CITY OF
VICTORVILLE

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February 25, 2008

Mr. Gerardo Rios
Chief, Permits Office (AIR 3)
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

RE: Victorville 2 Hybrid Power Project (VV2) Application for PSD Permit and Issuance of Biological Opinion Under Endangered Species Act Section 7

Dear Mr. Rios.

On May 3, 2007, Inland Energy, Inc., on behalf of the City of Victorville, submitted an application for a Prevention of Significant Deterioration (PSD) permit for the Victorville 2 Hybrid Power Project (VV2 Project) to the U.S. Environmental Protection Agency (EPA). The VV2 Project is a hybrid power plant consisting of combined-cycle power plant integrated with 50 MW of solar arrays for a combined nominal output of 570 MW. Included with the PSD permit application was a request that the EPA initiate consultation with the U.S. Fish and Wildlife Service (USFWS) for the project under Section 7 of the federal Endangered Species Act (ESA).

On January 23, 2008, the USFWS issued to the EPA the attached Biological Opinion for the Victorville 2 Hybrid Power Project, San Bernardino County, California (1-8-07-F-67) (Biological Opinion), pursuant to Section 7 of the ESA. This letter is to request that the Biological Opinion be included as part of the PSD permit application for the VV2 Project, and to confirm that the City of Victorville hereby commits to implement all the reasonable and prudent measures, the terms and conditions, and the notification requirements contained in the Biological Opinion.

Please call me at (760) 955-5000, or Sara Head of ENSR at (805) 388-3775, if you have any questions or need additional information. We appreciate your assistance with this matter.

Sincerely

Jon B. Roberts
City Manager, City of Victorville

Attachment: Biological Opinion dated January 23, 2008 (1-8-07-F-67)

cc: Ms. Anita Lee, U.S. Environmental Protection Agency
Mr. John Kessler, California Energy Commission
Mr. Thomas Barnett, Inland Energy, Inc.
Mr. Tony Penna, Inland Energy, Inc.
Mr. Mike Carroll, Latham & Watkins
Ms. Kim McCormick, Law Offices of Kim McCormick
Ms. Sara Head, ENSR

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
2007-F-0252

January 23, 2008

Gerardo C. Rios
Chief, Air Permits Office
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Subject: Biological Opinion for the Victorville 2 Hybrid Power Project, San Bernardino County, California (1-8-07-F-67)

Dear Mr. Rios:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Environmental Protection Agency's proposal to issue a prevention of significant deterioration permit to the City of Victorville for the construction and operation of the Victorville 2 hybrid power project. At issue are the effects of the construction of this facility on the federally threatened desert tortoise (*Gopherus agassizii*). 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 was dated June 11, 2007.

This biological opinion is based on information in the biological assessment for the proposed facility (AMEC Earth and Environmental 2007), the addendum to the biological assessment (AMEC Earth and Environmental 2008a), and various reports and publications. A complete administrative record of this consultation is on file at the Service's Ventura Fish and Wildlife Office.

The proposed action is not located within the boundaries of critical habitat of the desert tortoise and will not affect the nearby Fremont-Kramer Critical Habitat Unit. Consequently, we will not discuss critical habitat again in this biological opinion.

CONSULTATION HISTORY

In its June 11, 2007, correspondence, the Environmental Protection Agency requested our concurrence that the proposed action is not likely to adversely affect the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii*

extimus). Riparian habitat in the Mojave River that could be used by these two species will not be affected by construction. Small amounts of salts would be present in the evaporative mist emitted by the power plant's cooling tower. These salts are unlikely to adversely affect riparian habitat because the amount of salt (less than 0.09 microgram per cubic meter) that would potentially reach the portion of the Mojave River situated closest to the project is insignificant, particularly in relation to the amount of salt that naturally occurs in the river (AMEC Earth and Environmental 2008a). Additionally, the plant species that are most important to the least Bell's vireo and southwestern willow flycatcher are deciduous; consequently, the leaves would not remain on the plants sufficiently long for the small amount of salt to build up and cause adverse effects. For these reasons, we concur with the Environmental Protection Agency's determination that the proposed action is not likely to adversely affect the least Bell's vireo or southwestern willow flycatcher.

The Environmental Protection Agency also requested our concurrence that the proposed action is not likely to adversely affect the bald eagle (*Haliaeetus leucocephalus*). The Service recently removed the bald eagle from the list of threatened and endangered species; consequently, we no longer include it in section 7(a)(2) consultations.

We provided a draft biological opinion to the Environmental Protection Agency and California Energy Commission on December 12, 2007 (Service 2007). The Environmental Protection Agency and California Energy Commission provided comments on the draft biological opinion by electronic mail on December 27, 2007, and January 2, 2008, respectively (Environmental Protection Agency 2007 and California Energy Commission 2008). The City of Victorville provided an addendum to the biological assessment and comments on the draft biological opinion by electronic mail on January 22, 2008 (AMEC Earth and Environmental 2008a, b). We incorporated their comments into this final biological opinion, as appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Description of the Proposed Facility

The City of Victorville proposes to construct and operate a hybrid electrical facility consisting of natural gas-fired power plant integrated with solar thermal generating equipment using parabolic collector arrays. The proposed project would be located on primarily undeveloped lands within the northernmost portions of the City of Victorville, adjacent to the Southern California Logistics Airport.

The footprint of the proposed power plant would total 338 acres; developed areas and non-native grassland cover 53 acres of this total (AMEC Earth and Environmental 2008b). An additional 50 acres of temporary-use lands would be required for construction staging adjacent to the proposed power plant. One 30-acre construction staging area would be located north of Colusa Road and west of Helendale Road; with a second 20-acre staging area located south of Colusa Road and

east of Helendale Road. Utility features would occupy approximately 107 acres; developed and disturbed areas cover approximately 4 acres of this total (AMEC Earth and Environmental 2008b). These features include: 4.3 miles of a new 230-kilovolt electric transmission line to connect to the existing High Desert Power Plant transmission path; 5.7 miles of a new 230-kilovolt electric transmission line in an existing utility right-of-way corridor, involving the installation of new lines on existing towers and installation of 3 new transmission towers; 11 miles of a new 230-kilovolt electric transmission line in an existing utility right-of-way and relocation of 6.6 miles of a 115-kilovolt electrical transmission line within the same existing utility right-of-way; 2.9 miles of potable water pipeline; 1.5 miles of reclaimed water supply pipeline, connecting the proposed power plant site to the Victorville Wastewater Reclamation Authority facility; 1.4 miles of sanitary wastewater pipeline, connecting the proposed power plant site to an existing sewer main; a natural gas supply pipeline; and a backup water supply pipeline. Map 8 (sheet 1 of 4) in appendix 1 of the biological assessment depicts the location of these facilities.

Primary vehicle access to the proposed power plant site would be via Adelanto, Colusa and Helendale Roads north from Air Expressway. Approximately four miles of this access route north from Air Expressway is currently unpaved and would be minimally graded and paved to facilitate vehicle travel to the project site (AMEC Earth and Environmental 2008b). Existing roads provide much of the vehicular access needs associated with the proposed linear features; any new vehicle access is included in the acreage of surface disturbance described in the previous paragraph.

Potable water required by the proposed project would be provided via a connection with the City of Victorville's existing water delivery system (Egan 2007, AMEC Earth and Environmental 2008a). This pipeline would be placed in a 2.90mile-long by 85-foot-wide right-of-way following the existing Perimeter Road for part of the way and the route of the City of Victorville's planned future extension of Perimeter Road for the remainder of the route between the project area and the entrance to the High Desert Power Project.

The reclaimed water and sanitary wastewater pipelines would be installed together within a shared right-of-way, located adjacent to the northernmost portion of the proposed electrical transmission line; the surface disturbance within this right-of-way would be a maximum of 50 feet wide (Egan 2007). The construction footprint within unshared portions of the right-of-way would be 25 feet wide.

The rights-of-way for linear features would be brushed and cleared for up to the entire width depending on the requirements at given locations (Egan 2007). For example, less surface disturbance will be required for the transmission line than for the pipelines, because surface disturbance for the former largely will be confined to transmission tower footings and pulling sites. Surface disturbance will be minimized to the degree practicable for construction activity of these linear utility features.

Construction activities are scheduled to commence during the summer of 2008. Commercial operation is scheduled to begin in the summer of 2010.

Unless amended pursuant to the regulations, the prevention of significant deterioration permit will be in effect for the life of the Victorville 2 power plant. The Environmental Protection Agency regulations obligate the source to construct and operate in accordance with the application submitted and with the terms of any approval to construct (40 *Code of Federal Regulations* 52.21(r)). In previous cases similar to this project where the prevention of significant deterioration permit has been the subject of a section 7 consultation, the Environmental Protection Agency has required that the permit applicant amend its permit application to include a commitment to implement all the reasonable and prudent measures, the terms and conditions, and the notification requirements contained in the biological opinion. The obligation to comply with these commitments becomes part of the terms of approval to construct (Lee 2008).

Measures Proposed to Protect Desert Tortoises

Prior to the onset of ground-disturbing activities, the City of Victorville will complete a 100 percent clearance survey of work sites for desert tortoises as described in Service (1992b). The goal of the survey is to remove all desert tortoises from portions of the action area that would be disturbed by heavy equipment and subsequent development (Egan 2008). The power plant site will be permanently fenced and the two adjacent staging areas will be temporarily fenced (Egan 2007). Careful monitoring will be conducted in these areas while fencing is being completed and until such time as affected desert tortoises are removed to the approved translocation area. Construction activities in the utility areas will not be fenced, but will be closely monitored to ensure desert tortoises are not killed or injured.

All burrows found during clearance surveys, whether occupied or vacant, will be excavated by the authorized biologist and collapsed or blocked to prevent desert tortoises from re-entering them. All burrows will be excavated with hand tools to allow removal of desert tortoises and their eggs. The authorized biologist will conduct all handling and excavations, including nests, in accordance with Service-approved protocols (Desert Tortoise Council 1999).

Desert tortoises will be treated in a manner to ensure that they do not overheat or exhibit signs of overheating (e.g., gaping, foaming at the mouth, etc.); desert tortoises will not be placed in a situation where they cannot maintain surface and core temperatures necessary to their well-being. Desert tortoises will be kept shaded at all times until it is safe to release them.

Each desert tortoise will be handled with new disposable latex gloves. After use, the gloves will be properly discarded and a fresh set used for each subsequent handling of a desert tortoise.

No desert tortoise will be captured, moved, transported, or purposely caused to leave its burrow for whatever reason when the ambient temperature is above 95°F. Ambient air temperature will

be measured in the shade, protected from the wind, at a height of 2 inches above the ground surface.

If the ambient air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment that does not exceed 95°F, and the animals will not be released until ambient air temperature declines to below 95°F.

All surface-disturbing actions on undisturbed lands will be monitored. Each piece of heavy equipment traversing habitat within utility corridors will be assigned a biological resource monitor.

The City of Victorville will submit annual reports to the Service until construction work is complete; a final report to be submitted within 60 days of completion of construction (Egan 2007). The field contact representative or other representative of the City of Victorville will contact the Service and Environmental Protection Agency promptly if changes to the proposed action or protective measures are needed or if a desert tortoise is killed or injured.

All personnel working during the construction, operation or maintenance of the proposed project will be required to attend an environmental awareness and project approval compliance training. A qualified biologist familiar with the desert tortoise will present this training. A fact sheet summarizing the life history and legal status (including the penalties for violating the Act) of the desert tortoise will be provided to all project personnel who attend the environmental awareness training; the fact sheet will also list the terms and conditions of all permits for the project. The fact sheet will also describe the protocol for reporting the death, injury, or disturbance of the desert tortoise. Personnel working onsite will also be briefed on appropriate protocol to follow in reporting and cleaning up all potentially hazardous material such as petroleum and radiator fluid spills, and procedures to follow in reporting wildfire sightings. Personnel will be required to sign and date an attendance sheet confirming this training was completed.

Construction and maintenance personnel in areas that have not been fenced to exclude desert tortoises will be required to inspect under vehicles prior to moving the vehicle. If a desert tortoise is found beneath a vehicle, the vehicle will not be moved until the desert tortoise has left of its own accord and this movement has been confirmed by a biological monitor or authorized biologist or until an authorized biologist has removed the desert tortoise from harm's way (Egan 2007).

All desert tortoise observations will be reported to the authorized biologist and, subsequently, to the field contact representative.

If a desert tortoise is in imminent danger with immediate death or injury likely (such as from an approaching vehicle or equipment) and an authorized biologist or biological monitor is not available, any worker associated with the project will capture the animal and contact an authorized biologist or biological monitor immediately. The worker will maintain the desert tortoise in his or her possession until an authorized biologist or biological monitor assumes

possession. The education program provided to all workers will fully describe this contingency (Egan 2007b).

Upon locating or receiving a report of a dead or injured desert tortoise in the project area, the field contact representative or appointed agent (designated by the City of Victorville prior to any surface-disturbing activities onsite (Egan 2007)) will be required to immediately notify the appropriate representatives of the California Department of Fish and Game and Service.

All work activities will be restricted to specifically approved and clearly marked areas.

A field contact representative will be designated to oversee and be responsible for compliance with the conditions of project approval. This field contact representative will be on site or easily accessible during all project activities and will have the authority to halt all project activities that are in violation of project's approval conditions. An authorized biologist will also have the authority to temporarily halt those project activities that could compromise adequate clearance or biological monitoring. Project activities that might endanger a desert tortoise will cease if an individual of the species is found in an active work area. Project activities may resume after an authorized biologist has removed the desert tortoise from danger or after the animal moves to a safe area on its own volition (AMEC Earth and Environmental 2008b).

Only water or gravel will be employed to control fugitive dust emissions. Construction and maintenance vehicles will observe a 25-mile-per-hour speed limit on all unpaved roads in the project area to reduce emissions of fugitive dust.

To reduce the likelihood of construction vehicles striking desert tortoises on the access roads to the power plant site, temporary fencing to exclude desert tortoises will be installed in disturbed areas of the road shoulder and a biological monitor will be on-call to deal with issues that emerge during construction (if any). Because the fencing should prevent most desert tortoises from entering the access roads, a speed limit of 25 miles per hour will be set on these roads (Bachrach 2008). These measures were proposed and agreed upon during a conference call on December 20, 2007.

Temporary fencing to exclude desert tortoises will be installed along both shoulders of the access route under the oversight of qualified biological monitors. Fencing will be placed to exclude all desert tortoise burrows from the road corridor. Fencing at the open ends will include some shrubs inside the road corridor to protect any desert tortoises that may enter the road corridor at these sites, but no shrubs will be disturbed during construction of the temporary fence to preclude the loss of habitat (AMEC Earth and Environmental 2008b).

All fences will be maintained throughout their intended life. Fences will be monitored monthly, or more often as needed, as well as during or after all storms. All fence breaches will be repaired immediately with appropriate fencing material (AMEC Earth and Environmental 2008b).

Prior to mobilization of construction activities on site, all vehicles and equipment will be inspected to ensure these vehicles and equipment are operating correctly and free of fluid leaks. Equipment will be inspected daily to make sure that fluid discharges do not occur.

A trash abatement program will be initiated during pre-construction phases of the project and continue through its duration. Trash and food items will be contained in closed containers and removed regularly (at least once a week) to avoid attracting predators such as common ravens, coyotes, and feral dogs.

The authorized biologist will be onsite during the periods when desert tortoises are expected to be active to ensure construction activities are in compliance with protective measures relevant to the desert tortoise and to ensure that any desert tortoises wandering on to the construction site via unfenced areas will not be inadvertently killed or injured.

The authorized biologist will be responsible for ensuring: (a) that a litter-control program is enforced; (b) that desert tortoise exclusion fences are maintained where applicable; (c) that disturbance of desert tortoise habitat is restricted to authorized areas; (d) that all equipment and materials are stored within the boundaries of previously disturbed areas; (e) that all vehicles associated with construction activities remain within the proposed construction zones; and (f) compliance with the terms and conditions of the biological opinion.

Project activities that might endanger a desert tortoise will cease if an individual of the species is found in an active work area. Project activities may resume after the authorized biologist removed the desert tortoise from danger or after the animal moves to a safe area on its own volition.

Any nesting of common ravens (*Corvus corax*) encountered during construction, operation or maintenance of the project will be reported to the Service and California Department of Fish and Game (Egan 2007). The removal of common raven nests from facilities, when determined necessary in consultation with the Service and California Department of Fish and Game, will occur during the inactive nesting season.

Upon completion of construction activities, areas that were temporarily disturbed will be revegetated in accordance with a project revegetation and restoration plan. This plan will be completed prior to commencement of surface-disturbing activities and is to include: salvage of most cactus, all Joshua trees (*Yucca brevifolia*) identified by the City of Victorville as appropriate for transplantation, and some native shrubs to be used in "vertical mulching" efforts (Egan 2007); planting of salvaged shrubs and cactus; relocation of Joshua trees; placing rocks and vegetative debris into areas where the soil has been disturbed; raking out of vehicle tracks; hand-broadcast seeding of native plants (with the seeds collected locally); and a focused weed control program for targeted non-native, invasive plant species such as Russian thistle (*Salsola tragus*) and certain mustards (*Brassica* spp) (AMEC Earth and Environmental 2008b). Salvaged plant material will either be stored onsite in areas of temporary surface disturbance or cared for at an offsite nursery, until such time as needed for revegetation.

A qualified biologist will monitor all revegetation efforts to minimize impacts upon special status species potentially occurring in the vicinity of the proposed project. The revegetation plan will specify the time period at which monitoring will occur.

The biological assessment contains general details of a translocation plan. Desert tortoises found at the site of the proposed power plant and the two staging areas will be translocated to a protected site within the general region. Desert tortoises that are found along the utility lines may also be translocated to these areas, depending upon the specific circumstances. Some potential exists that these animals may be placed in a captive breeding or research facility. The Service, California Department of Fish and Game, and City of Victorville agreed, during the course of formal consultation, that the details of the translocation plan could be developed after the consultation was completed but prior to surface disturbance associated with development of the proposed project.

The City of Victorville has proposed to compensate for the loss of habitat for the desert tortoise as a result of the proposed project. The biological assessment notes that the "... specific amount of compensation acreage to be acquired and managed will be determined in negotiations with, and approved by, (the Service) and (California Department of Fish and Game);" it also states that "(a)n implementation agreement with a mitigation banking and conservation land management entity approved by (the Service) and (California Department of Fish and Game) will be finalized to ensure appropriate compensation habitat was acquired and managed over the long-term for the benefit of the desert tortoise...." Section 7(a)(2) of the Act and its implementing regulations do not address compensation for impacts to federally listed species or their habitats. Consequently, the Service has no regulatory role in these discussions. We note the City of Victorville's proposal herein because the compensation is part of the proposed action.

STATUS OF THE DESERT TORTOISE

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 of Land Management (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. The Service published the results of the first 5 years of line-distance sampling in 2006; the densities presented herein for line-distance sampling are the average of the densities for the years sampled between 2001 and 2005 (Service 2006)

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 2006).

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 2006). 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 2006). 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 2006). 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 2006). 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 (1992a), 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 1992a) 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 the 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 2006). 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 and Revision 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 is currently in the process of revising the recovery plan for the desert tortoise.

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.

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." We consider the action area to include the proposed power plant site; the proposed western and southern construction staging areas adjacent to the plant site; the electric, gas, and water transmission lines described in this biological opinion; and the proposed access roads to the site along the existing Adelanto, Colusa, and Helendale roads. The power plant would occupy 338 acres, the 2 staging areas would cover 50 acres, and installation of the utilities would occur in an area of 107 acres. Dust, noise, light, and emissions from construction and operation of the plant and its ancillary facilities may extend beyond the physical footprint of the action area; however, we have no means by which to delineate the area within which these effects may occur.

The City of Victorville has proposed to translocate any desert tortoises found within the site of the proposed power plant to a location approved by both the Service and the California Department of Fish and Game. If desert tortoises are found onsite during construction and are moved to an off-site area, the area to which they would be moved would also be considered part of the action area. As this area has not yet been specified or approved, we cannot provide any information on the baseline conditions in such a translocation area. The Service will allow the translocation of desert tortoises only to areas that meet the minimum criteria to be provided in a translocation plan subject to agency approval. Such criteria include but are not limited to appropriate habitat conditions and available protected space, such as areas removed from immediate, obvious threats.

Habitat Characteristics of the Action Area

The following description of the action area is summarized from the biological assessment (AMEC Earth and Environmental 2007). Mojave creosote bush scrub covers most of the power plant site and staging areas; it is also the most common community along the transmission line to

the south to Interstate 15. South of Interstate 15, Mojave juniper woodland and scrub habitat comprises most of the remaining native habitat. Approximately 57 acres within the power plant site and transmission line rights-of-way are currently disturbed or developed.

Status of the Desert Tortoise in the Action Area

The following description of the action area is summarized from the biological assessment (AMEC Earth and Environmental 2007). Two desert tortoises were detected within the area of the proposed power plant. Four desert tortoises were observed adjacent to the proposed site; any of these animals could potentially move to within the work area. Additionally, the surveys conducted outside the footprint of the power plant did not cover the entire site; consequently, other desert tortoises may be present in the vicinity of the project site. One hatchling and 4 adult carcasses, 39 burrows, and 29 scat were recorded within the project area and the area adjacent to the site. The desert tortoises and their sign were most abundant in the northern and eastern portions of the project site and to the east of the project footprint.

EFFECTS OF THE ACTION

Three primary aspects of the proposed action may affect desert tortoises within the action area. These aspects are the capture and removal of any desert tortoises that may be in the action area, the construction of the power plant and its ancillary facilities, and operation of the power plant and its ancillary facilities. We will discuss these aspects in the following sections.

Capture and Removal of Desert Tortoises

The City of Victorville has proposed to install fencing to prevent desert tortoises from entering the site of the proposed power plant. After the fence is installed, qualified biologists will survey the site of the proposed facility to find and remove any desert tortoises. The City of Victorville would not begin ground-disturbing activities until this survey is completed.

At this time, we do not have substantial details related to the translocation of desert tortoises from the project site. The Environmental Protection Agency, City of Victorville, California Department of Fish and Game, and Service agreed to postpone a specific analysis of such a plan until the City of Victorville could provide additional details, such as a potential translocation site. However, given the responses of desert tortoises to translocation at the Long-term Study Site in Nevada and at the Hyundai site in California, we anticipate that successful translocation of the desert tortoises from the action area is highly likely. In this section, we will consider the potential adverse effects of translocating desert tortoises from the action area.

Some potential exists that capturing desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or predation. Because the City of Victorville has proposed to use only experienced biologists approved by the Service, the potential that the stress levels of the desert tortoises would be substantially elevated will likely be minimized.

Desert tortoises that are moved from their home ranges occasionally try to return to the site from which they were removed. Consequently, translocated animals may attempt to re-enter their former territories and thus spend relatively greater amounts of time above ground or to attempt to cross roads or other hazardous areas. This change in behavior patterns may expose them to elevated risks of predation and exposure to temperature extremes that they would otherwise avoid. In such cases, desert tortoises may be killed or injured.

The translocation of any desert tortoises from the project area into off-site habitat has the potential to disrupt the behavior and social structure of and to introduce disease to animals that reside at the receiving site. Such disruption may impair their breeding, feeding, and sheltering by elevating the frequency and intensity of aggressive interactions between individuals; the introduction of disease would likely be detrimental to naïve desert tortoises.

The Service will ensure that desert tortoises are translocated using the best available information and according to criteria established in the translocation plan. For these reasons, we anticipate that, overall, the effects of translocation on both resident and translocated desert tortoises are likely to be minor. We have reached this conclusion because surveys have indicated that few desert tortoises are present and thus likely to be translocated; consequently, few resident animals are likely to be affected. Because the desert tortoises that would be translocated currently reside on private land that is not managed for its wildlife values, the potential also exists that the translocation may improve the conservation status of the desert tortoise by placing these animals in a location where they are likely to more be protected in the long term from human activities.

Desert tortoises may be encountered during construction of the utility lines in the northern portion of the utility lines. Given the temporary and linear nature of the disturbance in this area, the potential exists that these animals may be moved from harm's way. Another technique occasionally used to protect desert tortoises under these circumstances is to use temporary fencing to restrict them to the immediate vicinity of their burrows and away from human activity; the fences are then removed after work has been completed. Desert tortoises may also be encountered during maintenance along these utilities, although the chance that an encounter may occur during any given activity would likely be low, given the smaller scale of this work.

Short-distance movements of these animals from harm's way are unlikely to cause undue stress, disrupt the social structure of resident animals, and introduce disease. We have reached this conclusion because such movements would likely be within the home range of any desert tortoises that are moved. Additionally, such short-distance movements would be unlikely to place desert tortoises at risk of contacting new animals. They likely would have had past opportunity to contact nearby animals and would thereby be operating within their usual social structure; the transmission of disease would also be less likely under this scenario.

The potential exists that some desert tortoises living under particularly hazardous circumstances may be found along the utility lines. Such animals may include those living near a busy road or adjacent to an area used for unauthorized off-road vehicle play. Moving these desert tortoises to the translocation site may be protective of the individuals and further improve the conservation

status of the species. Overall, based on the results of the surveys and the nature of the present uses along the utility lines, particularly in the more southerly portions of the rights-of-way, we do not expect many desert tortoises to occur or be found.

Depending on various circumstances, such as the number of desert tortoises found during construction, the health status of the individuals, and the need for animals to be used in research on the ecology of the species or in captive breeding facilities, we may determine that removing these individuals from the wild would be their highest and best use. The loss of this small number of desert tortoises from the wild would not affect, in an appreciable manner, the reproduction, numbers, or distribution of the desert tortoise; these individuals have the potential to contribute to the recovery of the species by contributing information or offspring that could eventually released to the wild.

Two desert tortoises were detected during surveys within the area of the proposed power plant; four animals were found adjacent to the site. We expect that more desert tortoises may be found during clearance surveys because these surveys are designed to detect every animal, whereas the initial surveys were intended to provide more general information. Regardless of this fact, we conclude, based on the information presented in the biological assessment, that site and the surrounding area support relatively few desert tortoises. We estimate that approximately ten individuals may occur in the action area; this number may change by some amount as a result of the movement of desert tortoises, reproduction, and predation.

Construction of the Power Plant and its Ancillary Facilities

Given the size of the proposed power plant, some potential exists that not all desert tortoises would be found during clearance surveys prior to the onset of construction. Desert tortoises may also re-enter work areas after surveys have been completed; this situation is more likely to occur along the utility lines because of their linear nature and because they would not be fenced. In such cases, desert tortoises may be killed or injured by equipment or other aspect of construction. Smaller desert tortoises, because they are more difficult to detect during surveys, are more likely to be affected in this manner.

Because the City of Victorville will only use qualified biologists to conduct the pre-construction surveys, we expect that few desert tortoises are likely to be killed or injured during construction. The training program that will be provided to all workers may also assist in reducing mortality of desert tortoises; if workers are aware of the potential presence of desert tortoises, they may be more likely to see them during work activities and contact the project biologists to remove the animals. Given that few desert tortoises were found on the site during surveys and that the City of Victorville proposes to remove them prior to the onset of work, we anticipate that few, if any, individuals are likely to be killed or injured during construction.

Construction of the power plant would cause the permanent loss of approximately 285 acres of desert tortoise habitat; developed areas and non-native grassland cover the remaining 53 acres of the 338-acre site. An additional 50 acres, in 2 parcels, would be subjected to temporary

disturbance during construction; although the City of Victorville has proposed to revegetate these areas, we expect that their restoration to pre-project conditions would require decades, given the nature of the desert's climate, substrate, and plant species. The loss of this area will not substantially reduce the habitat that is available within the region for desert tortoises to breed, feed, seek shelter, or conduct other necessary ecological functions. The proposed facility is surrounded by additional habitat that provides these functions to desert tortoises. In addition, the proposed power plant is located at the edge of an urbanizing area that the Service has not identified as being important to the conservation of the desert tortoise.

The Environmental Protection Agency's and City of Victorville's commitment to prevent common ravens from accessing construction-related trash should reduce the likelihood that these birds will gain substantial subsidies during construction. Although common ravens may be attracted to the heightened levels of human activity during construction to some degree, we expect this slight local increase is likely to be minor and temporary because of the lack of substantial subsidies.

The biological assessment notes that noise, light, and dust from construction activities may affect wildlife that occurs near the facility. Excessive noise could damage the ears of desert tortoises; at a lower level, it may mask sounds that may be important for intra-specific communication or that may allow desert tortoises to detect predators. The Environmental Protection Agency and City of Victorville did not provide any specific information on the levels and duration of noise that would be generated by construction; however, we anticipate that, because sound dissipates fairly quickly with distance, noise generated during construction is unlikely to damage desert tortoises. Increased lighting could potentially influence the activity patterns at night; we are unaware of any studies that evaluated this potential effect. Dust deposited on plants can impede photosynthesis and thus alter their growth patterns and reproductive output; such an effect would likely be most prominent on perennial species, which do not contribute to the diet of desert tortoises in a substantial manner. The effects of noise and dust would be temporary and localized in nature, occurring primarily during construction; consequently, they would not cause long-term or widespread effects on desert tortoises. Although we are unaware of how light may affect desert tortoises, we suspect that its effects are likely to be minimal, if any, because desert tortoises spend most nights in burrows, which would further reduce their exposure.

The vast majority of work would occur within an area that has been fenced to preclude entry by desert tortoises; as we have stated, this single measure should greatly decrease the likelihood that desert tortoises will be killed or injured during construction. However, several utility lines would be constructed outside of the fenced area. Workers may encounter desert tortoises during these activities. However, because these workers will abide by the same best management practices that the City of Victorville will be implementing throughout the rest of the action area and all construction in unfenced areas will be monitored by biological monitors, we expect the installation of the utilities to kill or injure few, if any, desert tortoises; additionally, desert tortoises are unlikely to be present in the more southerly portions of the utility lines where the lines begin to enter more urbanized area or leave suitable appropriate habitat for the species. Approximately 107 acres of desert tortoise habitat would be disturbed by this work, primarily in

a linear manner; this disturbance will not substantially affect the ability of the desert tortoise to breed, feed, or shelter in this area.

The City of Victorville's proposal to install temporary fencing along the Adelanto, Colusa and Helendale roads will substantially reduce the potential for desert tortoises to be killed or injured as a result of being struck by vehicles during construction. Because the fencing will have some gaps in it that cannot be fenced because of crossroads, desert tortoises could enter the access road; these animals would be at risk of being stuck by vehicles or dying of exposure because the fence, having been constructed on the road shoulder, outside of habitat, would prevent them from finding shelter, except at the ends of the fence. Given the generally low density of desert tortoises in the action area, relatively few animals may be at risk.

Construction and other vehicles traveling along the utility lines may strike desert tortoises attempting to cross these roads. Given the generally low density of desert tortoises in the action area, relatively few animals may be at risk. Conversely, because of the speed at which vehicles travel along maintained roads, this aspect of the process action likely poses the greatest risk to desert tortoises. We have no information regarding the current level of vehicle use of these roads.

Construction activities have the potential to introduce or spread non-native plant species. As noted in the biological assessment (AMEC Earth and Environmental 2007), the action area already supports non-native species to some degree. These species, at least in some cases, provide less nutritious forage for desert tortoises than native plant species; if desert tortoises cannot obtain adequate nutrition, they may be more susceptible to disease and predation, may not reproduce at optimal rates, and could ultimately starve. The area that would be temporarily disturbed may be highly susceptible to invasion by nonnative species; if it is heavily invaded, its future value to desert tortoises would likely be compromised. More importantly, a high concentration of non-native plants in the 50-acre construction area could serve as a substantial source of seeds for non-native plants to invade surrounding areas. The proposed revegetation of the areas of temporary disturbance may assist in controlling non-native species in the action area; we cannot predict, with any degree of certainty, how effective such measures may be, given the many variables involved (e.g., weather patterns that favor native species over non-natives or vice versa, the ability of restored native species to become re-established quickly).

The education program that the City of Victorville will provide should prevent workers from killing, injuring, or otherwise affecting desert tortoises as a result of being uninformed.

Operation of the Facility and Its Ancillary Features

Fencing to preclude entry by desert tortoises will surround the completed facility. We expect that few, if any, desert tortoises would be able to enter the facility once it is fenced. Consequently, we do not expect desert tortoises to be killed or injured by the power plant. Some potential exists that individuals may be able to enter the site periodically through gates or breaches in the fence; these individuals would be at risk of being killed or injured by vehicles.

We expect that few individuals would be killed or injured as a result of entering the power plant site during its operational phase.

The presence of the power plant would fragment habitat of the desert tortoise. Over the long term, we do not consider this effect to be substantial because few desert tortoises currently occur in the area; additionally, desert tortoises are currently largely precluded from long-range movements by Highway 395 to the west of the action area and the Mojave River to its east. Additionally, genetic exchange, if it occurs in this local area, would continue to be possible, over the long term, around the edges of the facility.

Desert tortoises could be killed or injured during maintenance of the utility lines. We expect that few desert tortoises are likely to be killed or injured during these activities, primarily because few individuals likely remain in the areas that the utility lines cross. As we have discussed previously in the biological opinion, desert tortoises are present only along the northern portions of the lines. We also expect, over time, as the area continues to experience more human use, the likelihood of individuals being killed or injured as a result of maintenance activities will decrease as the number of desert tortoises in the region continues to decrease.

Vehicles carrying workers and equipment to the power plant during its operational phase may strike desert tortoises on the access roads. We expect, over time, this threat to desert tortoises will decrease as the area continues to urbanize and number of desert tortoise in the region decreases. As we mentioned in the discussion of the effects of vehicles during construction, we have no information on the level of vehicle use that is likely along the access roads.

The power plant would emit approximately 111.9 tons of nitrogen per year as a waste product during its operation; additional nitrogen would also be produced during construction (Inland Energy 2007). This nitrogen would be carried by wind to the surrounding desert, where it could add, to some degree, nutrients to the substrate. Desert substrates are generally poor in nitrogen; an increased level of nitrogen could further promote the growth and spread of non-native species of plants, which are generally adapted to a higher level of soil nitrogen than native species. As we have discussed previously in this biological opinion, the proliferation of weedy species can compromise the value of the habitat of the desert tortoise.

Inland Energy (2007) expects nitrogen deposition resulting from the proposed project to occur in only trace amounts in the vicinity of the project. Nitrogen oxide (NO_X) emissions from the proposed project were studied using a model that incorporates the required atmospheric chemistry and chemical transformations necessary to compute nitrogen deposition. Nitrogen deposition rates were modeled at receptor grids which included the proposed project fence-line and sites occurring 1 to 3 miles distant. The maximum annual deposition rate of 0.083 kilogram per hectare per year was modeled to occur along the fence-line to the northeast of the facility, consistent with the predominant winds which blow most frequently from the south and south-southwest. The maximum concentrations of NO_X emissions declined to 0.003 kilogram per hectare per year at a location 3 miles from the proposed power plant source. Inland Energy estimates that the maximum rate pound of nitrogen deposition at the fence-line of the proposed

project would be approximately 1.2 ounces per acre (AMEC Earth and Environmental 2008b). This rate of nitrogen deposition is considered negligible and is unlikely to affect vegetative growth either in the proposed project vicinity or at more distant locations.

Offsite Conservation Measures

The City of Victorville has proposed to offset the adverse effects of the proposed facility on desert tortoise habitat by providing protected offsite compensation habitat at a rate negotiated with the California Department of Fish and Game. At the time this biological opinion was completed, the compensation plan had not been completed. The potential exists that a well-conceived compensation plan would promote the recovery of the desert tortoise; however, because we have no details on the compensation, we cannot assess its value for the desert tortoise at this time.

Summary

The City of Victorville has proposed numerous measures to avoid and reduce the adverse effects on the desert tortoise of the proposed action. Additionally, we expect that few desert tortoises are likely to be found on the site of proposed power plant, based on the findings of surveys conducted in the area. Consequently, we expect that few, in any, desert tortoises will be killed or injured by the construction and operation of the facility. Given numerous factors, including the facts that desert tortoises will move through habitat over time and the protective measures proposed by the City of Victorville are likely to prevent most mortality, we cannot predict, with absolute certainty, the number of desert tortoises that may be killed or injured during construction activities. Because the City of Victorville will fence the facility to preclude entry by desert tortoises, we do not expect that the operation of the facility will kill or injure any desert tortoises; we acknowledge that, over the life of the facility, some circumstances may occur that allow desert tortoises to enter the site but we anticipate that such occasions will be rare. Some desert tortoises may enter the unfenced transmission line area and may be encountered during project operation; we anticipate such instances would be uncommon.

The permanent 57 acres of disturbed areas and non-native grassland that would be lost as a result of the proposed action are considered to be of little to no value for desert tortoise. The permanent loss of 292 acres of habitat suitable for the desert tortoise resulting from installation of the power plant and certain utility features and the long-term, temporary habitat loss of 146 acres resulting from equipment staging areas and other utilities will not substantially reduce the reproduction, numbers, or distribution of the desert tortoise in the wild. We have reached this conclusion primarily because the habitat that will be lost or disturbed is adjacent an area of the Mojave Desert that is experiencing rapid urbanization and, as such, is not considered important habitat for the long-term survival of the desert tortoise.

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. We are unaware of any non-federal activities within the action area that are reasonably certain to occur.

CONCLUSION

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 Environmental Protection Agency's proposal to issue a prevention of significant deterioration permit to the City of Victorville for the construction and operation of the Victorville 2 hybrid power project is not likely to jeopardize the continued existence of the desert tortoise. We reached this conclusion primarily because the proposed action will affect a limited number of desert tortoises and habitat that is not considered important to the survival and recovery of the desert tortoise; additionally, the City of Victorville has proposed numerous measures to avoid and reduce the potential adverse effects of the action on the desert tortoise.

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; the Environmental Protection Agency must ensure that the City of Victorville undertakes these measures or makes them binding conditions of any authorization provided to contractors. If the City of Victorville fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the City of Victorville must report the progress of the 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 all desert tortoises within the action area may be taken during construction of the facility and its ancillary facilities; because only two desert tortoises were detected during surveys, we expect that the total number of animals that may be taken during construction will be extremely low. We anticipate that most of these individuals will be captured and translocated to either nearby suitable habitat or an off-site location. We anticipate that few, if any, desert tortoises are likely to be killed or injured by construction of the proposed power plant and its ancillary facilities because the site will be fenced to preclude their entry.

We expect few desert tortoises are likely to be killed or injured during operation of the power plant because it will be fenced to preclude their entry. We also expect few desert tortoises to be killed or injured during maintenance of the utilities because of the nature of these activities and the generally low number of desert tortoises in the area where these facilities are located.

We do not expect that any resident animals will be killed or injured as a result of the translocation of desert tortoises from the project area to off-site locations.

We cannot quantify the precise numbers of desert tortoises that may be captured, killed, or injured as a result of the actions that the City of Victorville has proposed because desert tortoises move over time; for example, more animals may have entered the action area since the time of the survey. We consider this circumstance unlikely, given that the action area is located in an area considered to support generally low densities of desert tortoises. Additionally, the protective measures proposed by the City of Victorville are likely to reduce substantially the level of mortality or injury. The exemption provided by this incidental take statement to the prohibitions against take contained in section 9 of the Act extends only to the 338-acre power plant site, the 50-acre staging areas, the Adelanto-Colusa-Helendale Roads access route used by project construction personnel, and the rights-of-way for the utility lines that will be disturbed during construction of the facility.

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 construction of the proposed power plant:

1. The City of Victorville must ensure that only experienced biologists conduct surveys for and translocate desert tortoises during the construction of the power plant.

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

3. The City of Victorville must provide a translocation plan to the Service for our written approval prior to the onset of ground-disturbing activities.

Our evaluation of the proposed action includes consideration of the protective measures proposed by the City of Victorville in its biological assessment and re-iterated in the Description of the Proposed Action section of this biological opinion. Consequently, any changes in these protective measures may constitute a modification of the proposed action that causes an effect to the desert tortoise that was not considered in the biological opinion and require re-initiation of consultation, pursuant to the implementing regulations of the section 7(a)(2) of the Act (50 *Code of Federal Regulations* 402.16). The following reasonable and prudent measures and terms and conditions are intended to compliment and clarify the protective measures proposed by the City of Victorville.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the City of Victorville must 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 City of Victorville must ensure that only biologists authorized by the Service under the auspices of this biological opinion conduct clearance surveys for and translocate desert tortoises. We request that you provide us with the credentials of authorized biologists or biological monitors who you wish to conduct these duties at least 30 days prior to the time they must be in the field.

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

   a. To ensure that the measures proposed by the City of Victorville are effective and are being properly implemented, the City of Victorville or its agent 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 Environmental Protection Agency and its agent 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 proposed protective measures and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented.

   b. The Environmental Protection Agency must immediately re-initiate formal consultation with the Service, pursuant to section 7(a)(2) of the Endangered Species Act, if 3 desert tortoises are killed or injured by project activities within the action area.

2. The following term and condition implements reasonable and prudent measure 3:

The Environmental Protection Agency must ensure that the City of Victorville does not commence ground-disturbing activities until the Service has provided written approval of the translocation plan. The translocation plan must thoroughly address the following elements:

i. The survey methods that will be used to find and remove desert tortoises from the power plant site and staging areas;

ii. A protocol for holding and transporting desert tortoises from the project site to the translocation area;

iii. A description of the translocation area and proof that the land owner has agreed to receive the translocated desert tortoises;

iv. A protocol for monitoring the status of the translocated desert tortoises, including the frequency with which they will be checked, the length of time they will be monitored after translocation, and a method of marking them so they can be identified permanently;

v. A protocol for testing for disease and a strategy for dealing with clinically ill and seropositive animals; and

vi. A contingency plan and list of contacts in the event unforeseen circumstances arise.

We reserve the right to include additional provisions as the translocation plan is developed. Given that we expect that few desert tortoises will require translocation, we suggest that the level of monitoring be sufficient to assess the general status of the translocated animals; it does not need to study the effects of the translocation in a scientifically rigorous manner.

REPORTING REQUIREMENTS

Within 60 days of the completion of the proposed action, the City of Victorville 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. This report must also include any information required as a result of the translocation plan. We recommend that the City of Victorville 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) or by facsimile (805 644-3958). The report must include the date, time, location of the carcass or injured animal, a photograph, cause of death or injury, 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. Prior to the onset of ground-disturbing activities, the City of Victorville must contact the U.S. Geological Survey to determine whether it wants carcasses and to determine the proper handling of carcasses that it desires.

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 recommend that the temporary fencing along the access roads to the power plant site be situated a few feet into habitat of the desert tortoise, rather than on the exposed road shoulder. Because some gaps will likely be present in the fence because of crossroads, desert tortoises may enter the road and become trapped on the road-side of the fence. If the fence is constructed in disturbed habitat on the shoulder, these animals may die of exposure. Constructing the fence a few feet within habitat would provide cover for these animals until they can find their way around the fence or be moved by project biologists. The installation of the fence within the edge of habitat will not result in a measurable adverse effect to the overall quality of the habitat in this area, which generally supports reduced densities of desert tortoises because of encroaching development. If the Environmental Protection Agency and other agencies decide to adopt this recommendation, we request that the authorized biologist be given the authority to direct placement of the fence to ensure it is properly installed and that desert tortoises be protected during its installation and removal.

REINITIATION NOTICE

This concludes formal consultation on the proposed construction of the Victorville 2 hybrid power plant. 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,

Carl T. Benz
Assistant Field Supervisor

REFERENCES CITED
IN THE STATUS OF THE DESERT TORTOISE
SECTION OF THIS BIOLOGICAL OPINION

Avery, H.W. 1998. Nutritional ecology of the desert tortoise (*Gopherus agassizii*) in relation to cattle grazing in the Mojave Desert. Ph.D. Dissertation, Department of Biology, University of California, Los Angeles. California.

Berry, K.H. 1996. Summary of the results of long-term study plots for the desert tortoise in California. Letter to Molly Brady, Bureau of Land Management, Riverside, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K.H. 1999. Preliminary report from the 1999 spring survey of the desert tortoise long-term study plot in Chemehuevi Valley and Wash, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K.H. 2000. Preliminary report on the spring survey of desert tortoises at Goffs permanent study plot. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Berry, K.H. 2005. Personal communication. Electronic mail containing information on the number of desert tortoises detected on select permanent study plots in California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

Burge, B.L. 1978. Physical characteristics and patterns of utilization of cover sites by *Gopherus agassizii* in southern Nevada. Proceedings of the 1978 Symposium, Desert Tortoise Council.

Burge, B.L., and W.G. Bradley. 1976. Population density, structure and feeding habits of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. Proceedings of the 1976 Symposium, Desert Tortoise Council.

Charis Professional Services Corporation. 2003. Biological assessment for the proposed addition of maneuver training land at Fort Irwin, California. Prepared for the U.S. Army National Training Center, Fort Irwin, California. Temecula, California.

Clayton, C. 2005. Desert tortoise acres consumed by fires in 2005. Electronic mail. Dated November 11. Fish and wildlife biologist, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service. Ventura, California.

Congdon, J.D., A.E. Dunham, and R.C. Van Loben Sels. 1993. Delayed sexual maturity and demographics of Blanding's turtles (*Emydoidea blandingii*): implications for conservation and management of long-lived organisms. Conservation Biology 7:826-833.

Hovik, D.C., and D.B. Hardenbrook. 1989. Summer and fall activity and movements of desert tortoises in Pahrump Valley, Nevada. Abstract of paper presented at Fourteenth Annual Meeting and Symposium of the Desert Tortoise Council.

Jennings, W.B. 1997. Habitat use and food preferences of the desert tortoise, *Gopherus agassizii*, in the western Mojave Desert and impacts of off-road vehicles. Pp. 42-45 in Van Abbema, J., (Ed.). Proceedings: Conservation, restoration, and management of tortoises and turtles – an international conference. Purchase, New York. New York Turtle and Tortoise Society and WCS Turtle Recovery Program.

Luckenbach, R.A. 1982. Ecology and management of the desert tortoise (*Gopherus agassizii*) in California. *In*: R.B. Bury (ed.). North American Tortoises: Conservation and Ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12, Washington, D.C.

McLuckie, A.M., J.W. Marr, and R.A. Fridell. 2001. Annual report of desert tortoise monitoring in the Red Cliffs Desert Reserve, Washington County, Utah. Utah Division of Wildlife Resources, Publication Number 02-14. Salt Lake City, Utah.

McLuckie, A.M., M.R.M. Bennion, and R.A. Fridell. 2003. Regional desert tortoise monitoring in the Red Cliffs Desert Reserve, 2003. Utah Division of Wildlife Resources, Publication Number 04-21. Salt Lake City, Utah.

Natural Resources and Environmental Affairs Division. 2001. Integrated natural resources management plan and environmental assessment. Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center. Twentynine Palms, California.

Oftedal, O.T. 2001. Low rainfall affects the nutritive quality as well as the total quantity of food available to the desert tortoise. Abstract of paper presented at the Twenty-sixth Annual Meeting and Symposium of the Desert Tortoise Council. Http://www.deserttortoise.org/abstracts2001/2001abs29.html

Schamberger, M., and F.B. Turner. 1986. The application of habitat modeling to the desert tortoise (*Gopherus agassizii*). Herpetologica 42(1):134-138.

Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert Tortoise Recovery Plan Assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.

Turner, F.B., and D.E. Brown. 1982. Sonoran desertscrub. In: D.E. Brown (editor). Biotic communities of the American Southwest - United States and Mexico. Desert Plants 4(1-4):181-222.

U.S. Air Force. 2004. Integrated natural resources management plan for Edwards Air Force Base, California. Edwards Air Force Base 32-7064. September update. Edwards Air Force Base, California.U.S. Bureau of Land Management. 2002. Northern and Eastern

Mojave Desert management plan, amendment to the California Desert Conservation Area Plan 1980, and final environmental impact statement. Riverside, California.

U.S. Bureau of Land Management. 2003. Map. Total corrected tortoise sign (TCS) distribution (1998-2002). Dated December 12. Moreno Valley, California.

U.S. Bureau of Land Management, County of San Bernardino, and City of Barstow. 2005. Final environmental impact report and statement for the West Mojave Plan; a habitat conservation plan and California Desert Conservation Area Plan amendment. Moreno Valley, San Bernardino, and Barstow, California.

U.S. Department of the Army. 2004. Letter to U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office providing an addendum to the biological assessment. Dated February 25. From Colonel Edward L. Flinn, Deputy Commander and Chief of Staff, National Training Center. Fort Irwin, California.

U.S. Fish and Wildlife Service. 1992a. Biological opinion for the proposed desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 008/C0808/1309) (1-6-92-F-60). Dated December 3. From Acting Field Supervisor, Ventura Field Office to Thomas Mc Gill, U.S. Navy, China Lake, California. Ventura, California.

U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.

U.S. Fish and Wildlife Service. 1995. Reinitiation of formal consultation for the desert tortoise habitat management plan for the Naval Air Weapons Station, China Lake, California (5090 Ser 823EOOD C8305) (1-8-95-F-30R). Dated June 27. From Field Supervisor, Ventura Field Office to Carolyn Shepherd, U.S. Navy, China Lake, California. Ventura, California.

U.S. Fish and Wildlife Service. 2004. Biological opinion for the proposed addition of maneuver training lands at Fort Irwin, California (1-8-03-F-48). Letter to Colonel Edward Flynn, Fort Irwin, California. Dated March 15. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.

U.S. Fish and Wildlife Service. 2006. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005 summary report. Desert Tortoise Recovery Office. Reno, Nevada.

U.S. Navy. 1995. Annual report for desert tortoise management issues at the Naval Air Weapons Station, China Lake. Dated December 21. China Lake, California.

U.S. Navy. 2001. Annual report for desert tortoise management issues at the Naval Air Weapons Station, China Lake. Dated January 3. China Lake, California.U.S. Navy. 2002. Annual report for desert tortoise management issues at the Naval Air Weapons Station, China Lake. Dated January 9. China Lake, California.

Von Seckendorff Hoff, K. and R.W. Marlow. 2002. Impacts of vehicle road traffic on desert tortoise populations with consideration of conservation of tortoise habitat in southern Nevada. Chelonian Conservation and Biology 4(2):449-456.

Weinstein, M., K.H. Berry, and F.B. Turner. 1987. An analysis of habitat relationships of the desert tortoise in California. A report to Southern California Edison Company. Rosemead, California.

REFERENCES CITED
IN THE REMAINDER
OF THE BIOLOGICAL OPINION

AMEC Earth and Environmental, Inc. 2007. Victorville 2 hybrid power project, biological assessment. City of Victorville, San Bernardino County, California. Prepared for: Environmental Protection Agency, Los Angeles, California. Riverside, California.

AMEC Earth and Environmental, Inc. 2008a. Victorville 2 hybrid power project, biological assessment addendum. City of Victorville, San Bernardino County, California. Prepared for: Environmental Protection Agency, Los Angeles, California. Riverside, California.

AMEC Earth and Environmental, Inc. 2008b. Comments on the draft biological opinion for the Victorville 2 hybrid power project. Electronic mail. Dated January 22. Riverside, California.

Bachrach, A. 2008. Notes from conference call on December 20. Electronic mail. Dated January 8. AMEC Earth and Environmental. Riverside, California.

California Energy Commission. 2008. Comments on draft biological opinion. Electronic mail. Dated January 2. Sacramento, California.

Egan, T. 2007. Response to Fish and Wildlife Service general questions. Electronic mail. Dated October 17. Senior Ecologist. AMEC Earth and Environmental. Riverside, California.

Egan, T. 2008. Response to Fish and Wildlife Service question regarding clearance survey. Electronic mail. Dated January 4. Senior Ecologist. AMEC Earth and Environmental. Riverside, California.

Inland Energy. 2007. Application for certification, Victorville 2 hybrid power project. Appendix 6.3, air quality. Submitted for the City of Victorville to the California Energy Commission. Prepared by ENSR, Camarillo, California.

Lee, A. 2008. Information regarding prevention of the significant deterioration permit. Electronic mail. Dated January 7. U.S. Environmental Protection Agency. San Francisco, California.

U.S. Environmental Protection Agency. 2007. Comments on draft biological opinion. Electronic mail. Dated December 27. San Francisco, California.

U.S. Fish and Wildlife Service. 1992b. Procedures for Endangered Species Act compliance for the Mojave desert tortoise. Regions 1, 2, and 6.

U.S. Fish and Wildlife Service. 2007. Draft biological opinion for the Victorville 2 Hybrid Power Project, San Bernardino County, California (1-8-07-F-67). Dated December 12. Ventura Fish and Wildlife Office. Ventura, California.