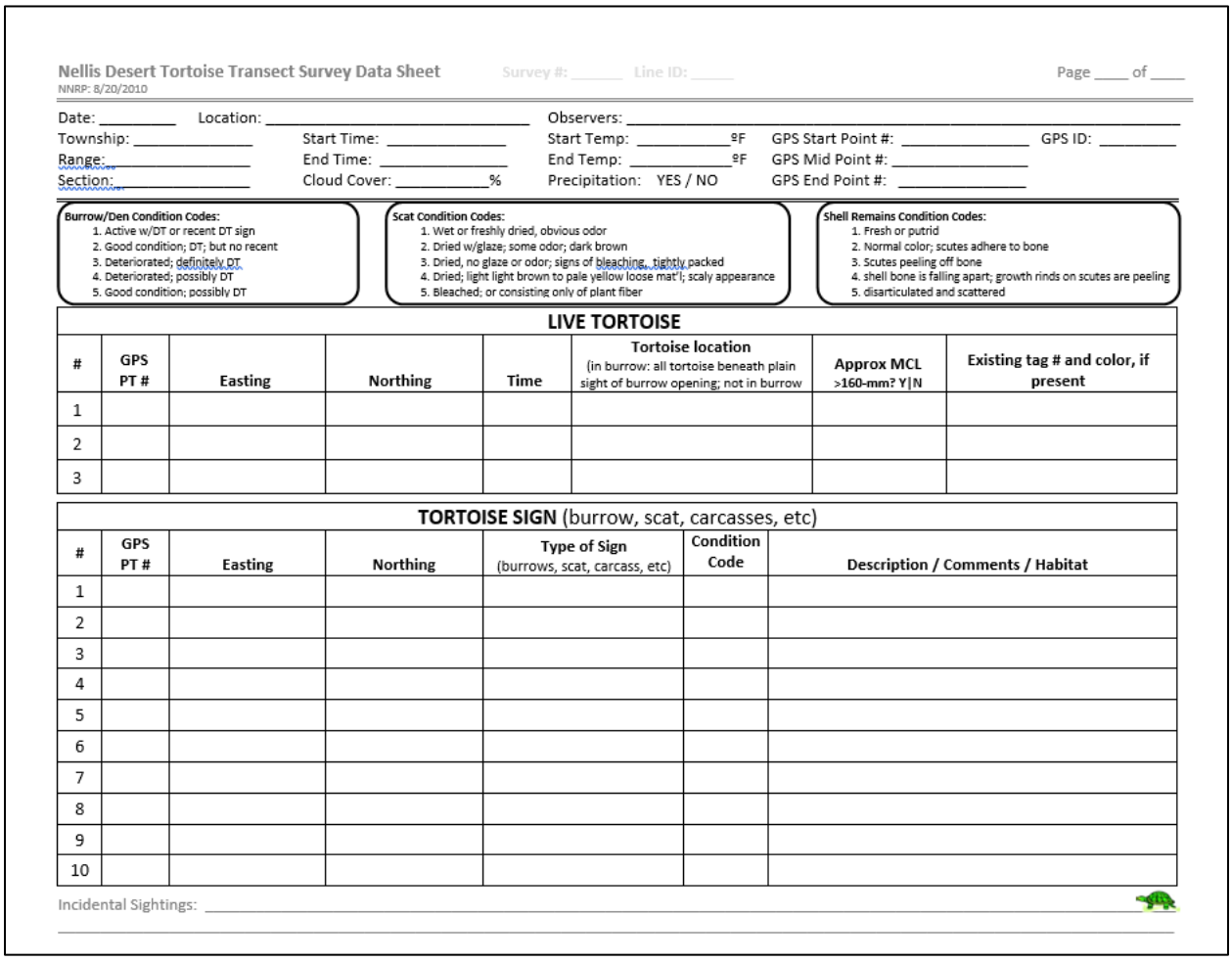
1. Fresh or putrid (Time of Death <1 year)
2. Normal color; scutes adhere to bone (Time of Death <1 year)
3. Scutes peeling off bone (Time of Death = 1-2 years)

4. Shell bone is falling apart; Growth rings on scutes are peeling (2-4 years)
5. Disarticulated and scattered (>4 years)

If a live DT was encountered, the following parameters were measured:

1. Median carapace length
2. Sex
3. Approximate age
4. Condition

An example of the field form used for DT surveys is provided in Figure 3.



Nellis Desert Tortoise Transect Survey Data Sheet Survey #: _____ Line ID: _____ Page ____ of ____

NNRP: 8/20/2010

Date: _____ Location: _____ Observers: _____

Township: _____ Start Time: _____ Start Temp: _____ºF GPS Start Point #: _____ GPS ID: _____

Range: _____ End Time: _____ End Temp: _____ºF GPS Mid Point #: _____

Section: _____ Cloud Cover: _____% Precipitation: YES / NO GPS End Point #: _____

Burrow/Den Condition Codes:
1. Active w/DT or recent DT sign
2. Good condition; DT; but no recent
3. Deteriorated; definitely DT
4. Deteriorated; possibly DT
5. Good condition; possibly DT

Scat Condition Codes:
1. Wet or freshly dried, obvious odor
2. Dried w/glaze; some odor; dark brown
3. Dried, no glaze or odor; signs of bleaching, tightly packed
4. Dried; light light brown to pale yellow loose mat'l; scaly appearance
5. Bleached; or consisting only of plant fiber

Shell Remains Condition Codes:
1. Fresh or putrid
2. Normal color; scutes adhere to bone
3. Scutes peeling off bone
4. shell bone is falling apart; growth rinds on scutes are peeling
5. disarticulated and scattered

LIVE TORTOISE

#	GPS PT #	Easting	Northing	Time	Tortoise location (in burrow: all tortoise beneath plain sight of burrow opening; not in burrow	Approx MCL >160-mm? Y|N	Existing tag # and color, if present
1							
2							
3							

TORTOISE SIGN (burrow, scat, carcasses, etc)

#	GPS PT #	Easting	Northing	Type of Sign (burrows, scat, carcass, etc)	Condition Code	Description / Comments / Habitat
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Incidental Sightings: _____

Figure 3. Form used for entering data collected during the relative abundance surveys on the South Range of NTTR

No formal DT surveys have been conducted on the expansion alternatives. For the Biological Assessment, the USAF has coordinated with the Las Vegas Office of the USFWS, Ecological Services, to develop a DT habitat range model for all expansion alternatives based on vegetation, soils, and other factors. Formal vegetation surveys have been conducted on the expansion alternatives and will be used to prepare detailed vegetation maps of those areas. Those maps will be used to delineate DT habitat in lieu of field surveys. If the alternative areas are incorporated into the withdrawn land, surveys will likely be required by the USFWS in the BO, especially in areas directly impacted by soil disturbances. In 2016, incidental observations of DT and DT sign were recorded during migratory bird surveys and vegetation surveys on the expansion alternatives and those observations are discussed in the results section of this report.

RESULTS

As of the end of 2015, approximately 69% of the DT habitat of the South Range of the NTTR had been surveyed. Of the remaining 31%, 24% is inaccessible to surveyors due to safety and security issues. Thus, only 7% of the habitat remains to be surveyed. A total of 270,860 acres were to be sampled on the South Range of the NTTR. As of the end of 2015, 185,632 acres have been sampled. Figure 4 shows the areas that were surveyed each year of the project.

Seventeen live DTs and 79 active burrows (428 inactive or abandoned) were observed during surveys on the South Ranges of the NTTR (Table 3). During the surveys, 33 carcasses were observed and recorded (Table 2).

Table 2. DT carcasses observed during relative abundance surveys on the South Range of the NTTR

Class	Time of Death	Number of Carcasses
1	<1 year	1
2	<1 year	6
3	1-2 years	5
4	2-4 years	6
5	>4 years	15

This indicates a relatively even distribution of mortality over time. However, no real conclusions can be made since the surveys were not designed to determine mortality rates.

Figures 5 and 6 show the locations of live DTs and other observed DT sign as recorded for the South Range Study Area. Table 3 shows the condition class of burrows that were observed during the South Range surveys. Figure 7 shows the areas that have been completed and the areas remaining to be surveyed as of the end of 2015 (2016 data is not available). The areas shaded in red represent areas that are inaccessible to surveyors due to safety and security issues. The relative abundance surveys indicate that the majority of the South Range supports a low abundance of DT based on the density classes developed for the survey (Figure 8 and Table 4). Suitable habitat is estimated to be 247,459 acres. Of the areas that have been surveyed thus far, approximately 88% were classed as habitat with a low abundance (6-20 DT/sq. mi.) or areas where DT may not be present (0-5 DT/sq. mi.). The remaining 12% supports moderate to high abundance of DT. If the total number of live DT is divided by the total area surveyed (30 ft. x 592.5 mi. or 3.37 sq. mi.), the estimated density of DT on the South Range is approximately 5.2 live DT/sq. mi or 5.8 DT/sq. mi. correcting for 90% detection. This is lower than the average density for the Eastern Mojave Recovery Unit where the average DT density in 2007 was estimated to be 15 live DT/sq. mi. (U.S. Fish and Wildlife Service, 2010). However, the density is comparable to the estimates for 2015 and 2016 for the Eastern Mojave Recovery Unit, which were 4.9 and 7.0 DT/sq. mi., respectively (U.S. Fish and Wildlife Service, 2016). These field surveys support past surveys conducted in 1991-1992 that indicated that most of the South Range supported low density populations of DT (Revegetation Innovations, 1992). The 1992 survey found evidence of DT in 110 of 431 (26%) transects. The 2010-2015 surveys found 178 of 405 transects (44%) showing evidence of DT. This indicates that, based on observed DT sign, the DT population on the South Range is showing a trend towards an increase in size and is comparable in density to populations in the Eastern Mojave Recovery Unit.

Table 3. DT burrows observed during relative abundance surveys on the South Range of the NTTR

Condition Class	Description	Number of Burrows
1	Active w/live DT or recent DT sign	79
2	Good Condition; Definitely DT and recently used	202
3	Deteriorated; Definitely DT	129
4	Deteriorated; Possibly DT	58
5	Good condition; Possibly DT	39

Table 4. Relative abundance of DT on the South Range of the NTTR

Density (DT/sq. mi.)	Abundance Class[1]	Area (acres)	Percent of Surveyed Area (%)
0-5	DT May Not Be Present	99,906	54
6-20	Low Abundance	65,443	34
21-50	Moderate Abundance	17,689	9
51-100	Moderately High Abundance	4,653	3

[1]Abundance classes as described by Berry and Nicholson (1984) and modified by Woodman (2006).

It is important to note that these surveys were not designed to provide accurate estimates of DT density, but are only used to calculate relative abundance. The USFWS has developed standard methodologies to determine densities more accurately and those methods will be used on areas where USAF activities result in any disturbances (especially soil disturbance or habitat removal) that could impact DT. The method used for the South Range survey was the best that could be accomplished during the active DT season, in a large survey area, and with issues involved in scheduling surveys within the constraints of safety, security, and military activities.

Formal DT surveys have not been conducted in the expansion alternatives. Because of the size of the area encompassed by the expansion alternatives, the USAF has coordinated with the USFWS to develop habitat models based on vegetation and other parameters to determine the potential location of DT populations and to measure potential impacts to those populations. This information will be provided in the biological assessment prepared for the LEIS. Field surveys (100% coverage) will likely be required by the USFWS for soil disturbing actions by the USAF if the expansion alternatives are incorporated into the withdrawn land. While other wildlife and vegetation surveys were being completed on all the expansion areas in 2016, incidental sightings of DT and sign were recorded. When such sightings occurred, a GPS point was taken along with condition and any other information that could be gathered. In Expansion Alternatives 3B and 3C two live DT were encountered, while 5 carcasses and 6 burrows were observed (Figures 5 and 6). No DT or DT sign was incidentally observed in Expansion Alternative 3A during vegetation and migratory bird surveys conducted in 2016.

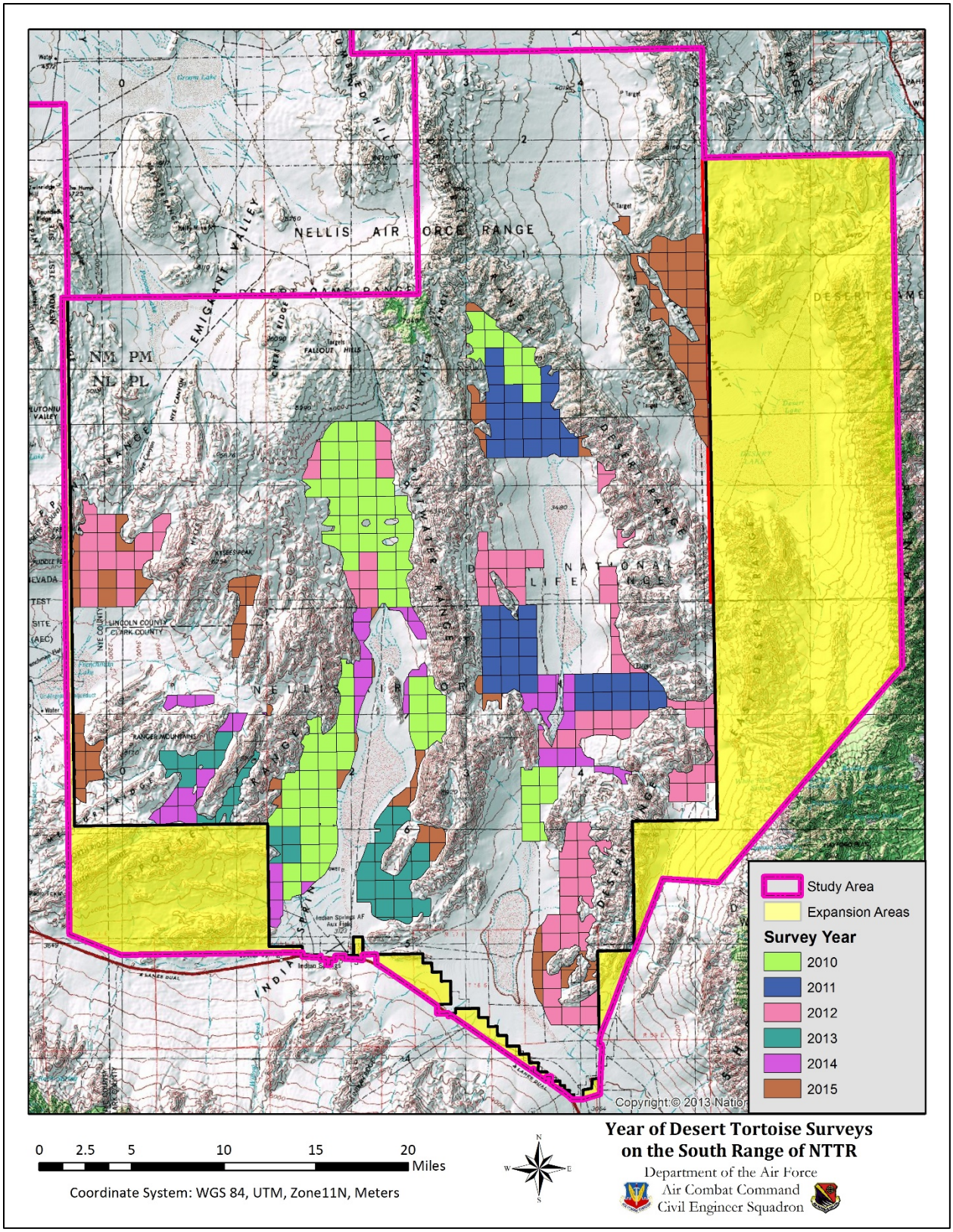


Figure 4. Years that DT surveys were conducted on the South Range of the NTTR

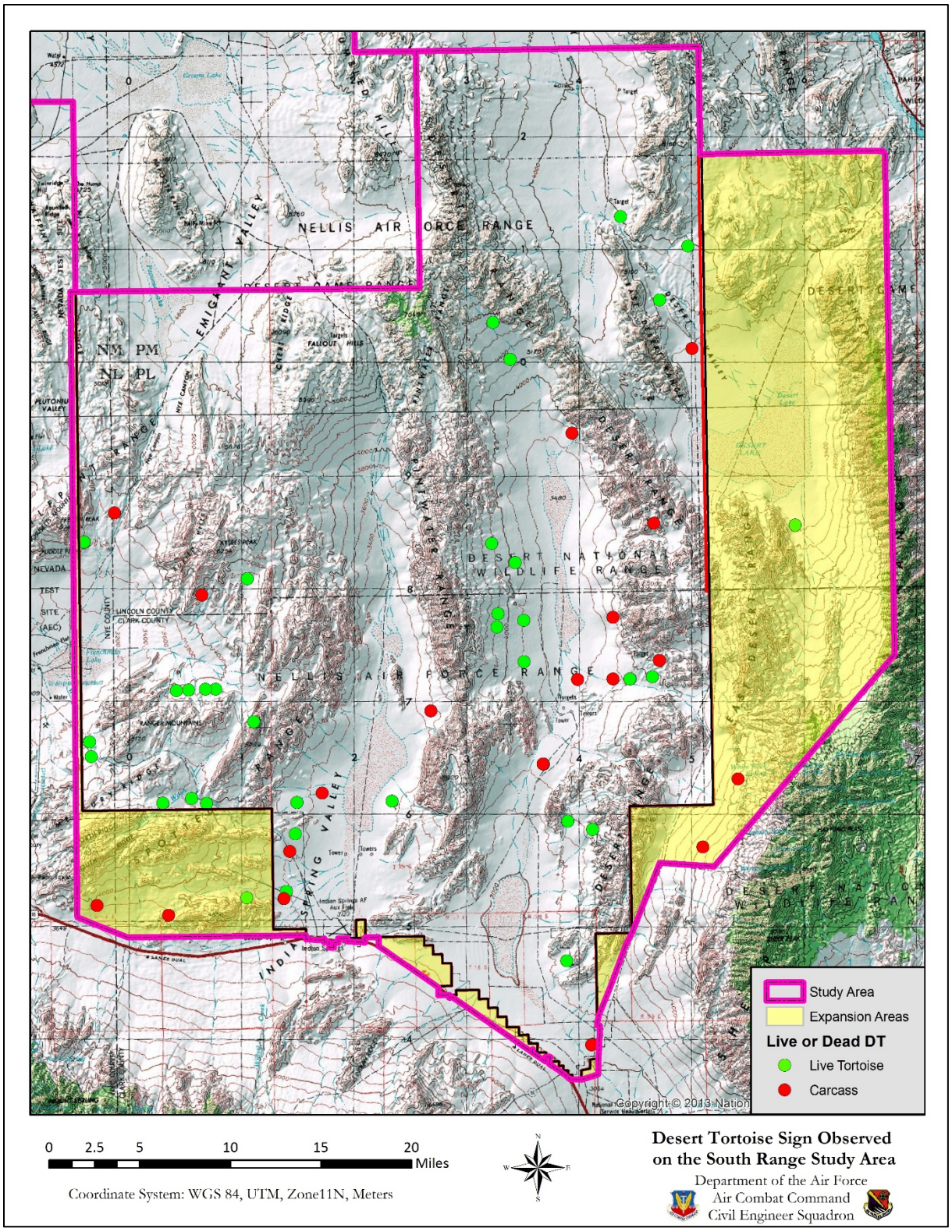


Figure 5. Live desert tortoise and desert tortoise carcasses observed on the South Range Study Area

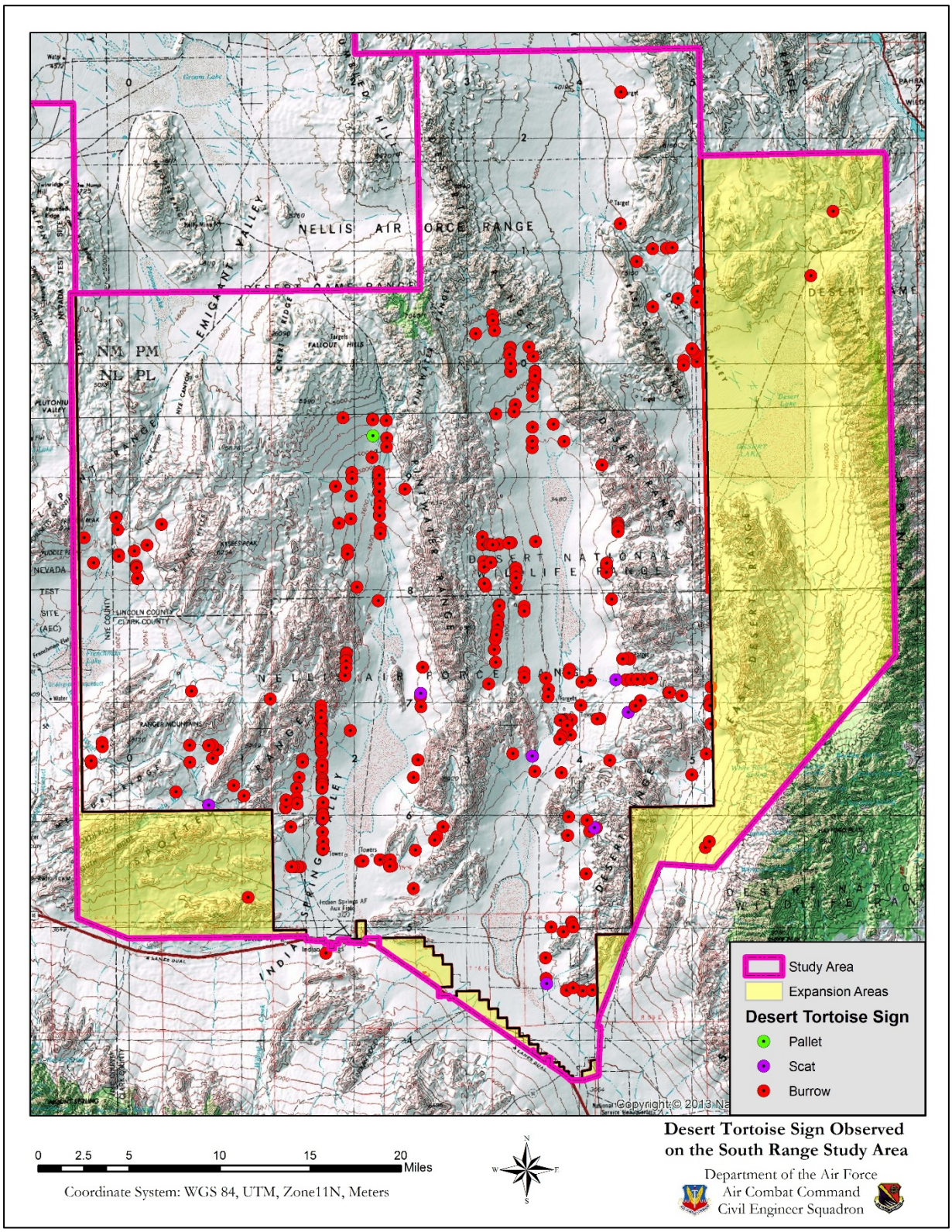


Figure 6. DT sign observed on the South Range Study Area

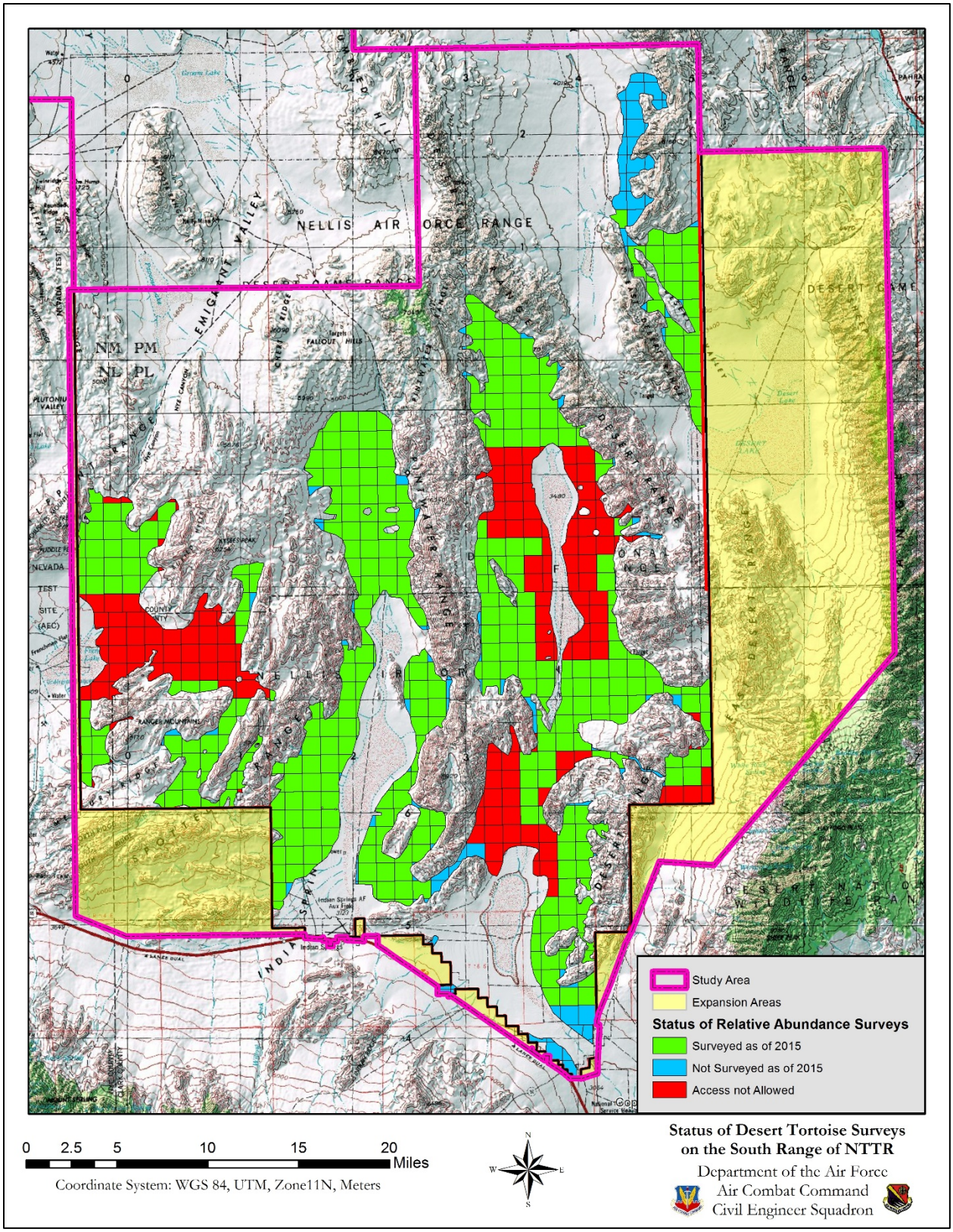


Figure 7. Status of relative abundance surveys on the South Range of the NTTR

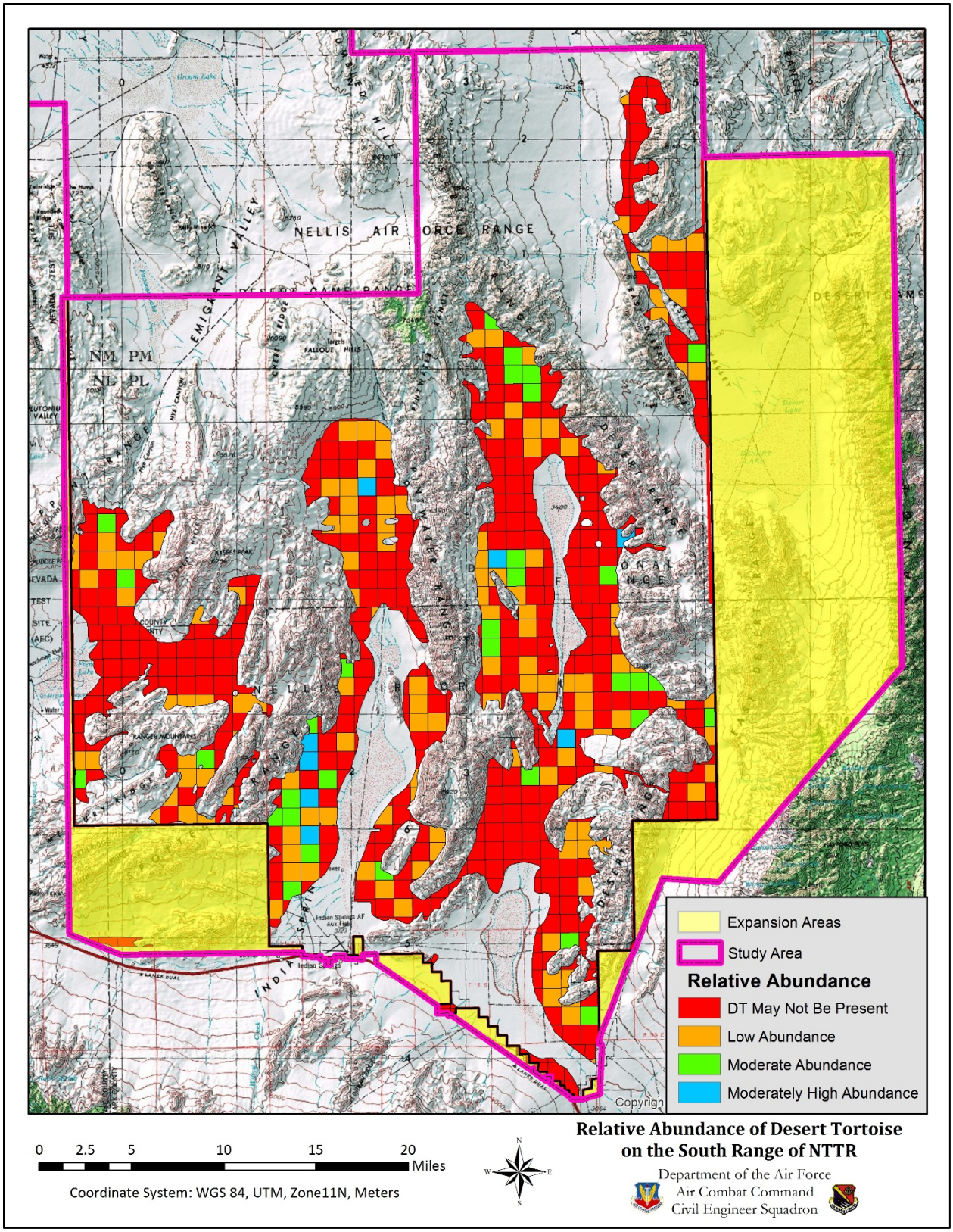


Figure 8. Relative abundance of the DT on the South Range of the NTTR

DT Habitat Mapping

USFWS Approved DT Habitat Map for the South Range of the NTTR

Beginning in 2005, the Nellis Natural Resources Program (NNRP) conducted several helicopter surveys to map and characterize DT habitat on the South Range of the NTTR. Habitat was determined as a factor of various features including geology, soils, and vegetation; as well as slope and topography. Boundaries of the habitat were hand drawn on topographic maps, confirmed in the field, and then eventually digitized into GIS as a shapefile. The map was finalized in 2009 and reviewed by the USFWS at that time. Later, the USFWS accompanied the Natural Resources Manager on a helicopter tour of the South Range to finalize the map, which was officially approved by the USFWS on August 27, 2009. Figure 3 is the map approved by the USFWS. It was agreed that any military mission activities impacting areas shown as DT habitat would require monitoring for DT during the activity and coordination with the USFWS. All other areas would not require monitoring or coordination.

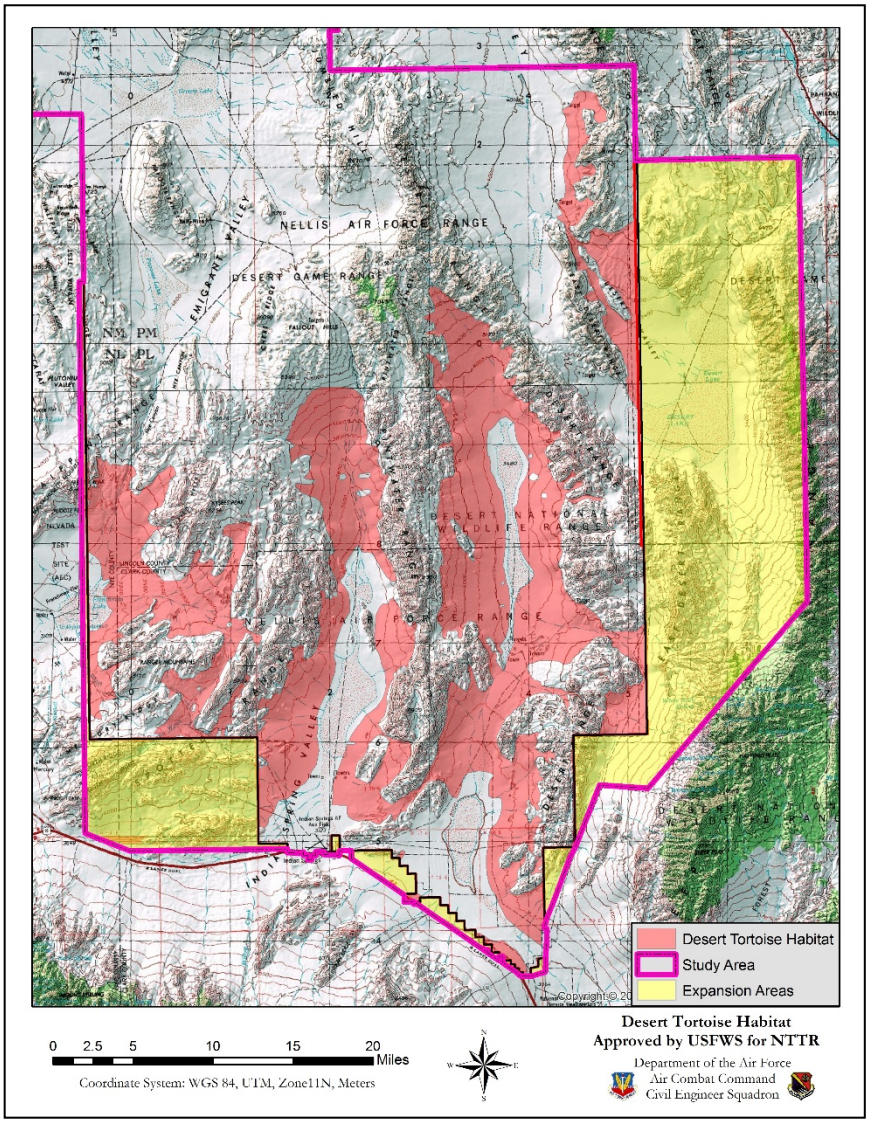


Figure 9. Potential DT habitat as mapped on the South Range of the NTTR

PRELIMINARY DT HABITAT MAPS FOR THE SOUTH RANGE

In 2015, DT habitat was evaluated in several locations on the South Range including Ranges 64A, 64B, 64C, 64D, 64E, 64F, and 65C (Figure 9). Maps of the habitat in these ranges were developed using maps of plant communities and/or actual evaluations at ground truth points. Please note that the DT habitat classification is preliminary in this report and will be updated with additional vegetation information and modeling in the biological assessment that is to be prepared for the LEIS. This report is only providing an update on the current progress of vegetation and DT mapping. It is not intended to be final. A table which shows the plant community and the average field rating for that community with respect to DT habitat is provided for each of the maps. The ratings provided (poor, fair, good) for DT habitat were qualitative and based entirely on the opinion of the biologist in the field. These opinions were based on the composition, diversity, and quality of vegetation, as well as topography and soils. These are preliminary determinations

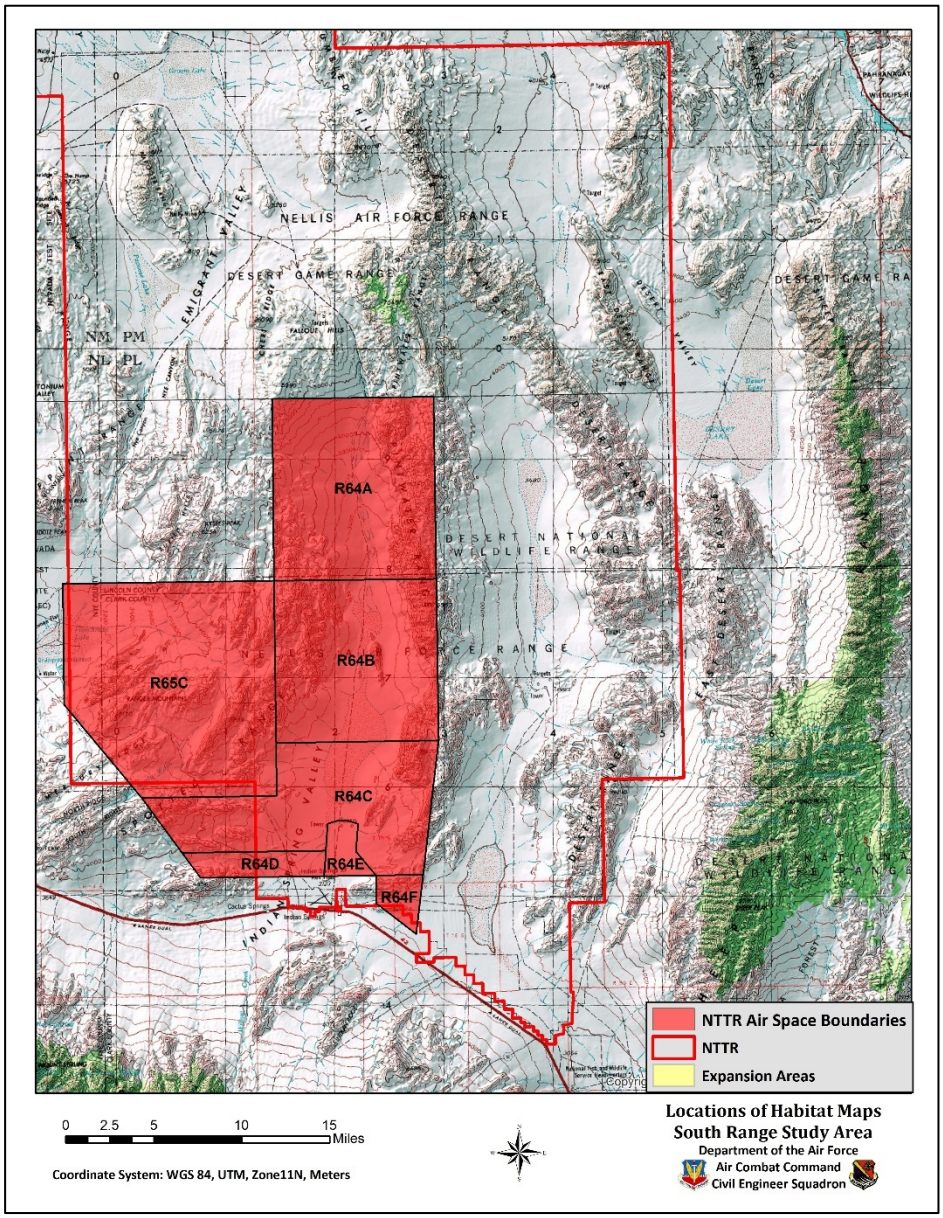


Figure 10. The NTTR air space boundaries showing the location of habitat maps in the figures that follow

and will be finalized after vegetation mapping for the South Range is complete. Habitat was drawn using the boundaries of the plant communities mapped by the NNRP and colorized according to field ratings of DT quality. Please note that these maps are not models, but are maps based entirely on plant community boundaries and qualitative field observations. A model of DT habitat will be prepared using various GIS layers that are available for the study area and will be included in the Biological Assessment that is being prepared for support of the LEIS.

Table 5. DT habitat rating for each of the plant communities identified in Range 64A

Plant Community	DT Habitat Rating
Blackbrush Mixed Scrub	None
Blackbrush Scrub	None
Bladdersage Mixed Scrub	Good
Burroweed Mixed Scrub	Fair
Burroweed Scrub	Poor
Creosote Mixed Scrub	Good
Joshua Tree Mixed Scrub	Fair
Joshua Tree Mixed Woodland	Good
Nevada Joint Fir Mixed Scrub	Good

Table 6. DT habitat rating for each of the plant communities identified in Range 64B

Plant Community	DT Habitat Rating
Atriplex canescens Shrubland Association	None
Desert Pavement Mosaic	Poor
Gutierrezia sarothrae – Atriplex confertifolia / Ephedra torreyana Shrubland	None
Gutierrezia sarothrae – Peucephyllum schottii Shrubland	None
Larrea tridentata - Ambrosia dumosa Shrubland	Fair
Larrea tridentata / Ambrosia dumosa - Atriplex confertifolia – Ephedra torreyana Shrubland	Fair
Larrea tridentata / Ambrosia dumosa / Atriplex confertifolia Shrubland	None
Microphytic Playa - Atriplex confertifolia Sparse Shrubland	None
Microphytic Playa Sparse Vegetation	None
Mountain Slopes	None
Pleuraphis rigida Herbaceous Alliance	None
Purshia mexicana Shrubland	None
Sandy Slopes	None

Table 7. DT habitat rating for each of the plant communities identified in Ranges 64C-F

Plant Community	DT Habitat Rating
Big Galleta Herbaceous Alliance	Fair
Burrobush Mojave Shrubland	Good
Creosote Bush - Burrobush Shrubland	Fair
Creosote Bush Shrubland	Fair
Desert Pavement Mosaic	Poor
Disturbed Areas and Roads	None
Fourwing Saltbush Shrubland (Dense)	None
Fourwing Saltbush Shrubland (Sparse)	None
Longleaf Jointfir Alliance	Fair
Microphytic Playa Shadscale Saltbush Sparse Shrubland	None
Microphytic Playa Sparse Vegetation	None
Mojave Seablite Shrubland	None
Shadscale Saltbush - Burrobush Shrubland	Fair
Shadscale Saltbush Mojave Shrubland	None
Blackbrush Shrubland	None
Nevada Jointfir Shrubland Alliance	None

Plant Community	DT Habitat Rating
JoshuaTree-Spiny Menodora/James Galleta Wooded Shrubland	Poor

Table 8. DT habitat rating for each of the plant communities identified in Range 65C

Plant Community	DT Habitat Rating
Big Galleta Herbaceous Alliance	Fair
Blackbrush - Joshua Tree - Creosote Bush Shrubland Association	Fair
Blackbrush Shrubland	None
Cheesebush/ James' Galleta Shrubland Association	Poor
Burrobush Mojave Shrubland	Good
Creosote Bush - Burrobush Shrubland	Fair
Creosote Bush - Joshua Tree Shrubland Association	Fair
Creosote Bush Shrubland	Fair
Desert Pavement Mosaic	Poor
Disturbed Areas and Roads	None
JoshuaTree-Spiny Menodora/James Galleta Wooded Shrubland	Poor
Joshua Tree Wooded Shrubland Alliance	None
Snakeweed (Broom/Threadleaf) Alliance	None
Fourwing Saltbush Shrubland (Dense)	None
Fourwing Saltbush Shrubland (Sparse)	None
Microphytic Playa Sparse Vegetation	None
Microphytic Playa Shadscale Saltbush Sparse Shrubland	None
Mojave Seablite Shrubland	None
Nevada Jointfir Shrubland Alliance	None
Shadscale Saltbush Mojave Shrubland	None
Stansbury Cliffrose Shrubland Alliance	None

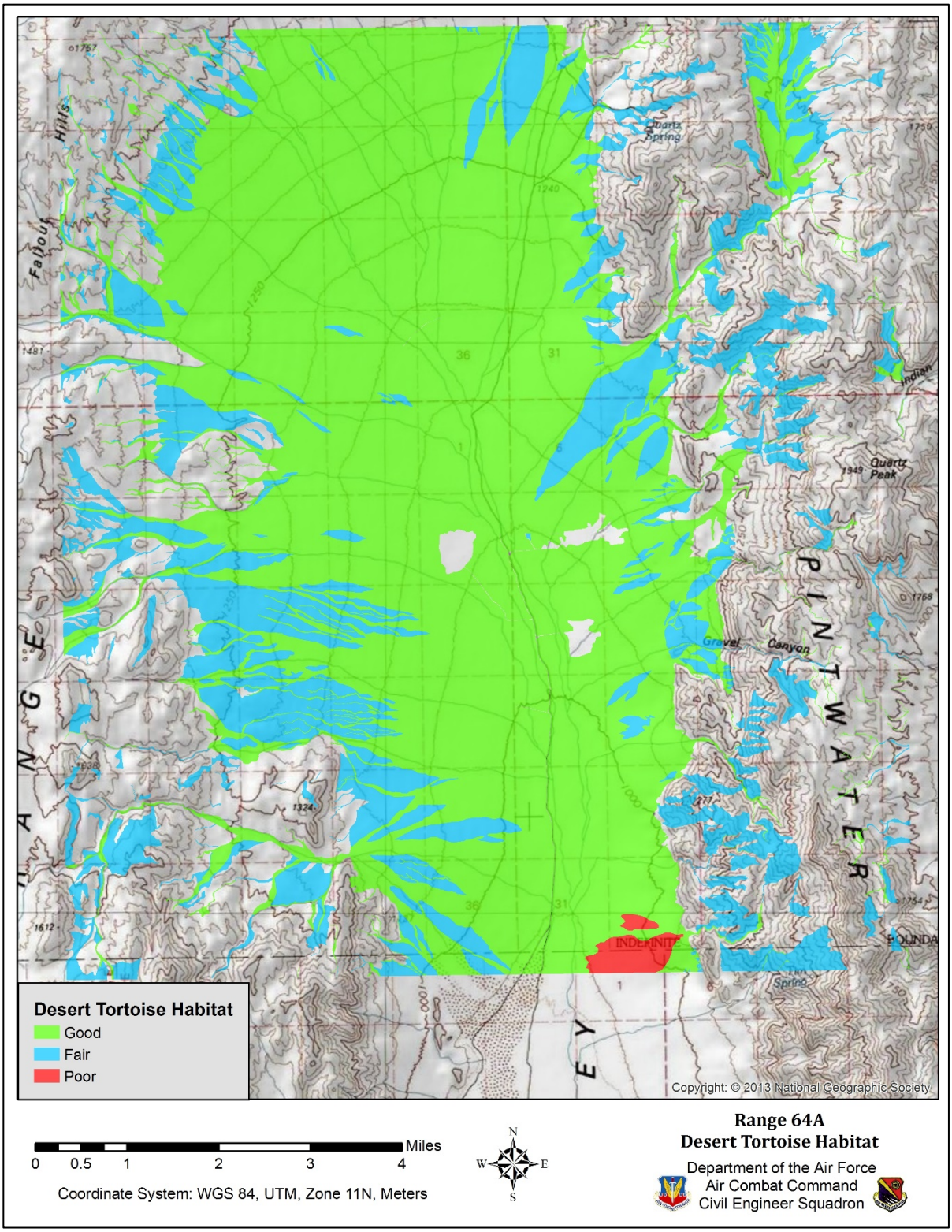


Figure 11. Preliminary DT habitat rating based on plant communities for Range 64A

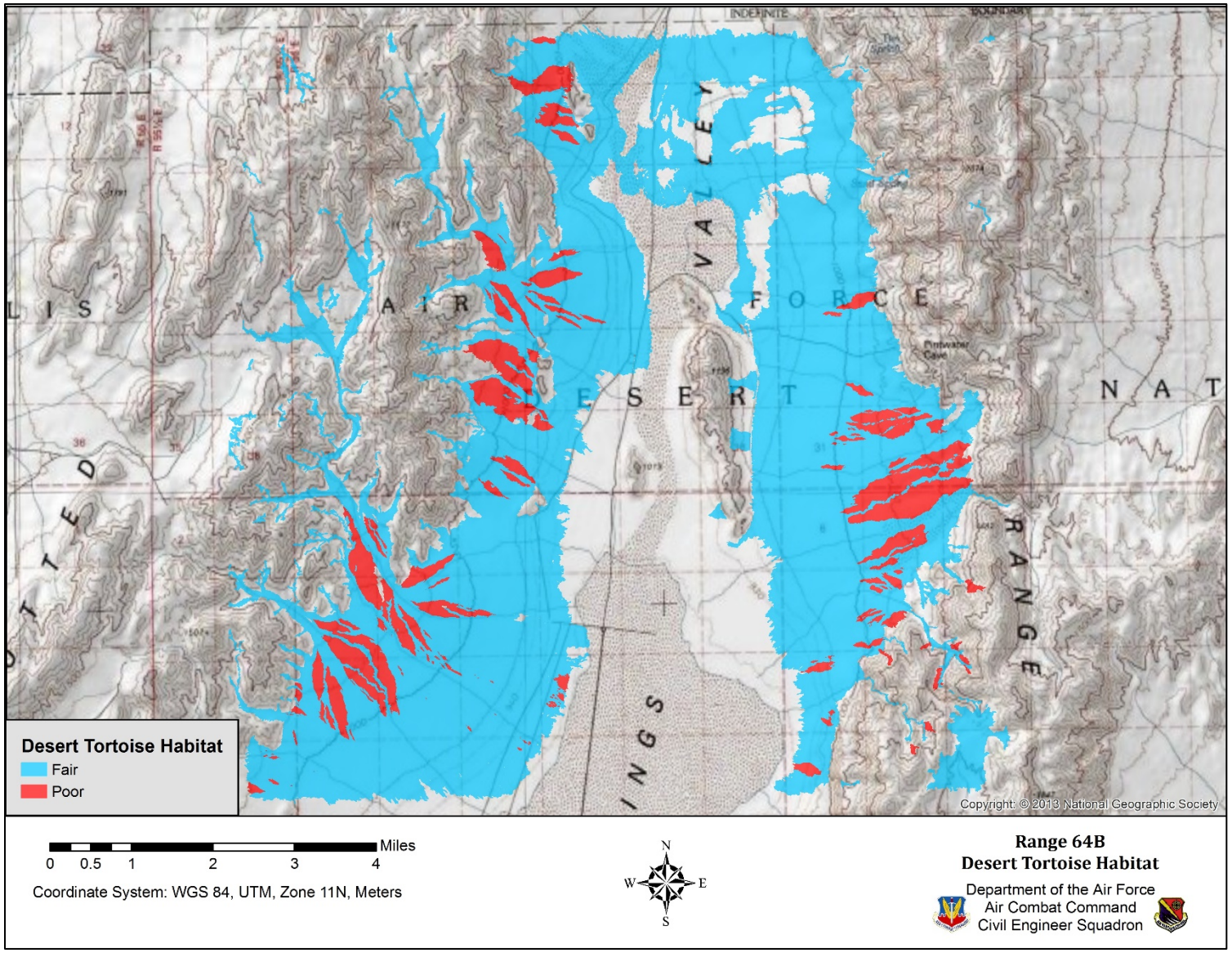


Figure 12. Preliminary DT habitat rating based on plant communities for Range 64B

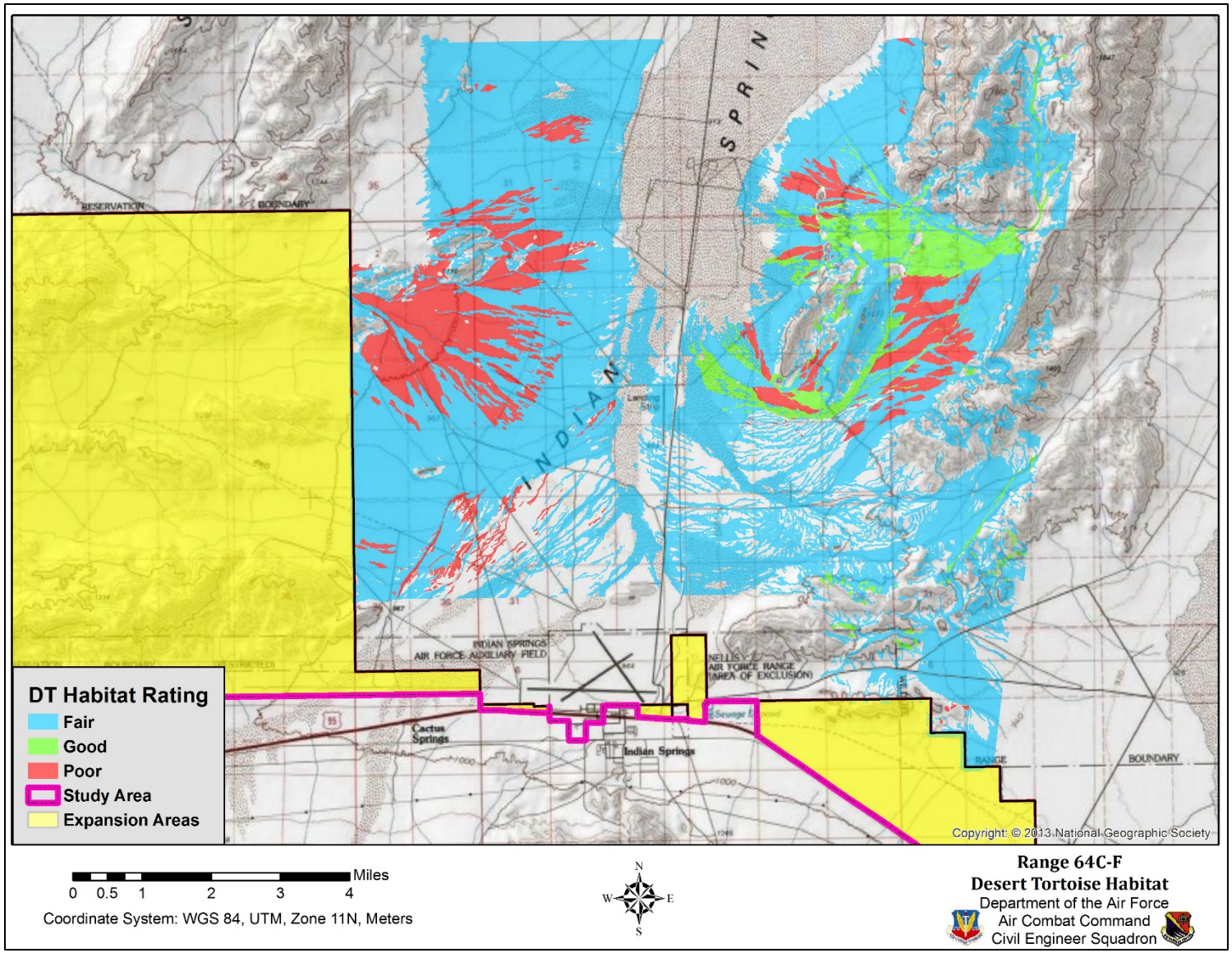


Figure 13. Preliminary DT habitat rating based on plant communities for Ranges 64C-F

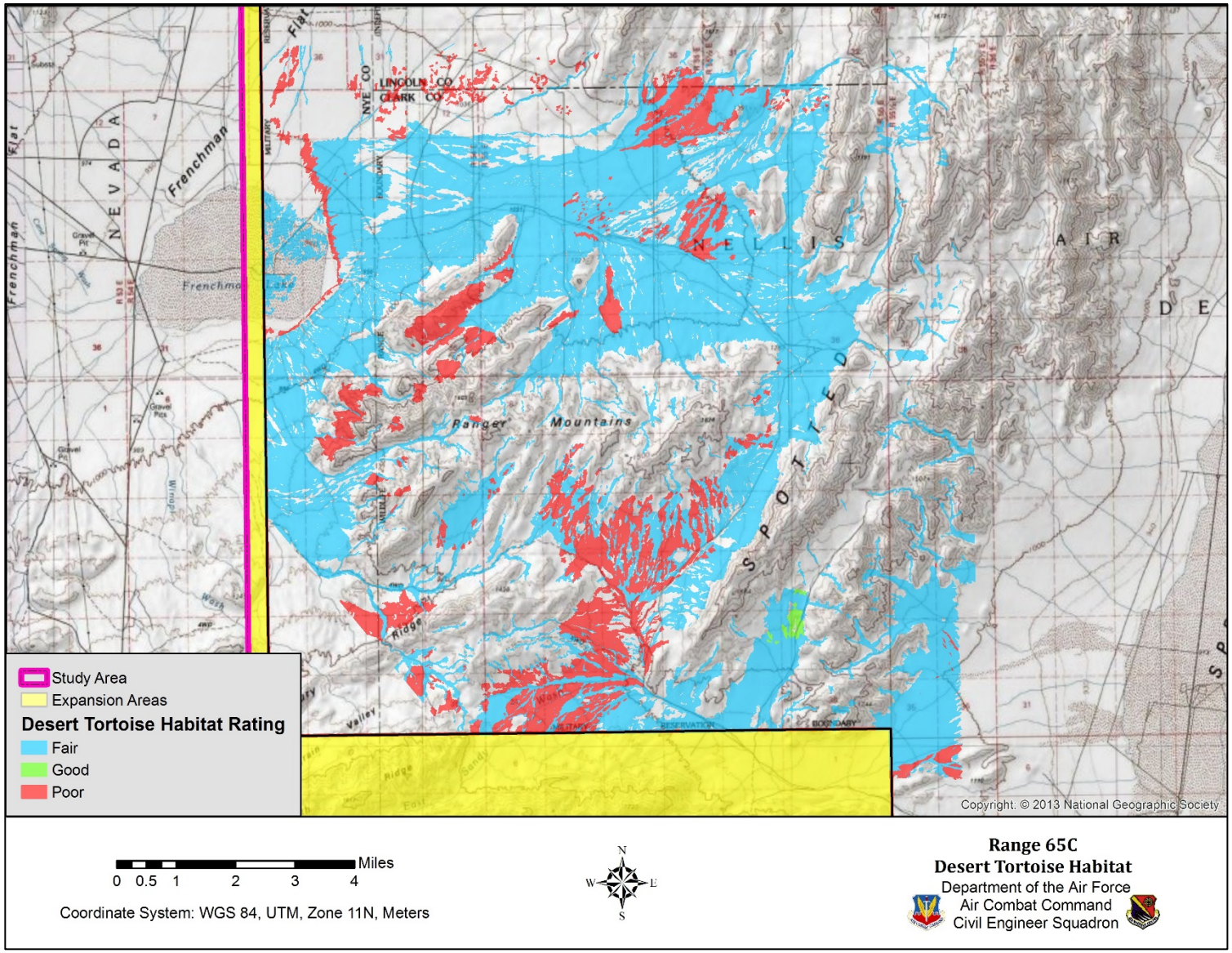


Figure 14. Preliminary DT habitat rating based on plant communities for Range 65C

1

DT Habitat Model

No current or historical surveys have been conducted in the expansion alternatives for determining DT habitat quality or population density. A DT habitat model will be prepared for the Biological Assessment in support of the LEIS to allow measurements of impacts to the DT populations potentially caused by the land withdrawal. This model will use available GIS layers and habitat parameters to create the potential habitat range for the DT in the South Range Study Area. An extensive survey to map vegetation alliances on the expansion alternatives has been conducted and will be used to assist in the delineation of potential DT habitat.

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