United States Department of the Interior

FISH AND WILDLIFE SERVICE
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IN REPLY REFER TO:
PAS 1231.1347.6745

December 29, 2006

Raymond H. Marler
Director, Strategic Programs
Headquarters, National Training Center and Fort Irwin
Department of the Army
Fort Irwin, California 92310-5000

Subject: Biological Opinion for Translocation of Desert Tortoises from the Southern Expansion Area of Fort Irwin to Occupied Habitat, San Bernardino County, California (1-8-05-F-43)

Dear Mr. Marler:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding the potential effects of translocating desert tortoises (*Gopherus agassizii*) to areas that are currently occupied by individuals of this federally threatened species. Also at issue are the effects of the construction of pens near the southeastern boundary of Fort Irwin to hold desert tortoises that are candidates for translocation but exhibit signs of disease, and the installation of a fence to prevent translocated desert tortoises from attempting to cross Interstate 15. This document was prepared in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). Your request for formal consultation regarding the movement of desert tortoises into occupied habitat and construction of pens was dated August 8, 2005 (Army 2005). You requested formal consultation regarding the installation of the fence along Interstate 15 by letter dated December 19, 2006 (Army 2006).

This biological opinion is based on information in the translocation plan for the Southern Expansion Area (Esque et al. 2005) and various reports and publications. A complete administrative record of this consultation is on file at the Service's Ventura Fish and Wildlife Office.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification of critical habitat" at 50 *Code of Federal Regulations* 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

CONSULTATION HISTORY

On July 2, 2003, the Army initiated formal consultation with the Service regarding the use of additional maneuver training lands at Fort Irwin. As part of its action, the Army proposed to translocate desert tortoises from the Southern Expansion Area of Fort Irwin; specifically, the Army committed to preparing a translocation plan for this activity, if the Service concluded in its biological opinion that use of the additional training lands was not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat (Charis Professional Services Corporation 2003). On March 15, 2004, the Service issued a biological opinion in which it reached these conclusions regarding the desert tortoise and its critical habitat (Service 2004).

Consequently, the Army contracted with the U.S. Geological Survey to prepare a comprehensive, peer-reviewed translocation plan. To ensure that the translocation plan would be a thorough and comprehensive document, the U.S. Geological Survey conducted habitat assessments of the translocation area and began to monitor desert tortoises in both the Southern Expansion Area and the translocation area. The Service issued a permit, pursuant to section 10(a)(1)(A) of the Act, to the Army for this monitoring work (Service 2006a); the permit covers activities that may be undertaken by the U.S. Geological Survey and other contractors who are or may be implementing the monitoring and subsequent translocation.

During the consultation regarding the use of additional maneuver training lands at Fort Irwin, the Army and Service concluded that the most appropriate locations to place desert tortoises being moved from Fort Irwin would be those where desert tortoise densities had declined to the extent that the areas were no longer occupied. Surveys conducted by the Bureau of Land Management (Bureau) in support of an amendment to the California Desert Conservation Area Plan and a regional habitat conservation plan for the western Mojave Desert indicated such areas existed within the Fremont-Kramer Desert Wildlife Management Area (Bureau 2003). Consequently, the Service's biological opinion for the use of additional maneuver training lands at Fort Irwin concluded that the translocation of desert tortoises from Fort Irwin to these areas was not likely to have substantial adverse effects on resident animals because very few desert tortoises remained in these areas. After the U.S. Geological Survey began preparation of the translocation plan, its researchers advised the Service that moving desert tortoises from the eastern portion of the Superior-Cronese Desert Wildlife Management Area to the northern portions of the Fremont-Kramer Desert Wildlife Management Area would not be in the best interests of the translocation animals.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

As we noted in the Consultation History section of this biological opinion, the Service issued a permit, pursuant to section 10(a)(1)(A) of the Act, to the Army for activities related to the

translocation of desert tortoises from Fort Irwin to the Southern Expansion Area. Consequently, we will not discuss the details of the translocation in this biological opinion. In this biological opinion, we will evaluate only the effects of moving desert tortoises into occupied habitat, of construction of holding pens near the southeastern boundary of Fort Irwin, and the installation of a fence to prevent translocated desert tortoises from attempting to cross Interstate 15. These potential effects of translocation were not considered in our biological opinion on the effects of the use of the additional training lands on the desert tortoise and its critical habitat (Service 2004).

Movement of Desert Tortoises into Occupied Habitat

The translocation plan notes that desert tortoises would be moved into occupied habitat "in small groups" at densities of 50 to 70 individuals per square mile "to many different sites to disperse them throughout the release areas" (Esque et al. 2005). As noted previously in this biological opinion, the Service has previously analyzed the effects of the actual translocation work through the section 10(a)(1)(A) process.

Staff from the Desert Tortoise Recovery Office and other biologists familiar with the translocation plan and diseases of desert tortoises developed an interim contingency plan for managing disease within the translocation area (Desert Tortoise Recovery Office 2006). The contingency plan calls for desert tortoises in the translocation area that show clinical signs of disease to be moved to the holding pens. Desert tortoises that exhibit signs of having been in captivity will be offered for adoption through established programs. After translocation begins, workers will monitor animals and conduct health assessments on a monthly basis. At various thresholds of detection of disease, male desert tortoises would be moved into the holding pens to be used for research or necropsy. Moribund desert tortoises or those exhibiting severe clinical signs of upper respiratory tract disease will be removed from the translocation area for necropsy.

Construction and Use of Pens to Hold ELISA-Positive Desert Tortoises

The Army proposes to construct doubly fenced pens near the southeastern boundary of Fort Irwin to house desert tortoises that test positive for antibodies to *Mycoplasma* and for those that show signs of upper respiratory tract disease. The fenced area would cover approximately 140 acres and require the installation of approximately 6 miles of fencing. The fence would be constructed according to protocols established by the Service for fences to preclude entry by desert tortoises (see appendix 6 in Esque et al. 2005). The Army did not provide information regarding the manner in which the fence would be constructed; however, most fences of this nature can be constructed using all-terrain vehicles, pickup trucks, and small tractors using mounted equipment.

The Service provided direction regarding the specific manner in which desert tortoises would be evaluated for disease and isolated during the translocation in its recovery permit (Service 2006a). We will not consider those actions in this biological opinion.

Installation of Fencing along Interstate 15

The Army has proposed to install fencing along the southbound side of Interstate 15 from near the Minneola Road exit in the west to near the Afton Canyon Road exit in the east. Recent work has shown that translocated desert tortoises frequently roam substantial distances after they have been removed from their territories (Esque et al. 2005); the purpose of the fence is to prevent translocated desert tortoises from entering the freeway.

In places, the existing fence would be retro-fitted with 1- by 2-inch mesh to prevent desert tortoises from entering the freeway; in other places, the entire fence may need to be replaced with one that meets the Service's recommended standards for desert tortoises (see appendix 6 in Esque et al. 2005). Approximately 24.2 miles of fence would be replaced or retro-fitted (California Department of Transportation 2005). Where necessary, fences would be tied into culverts or underpasses that cross under the freeway.

The Army did not provide information regarding the manner in which the fence would be constructed. As we noted in the previous section of this biological opinion, most fences of this nature can be constructed using all-terrain vehicles, pickup trucks, and small tractors using mounted equipment.

The Army proposed numerous measures to reduce the likelihood that desert tortoises would be killed or injured during installation of the fence. These measures generally include the presence of a biological monitor during construction, clearance of desert tortoises from work areas, flagging of burrows, educating workers regarding the desert tortoise and the protective measures that are in place, checking for desert tortoises under vehicles, and other best management practices typically used for construction projects within habitat of the desert tortoise (Army 2006).

STATUS OF THE DESERT TORTOISE AND ITS CRITICAL HABITAT

Basic Ecology of the Desert Tortoise

The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. It also occurs in Sonora and Sinaloa, Mexico. In California, the desert tortoise occurs primarily within the creosote, shadscale, and Joshua tree series of Mojave desert scrub, and the lower Colorado River Valley subdivision of Sonoran desert scrub. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches, diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982, Turner and Brown 1982, Schamberger and Turner 1986). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. In California, desert tortoises are typically associated with gravelly flats or sandy soils with some clay, but are occasionally found in windblown sand or in rocky terrain (Luckenbach 1982). Desert tortoises occur in the California desert from below sea level to an elevation of 7,300 feet, but the most favorable habitat occurs at elevations of approximately 1,000 to 3,000 feet Luckenbach 1982, Schamberger and Turner 1986).

Desert tortoises may spend more time in washes than in flat areas outside of washes; Jennings (1997) notes that, between March 1 and April 30, desert tortoises "spent a disproportionately longer time within hill and washlet strata" and, from May 1 through May 31, hills, washlets, and washes "continued to be important." Jennings' paper does not differentiate between the time desert tortoises spent in hilly areas versus washes and washlets; however, he notes that, although washes and washlets comprised only 10.3 percent of the study area, more than 25 percent of the plant species on which desert tortoises fed were located in these areas. Luckenbach (1982) states that the "banks and berms of washes are preferred places for burrows;" he also recounts an incident in which 15 desert tortoises along 0.12 mile of wash were killed by a flash flood.

Desert tortoises are most active in California during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and occasionally after summer rain storms. Desert tortoises spend most of their time in the remainder of the year in burrows, escaping the extreme conditions of the desert; however, recent work has demonstrated that they can be active at any time of the year. Further information on the range, biology, and ecology of the desert tortoise can be found in Burge (1978), Burge and Bradley (1976), Hovik and Hardenbrook (1989), Luckenbach (1982), Weinstein et al. (1987), and Service (1994c).

Food resources for desert tortoises are dependent on the availability and nutritional quality of annual and perennial vegetation, which is greatly influenced by climatic factors, such as the timing and amount of rainfall, temperatures, and wind (Beatley 1969, 1974, Congdon 1989, Karasov 1989, Polis 1991 in Avery 1998). In the Mojave Desert, these climatic factors are typically highly variable; this variability can limit the desert tortoise's food resources.

Desert tortoises will eat many species of plants. However, at any time, most of their diet often consists of a few species (Nagy and Medica 1986, Jennings 1993 in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 in Avery 1998). Possible reasons for desert tortoises to alter their preferences may include changes in nutrient concentrations in plant species, the availability of plants, and the nutrient requirements of individual animals (Avery 1998). In Avery's (1998) study in the Ivanpah Valley, desert tortoises consumed primarily green annual plants in spring; they ate cacti and herbaceous perennials once the winter annuals began to disappear. Medica et al. (1982 in Avery 1998) found that desert tortoises ate increased amounts of green perennial grass when winter annuals were sparse or unavailable; Avery (1998) found that desert tortoises rarely ate perennial grasses.

Desert tortoises can produce from one to three clutches of eggs per year. On rare occasions, clutches can contain up to 15 eggs; most clutches contain 3 to 7 eggs. Multi-decade studies of the Blanding's turtle (*Emydoidea blandingii*), which, like the desert tortoise, is long lived and matures late, indicate that approximately 70 percent of the young animals must survive each year until they reach adult size; after this time, annual survivorship exceeds 90 percent (Congdon et al. 1993). Research has indicated that 50 to 60 percent of young desert tortoises typically survive from year to year, even in the first and most vulnerable year of life. We do not have sufficient

information on the demography of the desert tortoise to determine whether this rate is sufficient to maintain viable populations; however, it does indicate that maintaining favorable habitat conditions for small desert tortoises is crucial for the continued viability of the species.

Desert tortoises typically hatch from late August through early October. At the time of hatching, the desert tortoise has a substantial yolk sac; the yolk can sustain them through the fall and winter months until forage is available in the late winter or early spring. However, neonates will eat if food is available to them at the time of hatching; when food is available, they can reduce their reliance on the yolk sac to conserve this source of nutrition. Neonate desert tortoises use abandoned rodent burrows for daily and winter shelter; these burrows are often shallowly excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises.

Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

In summary, the ecological requirements and behavior of neonate and juvenile desert tortoises are substantially different than those of subadults and adults. Smaller desert tortoises use abandoned rodent burrows, which are typically more fragile than the larger ones constructed by adults. They are active earlier in the season. Finally, small desert tortoises rely on smaller annual plants with greater protein content to be able to gain access to food and to grow, respectively.

Status of the Desert Tortoise

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326).

In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178).

The desert tortoise was listed in response to loss and degradation of habitat caused by numerous human activities including urbanization, agricultural development, military training, recreational use, mining, and livestock grazing. The loss of individual desert tortoises to increased predation by common ravens, collection by humans for pets or consumption, collisions with vehicles on paved and unpaved roads, and mortality resulting from diseases also contributed to the Service's listing of this species.

The following paragraphs provide general information on the results of efforts to determine the status and trends of desert tortoise populations across a large portion of its range; we present information on the status of the desert tortoise within the action area in the Environmental Baseline section of this biological opinion. We have grouped these paragraphs by recovery unit and critical habitat unit; we will describe these units in more detail later in this biological opinion.

Before entering into a discussion of the status and trends of desert tortoise populations across its range, a brief discussion of the methods of estimating the numbers of desert tortoises would be useful. Three primary methods have been widely used: permanent study plots, triangular transects, and line distance sampling.

Generally, permanent study plots are defined areas that are visited at roughly 4-year intervals to determine the numbers of desert tortoises present. Desert tortoises found on these plots during the spring surveys were registered; that is, they were marked so they could be identified individually during subsequent surveys. Between 1971 and 1980, 27 plots were established in California to study the desert tortoise; 15 of these plots were used by the Bureau to monitor desert tortoises on a long-term basis (Berry 1999). Range-wide, 49 plots have been used at one time or another to attempt to monitor desert tortoises (Tracy et al. 2004).

Triangular transects are used to detect sign (i.e., scat, burrows, footprints, etc.) of desert tortoises. The number of sign is then correlated with standard reference sites, such as permanent study plots, to allow the determination of density estimates.

Finally, line distance sampling involves walking transects while trying to detect live desert tortoises. Based on the distance of the desert tortoise from the centerline of the transect, the length of the transect, and a calculation of what percentage of the animals in the area were likely to have been above ground and visible to surveyors during the time the transect was walked, an estimation of the density can be made. Each of these methods has various strengths and weaknesses; the information we present on the density of desert tortoises across the range and in the action area is based on these methods of collecting data.

Note that, when reviewing the information presented in the following sections, determining the number of desert tortoises over large areas is extremely difficult. The report prepared by the Desert Tortoise Recovery Plan Assessment Committee (Tracy et al. 2004) acknowledges as much. Desert tortoises spend much of their lives underground or concealed under shrubs, are not very active in years of low rainfall, and are distributed over a wide area in several different types of habitat. Other factors, such as the inability to sample on private lands and rugged terrain, further complicate sampling efforts. Consequently, the topic of determining the best way to estimate the abundance of desert tortoises has generated many discussions over the years. As a result of this difficulty, we cannot provide concise estimations of the density of desert tortoises in each recovery unit or desert wildlife management area that have been made in a consistent manner.

Given the difficulty in determining the density of desert tortoises over large areas, the reader needs to understand fully that the differences in density estimates in the recovery plan and those derived from subsequent sampling efforts may not accurately reflect on-the-ground conditions.

Despite this statement, the reader should also be aware that the absence of live desert tortoises and the presence of carcasses over large areas of some desert wildlife management areas provide at least some evidence that desert tortoise populations seem to be in a downward trend in some regions.

Upper Virgin River Recovery Unit

The Upper Virgin River Recovery Unit is located in the northeastern most portion of the range of the desert tortoise; the Red Cliffs Reserve was established as a conservation area within this critical habitat unit. The recovery plan states that desert tortoises occur in densities of up to 250 adult animals per square mile within small areas of this recovery unit; overall, the area supports a mosaic of areas supporting high and low densities of desert tortoises (Service 1994c).

We have summarized the information in this paragraph from a report by the Utah Division of Wildlife Resources (McLuckie et al. 2003). The Utah Division of Wildlife Resources has intensively monitored desert tortoises, using a distance sampling technique, since 1998. Monitoring in 2003 indicated that the density of desert tortoises was approximately 44 per square mile throughout the reserve. This density represents a 41 percent decline since monitoring began in 1998. The report notes that the majority of desert tortoises that died within one year (n=64) were found in areas with relatively high densities; the remains showed no evidence of predation. Upper respiratory tract disease has been observed in this population; the region also experienced a drought from 1999 through 2002, with 2002 being the driest year. McLuckie et al. (2003) attribute the primary cause of the die-off to drought, but note that disease, habitat degradation, direct mortality of animals, and predation by domestic dogs and common ravens were also factors in the decline. The average density of desert tortoises in this recovery unit, based on line-distance sampling conducted in 2001, 2003, and 2005 was 59.4 per square mile (Service 2006b).

Northeastern Mojave Recovery Unit

The Northeastern Mojave Recovery Unit is located to the southwest of the Upper Virgin River Recovery Unit and extends through Nevada and into California in Ivanpah Valley. Several critical habitat units and four desert wildlife management areas are located within this recovery unit. Tracy et al. (2004) note that densities of adult desert tortoises for the overall region do not show a statistical trend over time.

The Beaver Dam Slope Desert Wildlife Management Area covers portions of Nevada, Utah, and Arizona; it is located to the southwest of the Red Cliffs Reserve. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 5 to 56 animals per square mile (Service 1994c). McLuckie et al. (2001) estimated the density in 2001 to be approximately 7.9 reproductive desert tortoises per square mile, using a distance sampling method. However, they also note several problems with the sampling effort, including too few transects and transects placed in habitat types not normally inhabited by desert tortoises; we also note that, as described in the previous paragraph, the survey occurred during a year of lower-than-average rainfall, which would decrease activity levels of desert tortoises and make them more difficult to detect. The encounter rate during this survey was so low that the precision level of the results is low; other monitoring plots, from earlier years, showed higher density estimates.

The Gold Butte-Pakoon Desert Wildlife Management Area covers portions of Nevada and Arizona, generally south of the Beaver Dam Slope Desert Wildlife Management Area. The recovery plan states that densities of desert tortoises in this recovery unit vary from 5 to 56 animals per square mile (Service 1994c).

The Mormon Mesa Desert Wildlife Management Area is located entirely in Nevada, generally west and northwest of the Beaver Dam Slope and Gold Butte-Pakoon desert wildlife management areas, respectively. The recovery plan states that densities of desert tortoises in this recovery unit vary from 41 to 87 subadult and adult animals per square mile (Service 1994c).

The Coyote Springs Desert Wildlife Management Area is located entirely in Nevada, generally west of the Mormon Mesa Desert Wildlife Management Area and east of the Desert National Wildlife Refuge. The recovery plan states that densities of desert tortoises in this recovery unit vary from 0 to 90 adult animals per square mile (Service 1994c). Kernel analysis for the Coyote Springs Desert Wildlife Management Area showed areas where the distributions of carcasses and living desert tortoises do not overlap (Tracy et al. 2004); this scenario is indicative of a higher than average rate of mortality. (The Desert Tortoise Recovery Plan Assessment Committee used a kernel analysis to examine the distribution of live desert tortoises and carcasses over large areas of the range of the species (Tracy et al. 2004). The intent of this analysis is to determine where large areas with numerous carcasses do not overlap large areas with live animals. Regions where the areas of carcasses do not overlap areas of live animals likely represent recent die-offs or declines in desert tortoise populations.) Because permanent study plots for this region were discontinued after 1996, recent declines in numbers would not be reflected in the kernel analysis if they had occurred.

The Ivanpah Desert Wildlife Management Area lies east of the Mojave National Preserve and covers approximately 36,795 acres. It is contiguous with National Park Service lands; note that the National Park Service did not designate desert wildlife management areas within the Mojave National Preserve because it considers that all of its lands are managed in a manner that is conducive to the recovery of the desert tortoise. The permanent study plot in the Ivanpah Valley is located within the Mojave National Preserve and provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1986, 1990, and 1994; the densities of desert tortoises of all sizes per square mile were 386, 393, 249, and 164, respectively (Berry 1996). (Numerous data sets are collected from the study plots and various statistical analyses conducted to provide information on various aspects of trends. We cannot, in this biological opinion, provide all of this information; therefore, we have selected the density of desert tortoises of all sizes per square mile to attempt to indicate trends.) The number of juvenile and immature desert tortoises on the study plot declined, although the number of adult animals remained fairly constant. The notes accompanying this report indicated that the "ill juvenile and dead adult male (desert) tortoises salvaged for necropsy contained contaminants;" it also cited predation by common ravens and the effects of cattle grazing as causative factors in the decline in the number of juvenile and immature desert tortoises on the study plot (Berry 1996). In 2002, workers found 55 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005).

The average density of desert tortoises in this recovery unit was 5.1 per square mile (Service 2006b). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Eastern Mojave Recovery Unit

The Eastern Mojave Recovery Unit extends from west of Clark Mountain, south through the Mojave National Preserve, and east into southern Nevada. Within this recovery unit, the Bureau designated the Shadow Valley and Piute-Fenner desert wildlife management areas within California and the Piute-El Dorado Desert Wildlife Management Area in Nevada.

The Shadow Valley Desert Wildlife Management Area, which occupies approximately 101,355 acres, lies north of Interstate 15 and west of the Clark Mountains. The Mojave National Preserve is located to the south of the interstate. Data on desert tortoises on a permanent study plot in this area were collected in 1988 and 1992; the densities of desert tortoises of all sizes per square mile were 50 and 58, respectively (Berry 1996). Although these data seem to indicate a slight increase in the number of desert tortoises, in 2002, workers found five desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). Some signs of shell disease have been observed in the population in recent years (Bureau 2002).

The Bureau's Piute-Fenner Desert Wildlife Management Area lies to the east of the southeast portion of the Mojave National Preserve and is contiguous with National Park Service lands. It occupies approximately 173,850 acres. The Goffs permanent study plot, which is located within

the Mojave National Preserve, provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1990, and 1994; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 440, 362, and 447 individuals per square mile, respectively. As Berry (1996) noted, these data seem to indicate that this area supported "one of the more stable, high density populations" of desert tortoises within the United States. Berry (1996) also noted that "a high proportion of the animals (had) shell lesions." In 2000, only 30 live desert tortoises were found; Berry (2000) estimated the density of desert tortoises at approximately 88 animals per square mile. The shell and skeletal remains of approximately 393 desert tortoises were collected; most of these animals died between 1994 and 2000. Most of the desert tortoises exhibited signs of shell lesions; three salvaged desert tortoises showed abnormalities in the liver and other organs and signs of shell lesions. None of the three salvaged desert tortoises tested positive for upper respiratory tract disease.

The Piute-Eldorado Desert Wildlife Management Area is located entirely in southern Nevada and is contiguous with California's Piute-Fenner Desert Wildlife Management Area. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 40 to 90 adults per square mile (Service 1994c). A kernal analysis of the results of distance sampling data from 2001 depicted large areas where only carcasses were detected (Tracy et al. 2004). Only six live desert tortoises were encountered in approximately 103 miles of transects during this sampling effort; this encounter rate is very low.

The average density of desert tortoises in this recovery unit was 54.3 per square mile (Service 2006b). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Northern Colorado Recovery Unit

The Northern Colorado Recovery Unit extends from Interstate 40 south, almost to Interstate 10 and from the eastern portions of Joshua Tree National Park east to the Colorado River; it is located immediately south of the Eastern Mojave Recovery Unit. The 874,843-acre Chemehuevi Desert Wildlife Management Area, which is managed by the Bureau, is the sole conservation area for the desert tortoise in this recovery unit.

Two permanent study plots are located within this desert wildlife management area. At the Chemehuevi Valley and Wash plot, 257 and 235 desert tortoises were registered in 1988 and 1992, respectively (Berry 1999). During the 1999 spring survey, only 38 live desert tortoises were found. The shell and skeletal remains of at least 327 desert tortoises were collected; most, if not all, of these animals died between 1992 and 1999. The frequency of shell lesions and nutritional deficiencies appeared to be increasing and may be related to the mortalities.

The Upper Ward Valley permanent study plot was surveyed in 1980, 1987, 1991, and 1995; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 437, 199, 273, and 447 individuals per square mile, respectively. In 2002, workers found 17 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005).

The average density of desert tortoises in this recovery unit was 19.0 per square mile (Service 2006b). The line-distance sampling from which this density was derived was conducted in 2001, 2003, 2004, and 2005.

Eastern Colorado Recovery Unit

The Eastern Colorado Recovery Unit, which is located immediately south of the Northern Colorado Recovery Unit, extends from just north of Interstate 10 south to the Mexico border near Yuma, Arizona; the Salton Sink and Imperial Valley form the western edge of this recovery unit, which extends east to the Colorado River. The Chuckwalla Desert Wildlife Management Area, which covers 818,685 acres, is the sole conservation area for the desert tortoise in this recovery unit. The Marine Corps (Chocolate Mountains Aerial Gunnery Range), Bureau, and National Park Service (Joshua Tree National Park) manage the Federal lands in this recovery unit and desert wildlife management area. Two permanent study plots are located within this desert wildlife management area.

At the Chuckwalla Bench plot, Berry (1996) calculated approximate densities of 578, 396, 167, 160, and 182 desert tortoises per square mile in 1979, 1982, 1988, 1990, and 1992, respectively. In 1997, workers found 52 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). At the Chuckwalla Valley plot, Berry (1996) calculated approximate densities of 163, 181, and 73 desert tortoises per square mile in 1980, 1987, and 1991, respectively. Tracy et al. (2004) concluded that these data show a statistically significant decline in the number of adult desert tortoises over time; they further postulate that the decline on the Chuckwalla Bench plot seemed to be responsible for the overall significant decline within the recovery unit.

The average density of desert tortoises in this recovery unit was 18.1 per square mile (Service 2006b). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Western Mojave Recovery Unit

Although desert tortoises were historically widespread in the western Mojave Desert, their distribution within this region was not uniform. For example, desert tortoises likely occurred at low densities in the juniper woodlands of the western Antelope Valley and in the sandier habitats in the Mojave River valley. They were also likely largely absent from the higher elevations of the Ord and Newberry mountains and from playas and the areas immediately surrounding these dry lakes. Several large areas of land that are not managed by the Bureau lie within the Western Mojave Recovery Unit; because of their size, these areas are not affected by the Bureau's management of public lands and are therefore not part of the action area for this consultation. These areas lie primarily on military bases, within Joshua Tree National Park, and in areas of private land.

Desert tortoises occur over large areas of Fort Irwin, which is managed by the Department of the Army (Army). At Fort Irwin, the Army conducts realistic, large-scale exercises with large numbers of wheeled and tracked vehicles. In areas where training has occurred for many decades, desert tortoises persist in relatively low numbers primarily on the steep, rugged slopes of the mountain ranges that occur throughout Fort Irwin. Through Public Law 107-107, approximately 118,600 acres were added to Fort Irwin along its southwestern and eastern boundaries in 2002. Approximately 97,860 acres of the Superior-Cronese Critical Habitat Unit lie along the original southern boundary of Fort Irwin and in the parcel to the southwest that was added in 2002 (Charis Professional Services Corporation 2003, Army 2004). Currently, the Army may conduct some low intensity training in these areas on occasion and some preparations for the onset of force-on-force training should begin soon. To date, these parcels have not been used for force-on-force training; within the next few years, the Army will begin to use a large portion of these lands for maneuvers with numerous wheeled and tracked vehicles. In our biological opinion regarding the effects of the use of these lands for training on the desert tortoise (Service 2004), we noted that approximately 1,299 to 1,349 adult desert tortoises may occur within the action area for that consultation. The Army established several conservation areas, totaling approximately 16,900 acres, just inside the boundaries of Fort Irwin where maneuvers would not occur. The Army calculated that approximately 152 desert tortoises may reside within these areas; these animals are unlikely to be affected by use of the new training lands. Additionally, because of other restrictions that the Army will follow during training, approximately 5,500 acres of critical habitat of the desert tortoise within the additional training lands will not be used for force-on-force training. These lands lie primarily on and around dry lakes, which generally do not support large numbers of desert tortoises, because the lake beds themselves do not provide suitable habitat and the areas immediately surrounding the playas usually support substrates composed of clays and silt that are not suitable for burrowing. Finally, in the Eastgate portion of Fort Irwin, approximately 288 desert tortoises may be exposed to additional training; however, most of these animals are located in an area that is unlikely to receive much used by vehicles and are thus unlikely to be affected. The Army and Service have agreed that desert tortoises within new training areas that are likely to be killed by maneuvers will be translocated to newly acquired lands to the south of Fort Irwin; a plan for this translocation is currently under development.

The Navy has designated approximately 200,000 acres of the South Range at the Naval Air Weapons Station, China Lake as a management area for the desert tortoise (Service 1995). Through a consultation with the Service (1992), the Navy agreed to try to direct most ground-disturbing activities outside of this area, to use previously disturbed areas for these activities when possible, and to implement measures to reduce the effects of any action on desert tortoises. This area also encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station; it continues to be used as an active bombing range for military test and training operations by the Navy and Department of Defense. In the 3 years for which we had annual reports available, activities conducted by the Navy did not kill or injure any desert tortoises (Navy 1995, 2001, 2002). In general, desert tortoises occur in low densities on the North Range of the Naval Air Weapons Station; Kiva Biological Consulting and McClenahan and Hopkins

Associates (in Service 1992) reported that approximately 136 square miles of the North Range supported densities of 20 or fewer desert tortoises per square mile. The South Range supported densities of 20 or fewer desert tortoises per square mile over an area of approximately 189 square miles and densities of greater than 20 per square mile on approximately 30 square miles. The higher elevations and latitude in this area may be responsible for these generally low densities (Weinstein 1989 in Bureau et al. 2005).

The Indian Wells Valley, which is located to the southwest of the Naval Air Weapons Station, likely supported desert tortoises at higher densities in the past. Urban, suburban, and agricultural development in this area is likely cause of the lower densities that are currently found in this area.

Edwards Air Force Base is used primarily to test aircraft and weapons systems used by the Department of Defense. Desert tortoises occur over approximately 220,800 acres of the installation. Approximately 80,640 acres of the base have been developed for military uses or are naturally unsuitable for use by desert tortoises, such as Rogers and Rosamond dry lakes. Based on surveys conducted between 1991 and 1994, approximately 160,640 acres of the base supported 20 or fewer desert tortoises per square mile. Approximately 55,040 acres supported densities between 21 and 50 desert tortoises per square mile; from 51 to 69 desert tortoises per square mile occurred on several smaller areas that totaled 5,120 acres (U.S. Air Force 2004). We expect that current densities are somewhat lower, given the regional declines in desert tortoise numbers elsewhere in the Western Mojave Recovery Unit.

Desert tortoises may have been more common in the past the area west of Highway 14 between the town of Mojave and Walker Pass; high levels of off-road vehicle use and extensive livestock grazing are potential causes for the current scarcity of desert tortoises in this area. Four townships of private land east of the city of California City and south of the Rand Mountains supported large numbers of desert tortoises as late as the 1970s; high levels of off-road vehicle use, extensive grazing of sheep, scattered development, and possibly poaching have greatly reduced the density of desert tortoises in this area.

The direct and indirect effects of urban and suburban development extending from Lancaster in the west to Lucerne Valley in the east has largely eliminated desert tortoises from this area. A few desert tortoises remain on the northern slopes of the San Bernardino Mountains, south of Lucerne Valley; however, they seem to be largely absent from the portion of this area in Los Angeles County (Bureau et al. 2005).

The northern portion of Joshua Tree National Park is within the planning area for the West Mojave Plan. Given the general patterns of visitor use at Joshua Tree National Park, we expect that this area receives little use.

Private lands between the northern boundary of Joshua Tree National Park and the southern boundary of the Marine Corps Air Ground Combat Center continue to support desert tortoises; the primary threat to desert tortoises in this area is urbanization.

Desert tortoises occur within the Marine Corps Air Ground Combat Center in densities of greater than 50 per square mile in limited areas; most of the installation, however, supports from 0 to 5 animals per square mile (Jones and Stokes Associates 1998 in Natural Resources and Environmental Affairs Division 2001). The Marine Corps' integrated natural resource management plan also notes that the number of desert tortoises may have declined in the more heavily disturbed areas of the Marine Corps Air Ground Combat Center and that vehicles, common ravens, and dogs are responsible for mortalities. In general, the Marine Corps Air Ground Combat Center supports a wide variety of training exercises that include the use of tracked and wheeled vehicles and live fire.

The average density of desert tortoises in this recovery unit was 16.4 per square mile (Service 2006b). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Recovery Plan for the Desert Tortoise

The recovery plan for the desert tortoise is the basis and key strategy for recovery and delisting of the desert tortoise. The recovery plan divides the range of the desert tortoise into 6 distinct population segments or recovery units and recommends the establishment of 14 desert wildlife management areas throughout the recovery units. Within each desert wildlife management area, the recovery plan recommends implementation of reserve level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that desert wildlife management areas be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994c). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;

2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;

3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (lambdas) are maintained at or above 1.0;

4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Endangered Species Act in the foreseeable future.

The recovery plan based its descriptions of the six recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994c). The recovery plan (pages 24 to 26 from Service 1994c) describes the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotype across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

Assessment of the Recovery Plan

In 2003, the Service appointed a group of researchers to conduct a scientific assessment of the recovery plan for the desert tortoise, which was completed in 1994. This group, called the Desert Tortoise Recovery Plan Assessment Committee, completed its assessment in 2004. The group found that the recovery plan was "fundamentally sound, but some modifications for contemporary management will likely make recovery more successful" (Tracy et al. 2004). The group also found that analyses showed desert tortoise populations were declining in some portions of the range, assessing the density of desert tortoises is difficult, and "the original paradigm of desert tortoises being recovered in large populations relieved of intense threats may be flawed..."(Tracy et al. 2004). Finally, the group reviewed the distinct population segments (or recovery units) described in the recovery plan and concluded they should be modified; briefly, the Desert Tortoise Recovery Plan Assessment Committee recommends leaving the Western Mojave and Upper Virgin River units intact and recombining the remaining four into three distinct population segments.

The Service subsequently determined that the recovery plan for the desert tortoise should be revised, with a substantial level of input from stakeholders. To date, the actual revision of the recovery plan has not been initiated.

Status of Critical Habitat

The Service designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah in a final rule, published February 8, 1994 (59 *Federal Register* 5820). We included approximately 6,446,200 acres in 12 separate critical habitat units in the final designation.

Critical habitat is designated by the Service to identify the key biological and physical needs of the species and key areas for recovery and focuses conservation actions on those areas. Critical habitat is composed of specific geographic areas that contain the biological and physical attributes that are essential to the species' conservation within those areas, such as space, food, water, nutrition, cover, shelter, reproductive sites, and special habitats. These features are called

the primary constituent elements of critical habitat. The specific primary constituent elements of desert tortoise critical habitat are: sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

The final rule for designation of critical habitat did not explicitly ascribe specific conservation roles or functions to the various critical habitat units. Rather, it refers to the strategy of establishing recovery units and desert wildlife management areas recommended by the recovery plan for the desert tortoise, which had been published as a draft at the time of the designation of critical habitat, to capture the "biotic and abiotic variability found in desert tortoise habitat" (59 *Federal Register* 5820, see page 5823). Specifically, we designated the critical habitat units to follow the direction provided by the draft recovery plan for the establishment of desert wildlife management areas. Note that each critical habitat unit functions independently of the others in terms of providing the physical and biological needs of individual desert tortoises; that is, desert tortoises are not required to move between or among units to complete their life histories. For this reason, we have not presented specific information related to the status of individual critical habitat units that are located outside of the action area. We also note that the critical habitat units in aggregate are intended to protect the variability that occurs across the large range of the desert tortoise; the loss of any specific unit would eliminate elements of the species' behavioral, ecological, and genetic variability.

We did not designate the Desert Tortoise Natural Area and Joshua Tree National Park in California and the Desert National Wildlife Refuge in Nevada as critical habitat because they are "primarily managed as natural ecosystems" (59 *Federal Register* 5820, see page 5825) and provide adequate protection to desert tortoises. Since the designation of critical habitat, Congress increased the size of Joshua Tree National Park; a portion of the expanded boundary of Joshua Tree National Park lies within critical habitat of the desert tortoise.

Note that, for all critical habitat units, the primary constituent elements are generally functioning, to the best of our knowledge, in a manner that would support the key biological and physical needs of the desert tortoise. In some specific areas within the boundaries of critical habitat, such as within and adjacent to dry lakes, some of the primary constituent elements are naturally absent; desert tortoises do not usually reside in such areas in large numbers. In other areas, human activities have decreased the ability of some of the primary constituent elements to function to the maximum extent; such areas include but are not limited to unpaved roads and areas around water sources within cattle allotments. These areas are too numerous to mention specifically; generally, however, these areas comprise a relatively small portion of the critical habitat unit and do not compromise the conservation role of the units as a whole. Non-native annual plant species are an exception to the general statements in the previous sentences. These species are widely distributed throughout critical habitat units and, in some cases such as Sahara

mustard (*Brassica tournefortii*), continuing to spread rapidly; their abundance in any given area varies annually according to weather patterns. Although we do not understand their complete role in relation to the ecology of the desert tortoise, we know that these species can exclude the native annual species on which the desert tortoise depends and can lead to the spread of wildfires. The role of these species with regard to the proper functioning of critical habitat units is an important topic for further research.

The analysis of whether any proposed action may result in adverse modification of critical habitat is an iterative process that begins with the specific critical habitat unit that is affected. If the conservation value and function of an individual critical habitat unit would not be appreciably diminished by the action, reason dictates that the proposed action could not adversely modify the entirety of critical habitat for the species. Conversely, if the proposed action compromised the conservation value and function of an individual critical habitat unit, we would expand our analysis to determine whether the effects to designated critical habitat as a whole would constitute adverse modification. The proposed action under consideration in this biological opinion lies entirely within the boundaries of the Superior-Cronese Critical Habitat Unit. For this reason, we have included only information with regard to status of the Superior-Cronese Critical Habitat Unit in this biological opinion.

Superior-Cronese Critical Habitat Unit. The Superior-Cronese Critical Habitat Unit covers approximately 772,000 acres. The following information regarding land ownership is from LaPre (2005a). Approximately 189,304 acres are within military bases. The Bureau manages approximately 380,592 acres of this area. The State Lands Commission manages 5,530 acres; the California Department of Fish and Game manages 3,861 acres. Approximately 192,237 acres are privately owned.

Approximately 97,860 acres of the Superior-Cronese Critical Habitat Unit lie within the boundaries of the Army's National Training Center (Charis Professional Services Corporation 2003, Army 2004). Currently, the Army may conduct some low intensity training in these areas on occasion and some preparations for the onset of force-on-force training should begin soon. To date, these parcels have not been used for force-on-force training; within the next few years, the Army will begin to use a large portion of these lands for maneuvers with numerous wheeled and tracked vehicles. In our biological opinion regarding the effects of the use of these lands for training on the desert tortoise (Service 2004), we noted that approximately 75,439 acres of critical habitat located within Fort Irwin would be affected by force-on-force training. As part of the consultation regarding the effects of the use of these lands for training on the desert tortoise and its critical habitat (Service 2004), the Army established several conservation areas, totaling approximately 16,900 acres, just inside the boundaries of Fort Irwin where maneuvers would not occur. Because of other restrictions that the Army will follow during training, approximately 5,500 acres of critical habitat of the desert tortoise within the additional training lands will not be used for force-on-force training. These lands lie primarily on and around dry lakes, which generally do not support high quality habitat of the desert tortoise, because the primary constituent elements are absent from the lake beds themselves and usually of lower quality in the immediately surrounding areas.

Approximately 87,265 acres in the southern portion of the Naval Air Weapons Station at China Lake are designated as critical habitat for the desert tortoise. This area, which lies to the north of the new western boundary of Fort Irwin, encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station. This area continues to be used as an active bombing range for military test and training operations by the Navy and other branches of the Department of Defense. Within the area designated as critical habitat, approximately 675 acres are disturbed to date. Disturbed areas support the required road network, associated facilities and infrastructure, and target impact areas (O'Gara 2005).

The Air Force's Cuddeback Gunnery Range lies entirely contained within this critical habitat unit. This range is no longer in use; some activity related to removal of ordnance has occurred within the range in recent years.

A small portion of utility corridor BB is within the southeast portion of the Superior-Cronese Critical Habitat Unit. Corridor BB is an east-west corridor, 3 miles wide, which follows Interstate 15. Major utilities located in this corridor include one 131- kilovolt transmission line, two gas pipelines, and two fiber optic cables. This corridor also includes Interstate 15. The 2-mile wide Boulder Corridor (Corridor D) also traverses this critical habitat unit. The 5-mile wide corridor Q also runs east-west through the critical habitat unit.

Several popular off-highway vehicle routes are found within the Superior-Cronese Critical Habitat Unit. Cultural sites include the 61,805-acre Black Mountain Cultural Area and the 898-acre Calico Early Man Site. The Rainbow Basin/Owl Canyon area contains a campground and highly eroded geological formations; this 4,087-acre site is popular with visitors.

The Black Mountain Wilderness overlaps 20,929 acres of the critical habitat unit. The Grass Valley Wilderness consists of 32,835 acres. Both of these wilderness areas are entirely within the critical habitat unit. Approximately 1,715 acres of the Golden Valley Wilderness are within the Superior-Cronese Critical Habitat Unit; the remainder of the 37,700 acres adjoins the critical habitat unit on its northern edge.

In the last 10 years, the Bureau has acquired more than 500,000 acres of private lands in critical habitat of the desert tortoise and wilderness areas through the California Desert Conservation Area (LaPre 2005b). These acquisitions have improved the ability of the Bureau to manage critical habitat of the desert tortoise within the California Desert Conservation Area and reduced the threat of private development. Additionally, to offset the impacts of the use of additional training lands at Fort Irwin, the Army has acquired slightly more than 99,000 acres within the Superior-Cronese, Fremont-Kramer, and Ord-Rodman critical habitat units (Kernek pers. comm. 2005); these lands are interspersed among public lands generally to the south and southwest of Fort Irwin.

The primary constituent elements are generally functioning, to the best of our knowledge, in a manner that would support the key biological and physical needs of the desert tortoise within the Superior-Cronese Critical Habitat Unit. In some specific areas within the boundaries of critical habitat, such as within and adjacent to dry lakes, some of the primary constituent elements are naturally absent; desert tortoises do not usually reside in such areas in large numbers. In other areas, human activities have decreased the ability of some of the primary constituent elements to function to the maximum extent; such areas include but are not limited to unpaved roads and popular recreational areas. These areas are too numerous to mention specifically; generally, however, these areas comprise a relatively small portion of the critical habitat unit and do not compromise the conservation role of the unit as a whole. Non-native annual plant species are an exception to the general statements in the previous sentences. These species are widely distributed throughout the critical habitat unit and, in cases such as Sahara mustard (*Brassica tournefortii*), continue to spread rapidly; their abundance in any given area varies annually according to weather patterns. Although we do not understand their complete role in relation to the ecology of the desert tortoise, we know that these species can exclude the native annual species on which the desert tortoise depends and can lead to the spread of wildfires. The role of these species with regard to the proper functioning of critical habitat units is an important topic for further research.

Relationship of Recovery Units, Distinct Population Segments, Desert Wildlife Management Areas, and Critical Habitat Units

The recovery plan (Service 1994c) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between these areas are vaguely defined. In some cases, such as where the Western Mojave Recovery Unit borders the Eastern Mojave Recovery Unit, a long, low-lying, arid valley provides a fairly substantial separation of recovery units. In other areas, such as where the Eastern Mojave Recovery Unit borders the Northern Colorado Recovery Unit, little natural separation exists. Because of the vague boundaries, the acreage of these areas has not been quantified. Over the years, workers have commonly referred to the areas as "recovery units;" the term "distinct population segment" has not been in common use. As mentioned previously in the Assessment of the Recovery Plan section of this biological opinion, the Desert Tortoise Recovery Plan Assessment Committee suggests that five recovery units (or distinct population segments) would more appropriately represent variation across the range of the desert tortoise rather than the six described in the recovery plan; because this concept is not yet universally accepted, we will continue to refer to the recovery units described in the recovery plan in this biological opinion.

The recovery plan recommended that land management agencies establish one or more desert wildlife management areas within each recovery unit. As mentioned previously in the Recovery

Plan for the Desert Tortoise section of this biological opinion, the recovery plan recommended that these areas receive reserve-level management to remove or mitigate the effects of the human activities responsible for declines in the number of desert tortoises. As was the case for the recovery units, the recovery plan did not determine precise boundaries for the desert wildlife management areas; the recovery team intended for land management agencies to establish these boundaries, based on the site-specific needs of the desert tortoise. At this time, desert wildlife management areas have been established throughout the range of the desert tortoise, except in the Western Mojave Recovery Unit.

Based on the recommendations contained in the draft recovery plan for the desert tortoise (59 *Federal Register* 5820), the Service designated critical habitat units throughout the range of the desert tortoise. The 14 critical habitat units have defined boundaries and cover specific areas throughout the 6 recovery units.

The Bureau used the boundaries of the critical habitat units and other considerations, such as conflicts in management objectives and more current information, to propose and designate desert wildlife management areas through its land use planning processes. In California, the Bureau also classified these desert wildlife management areas as areas of critical environmental concern, which, as we mentioned in the Description of the Proposed Action section of this biological opinion, allows the Bureau to establish management goals for specific resources in defined areas. Through the land use planning process, the Bureau established firm boundaries for the desert wildlife management areas.

Finally, we note that the Department of Defense installations and National Park Service units in the California desert did not establish desert wildlife management areas on their lands. Where the military mission is compatible with management of desert tortoises and their habitat, the Department of Defense has worked with the Service to conserve desert tortoises and their habitat. Examples of such overlap include the bombing ranges on the Navy's Mojave B and the Chocolate Mountains Aerial Gunnery Ranges; although the target areas are heavily disturbed, most of the surrounding land remains undisturbed. Additionally, the Army has established several areas along the boundaries of Fort Irwin where training with vehicles is prohibited; desert tortoises persist in these areas, which are contiguous with lands off-base. We discussed the situation at Joshua Tree National Park in the Status of Critical Habitat section of this biological opinion. The National Park Service did not establish desert wildlife management areas within the Mojave National Preserve, because the entire preserve is managed at a level that is generally consistent with the spirit and intent of the recovery plan for the desert tortoise.

The following table depicts the relationship among recovery units, desert wildlife management areas, and critical habitat units through the range of the desert tortoise.

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/ Eastern Colorado	CA	171,700
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado- CA Piute-Eldorado- NV	Fenner Piute-Eldorado	Eastern Mojave Northeastern Mojave/ Eastern Mojave	CA NV	453,800 516,800
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam: NV UT AZ	 Beaver Dam Beaver Dam Beaver Dam	Northeastern Mojave (all)	 NV UT AZ	 87,400 74,500 42,700
Gold Butte-Pakoon NV AZ	 Gold Butte-Pakoon Gold Butte-Pakoon	Northeastern Mojave (all)	 NV AZ	 192,300 296,000
Mormon Mesa	Mormon Mesa Coyote Spring	Northeastern Mojave	NV	427,900
Upper Virgin River	Upper Virgin River	Upper Virgin River	UT	54,600

Recent Fires

Since December 2004, numerous wildfires have occurred in desert tortoise habitat across its range. Although we know that some desert tortoises were killed by the wildfires, mortality estimates are not available at this time. We estimate that approximately 500,000 acres of potential desert tortoise habitat burned in the Northeastern Mojave Recovery unit in 2005. This number includes areas of critical habitat that burned, which are noted in the following table. All data are from Clayton (2005).

Recovery Unit	Critical Habitat Unit	Acres Burned
Upper Virgin River	Upper Virgin River	10,446
Northeastern Mojave	Beaver Dam Slope	46,757
Northeastern Mojave	Gold Butte-Pakoon	62,466
Northeastern Mojave	Mormon Mesa	15,559
Eastern Mojave	Piute-Eldorado	154
Eastern Mojave	Ivanpah	1,065
Total		136,447

The 136,447 acres of critical habitat that burned represent approximately 2.1 percent of the total amount of critical habitat that was designated for the desert tortoise. Given the patchiness with which the primary constituent elements of critical habitat are distributed across the critical habitat units and the varying intensity of the wildfires, we cannot quantify precisely the extent to which these fires disrupted the function and value of the critical habitat.

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the action area to be "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Figure 8 of the translocation plan (Esque et al. 2005) depicts the action area for this consultation. Generally, the action area lies within the area bounded by Fort Irwin on the north, the Paradise Range, the eastern slope of Lane Mountain, and the Calico Mountains on the west, Interstate 15 on the south, and the basin of West Cronese Dry Lake on the east. Although desert tortoises would be translocated only to specific plots, we consider the action area to encompass the entire region within these boundaries because of their propensity to roam widely after being moved.

Status of Desert Tortoises in the Action Area

The western edge of the translocation area is bounded by, from the north, the Paradise Range, the eastern slope of Lane Mountain, and the Calico Mountains. The uppermost reaches of these ranges likely do not support desert tortoises. The lower portions likely support desert tortoises in various densities.

The portions of these ranges in the action area drain to the east, on to a broad alluvial fan that supports desert tortoises. Coyote Dry Lake is the terminus of the drainages; the lake bed and halophytic saltbush scrub that borders it do not support desert tortoises.

To the northeast of Coyote Dry Lake, an alluvial fan that emanates from the Alvord Mountains supports some of the higher densities of desert tortoises in the action area. To the east of this alluvial fan, the Alvord Mountains support at least a few desert tortoises on their slopes (Bransfield pers. obs.), but are generally too steep and rocky to support higher densities.

The area south of the Alvord Mountains and Coyote Dry Lake, extending to Interstate 15, contains areas may support pockets of desert tortoise habitat but at least some areas seem to be too sandy. This area also contains a series of small dry lakes that desert tortoises would not inhabit.

Desert tortoises occur in higher densities on the lower, eastern slopes of the Alvord Mountains and patchily in the rolling terrain that extends eastward from this area to the eastern and

southeastern edges of the action area. The low range of mountains that lies in the southeastern corner of the action area likely does not support many desert tortoises. Desert tortoises are also likely not abundant in the low-lying habitat on the edges of West Cronese Dry Lake, which lies near the eastern border of the action area.

Status of Critical Habitat in the Action Area

With the exceptions of the extreme northeastern and southwestern corners, the action area lies entirely within the boundaries of the Superior-Cronese Critical Habitat Unit. In general, the area contains to primary constituent elements of critical habitat, except as noted in the following paragraphs.

The upper slopes of the Paradise Range, Lane Mountain, Calico Mountains, Alvord Mountains, and the low range of mountains that lie in the southeastern corner of the action area do not support appropriate substrates for burrowing, although they contain, to some degree, other shelter sites. Additionally, the plant communities in these areas are not typical of desert tortoise habitat.

Coyote Dry Lake, West Cronese Dry Lake, and the series of small dry lakes to the southeast of Coyote Dry Lake do not support desert tortoises. The substrates in these areas are not appropriate for burrowing and do not support the perennial or annual plants (except for the annual plants on the small dry lakes) desert tortoises require for shelter and forage. Portions of the area south of the Alvord Mountains and Coyote Dry Lake, extending to Interstate 15 seem to too sandy to support appropriate substrates for burrowing.

Anthropogenic Features in the Action Area

Notable disturbances within the action area include Fort Irwin Road, which crosses its western edge. We have antidotal information that road-killed desert tortoises were seen regularly on this road and that drivers occasionally moved animals from harm's way. The Department of the Army and County of San Bernardino recently installed fencing on this road to try to reduce the level of mortality.

The Boulder Corridor, which is a utility corridor authorized by the Bureau, crosses the action area from the southwest to the northeast. The corridor currently contains four or five electric transmission lines, two gas transmission lines, a fiber optic line, an access road, and numerous spur roads. The roads are used by utility company personnel to inspect and maintain their facilities and by the general public for recreation.

The starting point of the Barstow to Las Vegas motorcycle race lies south of the Alvord Mountains. Although this race has not been run since approximately 1990, the starting point continues to show extensive evidence of past off-road vehicle use.

The area around Coyote Dry Lake and between the lake bed and Interstate 15 supports several private residences.. A sand and gravel mine is located between Coyote Dry Lake and Fort Irwin Road.

EFFECTS OF THE ACTION

This consultation considers the effects of three actions on the desert tortoise and its critical habitat. These actions are the movement of desert tortoises into occupied habitat, construction and use of pens to hold ELISA-positive desert tortoises, and installation of fencing along Interstate 15.

Movement of Desert Tortoises into Occupied Habitat

The aspect of concern with this portion of the proposed action is whether increasing the density of desert tortoises in the action area may compromise the resident desert tortoises and critical habitat.

Effects on Resident Animals of the Movement of Desert Tortoises into Occupied Habitat

Two aspects of the potential effects on resident desert tortoises of the movement of translocated animals into the action area should be considered. The first aspect we will consider is whether the increased density of animals is likely to affect the basic ecological functioning of the resident desert tortoises. The second aspect is whether the increased density of animals is likely to exacerbate the spread of upper respiratory tract disease or other pathogens to resident animals.

Density. Saethre et al. (2003) evaluated the effects of density on desert tortoises in nine semi-natural enclosures at the Desert Tortoise Conservation Center in Nevada. The enclosures housed from approximately 289 to 2,890 desert tortoises per square mile. Saethre et al. (2003) observed a greater incidence of fighting during the first year of the experiment but did not detect any trends in body condition index, reproduction, or presence of the symptoms of upper respiratory tract disease among the enclosures. Regardless of density, extremely large and small desert tortoises were more at risk of dying, although no statistically significant trends were detected. Esque et al. (2005) note Saethre et al. (2003) observed "possible density effects" at densities greater than 1,295 desert tortoises per square mile.

As proposed, adult desert tortoises would be translocated in groups that would result in the addition of densities of 50 to 70 individuals per square mile to many different sites in the translocation area. Given that current densities in the Superior-Cronese Desert Wildlife Management Area average approximately 16.4 desert tortoises per square mile, the total density at most translocation sites would be well under 100 individuals per square mile.
We consider body condition index and reproduction to be important indicators of how translocation may affect resident desert tortoises. Generally, body condition index and reproduction are suppressed in animals that are stressed in some manner. As noted previously in this section, Saethre et al. (2003 in Esque et al. 2005) did not observe possible density effects until densities reached 1,295 desert tortoises per square mile, which is, at a minimum, 12 times greater than any density desert tortoises would encounter under the proposed action. Consequently, we expect that the translocation plan, as proposed, is unlikely to affect resident animals in a substantial manner.

Disease. In 2005, Berry (2006) evaluated 166 adult and subadult desert tortoises in the action area with regard to their health; this testing has not been completed to date. Berry was able to collect sufficient blood samples from 147 desert tortoises to allow for testing. In preliminary results, at least nine desert tortoises tested positive or suspect for *Mycoplasma agassizii* or *M. testudineum*; which are the causative agents of upper respiratory tract disease. Berry (2006) notes that desert tortoises "with suspect and positive tests appear to be distributed in the western half of the study area," which generally supports more anthropogenic activity in the form of residences and Fort Irwin Road than the remainder of the action area. Berry also notes that a full statistical analysis will be conducted when the sampling of desert tortoises in the action area has been completed.

Upper respiratory tract disease and other pathogens are spread by direct contact between desert tortoises. Consequently, increasing the density of desert tortoises in the action area may exacerbate the spread of diseases. Because desert tortoises that may be ill will be held in pens and not released to the translocation site, these animals will not contribute to the potential spread of disease. Additionally, the contingency plan mentioned previously in this biological opinion should provide some safeguard against rapid spread of diseases through systematic monitoring and removal of ill desert tortoises.

Under current conditions, we would expect that diseases in one portion of the action area would reach desert tortoises throughout the region within some time frame. The only boundary in the action area that could prevent such spread is Fort Irwin Road, which has been lined with fences to prevent entry by desert tortoises; breaks in the fence, which could be caused by vehicles or floods, and movement of desert tortoises by people would compromise this boundary.

To date, we have no data on the how upper respiratory tract disease or other pathogens affect desert tortoises on a demographic scale. We anticipate that increasing the density of desert tortoises in the action area may, to some degree, accelerate the spread of diseases, simply because more animals would be present. Based on the results of the work of Saethre et al. (2003), we do not expect that increasing the density of desert tortoises in the action area will predispose these animals in any way to being more disease prone.

Effects on Critical Habitat of the Movement of Desert Tortoises into Occupied Habitat

We do not anticipate that the increase in the density of desert tortoises in the action area, to the levels proposed in the translocation plan, is likely to adversely affect the primary constituent elements of critical habitat. We list the primary constituent elements of critical habitat and provide our rationale for this conclusion in the following paragraphs.

Sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow. Implementation of the translocation plan will not reduce the overall amount of habitat available to desert tortoises or impede their ability to move and disperse or their gene flow because this aspect of the proposed action will not impose any barriers to movement or result in loss of habitat.

Sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species. Implementation of the translocation plan is not likely to affect the quality and quantity of forage species or soil conditions for the growth of these species because the number of desert tortoises that will be moved into any specific area will be carefully controlled; additionally, the team that evaluated potential translocation sites chose areas that supported suitable habitat conditions.

Suitable substrates for burrowing, nesting, and overwintering. This primary constituent element will not be affected simply because the introduction of desert tortoises will not change the nature of the substrates.

Burrows, caliche caves, and other shelter sites. This primary constituent element will not be affected because the translocated desert tortoises will have the ability to dig their own burrows. From our experience with the action area, caliche caves are abundant, where the appropriate conditions exist for their formation. Finally, Saithre et al. (2003) found that desert tortoises did not share burrows under their experimental conditions, except at the three highest densities that were tested. Those densities were far higher than any density at which animals in the translocation site will be released. Consequently, various forms of shelter sites should be readily available.

Sufficient vegetation for shelter from temperature extremes and predators. The translocated animals will not affect shrubs and subshrubs that provide shelter because desert tortoises rarely consume perennial vegetation to the extent that it would affect the physical structure of the plant.

Habitat protected from disturbance and human-caused mortality. The proposed action would not increase the level of disturbance to the action area, except for the presence of the workers who are implementing the translocation. Their presence in the area would constitute a brief increase but unsubstantial in the amount of human activity in the region.

Construction and Use of Pens to Hold ELISA-Positive Desert Tortoises

The aspect of concern with this portion of the proposed action is the construction and use of pens to hold density ELISA-positive desert tortoises and the effects on desert tortoises and critical habitat.

Effects of the Construction and Use of Pens on Desert Tortoises

Approximately 6 miles of fencing would be needed to construct the pens to hold ELISA-positive desert tortoises. The equipment that would be used to construct the fence, such as all-terrain vehicles and small- to medium-sized trucks may kill or injure desert tortoises while traveling to the site along access roads or when traveling off of established roads at the work sites. Desert tortoises could be killed or injured by the equipment that would be used to bury the lower edge of the fence. If workers leave trash or food around the work site, animals that prey on desert tortoises, such as common ravens, may be attracted to the site. Uninformed workers may kill, injure, or collect desert tortoises. Desert tortoises may also be killed if they seek shelter underneath a parked vehicle and are not detected prior to movement of the vehicle.

The same general effects would likely occur during use and maintenance of the pens. We expect that the overall level of activity would be less during use and maintenance but that these low-level effects would continue as long as the pens are in use.

In general, we expect that few desert tortoises would be killed or injured as a result of construction and use (including maintenance) of the pens. We have reached this conclusion because of the relatively small size and low intensity of the proposed action.

Effects of the Construction and Use of Pens on Critical Habitat

The pens would cover approximately 140 acres of the Superior-Cronese Critical Habitat Unit. Most of the access to the work site would be via existing routes. Most of the primary constituent elements of critical habitat (e.g., annual plants, vegetation, providing shelter, appropriate substrates for forage and burrowing) already been removed from these routes; although the use of these routes would introduce an additional level of disturbance to the critical habitat unit, the amount of use during construction and use of the pens would be minor and unlikely to affect, in any substantial manner, critical habitat.

Construction and maintenance of the pens would cause a minor amount of disturbance. The Army did not provide any information on how the fence would be installed. For the purposes of analysis, we assume that a 10-foot wide swath of habitat would be disturbed temporarily by equipment during installation of the fence. Based on this width and a length of 6 miles, we estimate that approximately 7.3 acres of critical habitat would be disturbed by installation of the fences around the pens. This acreage is an inconsequential portion of the 766,900–acre Superior-Cronese Critical Habitat Unit.

After fencing of the pens is complete, the 140 acres of critical habitat within the pens would not be available to desert tortoises outside the pens. The primary constituent elements of critical habitat within the pens would likely remain functional; we do not expect the use of the pens by workers and desert tortoises to degrade habitat functions within the pens to any substantial degree. We also do not expect that the pens would fragment critical habitat to any substantial degree because they would occupy such a small area of the Superior-Cronese Critical Habitat Unit.

Installation of Fencing along Interstate 15

The aspect of concern with this portion of the proposed action is the construction and maintenance of approximately 24 miles of fence along the south-bound side of /15 to prevent translocated desert tortoises from entering the freeway and the effects on desert tortoises and critical habitat.

Effects of the Installation and Maintenance of Fencing along Interstate 15 on Desert Tortoises

The effects of installing and maintaining this fence would be similar to those described for the fencing of the pens. We anticipate that few, if any, desert tortoises would be killed or injured along access roads because most access would likely be from the freeway or along frontage

roads. As we have noted previously in this biological opinion, Hoff and Marlow (2002) found that "reductions in (desert) tortoise sign are easily detectable more than (2.48 miles) from the roadway" on heavily used paved roads. Because of the volume of vehicle use along Interstate 15 and the length of time that this road has been in place, we expect that few desert tortoises occur in the area immediately adjacent to the freeway. The presence of a frontage road and a few residences and commercial developments also points to a low density of desert tortoises near Interstate 15. Consequently, we expect that few, if any, desert tortoises would be killed during installation and maintenance of the fence along 24 miles of Interstate 15.

A limited potential exists that desert tortoises may attempt to cross Interstate 15 from the opposite side of the freeway, encounter the fence on the south-bound side, and then be killed as they try to re-cross the freeway. Few desert tortoises would likely be killed in this manner because the volume of traffic on Interstate 15 is sufficiently great that few, if any, animals would survive crossing four lanes of the freeway. Also, given the nature of the habitat adjacent to the northbound side of the freeway, we expect that few desert tortoises occur in this area.

Desert tortoises may encounter the fence, follow it to an undercrossing, travel under the freeway via the undercrossing, and then attempt to return to the north side of the road by crossing the freeway. We cannot discount that desert tortoises would not attempt such crossings but consider that they are likely to happen infrequently simply because several events would need to occur sequentially for mortality to occur in this manner. Additionally, desert tortoises that successfully used an undercrossing may also return to their original habitat via the undercrossing. We conclude that few desert tortoises would be killed or injured in this manner.

Finally, any analysis of the effects of the fence must consider the beneficial effects. The installation and maintenance of a fence to prevent desert tortoises from attempting to cross Interstate 15 will undoubtedly reduce the level of mortality that resident animals undergo every year in this portion of their range. It will also prevent the vast majority of translocated desert tortoises from being killed on the freeway; as we noted previously in this biological opinion, these individuals are more likely to roam farther in the time soon after their release than resident animals. We cannot predict how many resident or translocated desert tortoises would be saved from being killed on the freeway by installation of the fence. The installation of fencing along busy roads is a high-priority task that is identified in the recovery plan for the desert tortoise (Service 1994).

Effects of the Installation and Maintenance of Fencing along Interstate 15 on Critical Habitat

The effects of installing and maintaining the fence along 24 miles of Interstate 15 would be similar to those associated with installation and maintenance of the fence around the holding pens. The two primary differences are that this fence is much longer and the primary constituent elements of critical habitat are likely not present along many portions of the fence line.

The Army did not provide any information on precisely where the fence would be installed. Portions of the fence, in areas where the freeway right-of-way is at a standard distance from the edge of the road, would be placed at some distance from the road. In other areas, frontage roads may necessitate that the fence be placed almost immediately adjacent to the freeway. In the

former case, some portion of critical habitat would be fragmented from the remainder of the critical habitat unit; in the latter case, little, if any, critical habitat would remain on the freeway side of the fence.

For the purposes of analysis, we assume that the entire fence would be placed 200 feet from the edge of the road. Based on a width of 200 feet and a length of approximately 24.2 miles, we estimate that approximately 587 acres of critical habitat would be isolated by installation of the fences along the southbound side of Interstate 15. We did not calculate a disturbance factor for the installation of the fence because the amount of disturbance that would lie on the side of the fence away from the freeway would be inconsequential in relation to the acreage of critical habitat on the freeway side of the fence.

We note that portions of the fence would be placed immediately adjacent to freeway. Additionally, portions of the critical habitat adjacent to the freeway do not support the primary constituent elements of critical habitat because they have been removed by human activities or were not present naturally. Consequently, the approximately 587 acres that we calculated would be fragmented from the remainder of the critical habitat unit is a worst-case scenario and the actual acreage is likely to be substantially less. Even under a worst-case scenario, this acreage comprises 0.07 percent of the Superior-Cronese Critical Habitat Unit, which is an inconsequential portion of the 766,900–acre area.

Finally, with the exception of the area where the fence is actually installed, most of the area that supports the primary constituent elements of critical habitat would remain in place. Perhaps most importantly, although this area would be isolated from the remainder of the critical habitat unit, the fence would not further fragment critical habitat, primarily because Interstate 15 forms the southern boundary of the critical habitat unit and has already effectively isolated this portion of desert tortoise habitat from the areas to the south of the freeway.

Summary

Desert Tortoise

The movement of desert tortoises from the Southern Expansion Area to the translocation area is not likely to substantially reduce its reproduction, numbers, or distribution in the wild. The post-translocation densities would be far below levels at which substantial adverse effects were detected in an experiment. The installation and maintenance of fencing around the pens and along the southbound side of Interstate 15 is also not likely to substantially reduce the reproduction, numbers, or distribution of the desert tortoise in the wild because these activities are likely to result in the injury and mortality of few desert tortoises. Additionally, the installation of fencing along Interstate 15 would substantially reduce the number of desert tortoises that enter the freeway and are killed every year. We cannot quantify the number of desert tortoises that would be killed by the proposed action as a whole or prevented from being killed by the fencing of Interstate 15.

Critical Habitat

The translocation of desert tortoises from Fort Irwin to the south is not likely to adversely affect critical habitat. The installation and maintenance of the pens and the fencing along Interstate are not likely to compromise the conservation role and function of the Superior-Cronese Critical Habitat Unit because the amount of the primary constituent elements that would be temporarily disturbed by these activities is an inconsequential portion of the 766,900–acre area. Additionally, the fencing of the pens is not likely to fragment the critical habitat unit because these areas are small in relation to the size of the critical habitat unit. Finally, although a small portion of critical habitat would be isolated from the remainder of the critical habitat unit by the fence along Interstate 15, this fence is not likely to compromise the conservation role and function of the Superior-Cronese Critical Habitat Unit. We have reached this conclusion because the primary constituent elements within the area to be fenced off are already disturbed to some degree; also, the fencing will not increase the degree of fragmentation because Interstate 15 has already fragmented habitat in this area the fence would be placed at the edge of the critical habitat unit.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Most of the action area is located on Federal land, where all future actions will be subject to the consultation requirements of section 7(a)(2) of the Act. We are not aware of any cumulative effects that are reasonably certain to occur on non-federal lands in this area.

CONCLUSION

Desert Tortoise

After reviewing its current status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed translocation of desert tortoises from Fort Irwin to the translocation area, the installation, use, and maintenance of quarantine pens, and the installation and maintenance of a fence along the southbound side of Interstate 15 are not likely to jeopardize the continued existence of the desert tortoise. We reached this conclusion because the proposed action would likely kill or injure few desert tortoises. The fencing of Interstate 15 will likely reduce the number of desert tortoises that are currently being killed or injured by traffic on Interstate 15.

Critical Habitat

After reviewing the current status of critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed translocation of desert tortoises from Fort Irwin to the translocation area, the installation, use, and maintenance of quarantine pens, and the installation and maintenance of a fence along the southbound side of Interstate 15 are not likely to destroy or adversely modify the critical habitat of the desert tortoise. We reached this conclusion because the proposed action would disturb an inconsequentially small amount of the primary constituent elements within the Superior-Cronese Critical Habitat Unit; additionally, although approximately 0.07 percent of the critical habitat unit would be isolated from the remainder of the unit by the fence along Interstate 15, this area is at the edge of the critical habitat unit and the primary constituent elements within it have been degraded by previous human activities.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described in this incidental take statement are non-discretionary and must be undertaken by the Army or made binding conditions of any authorization provided to contractors. The Army has a continuing duty to regulate the activities covered by this incidental take statement. If the Army fails to assume and implement the terms and conditions of the incidental take statement or to make them enforceable terms of its contracts, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Army must report the progress of its action and its impact on the species to the Service as specified in the incidental take statement (50 *Code of Federal Regulations* 402.14(i)(3)).

We anticipate that desert tortoises may be killed or injured during installation, use, and maintenance of the pens and during installation and maintenance of the fence along Interstate 15.

As we discussed in the Effects of the Action - Summary section of this biological opinion, we anticipate that few desert tortoises are likely to be killed or injured during implementation of the proposed action. We cannot quantify the precise number of animals that may be killed or injured because of the uncertainty of how many desert tortoises would be encountered. We estimate that few would be encountered at the sites of the pens because these areas are small and relatively little work would occur in these areas; we estimate that few would be encountered during the installation and maintenance of the fence along Interstate 15 because desert tortoises usually occur at reduced densities near busy roads.

The exemption to the prohibition against take provided by this incidental take statement extends only to the action area described in this biological opinion.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the desert tortoise during installation and maintenance of fencing around the holding pens and along the southbound side of Interstate 15:

1. The Army must ensure that only experienced biologists conduct surveys for and translocate desert tortoises during the installation and maintenance of fencing around the pens and along the southbound side of Interstate 15.

2. The Army must ensure that the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.

3. The Army must implement measures to reduce the take of desert tortoises that may be killed or injured during project activities.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Army must comply with or ensure that its contractors comply with the following terms and conditions, which implement the reasonable and prudent measures described in the previous section, and the reporting and monitoring requirements. These conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

   The Army must ensure that only biologists authorized by the Service under the auspices of this biological opinion conduct clearance surveys for and move desert tortoises from harm's way. The Army must provide us with the credentials of any additional authorized biologists or biological monitors whom it wishes to conduct these duties at least 30 days prior to the time they must be in the field.

A biological monitor is a person who is approved by the Service to monitor project activities within desert tortoise habitat, ensure proper implementation of protective measures, and record and report desert tortoise and sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with a biological opinion or permit, move desert tortoises from harm's way when desert tortoises enter project sites and place these animals in "safe areas" pre-selected by authorized biologists or maintain the desert tortoises in their immediate possession until an authorized biologist assumes care of the animal. Monitors assist authorized biologists during surveys and often serve as "apprentices" to acquire experience. Monitors are not authorized to conduct presence/absence or clearance surveys unless directly supervised by an authorized biologist; "directly supervised" means the authorized biologist is direct voice and sight contact with the monitor.

An authorized biologist is a person who is approved by the Service to conduct all activities described in the previous section for biological monitors, and to locate desert tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with a biological opinion incidental take permit. Authorized biologists must keep current with the latest information on Service protocols and guidelines. An authorized biologist must have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and demonstrated substantial field experience and training to safely and successfully: handle and temporarily hold desert tortoises; excavate burrows to locate desert tortoise or eggs; relocate or translocate desert tortoises; reconstruct desert tortoise burrows; unearth and relocate desert tortoise eggs; and locate, identify, and record all forms of desert tortoise sign.

2. The following terms and conditions implement reasonable and prudent measure 2:

a. To ensure that the measures proposed by the Army are effective and are being properly implemented, the Army must contact the Service immediately if it becomes aware that a desert tortoise has been killed or injured by project activities. At that time, the Service and the Army must 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 that the Army's proposed protective measures and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented.

b. If more than three desert tortoises are killed or injured in any given year by work associated with the installation, use, and maintenance of the pens or the installation and maintenance of the fence along Interstate 15, the Army must re-initiate formal consultation with the Service, as required by 50 *Code of Federal Regulations* 402.16.

3. The following terms and conditions implement reasonable and prudent measure 3:

a. To avoid any additional disturbance beyond what is proposed, the Army must inform workers associated with installation and maintenance of the fences of where equipment and supplies

are to be stored and where vehicles may and may not be driven. These storage and use areas must be on previously disturbed sites to the extent practical and be confined to the smallest area practical, considering safety, terrain, and other onsite factors. If appropriate, the Army must mark undisturbed areas outside the work area to ensure workers understand the boundaries where activities may occur.

b. An authorized biologist must be onsite during installation of the fences at the pens and along Interstate 15. The authorized biologist must move any desert tortoises found in the paths of the fences to suitable habitat outside the work area, on the side of the fence away from the freeway, and placed in a natural or artificial burrow or under a shrub, depending on time of day and year. If deemed necessary by the authorized biologist, the desert tortoise must be enclosed in a fence to temporarily restrain its movement; the fence around the desert tortoise must be removed after completion of the fence along Interstate 15.

c. After installation of the fence along Interstate 15, all areas of suitable habitat between the fence and the freeway must be surveyed for desert tortoises by the authorized biologist. The authorized biologist and Army must determine, prior to the completion of the fencing, which areas are to be surveyed; the Army may contact the Service if questions arise as to the need for any given area to be surveyed. Given that few, if any, desert tortoises are likely to occur in this area, one pass by the authorized biologist will be sufficient. Biological monitors may assist in this task, provided that they are working under the direct, onsite control of the authorized biologist. Any desert tortoises that are found must be placed on the side of the fence away from the freeway as described in the previous term and condition.

d. All personnel involved in the installation, use, and maintenance of the pens and installation and maintenance of the fence along Interstate 15 must receive training on the status and basic ecology of the desert tortoise and the specific measures being implemented during the relevant activity to protect desert tortoises. The training may be from a program that was previously approved by the Service; if the program was not previously approved, the Army must have the training approved by the Service prior to performing onsite work.

e. Open trenches, auger holes, or other excavations that may act as pit-fall traps must be inspected by an authorized biologist before back filling. Any desert tortoise found must be safely removed and relocated out of harm's way by an authorized biologist. For open trenches, earthen escape ramps must be maintained at intervals of no greater than 0.25 mile. The open trenches will be inspected three times per day throughout most of the year and four times per day during periods when desert tortoises are active, as determined by local observations by the authorized biologist; inspections must be by an authorized biologist or biological monitor. Other excavations that remain open overnight must be covered to prevent them from becoming traps.

f. Project personnel must carefully check under parked vehicles and equipment for desert tortoises before operation. An authorized biologist or biological monitor must move desert tortoises found within work areas to a location away from danger prior to the onset of work.

g. Trash must be placed in a sealed container and emptied when full.

h. All handling of desert tortoises must be according to the protocols described in Desert Tortoise Council (1999).

We note that the Army proposed protective measures for the installation of fencing along Interstate 15 but not for the holding pens. The terms and conditions in this incidental take statement apply to both actions. We discussed these measures with the Army prior to completing this biological opinion.

REPORTING REQUIREMENTS

Within 60 days of the installation of the proposed fences, the Army must provide a report to the Service that provides details on the effects of the action on the desert tortoise. Specifically, the report must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar instances from re-occurring. We recommend that the Army provide us with any recommendations that would facilitate the implementation of the protective measures while maintaining protection of the desert tortoise.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Within 3 days of locating any dead or injured desert tortoises, you must notify the Service's Division of Law Enforcement (370 Amapola Avenue, Suite 114, Torrance, California 90501) and the Ventura Fish and Wildlife Office by telephone (805 644-1766) and by facsimile (805 644-3958). The report must include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

Injured desert tortoises must be taken to a qualified veterinarian for treatment. If any injured desert tortoises survive, the Service must be contacted regarding their final disposition.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. The remains of desert tortoises must be placed with the U.S. Geological Survey (Contact: Kristin Berry, U.S. Geological Survey, 22835 Calle San Juan De Los Lagos, Moreno Valley, California 92553, (951-697-5361); if the U.S. Geological Survey does not want the carcass because the damage is too extensive, the carcass must be disposed of in an appropriate manner. We recommend that the Army maintain a standing arrangement with the U.S. Geological Survey regarding proper disposition of carcasses and ensure that its offices are well aware this and other procedures regarding the disposition of dead or injured desert tortoises.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened

species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We have no conservation recommendations to offer at this time.

REINITIATION NOTICE

This concludes formal consultation on the proposed movement of desert tortoises from Fort Irwin to the translocation site, installation, use, and maintenance of the pens, and installation and maintenance of fencing along Interstate 15. Reinitiation of formal consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Ray Bransfield of my staff at (805) 644-1766, extension 317.

Sincerely,

for Carl T. Benz
Assistant Field Supervisor

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