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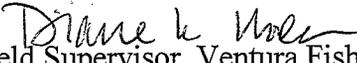
FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
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March 31, 2005

Memorandum

To: State Director, Bureau of Land Management, Sacramento, California

From: 
Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California

Subject: Biological Opinion for the California Desert Conservation Area Plan
[Desert Tortoise] (6840 CA930(P)) (1-8-04-F-43R)

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the effects of the California Desert Conservation Area Plan as it has been modified by the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, and interim measures for the western Mojave Desert on the federally threatened desert tortoise (*Gopherus agassizii*) and its critical habitat. 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 received on September 9, 2004.

This biological opinion is based on the following information: (1) the California Desert Conservation Area Plan, as modified by various planning amendments between 1980 and 1999 (Bureau of Land Management [Bureau] 1999); (2) the final environmental impact statement for the Northern and Eastern Mojave Desert Management Plan (Bureau 2002d); (3) the final environmental impact statement for the Northern and Eastern Colorado Desert Coordinated Management Plan (Bureau and California Department of Fish and Game 2002); (4) your biological evaluation (Bureau 2001); (5) information that you transmitted to us in a memorandum on September 27, 2001; (6) various written and oral communications, including meetings among staff of the Service and the Bureau; (7) previous biological opinions on sheep and cattle grazing; and (8) various reports and publications. This biological opinion was also prepared in accordance with recent court decisions that have invalidated the definition of adverse modification of critical habitat used by the Service (Ninth Circuit Court of Appeals in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service*, No. 03-35279; Northern District Court of California in *American Motorcyclists Association District v. Norton*, Civ. No. C03-0209-S.I.) and internal guidance provided by the Service (2004a). A complete administrative record of this consultation is on file at the Service's Ventura Fish and Wildlife Office.

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CONSULTATION HISTORY

On March 16, 2000, the Center for Biological Diversity, the Sierra Club, and the Public Employees for Environmental Responsibility (plaintiffs) filed a lawsuit against the Bureau. The plaintiffs alleged that the Bureau violated section 7(a)(2) of the Act and its implementing regulations by failing to initiate and complete a programmatic consultation with the Service on the effects of the California Desert Conservation Area Plan, its amendments, and all related actions that may affect listed species in the California Desert Conservation Area that are authorized, approved, allowed, or otherwise carried out pursuant to the California Desert Conservation Area Plan and its amendments. The plaintiffs also alleged that the Bureau violated section 7(d) of the Act and its implementing regulations by authorizing, allowing, or otherwise carrying out a variety of land use practices and other projects that may affect federally listed species prior to completing consultation with the Service on the California Desert Conservation Area Plan and its amendments.

On August 25, 2000, the plaintiffs and the Bureau agreed to a settlement agreement that was approved by the U.S. District Court, Northern District of California (District Court). The terms of the agreement required that the Bureau enter into formal consultation with the Service under section 7(a)(2) of the Act on the California Desert Conservation Area Plan as it would be modified by proposed amendments resulting from various planning efforts. On January 16, 2001, the plaintiffs and the Bureau agreed to a second settlement agreement that described additional measures to be included as part of the proposed action, which are intended to promote the conservation of various listed species within the California desert. The settlement agreements have been modified over time and are collectively referred to as the Consent Decree.

On June 17, 2002, the Service issued a biological opinion addressing the effects on the desert tortoise from implementation of the Bureau's California Desert Conservation Area Plan as it has been formally amended since 1980, modified by previous consultations related to grazing in the western Mojave Desert, modified by proposed interim conservation measures, and as proposed to be modified by the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan (Service 2002d). The June 17, 2002, biological opinion concluded that implementation of the California Desert Conservation Area Plan, as amended and proposed for amendment, was not likely to jeopardize the continued existence of the desert tortoise and was not likely to destroy or adversely modify designated critical habitat of the desert tortoise.

On May 27, 2003, the plaintiffs (joined by Desert Survivors) filed a related lawsuit in U.S. District Court, Northern District of California against the Bureau and the Service challenging issuance of the June 17, 2002, biological opinion and implementation of the California Desert Conservation Area plan (as amended). On June 20, 2003, the American Motorcycle Association District 37, Off-road Business Association, San Diego Off-road Vehicle Association, and Utah Shared Access Alliance filed a lawsuit in U.S. District Court, District of Utah against the Bureau

and the Service for the alleged failure to implement the recovery plan for the desert tortoise. The suit was later transferred to the Northern District of California and amended to challenge the biological opinion.

In an August 3, 2004, order, the District Court held that the Service had relied on an invalid regulatory definition of “adverse modification” while analyzing effects to designated critical habitat in the June 17, 2002, biological opinion. The biological opinion was vacated and remanded to the Service with instructions to reissue the biological opinion after applying the appropriate definition of adverse modification, which the District Court defined as “a direct or indirect alteration of critical habitat which appreciably diminishes the value of that habitat for either the survival or recovery of a listed species.”

The District Court responded to the defendants’ and plaintiffs’ subsequent motions to alter or amend the judgment and for injunctive relief, respectively, in a December 30, 2004, order that, among other things, no longer prescribes a specific definition for adverse modification but adopts the following language amending the August 3, 2004 Order to provide an example of a proper definition of adverse modification:

The Court finds, for example, that a proper definition of “destruction or adverse modification” would be “a direct or indirect alteration of critical habitat which appreciably diminishes the value of that habitat for either the survival or recovery of a listed species.” The Court hereby vacates and remands the biological opinion to the Service to reconsider its biological opinion of the (California Desert Conservation Area) Plan in light of the appropriate standard.

BIOLOGICAL OPINION

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

DESCRIPTION OF THE PROPOSED ACTION

Purpose and Function of the California Desert Conservation Area Plan

Congress designated the California Desert Conservation Area under section 601(c) of the Federal Land Policy and Management Act of 1976. To provide for management of recreational use and to resolve other resource and public land use conflicts, the Federal Land Policy and Management Act also directed the Secretary of the Interior to “prepare and implement a comprehensive, long-range plan for management, use, development, and protection of the public lands within the California Desert Conservation Area.” The purpose of the California Desert Conservation Area Plan, as specified by Congress, was “to provide for the immediate and future protection and administration of the public lands in the California Desert within the framework of a program of

multiple use and sustained yield, and the maintenance of environmental quality.”

The California Desert Conservation Area Plan was signed in January 1980, and now serves as the primary document that describes the basic management principles the Bureau uses for managing its portion of the California Desert Conservation Area. Since adoption, numerous amendments to the California Desert Conservation Area Plan have been completed.

The California Desert Conservation Area Plan employs three basic tools, which are further discussed in more detail in the following sections, for managing resources in the California Desert Conservation Area:

1. Four multiple-use classes are the basis of a land zoning system that allows for a variety of uses and resource conservation activities.
2. Twelve elements provide detailed treatments and prescriptions addressing the management of different land uses and resources.
3. The designation of special management areas, including, but not limited to, Special Areas and Areas of Critical Environmental Concern provides for the conservation of specific resource values.

Purpose and Function of the Bioregional Plans

Because the California Desert Conservation Area covers approximately 25 million acres and land management issues are substantially different across the desert landscape, federal, state, and local land management agencies have divided the California Desert Conservation Area into five bioregional planning areas. These include the western Mojave Desert, the northern and eastern Mojave Desert, the northern and eastern Colorado Desert, the western Colorado Desert, and the Coachella Valley. Planning efforts have been completed in and biological opinions issued for all regions, except for the western Mojave Desert bioregion. The Bureau has completed the final environmental impact statement for that planning effort and is awaiting the Service’s completion of its biological opinion.

The bioregional plans have been written to develop region-specific management activities that are applicable to the local region. As such, the plans address unique biological resource issues that are applicable to a given area and provide solutions that address local land management needs. The Bureau either has amended or is in the process of amending the California Desert Conservation Area Plan to include area-specific management plans that address and improve conservation management of biological resources, particularly as it relates to protection and recovery of threatened and endangered species.

The desert tortoise occurs within all of the bioregional planning areas, except for the western Colorado Desert bioregion. The Coachella Valley and western Colorado Desert planning areas do not include any critical habitat or recovery units for the desert tortoise.

Future Consultations

The California Desert Conservation Area Plan includes program guidance that indicates threatened and endangered species will be protected through compliance with the Act. The Bureau also notes in other documents that future consultations, pursuant to section 7(a)(2) of the Act, would be required for site-specific actions. Consequently, we have not repeated these commitments throughout the description of the proposed action.

In a few instances, the Bureau did not include entire critical habitat units within the desert wildlife management areas that it established (see discussion below regarding the designation of special management areas); we discuss the specific instances in the “Effects of the Action” section of this biological opinion. We note that approval of bioregional plans does not eliminate the need for the Bureau to consider the effects of future actions on these portions of critical habitat that were not included within desert wildlife management areas.

We note specifically that the purposes of this biological opinion are to evaluate, with regard to the desert tortoise and its critical habitat, the general effects of the implementation of the California Desert Conservation Area Plan, as amended, and the specific effects of the interim measures for the western Mojave Desert planning area, of the Northern and Eastern Mojave Desert Management Plan, and of the Northern and Eastern Colorado Desert Coordinated Management Plan. With a few exceptions, the Bureau must continue to comply with the consultation requirements contained in section 7(a)(2) of the Act for all future discretionary actions that it may consider undertaking, funding, or authorizing. The exceptions to this requirement for future consultations relate to casual use and the grazing of livestock and the removal of burros in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas. Casual use may occur with regard to certain activities that may be implemented under the California Desert Conservation Area Plan’s elements that provide guidance with regard to mining, recreation, and use of motorized vehicles.

Future consultation requirements will not apply to casual use because the records of decision for the California Desert Conservation Area Plan and its formal amendments are the authorizing documents for this level of activity; that is, the Bureau will not undertake future actions with regard to casual use at this time. Future consultation requirements will not apply to the grazing of livestock and the removal of burros in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas because the records of decision for the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan, respectively, are the authorizing documents for these activities. We note that the Bureau prepares environmental assessments approximately every 5 years to remove burros and consider the specific needs of and impacts on the environment in its herd management areas. However, we considered the Northern and Eastern Mojave Desert

Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan to provide sufficient information on the nature of the burro removal program and the potential effects on the desert tortoise and its critical habitat to determine that future consultations would not be required. Furthermore, the subsequent environmental assessments provide fairly general evaluations of the on-the-ground activities because, by its very nature, the removal of burros requires a certain degree of flexibility in its implementation (Morgan pers. comm. 2005b).

We note, finally, that, although we have determined that future consultations are not required for casual use and the grazing of livestock and the removal of burros in the planning areas for the northern and eastern Mojave Desert and northern and eastern Colorado Desert, the re-initiation requirements contained in 50 *Code of Federal Regulations* 402.16 remain in effect. Because the Bureau continues to have discretionary authority over these activities under the auspices of the California Desert Conservation Area Plan, it is required to re-initiate consultation, pursuant to section 7(a)(2) of the Act, if any of these criteria established at 50 *Code of Federal Regulations* 402.16 are met.

Multiple-Use Classes

To more effectively and consistently manage lands that it administers within the California Desert Conservation Area, the Bureau has developed a land zoning system that provides specific land management prescriptions. Under this zoning strategy, lands are assigned one of four multiple-use classes. The multiple-use class assignment is based on the sensitivity of resources and kinds of uses occurring in each geographic area. The four multiple-use classes are Class C (Controlled Use), Class L (Limited Use), Class M (Moderate Use), and Class I (Intensive Use).

Multiple-Use Class C: Formally designated wilderness areas and areas that have been recommended as being suitable for wilderness designation are managed under this class. Congress designated wilderness areas across large portions of the California Desert Conservation Area in 1994 under the California Desert Protection Act; these Congressional designations supercede the multiple-use class boundaries assigned by the Bureau in 1980 when the California Desert Conservation Area Plan was finalized.

Multiple-Use Class L: Lands within this class include areas that are managed to provide for lower density, carefully controlled multiple uses of resources while ensuring that sensitive values are not significantly diminished.

Multiple-Use Class M: Lands within this class include areas that are managed to provide for a wide variety of present or future uses that include mining, livestock grazing, recreation, energy, and utility development.

Multiple-Use Class I: Lands within this class include areas that will experience concentrated use serving human needs. The Bureau attempts to mitigate impacts to resource values in Multiple-Use Class I lands and attempts to rehabilitate these disturbed areas to the extent possible.

All land-use actions and resource-management activities on public lands must meet the guidelines for the class of land on which they would occur. These guidelines are divided into 19 categories and are more fully described in the California Desert Conservation Area Plan (Bureau 1999), which is herein incorporated by reference.

In addition to the four multiple-use classes, the Bureau also manages a limited amount of land that has not been classified. Parcels in the “unclassified lands” category are managed on a case-by-case basis, according to the land tenure adjustment element that is described in greater detail below. For the most part, unclassified lands are surrounded by private lands and opportunities for conservation management are extremely limited.

Elements

The California Desert Conservation Area Plan includes twelve program elements that provide more specific application of the multiple-use class guidelines for resources or activities that have been identified as a matter of public interest. Each element has a set of goals and planned actions and a description of how these goals and actions will be implemented and monitored. Descriptions of the twelve elements follow; we omitted information that is not relevant to the desert tortoise, such as that regarding the protection of wetlands and riparian areas.

Cultural Resources Element: Historic and prehistoric remains that include, but are not limited to, paleontological resources, such as vertebrate and invertebrate fossils, historic and prehistoric routes, road-side artifacts, and historic buildings are managed under this element. Typically, activities associated with this program element are designed to protect historic and prehistoric remains. The Bureau may undertake activities to stabilize or restore areas supporting cultural and paleontological resources. Locations supporting these resources may be monitored. The Bureau may also permit well-directed research at sites supporting these resources.

Native American Element: American Indian tribes have lived within the boundary of the California Desert Conservation Area for several thousand years and have left thousands of sites containing Native American artifacts such as burial remains, lithic scatter sites, and objects associated with historic or prehistoric hunting camps or long-term residences. Members of Native American tribes consider Bureau lands within the California Desert Conservation Area as part of their tribal homeland; on that basis, they may use these lands for a variety of activities that relate to hunting, religious worship, and the collection or cultivation of plant resources.

To protect historic and prehistoric artifacts and provide for the continued use of the desert landscape by Native Americans, the Bureau uses several tools, including land use designations (e.g., Class C or L) to protect Native American artifacts and promote traditional land uses and customs, designation of areas of critical environmental concern, and development of activity

plans for site-specific management guidelines. The Bureau and different tribal governments also hold formal and informal discussions or communications on an irregular basis. Guidance for this element requires the Bureau to provide full consideration to Native American values in land use planning and management decisions; the Bureau has also committed to manage and protect these values whenever prudent and feasible.

Wildlife Element: The Bureau manages wildlife through a variety of mechanisms that include the development of habitat management plans or activity plans for areas of critical environmental concern, the designation of special management areas or vehicle routes, or the development of Sikes Act agreements. This element calls for baseline monitoring of certain wildlife populations and how use of the desert may be affecting this resource.

Vegetation Element: Vegetation management within the California Desert Conservation Area may include: vegetation production; plant harvesting; management of rare, threatened, and endangered species; designation and management of unusual plant assemblages; and vegetation manipulation that is designed to promote the growth of desirable species such as jojoba (*Simmondsia californica*) or retard the spread of undesirable weedy plants such as salt cedar (*Tamarix ramosissima*). Vegetation production is typically a passive, naturally occurring process that is influenced by seasonal growth patterns and precipitation rates. Management of rare, threatened, or endangered species typically includes survey work designed to determine their distribution, abundance, and status. Unusual plant assemblages are plant communities that are recognized for their unusual age, size, cover, or density, or that represent a disjunct distribution. Unusual plant assemblages also include relatively rare plant assemblages that are typically associated with wetland, riparian, limestone outcrop, or sand dune habitats. Designation of an unusual plant assemblage benefits vegetation communities because these areas receive additional consideration during impact analyses.

Wilderness Element: The California Desert Conservation Area Plan established guidelines for how the Bureau would conduct an inventory to determine which of its lands may be appropriate for wilderness designation, study the identified areas, and provide a report to Congress with its recommendations. This process has been completed. Additionally, Congress designated numerous other wilderness areas on Bureau lands in 1994 through the passage of the California Desert Protection Act.

The Bureau's program guidance for managing wilderness includes maintenance of an enduring system of high-quality wilderness, maintenance of the plants and animals indigenous to the area, consideration of the needs of listed species and their habitats, and maintenance of stable watersheds. The Bureau's guidance allows some activities, such as maintenance of existing facilities, to occur within wilderness areas; those activities will be discussed within the context of the specific guidance.

Wild Horses and Burros Element: The Bureau's goals with regard to wild horses and burros are to provide for their requirements in specified areas, protect them from unauthorized removal, remove all wild horses and burros from areas not designated for their retention, and removal of excess wild horses and burros from designated retention areas. To ensure that the number of burros and wild horses does not exceed appropriate numbers, the California Desert Conservation Area Plan notes that the Bureau would estimate the number of animals annually, monitor population dynamics, monitor the condition of vegetation in areas used by burros and wild horses, and adjust the number of animals based on the results of that monitoring.

Livestock Grazing Element: The goals of this element are to use range management to maintain or improve vegetation to meet the needs of livestock and other objectives in the California Desert Conservation Area Plan, continue to use the California Desert Conservation Area for production of livestock to contribute to satisfying the need for food and fiber from public land, and maintain good and excellent range condition and improve poor and fair range condition by one condition class through the development and implementation of feasible grazing systems or allotment management plans. A key component of meeting the last goal is monitoring to determine where changes are necessary to meet resource objectives.

The California Desert Conservation Area Plan identified three types of range to attempt to manage grazing allotments. Allotments are classified as perennial, ephemeral, or ephemeral/perennial.

A perennial allotment is one where the primary forage for livestock consists of perennial plant species. Perennial range usually occurs at elevations greater than 3,500 feet or in the northern portions of the California Desert Conservation Area. The production of vegetation and the growing season are more consistent than elsewhere in the desert, except in extreme conditions; this consistency generally allows the Bureau to allocate forage without major changes from year to year. The Bureau may issue temporary, non-renewable authorizations to allow the operator to graze additional livestock on a perennial allotment when production of perennial plants is high.

An ephemeral allotment is one where the primary forage for livestock is ephemeral in nature, such as annual plants. Ephemeral range typically occurs below 3,500 feet in elevation where annual plants provide most of the forage. The production of annual forage can vary greatly from year to year, depending on many factors such as the amount and timing of rainfall, temperatures, and wind conditions. Sheep and cattle are managed differently. An interdisciplinary team of Bureau employees determines when cattle would be allowed on ephemeral range each year; the forage needs of wildlife, visual needs, and the potential for erosion are considered in determining when cattle can be turned out on the range. An interdisciplinary team also determines when sheep would be allowed on the range. The amount of forage would need to be at least 200 pounds per acre of dry weight before sheep can graze; in habitat that the Bureau rated as highly crucial for desert tortoises, the amount increases to 350 pounds per acre of dry weight before sheep can graze.

Ephemeral/perennial allotments are generally perennial in nature but allow for additional stocking of livestock when ephemeral production is appropriate. Ephemeral/perennial range combines aspects of both types of grazing. A stocking rate is based first on the perennial forage and then is increased in years when climatic conditions produce sufficient quality and quantity of forage; the same methods employed to determine stocking rates on ephemeral allotments are employed on ephemeral/perennial ranges. The Bureau allows ephemeral use of ephemeral/perennial range through short-term authorizations; this process is called an ephemeral authorization.

Since the signing of the California Desert Conservation Area Plan, numerous factors have altered grazing programs in the California desert. The listing of the desert tortoise resulted in the completion of consultations, pursuant to section 7(a)(2) of the Act, that substantially altered the area grazed by sheep in the western Mojave Desert; the consultations did not alter cattle grazing to the same degree. The creation of the Mojave National Preserve in 1994 precipitated a process of the acquisition of grazing privileges by conservation groups and the subsequent retirement of allotments by the National Park Service. At least some of these allotments were located, in part, on lands that continued to be managed by the Bureau after 1994; the Bureau reviewed the viability of the remaining portions of these allotments and retired those allotments that could no longer support a viable grazing operation.

At least partially as a result of these actions, alternative grazing strategies have been developed for the northern and eastern Colorado Desert and northern and eastern Mojave Desert planning areas. The Bureau has also proposed an interim strategy for the area that would be included in the western Mojave Desert planning area. Details of these strategies are provided elsewhere in this biological opinion.

Recreation Element: This element includes activities that involve both motorized (e.g., dune buggies, dirt bikes, all terrain vehicles, and other vehicles) and non-motorized recreation (e.g., target-shooting, land-sailing, rock-hounding, hiking, sight-seeing, hunting, camping, bird-watching, and nature study). Motorized recreation includes point-to-point travel on existing routes as part of organized events or on a casual basis; it also involves free play within designated off-highway vehicle management areas. This element also provides for the development of trails and facilities to meet visitor service needs. The Bureau has a public outreach program that is intended to provide visitors with information on the desert and increase environmental awareness; a volunteer program and maps and brochures produced by the Bureau assist in this effort. Most of these elements are designed to provide accurate information on recreational opportunities and public facilities.

Motorized-Vehicle Access Element: Motorized vehicles are the primary tool that most visitors use to access various portions of the California Desert Conservation Area. A primary goal of the Bureau's management is to provide for constrained access for motorized vehicles in a manner that balances the needs of all users of the desert, private landowners, and other public agencies; another goal is to avoid adverse impacts to resources, to the degree possible, when designating or amending routes for access by motorized vehicles. The Bureau distinguishes between the use of

mechanized vehicles for recreation purposes (e.g., use of off-highway vehicles) and the use of vehicles to convey visitors to various areas of the desert. The Motorized-Vehicle Access Element does not address access needs and approvals associated with specific use authorizations (e.g., rights-of-way for utilities, mining plans of operation).

Motorized vehicular access on Bureau lands within the California Desert Conservation Area is managed with the aid of area and route designations. Area designations include “open,” “closed,” or “limited” use categories.

Areas that are classified as being “open” allow travel anywhere if the vehicle is driven in a responsible manner and private property rights are respected. Lands in this category include certain sand dunes, lake beds, and some areas of Mojave desert scrub. Several off-highway vehicle management areas are designated as open. The Johnson Valley, Stoddard Valley, Spangler Hills, and El Mirage off-highway vehicle management areas are the only such areas that affect the desert tortoise; all are located in the western Mojave Desert. The Bureau and Service have completed formal consultation, pursuant to section 7(a)(2) of the Act, on these areas.

Vehicular use in “closed” areas is normally not permitted. Prohibitions against vehicular use typically apply to land in areas of critical environmental concern, wilderness areas, and other special areas where provided for in management plans, such as certain sand dunes, dry lake beds, and select areas.

Vehicle use in “closed” areas may be permitted in certain cases. Fire, military, emergency, or law enforcement vehicles may be used in these areas for emergency purposes. Combat or combat support vehicles may be used for national defense purposes. Finally, vehicle use may be expressly authorized by an agency head under a permit, lease, or contract, and when vehicles are used for official purposes by employees, agents, or designated representatives of the federal government or one of its contractors.

In “limited” use areas, motorized-vehicle access is allowed only on certain “routes of travel,” which include roadways, trails, and washes that have been approved for such use through the route of travel designation process. At a minimum, vehicle use is restricted to existing routes of travel. An existing route of travel is a route that existed before the approval of the California Desert Conservation Area Plan in 1980. These routes must have had a minimum width of 2 feet, showed substantial surface evidence of prior vehicle use, or, for washes, had a history of prior use.

Vehicle access in “limited” use areas is further modified by different land use classifications. Within Class I lands, those areas not “open” will be limited to use of existing routes, unless further limitations are necessary. Within Class M lands, access is limited to existing routes, unless the Bureau has determined that use on specific routes must be limited further. Within Class L areas, vehicle access is directed toward use of approved routes of travel. Approved routes include primary access routes intended for regular use and for linking desert attractions

for the general public and secondary access routes intended to meet specific user needs. In areas of critical environmental concern where vehicle use is allowed, vehicle access will be managed under the guidelines for Class L lands. In areas that have not been assigned to a multiple-use class, the route approval process will be applied, as needed, to resolve specific problems and to establish a cohesive program.

Stopping, parking, and vehicular camping along “routes of travel” are limited to within 300 feet of a route, except in certain sensitive areas in which the distance is 100 feet. In some locations, specific parking or stopping areas may be signed “open” or “closed” to protect fragile or sensitive resources adjacent to the route or to provide a safe place to stop. The Bureau has adopted different standards for stopping, parking, and vehicular camping in the desert wildlife management areas designated by the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan; these differences will be discussed in the portions of this biological opinion that describe those plans.

Vehicle use in desert washes is governed by the local area designation. Vehicle use in desert washes is prohibited in areas that have been designated as being “closed.” Vehicle access in desert washes is permitted in areas that are designated as being “open.” In all “limited” use areas, vehicle use in desert washes will be controlled according to the travel restrictions that are applicable to the local multiple-use class category. In addition, washes may have travel restrictions (e.g., speed limits or seasonal closure) that are designed to protect resources found in or along the wash or to minimize conflicts with other uses. The Bureau has adopted different standards in the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan.

The Bureau may post signs that describe the approved type of motorized vehicle access (open, closed, limited) that applies to a given area. The Bureau will also, with public involvement, determine which routes in Class L or M lands need to be closed or limited in some way. Routes not approved for vehicle access would, in most instances, be obliterated, barricaded, signed, or otherwise marked.

In areas with mining operations, additional access needs are managed in accordance with the Bureau’s regulations for the Exploration and Mining-Wilderness Review Program (43 *Code of Federal Regulations* 3802) and the Surface Management of Public Lands under the U.S. Mining Laws (43 *Code of Federal Regulations* 3809). Access needs for other uses, such as roads to private lands, grazing developments, competitive events, or communication sites, are permitted on an individual basis under Federal Land Policy and Management Act guidelines and other appropriate regulations.

Geology, Energy, Minerals Resources Element: Forty-six mineral commodities, including some of national and international importance, are known to exist in the California Desert Conservation Area. Substantial resources of geothermal energy are also present in the California desert; areas that may contain geothermal resources may be designated as a “known or potential geothermal resource area.” Extraction of oil, and gas reserves may take place on Bureau lands.

In the California Desert Conservation Area, approximately 360 exploration and mining plans of operation are active; approximately 22 of the mining and 5 to 10 of the exploration operations that are currently active have substantial development footprints.

Most exploration and development activity on public lands in the California Desert Conservation Area is guided and authorized under the General Mining Law of 1872 (30 U.S.C. 22 et seq.). Other applicable laws that regulate extraction and exploration for mineral resources include the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.), Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.), and the Materials Act of 1947, as amended (30 U.S.C. 701 et seq.). Collectively, these laws allow use of surface resources provided that the activities comply with appropriate Federal and state laws and rules. Regulations developed pursuant to the Federal Land Policy and Management Act (43 *Code of Federal Regulations* 3802 and 3809) guide the Bureau in managing surface operations under the mining laws for purposes of preventing undue or unnecessary degradation to public land and undue impairment to public lands and resources in the California Desert Conservation Area.

The *Code of Federal Regulations* addresses three distinct levels of mining law. Text appearing in the 1980 California Desert Conservation Area Plan has been revised to include changes that were addressed in the revised surface management regulations at 43 *Code of Federal Regulations* 3809, published in the *Federal Register* on January 20, 2001, and amended in October 2001. The new regulations affect three distinct levels of mining operations based on surface disturbance and degree of impact in sensitive areas. These levels include casual use, notices, and plans of operation.

Casual Use: Casual use is defined as activities causing no or negligible surface disturbance to public lands or resources. Mining conducted under the casual use category includes the collection of geochemical, rock, soil, or mineral specimens using hand tools, hand panning, sluicing, and small portable suction dredges. It also generally includes use of metal detectors, gold spears and other battery-operated devices for sensing the presence of minerals, and hand and battery-operated drywashers. Casual use does not include use of mechanized earth-moving equipment, truck-mounted drilling equipment, or motorized vehicles in areas designated as closed to off-road vehicles, chemicals, or explosives. Operators may use motorized vehicles for casual use activities provided the use is consistent with the regulations governing such use, off-road vehicle use designations contained in land-use plans, and the terms of temporary closures ordered by the Bureau.

Because of the guidelines in the California Desert Conservation Area Plan, vehicles cannot be operated off roads as part of the casual use provisions of the mining regulations within habitat of the desert tortoise on Class C, L, M, and some I lands. Vehicles can be used under the casual use provisions for mining within the boundaries of the Bureau's designated off-highway vehicle management areas, which are managed as Class I and designated as open; driving off established routes is permitted within these areas, provided that the vehicle is operated in a safe manner. Because the casual use of vehicles for mining is prohibited throughout the California Desert

Conservation Area except in areas where anyone can drive off established routes, this topic will not be discussed again in this biological opinion; off-road driving in open areas will be addressed in the discussion on recreation.

Casual use does not include “occupancy” or operations in areas where the cumulative effects of the activities result in more than negligible disturbance. Mining activity conducted under the casual use category does not require that the operator notify the Bureau or acquire its approval prior to conducting field activities. Operators must reclaim any casual-use disturbance that is created during their activities. If activities do not qualify as casual use, an operator must submit a notice or plan of operation, whichever is applicable.

Where the cumulative effects of casual use by individuals or groups have resulted in, or are reasonably expected to result in, more than negligible disturbance, the Bureau’s State Director may establish specific stipulations on defined casual use areas, as he or she deems necessary. In such cases, any individual or group intending to conduct activities under the mining laws must contact the Bureau 15 calendar days before beginning activities to determine whether the individual or group must submit a notice or plan of operation.

Notices: Operations under a notice are limited to exploration activity and involve surface disturbances greater than those associated with casual use. Actions associated with this category involve sampling, drilling, or developing surface workings to evaluate the type, extent, quantity, or quality of mineral values present. Exploration does not include activities where material is extracted for commercial use or sale.

Notices are not allowed on “any lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat, unless [the Bureau] allows for other action under a formal land-use plan or threatened or endangered species recovery plan” (43 *Code of Federal Regulations* 3809.11(c)(6)). None of the Bureau’s land-use plans in the California Desert Conservation Area provide for the use of notices in habitat of threatened or endangered species. For these reasons, operations conducted under a notice are not likely to affect listed species. For that reason, notices will not be discussed further in this document.

Plan of Operation: A plan of operation approved by the Bureau is required before the initiation of exploration or mining activities that are greater than casual use or are acceptable under a notice. A plan of operation is required for any bulk sampling in which the operator will remove 1,000 tons or more of presumed ore for testing. A plan of operation is required for any operations causing surface disturbance greater than casual use in:

1. Lands designated as Class C or L;
2. Designated areas of critical environmental concern;
3. Areas designated as “closed” (under regulations at 43 *Code of Federal Regulations* 8364 and published in the *Federal Register*) to off-road vehicle use (meaning cross-country

travel); and

4. Any lands or waters known to contain federally proposed or listed threatened or endangered species or their proposed or designated critical habitat, unless the Bureau allows for other action under a formal land-use plan or recovery plan.

The plan of operation must contain a complete description of the entire mining operation. Pertinent information in the plan must include, but not be limited to: the location and spatial extent of the proposed mining operation; the type of equipment that will be used to extract ore; a map showing the location of the project area in sufficient detail for Bureau staff to be able to find it and the location of access routes intended to be used, improved, or constructed during the mining activity; the type of support facilities; location of drill sites (to the extent possible); measures to prevent unnecessary or undue degradation; and a reclamation plan for the land involved. The plan of operation must demonstrate that the proposed operations would not result in unnecessary or undue degradation, or undue impairment to public lands in the California Desert Conservation Area.

Under the mining regulations, lands affected by all operations will be reclaimed, regardless of whether the operations are conducted under the casual use category, under a notice, or under a plan of operation. Regulations for reclamation activities are provided in 43 *Code of Federal Regulations* 3809.1-3(d) and include guidance regarding the development of access routes; disposal of tailings, dumps, deleterious materials or substances, and other waste produced by the operations; reclamation of the disturbed area; and inspection of the reclaimed area.

Approval of any plan of operation will be subject to changes or conditions that are necessary to meet the performance standards and to prevent unnecessary or undue degradation. The Bureau may require the operator to incorporate into the plan of operation other agency permits, final approved engineering designs and plans, or other conditions of approval. No operations may be conducted until the Bureau approves the plan of operation and receives the financial guarantee.

All plans of operation are reviewed to ensure that the compliance guidelines of the National Environmental Policy Act are met. A plan of operations may be conditioned and required to proceed with stipulations, modifications, or amendments that are developed through the process of environmental review. Plans are stipulated to bring the operation into compliance with the requirements regarding undue or unnecessary degradation and undue impairment, and to ensure protection of natural resources, reasonable reclamation, and proper conservation of the mineral resource. Policy directs that all operating plans and operations conducted on public land be inspected to ensure compliance with the terms of approval, regulations, and statutes.

Reclamation includes those activities associated with recontouring waste piles, reshaping pit walls and other excavations, removal of permanent or temporary facilities or structures, and soil placement, preparation, and in some cases, reseeding and maintenance of plants. Reclamation may also include any measures required to enhance or facilitate enhancement of previously disturbed areas or to modify areas to facilitate or accept displaced wildlife. As related to assuring a diverse and complete habitat as existed before operations, restoration of the area may be required. This normally entails inventory and consideration of the local biological features and the development of measures and time frames to ensure complete recovery, if required.

The Bureau requires that operators post a bond for surface disturbing operations conducted under a notice, plan of operation, or activity conducted under the Mineral Leasing or Materials Acts. The bond is required to cover liability for reclaiming disturbances approved in the plan of operation.

Mineral leasing, or any other activity, will require an environmental analysis pursuant to the National Environmental Policy Act, unless exempted. Activities affecting a threatened or endangered species will not qualify for an exemption (i.e., categorical exclusion) from this requirement. Mineral material sales in Class L and M lands are processed under 43 *Code of Federal Regulations* 3600. If a new extraction area in a Class L area is expected to be larger than 5 acres in size, documentation pursuant to the National Environmental Policy Act will be prepared to cover the entire area of potential extraction.

No mining operations will be allowed if such activity would cause unnecessary or undue degradation.

The mining laws allow individuals and corporations to apply for patents on public lands that have valid existing rights. Once these lands are removed from Federal ownership, desert tortoises located on the patented lands would likely receive less protection under the authorities of the Act. In 1994, however, Congress placed a moratorium on the acceptance of new applications for mineral patents. This moratorium remains in effect and has been renewed each year with the passage of the annual Interior Appropriations Act (Ed Lorentzen, pers. comm. 2005b). For this reason, patenting of public lands is not likely to affect the desert tortoise at this time. If Congress does not renew the moratorium at some point in the future, the potential exists that the desert tortoise could be adversely affected. Additional consultation, pursuant to section 7(a)(2) of the Act, may not be required because the patenting of land is not a discretionary action on the part of the Bureau. Patenting of public lands will not be discussed further in this biological opinion.

Energy Production and Utility Corridors Element: The goals of the California Desert Conservation Area Plan for this element include the full implementation of a network of planning corridors to meet the projected utility needs to the year 2000, the identification of environmental constraints and siting procedures to be used by telecommunications firms and public agencies, and the identification of potential sites for geothermal development, wind energy parks, and power plants. Sixteen planning corridors are identified in the California

Desert Conservation Area Plan. They are intended to include new electrical transmission lines of 161 kilovolts or above, all pipelines with diameters greater than 12 inches, cables for interstate communications, and major aqueducts or canals for interbasin transfers of water. The corridors vary in width from 2 to 5 miles.

The California Desert Conservation Area Plan also identifies nine contingent corridors in the event transmission needs change. A contingent corridor can be activated with an amendment to the California Desert Conservation Area Plan.

Since the California Desert Conservation Area Plan was signed, the Bureau has amended it to approve two additional corridors, moved a portion of corridor BB, and deleted contingent corridor W and portions of corridors M and E. The Bureau has also designated new corridors, provided permission to construct gas and oil pipelines and fiber optic cables outside corridors, and activated portions of contingent corridors as project-specific amendments to the California Desert Conservation Area Plan.

The Bureau may also allow the siting of microwave tower sites, and conventional, solar, geothermal, wind, and nuclear power plants on Bureau lands within the California Desert Conservation Area.

Land-Tenure Adjustment Element: The goal of this element is to direct the acquisition and disposal of public lands to maximize the efficiency and consistency of their management. The objectives are to: establish a program that complements the goals of other elements of the California Desert Conservation Area Plan through the consolidation of public lands with special management areas, such as areas of critical environmental concern, recreation areas where the use is intensive, and Class C areas; initiate a program for the disposal of public land through sale and exchange within the unclassified areas of the California Desert Conservation Area to reduce the need to manage isolated and fragmented parcels; sell, exchange, or lease public lands to meet the needs of other government agencies for public facilities; and cooperate with other public agencies to ensure that locally adopted land use plans are considered in any land tenure action.

At the time the California Desert Conservation Area Plan was signed, approximately 300,000 acres of scattered and isolated parcels of public lands were not included within one of the multiple-use categories. The Bureau proposed to retain or transfer to other appropriate agencies those unclassified parcels containing sensitive resources. Parcels with known mineral resources will be selectively retained. Prior to any disposal action, parcels would be inventoried for sensitive resources; parcels that do not support sensitive resources and would be appropriate for development would be sold or exchanged.

The California Desert Conservation Area Plan provides specific guidance with regard to the disposal and exchange of public lands. No disposals are allowed in Class C, L, or I; Class M lands may be disposed. The Bureau may exchange Class L lands; the Bureau's policy with regard to such exchanges is that they must provide a net public benefit, including improved management of habitat for listed species. The Bureau would not consider the loss of habitat of a listed species through an exchange as a public benefit; therefore, only a net gain in habitat would meet the definition of public benefit. Additionally, the Bureau's policy with regard to special status species is that it will "retain in Federal ownership all habitat essential for the survival and recovery of any listed species..." (section 6840, Bureau of Land Management Manual).

Special Management Areas

The third major management tool that is used for planning and management purposes in the California Desert Conservation Area Plan involves the designation of special management areas, such as areas of critical environmental concern or other special areas. Other areas that possess rare, unique, or unusual qualities of scientific, educational, cultural, or recreational significance may be designated as research natural areas, outstanding natural areas, other natural areas, national natural landmarks, national historical landmarks, national register of historic places, historic American engineering record, national scenic trails, national historic trails, man and biosphere reserves, and recreation lands.

After an area has been formally designated as an area of critical environmental concern or other special area, a site-specific activity plan is prepared. Activity plans vary in size and complexity depending on the nature of the resources and uses within the area of critical environmental concern. Activity plans clearly identify the ongoing management objectives for the area of critical environmental concern. The activity plan also includes a description of types of future uses, activities, or management practices considered compatible with the purposes of the area of critical environmental concern and a description of any existing incompatible uses, activities, or practices within the area. The plan also provides a schedule for implementing management goals. The activity plan includes the "details" of implementing the special management requirements, such as patrol schedules, posting signs, patrolling, and fencing specifications for facilities. Plans are prepared by interdisciplinary teams that consider all of the resources and uses present. Plans are subject to public review and environmental analysis.

Development, when wisely planned and properly managed, may occur in areas of critical environmental concern if the basic intent of protection of historic, cultural, scenic, or natural values is assured. In the case of certain wildlife and cultural resources, surface disturbances from mining, motorized-vehicle access, and grazing or other uses will be controlled. In some cases, fencing may be used to prevent unintentional impacts. Some valuable wildlife resources will require assistance in the way of reducing or eliminating competition for water sources or forage. Directional signs and visitor use areas will be developed and designated to encourage visitor cooperation, and informational facilities and interpretive programs will be instituted to

increase visitors' knowledge of and sensitivity to the protective needs of important natural and cultural resource values. Consultation with adjacent land owners will be conducted when areas of critical environmental concern and their management may conflict with adjacent owners' land uses and requirements.

Management prescriptions for areas of critical environmental concern may override the multiple-use class guidelines for the local area. The Bureau monitors existing conditions within an area of critical environmental concern to ensure that resource degradation is not occurring. Monitoring data will be used to guide corrective actions that may be necessary.

In summary, areas of critical environmental concern and other special areas are established to conserve specific resources. The presence of a listed taxon within such an area would prompt the development and implementation of a management plan to adequately conserve that taxon. For that reason, the program guidance for special management areas is not likely to adversely affect the desert tortoise or its critical habitat and will not be discussed further in this biological opinion.

Northern and Eastern Mojave Desert Management Plan

One of the goals of the Northern and Eastern Mojave Desert Management Plan is recovery of the desert tortoise. To achieve this goal, the Bureau amended the California Desert Conservation Area Plan to identify the boundaries of desert wildlife management areas and multiple-use classes; implement a general management strategy; manage vehicle use, livestock grazing, and burros; and acquire private lands. The following section provides general summaries of the Northern and Eastern Mojave Desert Management Plan that are relevant to the desert tortoise and its critical habitat. Details of this bioregional plan are contained in the final environmental impact statement for this planning effort (Bureau 2002d).

Establishment of Desert Wildlife Management Areas

The Bureau created three areas of critical environmental concern specifically for management of the desert tortoise, and these areas have been designated as desert wildlife management areas. ("Desert wildlife management area" is a concept that was proposed in the recovery plan for the desert tortoise (Service 1994c); more information on this concept is located in the Status of the Species section of this biological opinion.) The locations and acreage of the desert wildlife management areas are:

Desert Wildlife Management Areas	Acreage
Piute-Fenner	173,850
Ivanpah Valley	36,795
Shadow Valley	101,355
Total	312,000

These desert wildlife management areas include all critical habitat within the planning area of the Northern and Eastern Mojave Desert Management Plan except for approximately 12,700 acres west of Turquoise Mountain Road in the Shadow Valley unit and 485 acres adjacent to the community of Nipton in the Ivanpah Critical Habitat Unit. By memorandum dated April 29, 2002, the Bureau proposed to remove approximately 60 acres of private land and 425 acres of public lands from the Ivanpah Valley Desert Wildlife Management Area; the acreage in the table reflects this change. The Bureau may elect, at some future time, to exchange these public lands for private lands within this critical habitat unit that are located within the Mojave National Preserve (Bureau 2002c).

All desert tortoise habitat within the desert wildlife management areas would be considered as Category I; outside of the desert wildlife management areas, it would be considered as Category III. (The Bureau adopted categories of desert tortoise habitat to assist in its management of the species; these categories can be applied to any multiple-use class. The goal for Category I lands is to maintain stable, viable populations and increase populations wherever possible. For Category II, the goal is to maintain stable, viable populations. In Category III, the goal is to limit declines to the extent possible using mitigation measures (Bureau et al. 2003). Approximately 30,010 acres of Class M lands in this planning area would be changed to Class L.

General Management Strategy

The Bureau's general management strategy contains several prominent components. The following bulleted items generally follow the organization of this information as presented by the Bureau on page 2-27 of the final environmental impact statement (Bureau 2002d).

- Cumulative surface disturbance is limited to one percent of the public lands in each of the desert wildlife management areas. Appendix F of the final environmental impact statement for the planning area (Bureau 2002d) describes the rationale for this approach and how this limit would be monitored and managed. The Bureau defines surface-disturbing activities as "those that result in the elimination of perennial plant cover over an area." The Bureau recognizes that elimination of perennial plant cover "may result from blading or otherwise destroying plant roots and severely disturbing soil structure or

it may be less severe in the form of crushing of above-ground plant parts.” The cumulative total of the amount of disturbed lands would be reduced by the acreage of any restored lands that meet specific criteria.

- The Bureau adopted management prescriptions and mitigation measures to reduce the effects of proposed projects on the desert tortoise. These prescriptions and measures include: reclaiming habitat that is lost or disturbed by new projects; using specific design features to minimize the effects of projects on the desert tortoise; attempting to use seasonal restrictions to protect desert tortoises; using disturbed areas to the degree possible for new facilities; and requiring a plan of operation for all mining activities involving surface disturbance of perennial vegetation, use of vehicles off of designated open roads and trails, or use of mechanized earthmoving equipment or explosives. Appendix A of the draft environmental impact statement describes these measures in greater detail.
- The Bureau proposes to enter into a consultation that would address the effects on the desert tortoise and its critical habitat, if appropriate, of all projects that would result in a surface disturbance of 100 acres or less. Projects that would result in more than 100 acres of disturbance, require the preparation of an environmental impact statement, or require the amendment of the California Desert Conservation Area Plan that would necessitate a separate consultation. Because this proposal concerns future consultations, pursuant to the implementing regulations at 50 *Code of Federal Regulations* 402, we will not discuss it further in this biological opinion.
- Another component of the general management strategy is the implementation of a management program for the common raven (*Corvus corax*). This program would include research, alteration of habitat of common ravens, and removal of specific common ravens. New facilities or operations will be reviewed to determine whether they have the potential to increase the number of common ravens; if the review indicates that such a potential exists, the Bureau will require the project or operation to be modified to reduce or eliminate the opportunity for common ravens to increase in number. Appendix A of the draft environmental impact statement (Bureau 2002d) contains the detailed management plan for common ravens. The Bureau also notes that this proposal may be modified or supplemented by future multi-agency programs.
- The Bureau will continue to require project proponents to compensate for loss or disturbance of habitat of the desert tortoise. The compensation ratio for all projects within the desert wildlife management areas will be 5 acres acquired for every acre lost or disturbed.

The final environmental impact statement (Bureau 2002d) notes that the Bureau will continue to use existing mechanisms of compensation for proposed actions and land acquisition strategies to acquire lands in areas of high resource value within desert wildlife management areas. This strategy includes the disposal of public lands with less resource value in exchange for lands of high value.

Monitoring of desert tortoise populations to assess the effectiveness of management can occur through several mechanisms. To date, both permanent study plots and line distance sampling have been used on public lands. Appendix D of the final environmental impact statement (Bureau 2002d) provides some information on various types of monitoring. Although the Bureau may contribute to the funding of these monitoring efforts, it does not bear sole responsibility for this funding. Specific monitoring efforts have not been proposed by the Bureau under this proposed action; therefore, we will not discuss this issue further in this biological opinion.

Appendix A.5 in the final environmental impact statement (Bureau 2002d) describes an education program that the Bureau will implement to provide the public with a better understanding of the desert tortoise. In general, the Bureau proposes to update desert access guides to include information on the desert tortoise, update brochures and informational packets to reflect changes to the California Desert Conservation Area Plan, update its existing web page with information on recovery efforts, work with the California Department of Transportation to design and install interpretive kiosks at rest areas, and implement other activities as funding becomes available.

The Bureau's program guidance provides for conducting research on public lands. The Bureau proposes to allow research necessary to assess the relative importance of threats to the desert tortoise. Research will be conducted by various entities, and the Bureau would assist in funding such research. Appendix A.6 of the final environmental impact statement (Bureau 2002d) provides a list of recommended topics for research.

Management of Vehicles

To manage vehicles within desert wildlife management areas, the Bureau designated routes of travel. Routes not approved for vehicle access will, in most instances, be obliterated, barricaded, signed, or marked, as appropriate; the technique used would depend on the specific circumstances.

As part of the action originally proposed for consultation, the Bureau inventoried and designated the routes in the southern portion of the planning area where Category I, II, and III habitats of the desert tortoise are located. In this area of approximately 350,000 acres, the Bureau has

designated approximately 650 miles of routes as open and 200 miles of routes as closed. The Bureau designated routes of travel in the remainder of the northern and eastern Mojave Desert planning area, and has completed formal consultation with the Service on this designation (Service 2004d), and signed a record of decision. We will not discuss routes outside of critical habitat or desert wildlife management areas in the northern and eastern Mojave Desert planning area further in this biological opinion.

Parking and camping will be allowed in disturbed areas within 100 feet of the centerline of routes. Washes in desert wildlife management areas are closed, unless specifically designated as open. Where navigable washes are designated as open or limited routes, parking and camping would be allowed only within the banks of the wash.

Management of Grazing

The Bureau will use regional standards and guidelines for public land health, the California Desert Conservation Area Plan, allotment management plans, and terms and conditions from existing biological opinions to manage livestock grazing. The standards express the level of physical and biological condition or degree of function required for healthy, sustainable public lands; the guidelines for grazing management are the types of activities and practices determined to be appropriate to ensure that the standards can be met or that substantial progress can be made towards meeting them. Section 2.1 of the final environmental impact statement (Bureau 2002d) contains a more complete discussion of standards and guidelines and how they relate to management of livestock. A standard is an expression of the level or physical and biological condition or degree of function required for healthy, sustainable rangelands. Guidelines are types of grazing management activities and practices determined to be appropriate to ensure that the standards can be met or significant progress can be made toward meeting them.

The standards for the Northern and Eastern Mojave Desert Management Plan include the management of substrates, native species, the function of riparian areas and wetlands, and water quality; the function of riparian areas and wetlands and water quality are not relevant to the desert tortoise or its critical habitat so we will not discuss them further in this biological opinion. Substrates should have infiltration rates and permeability rates that are appropriate for substrate type, climate, geology, land form, and past uses; the Bureau uses canopy and ground cover, the diversity of plant species, the amount of litter and organic matter, microbiotic soil crusts, evidence of wind or water erosion, and other factors to indicate whether the standards for substrates are being met. To determine whether standards for native species are being met, the Bureau evaluates photosynthetic and ecological processes, plant vigor, nutrient cycles, the production of litter, age class distribution of plants and animals, distribution and cover of plant species, and other factors. The guidelines for grazing management are intended to maintain existing conditions, if the standards are being met, or to set management on a course toward improving conditions so that the standards can be met.

These standards and guidelines are generally compatible with the management of critical habitat of the desert tortoise because the standards provide descriptions for the physical and biological functioning that is appropriate for any given area of range and the guidelines establish management practices for grazing that either maintain habitat in good condition or seek to improve habitat quality where it is not functioning properly. Because the regional standards of public land health and guidelines for grazing management are designed to ensure the maintenance of high quality habitat or to improve the condition of habitat that is not functioning properly, we conclude that their implementation is not likely to adversely affect the desert tortoise or its critical habitat; consequently, we will not discuss them again in this biological opinion.

On the Jean Lake Allotment, cattle will be removed when ephemeral forage production is less than 230 pounds per acre from March 15 through November 1. The Bureau proposed to develop a final grazing strategy within a year and to implement it within 2 years; this strategy will provide details regarding the areas of removal, natural movements by cattle, existing and potential improvements, and other constraints of cattle management. The potential effects on the desert tortoise of implementing the grazing strategy will be evaluated in future consultations; therefore, this strategy will not be discussed further in this biological opinion.

Ephemeral cattle allotments will not be authorized in desert wildlife management areas. Grazing allotments with an ephemeral designation only will be terminated. Grazing allotments with an ephemeral/perennial designation will be changed to a perennial designation only. Temporary non-renewable grazing will not be authorized.

The Bureau proposes to allow voluntary relinquishment of grazing leases and related authorizations within desert wildlife management areas. Upon such relinquishment, these allotments will no longer be available for grazing.

Outside of desert wildlife management areas, the Bureau will monitor range condition to ensure that utilization does not exceed 30 percent on allotments that are rated in poor or fair condition and 40 percent on allotments that are rated in good or excellent condition. Appendix E of the final environmental impact statement (Bureau 2002d) provides a detailed description of the stipulations for cattle grazing within desert tortoise habitat on these allotments.

Management of Burros

The Bureau will reduce the number of burros from the Clark Mountain Herd Management Area until they are substantially removed. This area includes the Shadow Valley Desert Wildlife Management Area (Morgan pers. comm. 2004).

Land Tenure

The final component of the Bureau's general strategy for recovering the desert tortoise in the northern and eastern Mojave Desert planning area is to acquire all private lands in desert wildlife management areas from willing sellers.

Implementation Strategy for Recovery of the Desert Tortoise

Appendix B of the final environmental impact statement (Bureau 2002d) for the northern and eastern Mojave Desert planning area contains the implementation plan for the Bureau's actions. Anticipated time frames for completing activities vary greatly. Some time frames are established by regulation. Other activities will occur annually; many activities, such as implementing the routes of travel designations, will require several years to complete.

Northern and Eastern Colorado Desert Coordinated Management Plan

The Northern and Eastern Colorado Desert Coordinated Management Plan amends and creates land use plans and specific management prescriptions for species and habitats on Federal lands; in particular, its intent is to recover the desert tortoise (Bureau and California Department of Fish and Game 2002). The goals and many of the management proposals of the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan are similar; however, the environmental impact statements for the two plans are substantially different in their organization. In the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau identified issues and then addresses the issues through one or more amendments to the California Desert Conservation Area Plan. The following section provides general summaries of the aspects of the Northern and Eastern Colorado Desert Coordinated Management Plan that are relevant to the desert tortoise; we have not included any discussion of amendments that are not relevant to the desert tortoise. (Note that, although the proposed actions are discussed in terms of numerous amendments, the Bureau actually incorporated all of these changes through a single amendment to the California Desert Conservation Area Plan.) A more detailed description of the information we present in this section is contained in chapter 2 of the final environmental impact statement for the Northern and Eastern Colorado Desert Coordinated Management Plan (Bureau and California Department of Fish and Game 2002).

Amendment 1 – Standards and Guidelines

The Bureau adopted regional standards of public land health and guidelines for grazing management. The principles of the standards and guidelines are the same for both the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan because they are based on the Bureau's grazing regulations at 43 *Code of Federal Regulations* 4180; Appendix B of the final environmental impact statement (Bureau and California Department of Fish and Game 2002) provides more information on the guiding principles contained in the regulations. In the Northern and Eastern Mojave Desert

Management Plan - Management of Grazing section of this biological opinion, we concluded that the implementation of standards and guidelines for the management of grazing is not likely to adversely affect the desert tortoise or its critical habitat; that discussion is also relevant to the implementation of standards and guidelines for Northern and Eastern Colorado Desert Coordinated Management Plan.

Amendment 2- Establishment of Desert Wildlife Management Areas

The Bureau created two desert wildlife management areas for the desert tortoise that would be managed as areas of critical environmental concern; approximately 1,693,528 acres would be included in these desert wildlife management areas. The locations and acreage of the desert wildlife management areas are:

Desert Wildlife Management Areas	Acreage	(Bureau Lands)
Chemehuevi	874,843	(815,843)
Chuckwalla	818,685	(465,287)
Total	1,695,528	(1,281,130)

All desert tortoise habitat within the desert wildlife management areas has been changed to Category I; outside of the desert wildlife management areas, the Bureau changed it to Category III. All Class M lands in the desert wildlife management areas have been changed to Class L.

The Bureau will limit the amount of new disturbance within each desert wildlife management area to one percent of the public land. Appendix G of the final environmental impact statement for the planning area (Bureau and California Department of Fish and Game 2002) describes the rationale for this approach and how this limit would be monitored and managed; note that the criteria by which the Bureau will determine what activities have resulted in surface disturbance include “otherwise destroying plant roots and severely disturbing soil structure or it may be less severe in the form of crushing of above-ground plant parts.”

If disturbance or loss of habitat occurs as a result of a future proposed action, the Bureau will require permittees to compensate by acquiring 5 acres of desert tortoise habitat for each acre that is disturbed or lost; alternatively, funds equivalent to the amount necessary to purchase such lands may be used for restoration or enhancement of habitat. The periphery of desert wildlife management areas will be fenced, signed, or patrolled to ensure that conflicts with adjacent land uses are controlled.

Vegetation Resources

The Bureau will issue permits for the harvest of live vegetation after environmental review and only within salvage areas where surface disturbance has been authorized.

Lands and Land Use Authorizations

Lands acquired through compensation or mitigation will be classified as closed to disposal and use through various authorities. Therefore, these lands will be unavailable for agricultural use, lease or conveyance under the Recreation and Public Purposes Act, sale or lease under the Federal Land Policy and Management Act, grant or lease for airports, or other non-protective withdrawals. The Bureau may consider the sale of hazardous material sites to responsible parties as an exception to the general direction to not sell lands.

Transportation and Access

The final environmental impact statement (Bureau and California Department of Fish and Game 2002) discusses the fencing of portions of Interstate 10, Interstate 40, and Highway 95 by the California Department of Transportation to reduce the level of mortality of desert tortoises. Such fencing, if properly installed, would promote the recovery of the species by substantially reducing the number of desert tortoises that would be killed on roads. Because these proposals are not subject to the sole authorization of the Bureau, we will not discuss them further in this biological opinion.

If the Bureau authorizes new linear projects, such as roads and railroads, it will require the installation of bridges and culverts to allow animals to pass.

Portions of the desert wildlife management area are designated as “washes closed zones.” In these areas, vehicle use is restricted to specific routes, including navigable washes that are individually designated as “open” or “limited.”

Recreation

The Bureau will allow the use of firearms, and this activity will be regulated according to State regulations and county ordinances.

Amendment 3 - Management of Grazing

Prescriptions adapted from the terms and conditions of the biological opinion on cattle grazing (Service 1994b) have been added as permanent requirements for cattle and sheep grazing; they are described in Appendix C of the final environmental impact statement (Bureau and California Department of Fish and Game 2002). The terms and conditions will be implemented in both critical and non-critical habitat of the desert tortoise.

The portion of the Lazy Daisy Allotment that supports the highest density of desert tortoises has

been eliminated; the allotment has been reduced from 332,886 to 311,280 acres. The Bureau will terminate authorization of forage allocation and range improvements, and eliminate allotment designation in the California Desert Conservation Area Plan if the lessee voluntarily relinquishes the grazing lease. Grazing use will continue under the prescriptions described in the final environmental impact statement until such time as the lessee relinquishes the lease.

Utilization of perennial plants may not exceed 40 percent in any key area. The Bureau defines “utilization” as the portion of a year’s forage production that is consumed or destroyed by grazing animals; a “key area” is a relatively small portion of land selected for use in monitoring the effects of grazing use (see glossary *in* Bureau and California Department of Fish and Game 2002).

For grazing allotments that are partially within a desert wildlife management area, cattle will be substantially removed from desert wildlife management areas when ephemeral forage production is less than 230 pounds per acre (air dry weight) from March 15 through June 15. (“Substantially removed” means that some cattle may enter the area of the seasonal closure despite the operator’s best efforts.) Cattle may remain past March 15 if the levels of winter precipitation and soil moisture indicate that the amount of ephemeral vegetation would remain above 230 pounds per acre. If the amount of ephemeral vegetation is unlikely to reach 230 pounds per acre, cattle must be removed from the desert wildlife management area by March 15. The Bureau authorized officer will evaluate and judge whether conditions are likely to be appropriate for grazing. If cattle must be removed, the Bureau will give the operator 2 weeks to move the livestock out of the desert wildlife management area. They may return if the amount of ephemeral vegetation reaches 230 pounds per acre.

The Bureau proposed to develop a final grazing strategy under this amendment to the Northern and Eastern Colorado Desert Coordinated Management Plan within a year and to implement it within 2 years; the goal is to provide details regarding the areas of removal, natural movements by cattle, existing and potential improvements, and other constraints of cattle management. The potential effects on the desert tortoise of implementing this grazing strategy, if any, will be evaluated in future consultations; therefore, this strategy will not be discussed further in this biological opinion.

Authorization of ephemeral use has been terminated in the Lazy Daisy and Chemehuevi allotments. This amendment resulted in the Lazy Daisy Allotment being managed as a “perennial only” allotment and in the termination of the Chemehuevi Allotment. Temporary, non-renewable authorizations within desert wildlife management areas have been terminated on the Lazy Daisy Allotment.

All existing cattle guards will be modified to prevent entrapment of desert tortoises. New cattle guards will be designed to prevent entrapment.

Amendment 4 – Stopping, Parking, and Vehicle Camping

Stopping, parking, and vehicle camping would be allowed within 100 feet of the centerline of routes within areas of critical environmental concern. Outside of these areas, such activities would be allowed within 300 feet of the centerline of routes.

Amendments 5 through 9 – Changes Related to Management of Other Sensitive Species

These amendments are primarily concerned with the management of other sensitive species, although desert tortoises may occur to some degree in the affected areas. Through Amendments 5 and 8, the Bureau established wildlife habitat management areas for the desert bighorn (*Ovis canadensis nelsoni*) and approximately 60 species of rare wildlife and plants, respectively. (The Bureau intends wildlife habitat management areas as regions where active management is targeted at specific sensitive species. No additional restrictions will be proposed on use, except for the closure of some routes.) In Amendment 6, the Bureau changed the multiple use class from Class I to L and M in the Eagle Mountain area, also primarily to manage the desert bighorn.

The Bureau altered the management of domestic sheep to promote the conservation of desert bighorn; for example, the Bureau eliminated the 49,682-acre Ford Dry Lake Allotment and reduced the area of the Rice Valley Allotment from 85,565 to 76,301 acres (Amendment 7). The elimination of the Ford Dry Lake Allotment removes all grazing of domestic sheep from this area; the elimination of the western portion of the Rice Valley Allotment, which supports low densities of desert tortoises, reduces its area from 85,565 to 76,301 acres. Both of these actions benefit desert tortoises to some degree; the benefits are somewhat limited because of the low number of desert tortoises in these areas. Grazing the remainder of the Rice Valley Allotment will not affect desert tortoises in a substantial manner because much of the habitat is stabilized and vegetated dune that is lightly used by sheep approximately once every 6 years (Foreman, pers. com.); additionally, relatively few desert tortoises occur in this area.

The Bureau closed playas and sand dunes at Palen Dry Lake, Palen Dunes, Rice Valley Dunes, Ford Dry Lake, and Ford Dry Lake Dunes to vehicle use. Vehicles may be used in these areas only on designated routes (Amendment 9).

Generally, the measures detailed in the amendments are intended to protect sensitive species from the effects of human activities; additionally, many of these species occupy habitats in which desert tortoises are scarce or absent. Consequently, we have determined that these amendments are not likely to adversely affect the desert tortoise or its critical habitat. With one exception, which is described in the following paragraph, we will not discuss these amendments further in this biological opinion.

The Bureau proposed to continue to construct, improve, and maintain existing and 87 new natural and artificial water sources and exclosures around them where required; the final environmental impact statement (Bureau 2002d) notes that 75 of these sites were to be authorized through the amendment of the California Desert Conservation Area Plan with the record of the decision for the Northern and Eastern Colorado Desert Coordinated Management Plan. The Bureau will consult with the Service on proposed projects that occur within habitat of

the desert tortoise (Bureau 2002b). We have analyzed the potential effects of such facilities on the desert tortoise and its critical habitat in the Effects of Multiple-Use Class and Element Guidelines on the Desert Tortoise and its Critical Habitat - Natural and Artificial Waters and Enclosures section of this biological opinion. For this reason and because the Bureau will consult with the Service on specific new projects that occur within habitat of the desert tortoise, we will not discuss the construction, improvement, and maintenance of existing and 87 new natural and artificial water sources and enclosures further in this biological opinion.

Amendment 10 – Management of Burros

The Bureau re-aligned the existing herd management areas for burros in two areas, entirely removing them from desert wildlife management areas. The newly named Chemehuevi Herd Management Area occupies approximately 147,630 acres east of Highway 95 and north of Highway 62; the current management level for burros is 108 in this area. The newly named Chocolate/Mule Mountains Herd Management Area occupies approximately 223,542 acres southeast of Highway 78; the current management level for burros is 121 in this area. These current management levels will remain in effect until appropriate management levels are established through monitoring of the habitat and populations. Any water developments or enclosures needed to manage the new herd areas would be considered in future planning documents and consultations. The Bureau also eliminated the Picacho Herd Management Area for horses.

Amendment 11 - Organized Competitive Vehicle Events

The Bureau changed organized competitive vehicle events to protect sensitive resources. Specifically, the Bureau eliminated the Parker 400 competitive recreation corridor. This corridor was located in San Bernardino County, north of Route 62. The elimination of this corridor, which crossed important habitat of the desert tortoise, benefits the desert tortoise.

The Bureau will continue to allow competitive motorcycle and all-terrain vehicle events along the Johnson Valley to Parker route. The route begins in the Johnson Valley Off-highway Vehicle Management Area and then travels east to the north of the Marine Corps Air Ground Combat Center and through the northern and eastern Colorado Desert planning area. The route avoids crossing any desert wildlife management areas in the northern and eastern Colorado Desert planning area.

Competitive events on this route will be permitted as described in the California Desert Conservation Area Plan, with several exceptions that are fully described in the final environmental impact statement. The maximum number of participants in any one event is 500. The start area must be located sufficiently within the Johnson Valley Off-highway Vehicle Management Area to allow the field of participants to narrow to the degree that the event could continue within the established corridor outside the off-highway vehicle recreation area. The maximum width of the race corridor outside of the Johnson Valley Off-highway Vehicle Management Area is 200 feet (100 feet from the centerline of any existing route that establishes

the corridor). When the route establishes the boundaries of a desert wildlife management area, wildlife habitat management area, or wilderness, the race corridor must not extend beyond 100 feet from the centerline of the existing route opposite these areas. Pit areas will be limited to locations identified in the Northern and Eastern Colorado Desert Coordinated Management Plan; all pit activities will be limited to these areas. Cross-country portions of the corridor are not available to casual use. All access to the route by race officials must be by the established corridor and other routes available to the casual user.

Prior to any specific event, the Bureau will prepare an environmental assessment to determine if any changes have occurred; the Bureau will permit the event if the circumstances that led to the establishment of the corridor have not changed.

Competitive events using motorized vehicles in which speed is the primary competitive factor will be prohibited except on approved recreation routes (e.g., the Johnson Valley to Parker route) and within off-highway vehicle recreation areas.

Amendment 12 – Routes of Travel

The Bureau amended the California Desert Conservation Area Plan to require that motorized vehicle access be managed in accordance with current guidelines for Class L lands, irrespective of the multiple-use class. The exceptions to this guidance are that, in Class C areas (wilderness), vehicle use is prohibited and in areas designated “open” to vehicle use, vehicles are not restricted to designated routes. Managing routes of travel in accordance with guidelines for Class L lands, irrespective of the multiple-use class, is protective of the desert tortoise and its critical habitat. Under this guidance, vehicle use will be limited to designated routes throughout most of the desert. Restricting vehicle use to designated routes decreases the likelihood that desert tortoises will be struck by vehicles and eliminates the threat of disturbance of the primary constituent elements of critical habitat in certain areas. The exception to this statement is that vehicles can travel up to 100 feet from the centerline of the road to stop, park and camp and within the open wash zones; these issues are discussed elsewhere in this biological opinion. (Note that, because Bureau manages desert wildlife management areas as Class L, this amendment does not change the manner in which vehicles may use these areas; this amendment affects vehicle use on lands that are outside of desert wildlife management areas, including areas of critical habitat that were not included within their boundaries.)

Existing routes that have been inventoried and mapped, including navigable washes that have been individually identified, are designated “open” for vehicle use. Routes are closed where such use has already been limited or prohibited through publication of a final notice in the *Federal Register*, specific biological parameters proposed through this plan are applied to minimize disturbance of wildlife and significant disruption of wildlife habitats by motorized vehicle use, or restrictions on use are required to protect other resource values, to protect and promote the safety of all users of public lands, and to minimize conflicts among various users of public lands. Approximately 734 miles of routes within the Chemehuevi Desert Wildlife Management Area are open through the Bureau’s designation and roads on private lands; the Bureau also proposed

3 miles of new routes for recreation and closed 31 miles of routes. Note that, although the Bureau cannot legally designate routes as open or closed on private lands, the lengths of the routes noted in this paragraph include those on private land; these numbers provide a more accurate picture of the extent of the route network. Within the Chuckwalla Desert Wildlife Management Area, the Bureau's designation of open routes and routes on private lands totals 960 miles; it also closed 53 miles of routes. Within the planning area in its entirety but outside of desert wildlife management areas, approximately 3,049 miles of routes were designated as open or are located on private lands; the Bureau designated 155 miles of routes as closed outside of desert wildlife management areas.

The Bureau designated all navigable washes not individually inventoried and mapped on public land as open as a class except in "washes closed zones." The following table provides the acreages of "washes closed" and "washes open" zones in the desert wildlife management areas.

Desert Wildlife Management Area	Chemehuevi	Chuckwalla
Wash Open Zone	359,093	121,374
Wash Closed Zone	515,750	697,311
Total	874,843	818,685

Amendment 13 – Measuring the Distance for Stopping, Parking, and Vehicle Camping

The Bureau changed the manner in which distance is measured from a road for stopping, parking off a road, and camping from the edge of the road to its centerline. This administrative change is not likely to adversely affect and may benefit the desert tortoise by providing the Bureau with greater abilities to enforce the provisions of off-road use; we will not discuss this change further in this biological opinion.

Amendment 14 – Incorporation of Wilderness Areas into the California Desert Conservation Area Plan

Remnant parcels were assigned to the multiple-use class of the adjacent non-wilderness area, unless they are large enough to be evaluated on their individual merits; within desert wildlife management areas, remnants will always be assigned to Class L. Remnant parcels are those portions of public lands of the previous multiple-use class designations that extend beyond the boundaries of the wilderness areas created by Congress on Bureau lands in 1994. The incorporation of wilderness areas into the California Desert Conservation Area Plan is an administrative action and will not affect desert tortoises. The conversion of the multiple-use class of remnant parcels to Class L, the most protective class of lands except for wilderness, is not likely to affect the desert tortoise or its critical habitat in any manner that will not be considered in other portions of this biological opinion. Consequently, we will not discuss Amendment 14 again in this document.

Miscellaneous Actions

The Bureau has also proposed several other actions as part of the Northern and Eastern Colorado Desert Coordinated Management Plan. The Bureau will actively seek to acquire non-federal lands or interests in lands within wilderness, desert wildlife management areas, and wildlife habitat management areas through purchase, donation, or exchange. In total, approximately 353,463 acres of private lands occur within the planning area that are suitable for acquisition based on their location within wilderness, desert wildlife management areas, and wildlife habitat management areas. The acquisition of lands, particularly within desert wildlife management areas, is likely to benefit the desert tortoise because these lands would then be subject to the provisions of sections 7(a)(1) and 7(a)(2) of the Act and be eligible for inclusion in any habitat restoration plans, if necessary.

The Bureau will retain all public lands within desert wildlife management areas and Category 1 habitat for the desert tortoise in the planning area. This guideline will contribute to the conservation of the desert tortoise and its critical habitat; we will not discuss this guideline again in this biological opinion.

The Bureau will dispose of public lands outside of wilderness, desert wildlife management areas, and wildlife habitat management areas that do not support known occurrences of rare plants, springs, bats, or other special status species and where the disposal will support the consolidation and location of private land. A goal of this disposal is to promote private development and increase the tax base for local governments. By policy contained in the California Desert Conservation Area Plan, only lands within Class M may be disposed. Lands within Class L may be exchanged.

Interim Measures

The Bureau is implementing several interim measures to protect threatened and endangered species within the California Desert Conservation Area, pursuant to the Consent Decree agreed to in Federal litigation. The interim measures were developed to provide short-term conservation benefits that can be implemented without incurring the long time frames that are required to complete the comprehensive bioregional plans. The interim measures for a planning area expire once the Bureau signs the record of decision for the relevant plan. The Bureau has signed records of decisions for the Northern and Eastern Mojave Desert Management Plan, Northern and Eastern Colorado Desert Coordinated Management Plan, Coachella Valley Plan, and Algodones Dunes Recreation Area Management Plan and issued a decision record for the Western Colorado Desert Management Plan. The Bureau intends to sign a decision for the West

Mojave Plan in the near future. Amendments of the California Desert Conservation Area Plan that may affect listed species or critical habitat are subject to section 7(a)(2) consultation.

The interim measures described below no longer apply to those areas for which a record of decision has been signed. The numbering of the following measures no longer follows that contained in the Bureau's biological assessment. Also, the Bureau (2002c) provided additional information regarding changes to measure 7 in a memorandum dated April 29, 2002; additionally, measure 6 from the biological assessment has been combined with measure 1.

1. The Bureau has implemented road closures that were effective immediately in the western Mojave planning area in the Red Mountain, Kramer, Fremont, Superior, and Newberry/Rodman route subregions. The Bureau will maintain these route closures in the Ord Mountain pilot area and the route closures in the Red Mountain, Fremont, Kramer, Superior, and Newberry/Rodman polygons of the western Mojave planning area until the West Mojave Plan is completed.
2. The Bureau will close the Red Mountain, Fremont, Superior, Kramer, and Newberry/Rodman route subregions in the western Mojave planning area to shooting, except for hunting and target practice at paper targets specifically created for such purpose.
3. To benefit the desert tortoise (and other threatened and endangered species), the Bureau will amend its brochures and maps distributed to the public to encourage camping only in previously disturbed sites.
4. The Bureau will not authorize competitive events for motorized off-highway vehicles outside of designated off-highway vehicle management areas. Dual sport events conforming with the existing biological opinion are not restricted by this interim measure.
5. The Bureau will place the highest priority of its management program for burros on the removal of burros in the habitat of threatened or endangered species. The Bureau hired two monitoring specialists to conduct habitat evaluations in burro herd management areas during 2001.
6. Cattle grazing will not be authorized in desert tortoise habitat in the Tunawee Common and Hansen Common allotments as shown on maps provided by the Bureau (2002c). In the Hansen Common Allotment, grazing will not occur on a 3,500-acre area downslope of the Second Los Angeles Aqueduct. In the Tunawee Common Allotment, grazing will not occur on a 1,800-acre area south of Little Lake between the western boundary of the Naval Air Weapons Station, China Lake and Highway 395. This allotment is in the western Mojave planning area.

7. Grazing will not be authorized in desert tortoise habitat in the Ord Mountain, Cronese Lake, Harper Dry Lake, Cady Mountains, Rattlesnake Canyon, Rudnick Common, and Walker Pass allotments in the areas shown on maps provided by the Bureau (2002c) from March 1 through June 15 and from September 7 through November 7. Information on the areas from which grazing would be excluded is provided in the following table. The Department of the Army (Army) has purchased the private interests in the Cronese Lake, Harper Dry Lake, and Cady Mountains allotments. Cattle have been removed from the Harper Lake Allotment; for this reason, we will not discuss this allotment further in this biological opinion. The Army has signed a lease-back agreement with the operator of the Cronese Lake and Cady Mountains allotments that allows grazing until July 2005 (Kernek pers. comm. 2004). These allotments are in the western Mojave planning area.

Allotment	Acres in Allotment	Acres in Exclusion Area (Percentage of allotment)	Acres of Critical Habitat in Allotment	Acres of Excluded Critical Habitat (Percentage of Critical Habitat in Allotment)
Ord Mountain	154,848	67,350 (43)	102,141	41,650 (41)
Cronese Lake	65,304	18,000 (28)	30,080	18,000 (60)
Cady Mountains	231,897	88,320 (38)	0	-
Rattlesnake Canyon	28,757	6,600 (23)	0	-
Rudnick Common	236,184	31,000 (13)	0	-
Walker Pass	96,974	32,100 (33)	0	-

8. On the Ord Mountain and Cronese Lake allotments, grazing will not exceed 62,842 and 13,383 animals-days per year, respectively. These limits are the average use reported in the 1997, 1998, and 1999 billing years. This allotment is in the western Mojave Desert planning area.
9. For protection of habitat of the desert tortoise, the Bureau will not authorize grazing in the Pilot Knob Allotment until the West Mojave Plan is finalized. This allotment is in the western Mojave Desert planning area.
10. The Bureau will develop, in coordination with the Service and others, and implement a stipulation regarding roadside berm size and slope for graded roads on Bureau lands. The intent of the stipulation is to reduce the entrapment and mortality of desert tortoises on graded roads. The Bureau will require right-of-way holders to change grading practices on Bureau-administered public lands to conform to this new stipulation. The

Bureau will work with county governments to encourage application of the stipulation to county maintained roads. The Bureau will implement the new stipulation as soon as reasonably possible.

The intended purpose and effects of these actions are to assist in conserving desert tortoises and their habitat. These measures completely eliminate adverse effects (measures 1, 2, 4, 6, 7, 9, and 10), do not have direct on-the-ground effects and are entirely beneficial in nature (3), provide general guidance that is considered elsewhere in this biological opinion (5), or are continuing to operate either unchanged or slightly changed under existing biological opinions (4, 7, 8). Consequently, we will not discuss the interim measures further in this biological opinion.

Additional Measures Related to Livestock Grazing

By memorandum dated March 17, 2005, the Bureau (2005) requested that we include, in this biological opinion, a different mechanism of reporting on the conditions of livestock allotments than was contained in the previous biological opinion (Service 2002a). This revision reflects current grazing management, including the public land health standards, the regional standards and guidelines, the stipulations contained in the Northern and Eastern Mojave Desert Management Plan and Northern and Eastern Colorado Desert Coordinated Management Plan, and allotment-specific measures to protect the desert tortoise.

Specifically, the Bureau will authorize grazing activities in allotments within the planning areas of the Northern and Eastern Mojave Desert Management Plan and Northern and Eastern Colorado Desert Coordinated Management Plan under the prescribed parameters for grazing use in desert tortoise habitat. Allotments in desert tortoise habitat in the planning area for the western Mojave Desert will follow the prescriptions for the California Desert Conservation Area Plan, interim measures, and biological opinions on grazing until the record of decision is signed for the West Mojave Plan and the biological opinion for that amendment to the California Desert Conservation Area Plan is received. If the Bureau finds that grazing activities within an allotment are no longer in conformance with the plans, the Bureau will investigate and establish a corrective management action. The Bureau will contact the Service within 30 days of determining a management action. A determination will include either short-term or long-term management actions to resolve the conflict. Short-term corrective actions will require notification to the Service. A determination by the Bureau of a conflict that requires a long-term management measure may require informal or formal consultation with the Service. The Bureau will provide periodic reporting until the conflict within desert tortoise habitat is resolved or receipt of an allotment-specific biological opinion.

This method of reporting and resolving instances where grazing may occur in a manner that is not consistent with the parameters that the Bureau proposed achieves the goals intended by the first term and condition of the previous biological opinion (Service 2002a). Specifically, this method provides a mechanism by which the Bureau will ensure that livestock grazing does not affect desert tortoises in a manner that was not considered in this biological opinion. Consequently, we have removed term and condition number 1 from this biological opinion and

will not discuss general reporting requirements with regard to livestock grazing again in this biological opinion.

Action Area

For the purposes of this consultation, we consider the action area to be all lands managed by the Bureau within the California Desert Conservation Area that lie within the planning areas for West Mojave Plan, the Northern and Eastern Mojave Desert Management Plan, and the Northern and Eastern Colorado Desert Coordinated Management Plan and all undeveloped lands owned or managed by non-federal entities within or adjacent to the boundaries of these three planning areas that lie within one mile of large blocks of Bureau lands. We extended the action area onto non-federal lands that are surrounded by or within one mile of public lands because the Bureau's management of its vast areas of lands can have a substantial influence on adjacent properties and activities on these non-federal areas can affect desert tortoises and their habitat (whether or not it is designated as critical habitat). We used one mile as the distance to which we extended the action area because we believed it would encompass the area within which the effects of most actions on the desert tortoise or its habitat would be realized.

The Bureau manages small parcels of land that are separated from other public lands, particularly in Los Angeles County. We did not consider the non-federal lands surrounding these isolated parcels as part of the action area because the influence of the public lands on these areas is not substantial. Additionally, because areas that have been relatively heavily disturbed by human activities surround many of these parcels, desert tortoises are largely absent. Surveys for desert tortoises conducted in support of the development of the West Mojave Plan have demonstrated that desert tortoises no longer inhabit large portions of the western portion of that planning area (Bureau et al. 2003). These isolated parcels are not within the boundaries of critical habitat.

We also did not consider large blocks of non-federal land that are essentially surrounded by public lands as part of the action area. For example, the Mojave River valley area east of the city of Barstow comprises several thousand acres and is essentially completely surrounded by public lands. Because the Mojave River valley area is so large, activities away from its edges likely have no effect on desert tortoises and their critical habitat on the surrounding public lands.

The settlement agreement between the plaintiffs and the Bureau required that the Bureau enter into formal consultation with the Service under section 7(a)(2) of the Act on the California Desert Conservation Area Plan as it would be modified by proposed amendments resulting from various planning efforts. We have limited the action area in this consultation to those portions of the California Desert Conservation Area on which the Bureau and Service have not already completed formal consultation on amendments to the California Desert Conservation Area Plan. Areas on which consultation has been completed include the Coachella Valley (Service 2002b), the western Colorado Desert (Service 2003a), and the Algodones Dunes (Service 2005). Consequently, the action area for this consultation is limited to the planning areas for West Mojave Plan, the Northern and Eastern Mojave Desert Management Plan, and the Northern and

Eastern Colorado Desert Coordinated Management Plan.

The Bureau and the Service have also completed consultation, pursuant to section 7(a)(2) of the Act, on route designation in the western Mojave Desert (2003b) planning area and for the portion of the northern and eastern Mojave Desert planning area that is outside of the desert wildlife management areas (Service 2004d). We will not discuss the effects of these actions further in this biological opinion.

Finally, we did not consider any other Federal lands within the California Desert Conservation Area as part of the action area. Any activities on these lands will be considered in separate consultations.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Basic Ecology of the Desert Tortoise

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

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

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

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

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

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

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

excavated and run parallel to the surface of the ground.

Neonate desert tortoises emerge from their winter burrows as early as late January to take advantage of freshly germinating annual plants; if appropriate temperatures and rainfall are present, at least some plants will continue to germinate later in the spring. Freshly germinating plants and plant species that remain small throughout their phenological development are important to neonate desert tortoises because their size prohibits access to taller plants. As plants grow taller during the spring, some species become inaccessible to small desert tortoises. Neonate and juvenile desert tortoises require approximately 12 to 16 percent protein content in their diet for proper growth. Desert tortoises, both juveniles and adults, seem to selectively forage for particular species of plants with favorable ratios of water, nitrogen (protein), and potassium. The potassium excretion potential model (Oftedal 2001) predicts that, at favorable ratios, the water and nitrogen allow desert tortoises to excrete high concentrations of potentially toxic potassium, which is abundant in many desert plants. Oftedal (2001) also reports that variation in rainfall and temperatures cause the potassium excretion potential index to change annually and during the course of a plant's growing season. Therefore, the changing nutritive quality of plants, combined with their increase in size, further limits the forage available to small desert tortoises to sustain their survival and growth.

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

Status of the Desert Tortoise

The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Colorado Desert in California. On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 *Federal Register* 32326). In its final rule, dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 *Federal Register* 12178).

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

The following paragraphs provide general information on the results of efforts to determine the status and trends of desert tortoise populations across a large portion of its range; we present

information on the status of the desert tortoise within the action area in the Environmental Baseline section of this biological opinion. We have grouped these paragraphs by recovery unit and critical habitat unit; we will describe these units in more detail later in this biological opinion.

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

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

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

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

Note, when reviewing the information presented in the following sections, that 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.

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 slightly 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.

Eastern Mojave Recovery Unit

The Eastern Mojave Recovery Unit lies primarily in California, but also extends into southern Nevada and contains two desert wildlife management areas. The Ivanpah Desert Wildlife Management Area is located in California; we will discuss the status and trend information for that desert wildlife management area in the Environmental Baseline section of this biological opinion. The Piute-Eldorado Desert Wildlife Management Area is located entirely in Nevada and lies primarily within this recovery unit but also overlaps into the Northeastern Mojave Recovery Unit.

The Piute-Eldorado Desert Wildlife Management Area is located entirely in southern Nevada and is contiguous with California's 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 kernel 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 Western Mojave, Northern Colorado, and Eastern Colorado recovery units lie completely within California. We will present information on the relative abundance of desert tortoises in those recovery units in the Environmental Baseline section of this biological opinion.

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 (λ s) are maintained at or above 1.0;
4. Regulatory mechanisms or land management commitments must be implemented that provide for long-term protection of desert tortoises and their habitat; 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). We have attached four tables from the recovery plan (pages 24 to 26 from Service 1994c) that describe the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotype across the range of the listed taxon. Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

Assessment of the Recovery Plan

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

Status of Critical Habitat

The Service designated critical habitat for the desert tortoise in portions of California, Nevada, Arizona, and Utah in a final rule, published February 8, 1994 (59 *Federal Register* 5820). Critical habitat is designated by the Service to identify the key biological and physical needs of the species and key areas for recovery, and focuses conservation actions on those areas. Critical habitat is composed of specific geographic areas that contain the biological and physical attributes that are essential to the species' conservation within those areas, such as space, food, water, nutrition, cover, shelter, reproductive sites, and special habitats. These features are called the primary constituent elements of critical habitat. The specific primary constituent elements of desert tortoise critical habitat are: sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

The final rule for designation of critical habitat did not explicitly ascribe specific conservation roles or functions to the various critical habitat units. Rather, it refers to the strategy of establishing recovery units and desert wildlife management areas recommended by the recovery plan for the desert tortoise, which had been published as a draft at the time of the designation of critical habitat, to capture the “biotic and abiotic variability found in desert tortoise habitat” (59 *Federal Register* 5820, see page 5823). Specifically, we designated the critical habitat units to follow the direction provided by the draft recovery plan for the establishment of desert wildlife management areas. Note that each critical habitat unit functions independently of the others in terms of providing the physical and biological needs of individual desert tortoises; that is, desert tortoises are not required to move between or among units to complete their life histories. For this reason, we have not presented specific information related to the status of individual critical

habitat units that are located outside of California. We also note that the critical habitat units in aggregate are intended to protect the variability that occurs across the large range of the desert tortoise; the loss of any specific unit would eliminate elements of the species' behavioral, ecological, and genetic variability.

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

The following sections provide a brief description of the portions of the critical habitat units that are within California but outside of the action area of this consultation. This information is grouped by recovery unit. We present similar information for the critical habitat units within the action area in the Environmental Baseline section of this biological opinion.

Eastern Mojave Recovery Unit

Ivanpah Critical Habitat Unit. Approximately 492,360 acres of the Ivanpah Critical Habitat Unit lie within the Mojave National Preserve. The northern edge of the portion of this critical habitat unit within the Mojave National Preserve is bounded by Interstate 15. Several well-used, two-lane paved roads and unpaved roads cross the Ivanpah Critical Habitat Unit within the Mojave National Preserve. The critical habitat unit is also crossed by a rail line.

Piute-El Dorado Critical Habitat Unit. Approximately 280,103 acres of the Piute-El Dorado Critical Habitat Unit also lie within the Eastern Mojave Recovery Unit. The southern edge of the portion of this critical habitat unit within the Mojave National Preserve is bounded by Interstate 40. Approximately 151,700 acres of the Colton Hills Allotment and 1,200 acres of the Gold Valley Allotment are located within the National Park Service's portion of the Piute-El Dorado Critical Habitat Unit (Service 2001).

Eastern Colorado Recovery Unit

Chuckwalla Critical Habitat Unit. Approximately 107,183 acres of this critical habitat unit lie within Joshua Tree National Park (Service 2005a). We were unable to obtain any information on

specific uses of this area from the National Park Service; however, given the general patterns of visitor use at Joshua Tree National Park, we expect that this area receives little use.

Approximately 187,046 acres of this critical habitat unit lie within the Chocolate Mountains Aerial Gunnery Range (Pearce pers. comm. 2005). Within the area designated as critical habitat of the desert tortoise, the Marine Corps primarily uses the Chocolate Mountains Aerial Gunnery Range to support target sites for aircraft and, to a lesser degree, ground-based artillery; maintenance of the targets is the other primary activity in this area. Target areas cover approximately 2,095.5 acres and forward arming and refueling points occupy 161 acres. Approximately 202.8 miles of roads cross this portion of the critical habitat unit. Forward arming and refueling points are areas that the Marine Corps uses to land helicopters to refuel and rearm them in the field. Refueling can be done from a large transport helicopter to a smaller attack helicopter, but it is usually done from pre-positioned trucks. The trucks stay on designated routes to minimize surface disturbance and dust in the landing zone. Except to place targets in the designated targets areas, which are both mapped and marked with permanent monuments on the ground, vehicles are required to stay on the designated roads. Washes are only used when they are part of the designated routes. The Marine Corps and Service consulted, pursuant to section 7(a)(2) of the Act, on the effects on the desert tortoise and its critical habitat of the roads, target areas, and forward arming and refueling points in 1996 (Pearce pers. comm. 2005).

Western Mojave Recovery Unit

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

Approximately 87,265 acres of the Naval Air Weapons Station at China Lake are designated as critical habitat for the desert tortoise. This area encompasses the Superior Valley Tactical

Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station. This area continues to be used as an active bombing range for military test and training operations by the Navy and Department of Defense. Within the area designated as critical habitat, approximately 675 acres are disturbed to date. Disturbed areas support the required road network, associated facilities and infrastructure, and target impact areas (O’Gara pers. comm. 2005).

Fremont-Kramer Critical Habitat Unit. Approximately 65,560 acres of Edwards Air Force Base are designated as critical habitat of the desert tortoise. Edwards Air Force Base is used primarily to test aircraft and weapons systems used by the Department of Defense. Disturbance within the portion of the Fremont-Kramer Critical Habitat Unit that occurs within Edwards Air Force Base includes targets, buildings, parking lots, roads, road shoulders, trails, and cleared areas. Approximately 1,670 acres within critical habitat have been disturbed by human activities, including approximately 323 acres of primary and secondary roads. Additionally, approximately 195.3 miles of abandoned jeep trails and other minor routes are located within critical habitat (Collis pers. comm. 2005).

Pinto Mountain Critical Habitat Unit. Approximately 55,596 acres of this critical habitat unit lie within Joshua Tree National Park (Service 2005a). Given the general patterns of visitor use at Joshua Tree National Park, we expect that this area receives little use.

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. We have attached a map from the recovery plan that depicts these recovery units or distinct population segments (Service 1994c). Clearly, 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, with one exception. The Bureau has proposed boundaries and management prescriptions for desert wildlife management areas in the Western Mojave Recovery Unit; the Service is currently reviewing the Bureau's proposed amendments to the California Desert Conservation Area Plan for 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 Mtns.	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

ENVIRONMENTAL BASELINE

Previous Consultations

The Bureau and Service have completed approximately 300 formal consultations for actions affecting the desert tortoise or its critical habitat within the boundary of the California Desert Conservation Area. This number does not accurately reflect the number of actions that the Bureau has authorized or implemented for several reasons. First, several formal consultations were programmatic in nature and considered the effects of numerous separate actions; several biological opinions that evaluated the effects of pipeline maintenance are examples of this type of consultation. Other consultations were conducted as a result of the designation of critical habitat for the desert tortoise; these biological opinions evaluated the effects on critical habitat of actions for which consultation on the desert tortoise had already been completed. Finally, we

have completed consultation on several actions that were never implemented; the waste disposal sites in the Cady Mountains and at Broadwell and Bristol Dry Lakes are examples of such actions. In addition to these formal consultations, the Bureau and Service have engaged in numerous informal consultations.

The Service has issued several biological opinions to the Bureau with regard to the effects of cattle on the desert tortoise in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas. In March 1994, we issued a biological opinion regarding 25 grazing allotments, primarily in the eastern Mojave Desert (1-8-94-F-17, Service 1994b). That biological opinion concluded that the Bureau's cattle grazing program in the California Desert Conservation Area was not likely to jeopardize the continued existence of the desert tortoise. On April 20, 1994, the Service issued a biological opinion that evaluated the effects of cattle grazing on critical habitat of the desert tortoise, which had recently been designated; the Service concluded that the Bureau's rangewide cattle grazing program was not likely to adversely modify critical habitat of the desert tortoise (1-5-94-F-107, Service 1994a).

The Service and Bureau have also consulted programmatically on the effects of small mines, small projects, remediation of illegal dumps, dual sport events, installation of minor electrical utilities, and pipeline maintenance on the desert tortoise and its critical habitat. These consultations were conducted to expedite the consultation process for numerous projects that were similar in nature and had relatively minor effects on the desert tortoise; because of compensation requirements imposed by the Bureau, some acquisition of lands important to the recovery of the species has also occurred as a result of these programs. In the biological opinions for all of these consultations, the Service concluded that the proposed actions were not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat because of the protective measures proposed by the Bureau, the likelihood that these actions could be undertaken with little or no injury to or mortality of desert tortoises, and the small area of disturbance in relation to the available habitat of the species. These biological opinions remain in effect throughout the California Desert Conservation Area.

The Service has also issued several biological opinions to other Federal agencies that have affected the desert tortoise and its critical habitat. Several of these biological opinions are notable in their scope and public visibility. The Service issued two biological opinions to the Federal Energy Regulatory Commission regarding the effects of the installation of three large pipelines across the desert. During the first installation, in the early 1990s, approximately 30 desert tortoises were killed; only one desert tortoise was killed in the most recent installation, which occurred in 2003.

In 2004, the Service issued a biological opinion to the Army for the use of additional training lands at its National Training Center. The biological opinion considered the loss or degradation of approximately 75,000 acres of desert tortoise habitat within the Superior-Cronese Critical Habitat Unit, the loss or degradation of additional areas of lower quality habitat outside of critical habitat, the translocation of several hundred desert tortoises from areas that will be regularly used for training to locations off-base, and the possible loss of desert tortoises that are

not found during the translocation effort. As part of the conservation measures included in the proposed action, Congress will appropriate \$75 million over several years to implement numerous conservation measures (Service 2004c). To date, the Army has purchased approximately 99,000 acres of lands from the Catellus Corporation and the private interests in 3 cattle allotments in the western Mojave Desert as part of the conservation measures for the expanded training areas. We are currently participating in an inter-agency working group to develop a translocation plan for desert tortoises affected by the Army's use of additional training lands. We mention this consultation because, although the area within the boundaries of Fort Irwin is not within the action area for this consultation, the conservation measures being implemented by the Army as part of the proposed action are likely to have substantial beneficial effects on the desert tortoise and its critical habitat within the action area.

The Department of Defense consulted on a competitive race for robotic vehicles (Service 2004b). Despite the high visibility of this event, most vehicles failed within a short distance of the starting line. Impacts to desert tortoise habitat were insignificant, if any occurred at all; no desert tortoises were killed or injured.

The Federal Highways Administration has funded the widening of many miles of Interstate and State highways in the California Desert Conservation Area. Although hundreds of acres of habitat were destroyed by these actions, the vast majority of the loss was immediately adjacent to the freeways, where desert tortoises are usually scarce and the habitat of poor quality. To mitigate the loss of habitat, the California Department of Transportation has, through its consultations with the California Department of Fish and Game, fenced dozens of miles of highway to prevent desert tortoises from being killed and acquired thousands of acres of private lands that are being managed for the benefit of the desert tortoise. In balance, desert tortoises have likely benefited from the actions of the Federal Highways Administration and the California Department of Transportation.

The Service has also consulted many times with the Federal Communications Commission on the installation of cell towers in the California Desert Conservation Area. Although several towers have been installed, the aggregated effects are minor in that desert tortoises are usually avoided during construction and little habitat is affected.

Status of the Desert Tortoise in the Action Area

Four recovery units for the desert tortoise occur in the California Desert Conservation Area. As in the previous section, we have used the recovery units to organize the discussion of the baseline conditions. The following descriptions of the recovery units in California are from the recovery plan for the desert tortoise (Service 1994c) and the Bureau's biological assessment (Bureau 2001). Note that most of the facilities, such as roads and railroads, that are mentioned in the following section were constructed prior to the listing of the desert tortoise or designation of its critical habitat; in some cases, the facilities and activities discussed in the following section were the subject of consultations conducted under the authority of section 7(a)(2) of the act.

Eastern Mojave Recovery Unit

The Eastern Mojave Recovery Unit lies east of Death Valley and extends from the Nevada border south to Interstate 40; it lies generally to the southwest of the Northeastern Mojave Recovery Unit. The Bureau considers the small portion of the Northeastern Mojave Recovery Unit that extends into Ivanpah Valley as part of the Eastern Mojave Recovery Unit for its planning purposes.

Three desert wildlife management areas are included in the Eastern Mojave Recovery Unit; with large portions of the Mojave National Preserve, these three areas comprise the Ivanpah Critical Habitat Unit. The Ivanpah Desert Wildlife Management Area lies east of the Mojave National Preserve and covers approximately 36,795 acres. The permanent study plot in the Ivanpah Valley is the only such plot in this desert wildlife management area; consequently, we cite information from that plot herein, although it is located within the Mojave National Preserve. Data on desert tortoises on a permanent study plot in this area 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 Shadow Valley Desert Wildlife Management Area lies north of the Mojave National Preserve and west of the Clark Mountains. It occupies approximately 101,355 acres. 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 2002d).

The Piute-Fenner Desert Wildlife Management Area lies to the east of the southeast portion of the Mojave National Preserve. It occupies approximately 173,850 acres. The permanent study plot at Goffs is the only such plot in this desert wildlife management area; consequently, we cite information from that plot herein, although it is located within the Mojave National Preserve. Data on desert tortoises on the 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.

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 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).

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. 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.

Western Mojave Recovery Unit

The Western Mojave Recovery Unit extends from approximately Olancho and the northern Panamint Valley south to the middle of Joshua Tree National Park; it also extends from the Sierra Nevada and Tehachapi Mountains in the west to Death Valley and the eastern side of Joshua Tree National Park in the east. It is located to the west of the other recovery units. The Western Mojave Recovery Unit is exceptionally heterogeneous and large with distinct climatic and vegetation characteristics in its western, central, and southern regions. The most pronounced difference between this and other recovery units is in timing of rainfall and the resulting vegetation. This recovery unit includes the proposed Pinto Mountains, Ord-Rodman, Superior-Cronese, and Fremont-Kramer desert wildlife management areas. Because the Bureau has not yet signed a record of decision for an amendment to the California Desert Conservation Area Plan for the western Mojave Desert, desert wildlife management areas have not been designated to date. We will use them to provide geographic reference points for our discussion but will not review them in the context of section 7(a)(2) in this biological opinion. Heaton et al. (2004) estimated that 20,420 to 41,224 adult desert tortoises reside in the Western Mojave Recovery Unit; this range was based on extrapolation of data collected during line distance sampling.

The proposed Pinto Mountains Desert Wildlife Management Area is located in the southeastern portion of the Western Mojave Recovery Unit; Tracy et al. (2004) suggest that it would be more appropriately placed in the Eastern Colorado Recovery Unit. This proposed desert wildlife management area would cover approximately 117,120 acres. No permanent study plots are located in this proposed desert wildlife management area. Little information exists on the densities of desert tortoises in this area. Tracy et al. (2004) noted that the distribution of carcasses and live desert tortoises appeared to be what one would expect in a “normal” population of desert tortoises; that is, carcasses occurred in the same areas as live animals and were not found in extensive areas in the absence of live desert tortoises.

The proposed Ord-Rodman Desert Wildlife Management Area is located to the southeast of the city of Barstow. As proposed, it would cover approximately 248,320 acres. The recovery plan notes that the estimated density of desert tortoises in this area is 5 to 150 animals per square mile (Service 1994c). Three permanent study plots are located within and near this proposed desert wildlife management area. The following table contains the density estimates for these plots; the data are from Berry (1996); all data are in the approximate number of desert tortoises of all sizes per square mile.

	Stoddard Valley	Lucerne Valley	Johnson Valley
1980		176	114
1981	146		
1986		150	80
1987	178		
1990		82	18
1991	225		
1994		73	73

Berry (1996) notes that, for various reasons, surveys at the Stoddard Valley plot encountered various difficulties; some desert tortoises from this plot were taken by poachers and at least one animal became ill with upper respiratory tract disease and contained environmental contaminants. Common ravens and feral dogs have killed desert tortoises at the Lucerne Valley plot; Berry (1998) notes that little recruitment into adult size classes was occurring. Berry (1996) notes that at least two desert tortoises from the Johnson Valley plot were killed by off-road vehicle use or cattle; at least one ill and salvaged animal contained environmental contaminants.

The proposed Superior-Cronese Desert Wildlife Management Area is located north of the Ord-Rodman Desert Wildlife Management Area; two interstate freeways and rural, urban, and agricultural development separate them. This proposed desert wildlife management area covers 616,320 acres. No permanent study plots have been established in this area; the density of desert tortoises has been estimated through numerous triangular transects and line distance sampling efforts. The recovery plan notes that this desert wildlife management area supports densities of approximately 20 to 250 desert tortoises per square mile.

The proposed Fremont-Kramer Desert Wildlife Management Area is located west of the Superior-Cronese Desert Wildlife Management Area; the two desert wildlife management areas are contiguous. This proposed desert wildlife management area covers approximately 494,720 acres. The recovery plan notes that the estimated density of desert tortoises in this area was 5 to 100 animals per square mile (Service 1994c).

Five permanent study plots are located within this proposed desert wildlife management area; one plot, the Interpretive Center plot at the Desert Tortoise Natural Area, is split into two subplots. The following table contains the density estimates for these plots; the data are from Berry (1996); all data are in the approximate number of desert tortoises of all sizes per square mile.

	Fremont Valley	Desert Tortoise Natural Area, Interior	Desert Tortoise Natural Area, Interpretive Center		Fremont Peak	Kramer Hills
			Inside Fence	Outside Fence		
1979		387	339	296		
1980					99	223
1981	278					
1982		332				314
1985			229	134	45	
1987	179					130
1988		195				
1989			106	80	32	
1991	101					60
1992		47				
1993			61	42	8	
1995						139
1996		18				
1997		8*	34#	23#		
2001	19*					
2002			28#	10#		

* These values represent the actual numbers of desert tortoises found on the plot and do not represent a density estimate; the data are from Berry (pers. comm. 2005).

These data are from Connor (2003).

Berry (1996) notes that the overall trend in this proposed desert wildlife management area is “a steep, downward decline” and lists predation by common ravens and domestic dogs, off-road vehicle activity, illegal collecting, upper respiratory tract disease, and environmental contaminants as contributing factors.

During the summers of 1998 and 1999, the Bureau, in support of the development of the West Mojave Plan, funded surveys of over 1,200 transects over a large area of the western Mojave Desert. These transects failed to detect sign of desert tortoises in areas where they were previously considered to be common. Although these data have not been fully analyzed and compared with previously existing information, they strongly suggest that the number of desert tortoises has declined substantially over large areas of the western Mojave Desert. The Desert Tortoise Recovery Plan Assessment Committee also noted that the Western Mojave Recovery Unit has experienced declines in the number of desert tortoises (Tracy et al. 2004).

In summary, we note that the general trend for desert tortoises within the action area is one of decline. We make this statement despite acknowledging the difficulties involved in estimating

the numbers of a species that spends a large portion of its life underground and that occurs over millions of acres. Although some statistical tests do not indicate obvious declines, other studies and observations clearly indicate that desert tortoise populations are not functioning normally. For example, the transects in the Western Mojave Recovery Unit that did not detect any sign over large areas of previously occupied habitat and the numerous carcasses found on permanent study plots provide evidence of a decline. During line distance sampling conducted in 8 desert wildlife management areas in California in 2003, 930 carcasses and 438 live desert tortoises were detected; more carcasses than live animals were detected in every study area (Woodman 2004). In 2004, workers conducting line distance sampling in California detected 1,796 carcasses and 534 live desert tortoises; once again, more carcasses than live animals were detected in every study area (Woodman 2005).

Numerous factors are likely involved in the decline. Predation by common ravens and domestic and feral dogs, unauthorized off-road vehicle activity, authorized vehicular activity, illegal collecting, upper respiratory tract disease, possibly other diseases, mortality on paved roads, vandalism, drought, livestock grazing, feral burros, human development, non-native plants, and environmental contaminants are known or potential contributing factors. Tracy et al. (2004) postulate that “disease alone is not sufficient to explain (desert) tortoise die-offs.” They state that a combination of factors may be responsible for declines in the numbers of desert tortoises across its range and cite a “growing awareness” among experts on disease “that the probability of infection leading to death in (desert) tortoises may be a function of chronic stress (e.g., malnutrition) and the strain of infectious agent. This means that the presence of disease alone is not sufficient to explain (desert) tortoise die-offs. For example, it is possible that habitat degradation results in physiologically stressed (desert) tortoises that then succumb to disease agents that are normal at background levels in healthy populations.”

Oftedal (2005) has advanced the concept that desert tortoises “must match their ability to balance nutrient intake and excretion over a period of years to ephemeral plant resources that change over period of weeks.” Basically, Oftedal contends that desert tortoises are completely dependent on nutrient resources that are only available briefly and on an irregular basis to sustain them over years when these resources are scarce or absent; furthermore, the ephemeral plants that they need to ingest at these times are high in protein and water relative to potassium. In areas where non-native plant species that do not contain these specific nutrients, such as Mediterranean grass and brome grass, have displaced the plants that desert tortoises require, they may be in a state of chronic nutritional stress. This level of stress may be an important component in the declines that have been observed over large portions of the California desert.

Finally, Federal, State, and local agencies and non-governmental organizations have undertaken numerous activities to attempt to recover the desert tortoise in California. Agencies and others have modified grazing procedures, retired livestock allotments, fenced highways, removed burros, and restored disturbed habitat, among other activities in an attempt to recover the desert

tortoise. The extent that these efforts will benefit the desert tortoise will be difficult to measure because of the slow reproductive rate of the species and other factors, such as disease, drought, and predation, that may be affecting the number of individuals in a region.

Status of Critical Habitat in the Action Area

In the last 10 years, more than 500,000 acres of private lands have been acquired in critical habitat of the desert tortoise and wilderness areas (LaPre pers. comm. 2005f); these lands are now in Federal ownership. These acquisitions have improved the ability of the Bureau to manage critical habitat of the desert tortoise within the California Desert Conservation Area. We mention this fact here because these lands have been acquired in all the recovery units in the California Desert Conservation Area.

Eastern Mojave Recovery Unit

Portions of two critical habitat units overlap Bureau lands in the Eastern Mojave Recovery Unit. Although the recovery plan for the desert tortoise describes the Northeastern Mojave Recovery Unit as reaching into California, the agencies responsible for managing desert tortoises consider the entire northern and eastern Mojave Desert planning area as being within the Eastern Mojave Recovery Unit. Unless otherwise noted, the following information is summarized from the final environmental impact statement for the Northern and Eastern Mojave Desert Management Plan (Bureau 2002d).

Ivanpah Critical Habitat Unit. The Ivanpah Critical Habitat Unit overlaps both Bureau and National Park Service lands. Because the Mojave National Preserve is outside of the action area of this consultation, we will not discuss the status of critical habitat within its boundaries in this biological opinion.

Shadow Valley Area. The northernmost portion of the Ivanpah Critical Habitat Unit extends approximately 15 miles north of Interstate 15; this area is mostly encompassed in the Shadow Valley Desert Wildlife Management Area, which is generally bordered on the east by the Clark Mountains and on the west by the Shadow Mountains. The portion of the Ivanpah Critical Habitat unit north of Interstate 15 overlaps completely with the Bureau's Shadow Valley Desert Wildlife Management Area, except for two areas; a portion of the critical habitat lies within the Mojave National Preserve and approximately 12,700 acres of Bureau land in the southwestern corner are outside the desert wildlife management area. Approximately 114,100 acres of the Ivanpah Critical Habitat Unit lie within this portion of the action area.

Plant communities are primarily represented by various types of creosote bush scrub and Joshua tree woodland. Other, less common communities include series of catclaw acacia, creosote bush - white bursage, and hop-sage.

Portions of Shadow Valley contain the primary constituent elements of critical habitat for the desert tortoise. As we note elsewhere in this section, at least portions of the area have sandier

substrates that seem to support fewer desert tortoises; we note that desert tortoises are often distributed patchily in response to local differences in substrates and plant communities. We also note elsewhere in this section of the biological opinion that grazing by cattle and burros has degraded habitat conditions to some degree.

Approximately 31,000 acres of the Shadow Valley area are located in four designated wilderness areas. Approximately 29,300 acres of wilderness lie north of the Boulder utility corridor, which crosses the area from east to west slightly north of the middle of the critical habitat unit. Approximately 1,600 acres of the westernmost portion of the critical habitat unit overlap a portion of the Hollow Hills Wilderness. Because of the Bureau's program guidance for management of wilderness areas, these lands are managed in a manner that is highly compatible with the conservation of the desert tortoise and its critical habitat. An additional section of this portion of the Ivanpah Critical Habitat Unit is located within the Mojave National Preserve and outside the action area of this biological opinion.

The Bureau has zoned all of the remaining lands within the Shadow Valley Desert Wildlife Management Area as multiple-use class L, with the exception of 380 acres, which are segregated from the public land laws. Multiple use classes do not apply to lands that are segregated from the public land laws; the outcome is that the Bureau cannot permit any uses in these areas.

Approximately 12,700 acres of critical habitat west of Turquoise Mountain Road were not included within the desert wildlife management area; these lands are zoned as Class M. The density of desert tortoises seems to be low (0 to 20 per square mile); additionally, the primary constituent elements of critical habitat are lacking to some degree as a result of a sandier substrate than desert tortoises generally inhabit. Finally, this area receives a relatively high degree of use by various recreationists.

Portions of the Shadow Valley area have extremely important cultural values. The resources are generally concentrated around springs and lake margins; springs and lake margins are generally not important components of the critical habitat of the desert tortoise. Aboriginal turquoise mines are an important cultural resource within the Turquoise Mountain vicinity. In addition, a few small areas of high cultural sensitivity are scattered throughout the area, including zones of prehistoric and historic activity. The historic sites are clustered in the vicinity of permanent water sources or near valuable ore deposits. Prehistoric values are associated with water and located near natural resources.

The Shadow Valley portion of the Ivanpah Critical Habitat Unit includes a herd management area for wild burros; this herd management area covers approximately 75,350 acres. Burro grazing occurring in this area has been the most intense within desert tortoise habitat in the eastern Mojave Desert of California. The latest census figures for Shadow Valley estimate the herd at approximately 150 animals. Through the Northern and Eastern Mojave Desert Management Plan, the Bureau reduced the herd level in this area to zero.

Cattle grazing in Shadow Valley was the most intense within desert tortoise habitat in the eastern Mojave Desert of California. Approximately 104,800 acres of the Valley Wells Allotment are located within critical habitat in the Shadow Valley area. Note that the operator has voluntarily relinquished this allotment. The Bureau rated the condition of the allotment in 1999. The range assessment of the Valley Wells Allotment revealed some high utilization on key forage species; the native species component of the fallback standards and fallback guidelines is being minimally met due to the high burro concentration within Shadow Valley. As of 2002, the allotment was meeting all standards, but a portion of the allotment, specifically Shadow Valley, was in a downward trend.

As we mentioned previously in this section of the biological opinion, Utility Corridor D (the Boulder Corridor) transverses the Shadow Valley area, running roughly parallel to and several miles north of Interstate 15. Four large transmission lines, two 40-inch gas pipelines, and two fiber optic lines are located in this corridor.

Primary recreational uses include low-level, widely dispersed motorized activities. Casual public users primarily tour through this area rather than having particular destinations in mind. The Turquoise Mountain area is an exception to this statement; this area is relatively popular with rock hounds and others. Recreational uses in the area include hunting, camping, wilderness hiking, and birding. Occasionally, the Bureau authorizes organized motorized or non-motorized touring activities in the area. The Barstow-to-Vegas competitive racecourse traversed the Shadow Valley area through the Boulder Corridor and around the Turquoise Mountain area; this portion of the corridor was eliminated through an amendment to the California Desert Conservation Area Plan as part of the Northern and Eastern Mojave Desert Management Plan.

The westernmost portion of the area may have potential for rare earth metals. Historic mining has occurred in the Turquoise Mountains in the 10,000-acre area accessed by and east of Turquoise Mountain Road.

Approximately 94 percent (106,960 acres) of the total 114,060 acres of land area are public lands. Most of the non-federal lands consist of the two sections originally granted to the State for schools, with a few additional private parcels.

The Bureau summarizes the baseline conditions of this portion of the Ivanpah Critical Habitat Unit by noting that very little development occurs on public lands within the area, except within the transportation and utility corridors. The region is generally used at low levels for recreation. The plant communities in the region are not in optimal condition due to the past grazing pressure of cattle and burros; the operator has voluntarily relinquished his lease for the grazing allotment and the Bureau has established a herd management level of zero burros for this portion of the critical habitat unit.

Ivanpah Valley Area. The Bureau manages a second portion of the Ivanpah Critical Habitat Unit. This portion of the critical habitat unit is bounded by the Mojave National Preserve at Nipton Road on the south and southwest; it extends to the border with Nevada on the east and follows township lines for the remainder of its border. Critical habitat in this area covers

approximately 25,000 acres. Unless otherwise noted, the following information is from the final environmental impact statement for the Northern and Eastern Mojave Desert Management Plan (Bureau 2002d).

The dominant plant communities are primarily series of creosote bush scrub and mixed saltbush scrub in the lower elevation portions of the critical habitat unit. Other, less common communities include various series dominated by big galleta, Indian rice grass, four-wing saltbush, shadscale, winter fat, mesquite and greasewood.

The Bureau characterizes the critical habitat unit as “excellent quality desert tortoise habitat.” Consequently, this portion of the critical habitat unit supports the primary constituent elements of critical habitat for the desert tortoise. Desert tortoises also occupy the southern portion of the lakebed, but the habitat values are lower; portions of this area likely lie outside of critical habitat.

Cultural and Native American values in Ivanpah Valley include villages, temporary camps, lithic scatters, and many historic sites. Historic period sites include portions of the Von Schmidt Boundary and Old Traction Road. The southern shore of Ivanpah Lake has been previously nominated to the National Register of Historic Places.

With one exception, all of the cattle allotments in this portion of the Ivanpah Critical Habitat Unit have been voluntarily relinquished or are in the process of relinquishment. The remaining allotment, Jean Lake, is designated for perennial use. It covers 9,806 acres and is authorized for 300 animal unit months; it has not been grazed for many years (Bureau 2002d).

Utility corridor BB runs parallel to Interstate 15 and enters the western portion of the critical habitat unit for a short distance. Major utilities located in this corridor include one 131-kilovolt transmission line, two gas pipelines, and two fiber optic cables. This corridor also includes Interstate 15.

South of Ivanpah Dry Lake, which is located outside of critical habitat, this area is primarily used for very low-level, widely dispersed motorized recreation. Casual public users primarily tour through this area rather than having particular destinations in mind. Because the area is adjacent to and north of the Mojave National Preserve, the area north of Nipton Road provides dispersed camping areas for some visitors to National Park Service lands who would prefer not to camp in designated camping areas. Other recreational uses in the area include hunting, recreational shooting, and rock hounding. The Bureau occasionally authorizes organized, permitted, motorized or non-motorized touring activities in the area.

A portion of Ivanpah Dry Lake has moderate potential for development of salt resources. This area is outside of the boundaries of critical habitat.

Most of the lands within this portion of the Ivanpah Critical Habitat Unit are managed by the Bureau. Approximately 2,000 acres are privately owned (Service 2005a).

The Bureau considers the northern portion of the Ivanpah Valley, outside of the dry lakebed, to have high potential for development. This area is adjacent to existing casino developments within Nevada.

In summary, this portion of the Ivanpah Critical Habitat Unit does not receive heavy use as a result of human activities. The Bureau characterizes the area as supporting excellent quality habitat for the desert tortoise. It supports the primary constituent elements of critical habitat that are sufficient in quality and quantity to promote the conservation of the desert tortoise. Finally, the conservation value of this portion of the Ivanpah Critical Habitat Unit is enhanced because it is contiguous with the Mojave National Preserve, which also supports the primary constituent elements of critical habitat.

Piute-El Dorado Critical Habitat Unit. The *Piute-El Dorado* Critical Habitat Unit overlaps both Bureau and National Park Service lands. Because the Mojave National Preserve is outside of the action area of this consultation, we will not discuss the status of critical habitat within its boundaries in this biological opinion.

Piute-Fenner Valley Area. The Piute-Fenner Valley area includes approximately 173,850 acres of land bounded by Interstate 40 on the south, the California-Nevada border on the northeast, the Dead Mountains on the east and southeast, and the Mojave National Preserve on the north and west. Approximately 13,700 acres are managed as Class C. In addition, 34 acres have been segregated from the public land laws. The remainder of the area is managed as Class L. The Piute-Fenner Desert Wildlife Management Area completely overlaps the Bureau's portion of the Piute-Eldorado Critical Habitat Unit.

Natural vegetation communities are primarily creosote bush and creosote bush - white bursage scrub. Communities dominated by big galleta grass, Indian rice grass, and shadscale occur less commonly. The valley is dissected by washes of various sizes. The larger washes, such as Piute Wash, Woods Wash, and Watson Wash drain the area from north to south.

Valleys within the Piute-Fenner Valley area contain good to excellent quality habitat for the desert tortoise; that is, the primary constituent elements of critical habitat are present. These valleys provide the central connection in the largest contiguous habitat unit within the Eastern Mojave Recovery Unit, which stretches from the southeastern portion of the Mojave National Preserve through Fenner Valley and Piute Valley into Nevada.

The eastern boundary of the Piute-Fenner Valley area bisects the Dead Mountains Wilderness. The western 13,700 acres of the total of 47,100 acres of the wilderness are within the Piute-Fenner Valley. This area is managed as wilderness (i.e., Class C).

The Piute-Fenner Valley area contains religious and secular areas of importance recognized by affected North American tribes. Prehistoric cultural resources include permanent and temporary habitation sites, rock shelters, milling stations, lithic manufacture sites, trails, rock alignments, and rock art sites. Historic resources within the area include historic mining activity, portions of the Mojave Road, U.S. Route 66, the AT&SF railroad, and the Von Schmidt boundary.

The Piute-Fenner Valley area overlaps approximately 26,100 acres (15 percent) of the Dead Mountain Herd Area, which has a “no retain burros” designation in the California Desert Conservation Area Plan and a management level of 0 burros. This herd area is now almost entirely within designated wilderness. The most recent census for the Dead Mountains Herd Area indicates that approximately 24 burros are present. Consistent with the California Desert Conservation Area Plan, burro removals will continue to move the population numbers closer to zero burros.

The Piute Valley Allotment was managed for ephemeral use. Because the Bureau eliminated ephemeral use in the Northern and Eastern Mojave Desert Management Plan, this ephemeral allotment will be cancelled. This allotment was used infrequently over the past 20 years.

Portions of two major utility corridors transverse the Piute-Fenner Valley area. Corridor R is an east-west corridor, which follows and includes lands adjacent to Interstate 40, the southern boundary of Piute-Fenner area. This corridor contains a telephone line.

Corridor E is 3 miles wide and runs north to south; it lies at the boundary between the Mojave National Preserve and the western boundary of the Piute-Fenner Desert Wildlife Management Area. Two 230-kilovolt transmission lines and one telephone line are the major utilities located in this corridor.

Primary uses of this portion of the critical habitat unit include low-level, widely dispersed motorized recreation. The area is primarily used for touring, rather than as a destination for the general public, because it provides a gateway from the east to the Mojave National Preserve. Other recreational uses in the area include hunting, recreational shooting, and rock hounding. The Bureau has authorized equestrian trail rides and cattle drives in this portion of the Piute-El Dorado Critical Habitat Unit.

Within this portion of the Piute-El Dorado Critical Habitat Unit, approximately 2,700 acres contain high potential for an open pit, heap leach operation.

Other than major transportation and utility corridors on the southern and eastern boundary, the area contains little development. Vehicle access routes for residences and other facilities on private lands, connector utility lines, rural dumps, and telecommunications sites comprise most of the developments that are present. The telecommunications sites are primarily along Interstate 40 and U.S. Route 95, which runs north to south in the eastern portion of the desert wildlife management area. The dumps tend to be small areas for household items and appliances created by rural residents or campers. No permitted landfills are located within this portion of the Piute-El Dorado Critical Habitat Unit. Although numerous, all of these developments are small in size.

Most of the land in this portion of the Piute-El Dorado Critical Habitat Unit is managed by the Bureau. Large-scale land exchanges between the Bureau and Catellus have occurred in this recovery unit. In addition to desert tortoise critical habitat, this exchange agreement included wilderness and other lands associated with the California Desert Protection Act of 1994. In the planning area, a total of about 322,500 acres were added to the Bureau's public land base as a result of these exchanges. This included approximately 98,000 acres of high value desert tortoise habitat, with large portion located in the Piute Fenner Valley area.

Northern Colorado Recovery Unit

Chemehuevi Critical Habitat Unit. The Bureau is the sole Federal land management agency within this critical habitat unit.

The descriptive information in the following four paragraphs is from Crowe (2005a); the acreages are from Pratini (2005). The Chemehuevi Critical Habitat Unit, which lies within the Northern Colorado Recovery Unit, covers approximately 936,404 acres; the Bureau manages approximately 91.9 percent of the critical habitat unit. Although the desert wildlife management area and the critical habitat unit overlap to a large degree, their boundaries do not completely overlap.

Approximately 122,823 acres of the Chemehuevi Critical Habitat Unit are located outside the boundaries of the desert wildlife management area. The Bureau did not include three larger areas of critical habitat within the desert wildlife management area and a few smaller areas for various reasons. In the northwest corner of the critical habitat unit, in the upper Cadiz Valley, the Bureau did not include an area with a checker-boarded land ownership; the Catellus Corporation and Cadiz Land Company own a considerable amount of land in this area. In this area, approximately 21,000 acres of critical habitat that are outside of the desert wildlife management area are included in wilderness (15,843 acres), which provides the highest level of protection afforded any land use class in the California Desert Conservation Area, and in a multi-species wildlife habitat management area (5,615 acres), which provides a level of protection somewhat greater than Class M lands.

In the southernmost portion of the Chemehuevi Critical Habitat Unit, in the vicinity of Vidal Junction, the Bureau did not include an area that was fragmented by the Colorado River Aqueduct, State Highway 62, and the Southern Pacific Railroad. These facilities fragment critical habitat to a large degree in this area; additionally, they require ongoing maintenance that disturbs the primary constituent elements of critical habitat.

The smallest of the three large areas of critical habitat not included within the area of critical environmental concern is located in the northeast corner of the Chemehuevi Desert Wildlife Management Area. In this area and in a few other, smaller locations, the Bureau established the boundary of the desert wildlife management area to follow roads, rather than the section lines the Service used for the boundaries of the critical habitat unit. The use of roads to demarcate the edge of the desert wildlife management area provides the Bureau with a more manageable boundary than a section line.

The information in the following paragraphs is from Crowe (2005a). The Bureau is the only Federal manager of critical habitat in this recovery unit. The Chemehuevi Critical Habitat Unit is bounded on the north by Interstate 40. To the east, south, and west, the higher and rockier elevations of the Sacramento, Chemehuevi, Whipple, Turtle, Old Woman, and Marble mountains, respectively, border the critical habitat unit. Between the mountains, the critical habitat unit extends farther out from the core until it disappears into the hotter and drier extremities of Chemehuevi, Vidal, Ward, and Cadiz valleys.

The dominant plant communities are Mojave and Sonoran desert scrub; desert dry wash woodland comprises a small portion of the critical habitat unit in Homer, Chemehuevi, and Vidal washes. Habitat modeling shows that widely scattered portions of Ward and Chemehuevi valleys have the highest species richness in plants and animals, and in habitat diversity.

The Bureau characterizes the habitat to be in excellent condition, primarily due to a history of very little development. Cumulative visible surface disturbance over the last 100 years is approximately 0.5 percent of the area of the critical habitat unit. Most of this disturbance is in the form of roads, utilities, railroads, and the Colorado Aqueduct. The critical habitat unit supports an average of 0.7 mile of road per square mile of habitat. Roads are lightly used.

Most historical use by burros was in the lower Chemehuevi Wash and Chemehuevi and Whipple Mountains at the edge of the Chemehuevi Critical Habitat Unit. Burro use of the critical habitat unit has been eliminated through the Northern and Eastern Colorado Desert Coordinated Management Plan.

Use by cattle has traditionally been concentrated in the upper east side of the Old Woman Mountains. The Bureau characterizes this use as historically light.

Non-native plants occur throughout the critical habitat unit. The lack of fire and general disturbance may be responsible for the fact that they are not currently a substantial part of the flora. The critical habitat unit has essentially no history of wild fires except one or two fires over 20 years in the highest elevations of the Old Woman Mountains.

Cultural and Native American values in the area are not visibly outstanding. They include lithic scatters along nomadic pre-historic trails that extend through the area from the Colorado River, historic trails, mining camps and homesteads from the last 100 years, and World War II training camps. The area includes perhaps a thousand known sites. A large amount of the critical habitat unit is considered sacred to Native Americans, especially near the Colorado River.

The area contains no domestic sheep grazing leases. The remaining cattle allotment, the Lazy Daisy, overlaps 260,025 acres of the Chemehuevi Critical Habitat Unit; it is a perennial allotment and still in operation. We discuss the use levels elsewhere in this biological opinion; most use occurs in the higher slopes of the east side of the Old Woman Mountain. In years of good rainfall, cattle will graze easterly and downslope in the spring.

Four major utility corridors cross the critical habitat unit. These corridors each contain one to two powerline and pipelines. For the most part, they are not aligned with highways or railroads. All roads and pipelines, except Interstate 40, lie at landscape grade and therefore do not generally block the movement of desert tortoises in terms of grade and berms.

Portions of historic Route 66 and the Southern Pacific Railroad cross the Cadiz Valley through critical habitat; Highway 95 crosses Vidal and Chemehuevi valleys, which are also within critical habitat. A spur line of the railroad branches off in Cadiz Valley and runs to Parker, Arizona. This spur, portions of Highway 62, and the Colorado Aqueduct cross critical habitat in the Vidal Junction area. These linear features, to varying degrees, are barriers to the movement of desert tortoises, because they can be killed on the road and their passage can be blocked by the canal, rail line, and roadside berms. Railroads are protected from intermittent flowing water with numerous water under-crossings, which desert tortoises can use to cross under the rail lines. On average, railroad trestles occur at a frequency of approximately 2.5 per mile through the desert. Bridges and culverts on Interstate 40 occur at a frequency of approximately 2.1 per mile. The traffic on most roads in this unit is light, with the exception of Federal and State highways, which affect the density of desert tortoises in adjacent areas.

Very little recreation occurs within this critical habitat unit. The Bureau characterizes it as light and scattered, as opposed to intensive. Off road vehicle use is essentially absent and very little recreation use occurs in drivable washes. Most of the use in washes is by bird hunters in the fall. Recreational uses include rock hounding, hunting, camping, and sight-seeing. This critical habitat unit does not contain any campgrounds or outstanding destination sites. The various wilderness areas designated in 1994 are little used. A portion of the Johnson Valley-to-Parker race corridor traverses the Chemehuevi Critical Habitat Unit.

No large-scale mining has ever occurred in the recovery unit. Small-scale mining and prospecting as practiced a hundred years ago are evident in the mountains, mostly at elevations above where the primary constituent elements of critical habitat are present. Very little mineral potential exists; wilderness areas likely support the greatest potential for minerals. Sand and gravel operations occur now and then along highways to support routine freeway and highway maintenance activities.

All private lands, except for an area of checkerboard land ownership in northern Cadiz Valley, are highly scattered. Given the area's remoteness, lack of water and infrastructure, development does not seem to be a threat. The County of San Bernardino foresees no development trend in the area or in the nearby surrounding area, except possibly in the vicinity of the city of Needles.

In summary, the Chemehuevi Critical Habitat Unit is remote, receives little use, has extensive but scattered multiple uses of public lands, and is not urbanizing or developing. The Bureau characterizes the critical habitat unit as being in excellent condition.

Eastern Mojave Recovery Unit

Chuckwalla Critical Habitat Unit. The Bureau, National Park Service, and Marine Corps manage portions of this critical habitat unit. Because Joshua Tree National Park and the Marine Corps Aerial Gunnery Range are outside of the action area of this consultation, we will not discuss the status of critical habitat within their boundaries in this biological opinion.

Unless otherwise stated, the descriptive information in the following four paragraphs is from Crowe (pers. comm. 2005c); the acreages are from Pratini (2005). The Chuckwalla Critical Habitat Unit covers approximately 1,023,915 acres. The Bureau manages approximately 465,287 acres of the 818,685-acre Chuckwalla Desert Wildlife Management Area. Approximately 15.2 percent of the desert wildlife management area is within the boundary of Joshua Tree National Park and approximately 17.6 percent is included within the Chocolate Mountains Aerial Gunnery Range (Crowe 2005b).

Approximately 95,915 acres of the Chuckwalla Critical Habitat Unit are located outside the boundaries of the desert wildlife management area. The Bureau did not include several relatively small areas of critical habitat within the desert wildlife management area and one large area for various reasons. On the westernmost edge of the desert wildlife management area, adjacent to Joshua Tree National Park, the boundary of the desert wildlife management area follows the boundary of National Park Service lands, rather than the section lines used by the Service for the critical habitat unit. The Bureau notes that this area is not used intensively.

The Bureau also omitted six small portions of critical habitat from the desert wildlife management area that were located around exits from Interstate 10, the area adjacent to the Chuckwalla Prison, which is located in the northeast corner of the desert wildlife management area, and a parcel in its northernmost portion. The largest area of the Chuckwalla Critical Habitat Unit that was not included within the desert wildlife management area lies south of

Highway 178. This area includes a portion of Milpitas Wash, which is used for hunting, camping, and rock hounding. Off-road vehicle use increases towards the southwestern corner of the critical habitat unit, which is relatively close to the Algodones Dunes, an area that supports some intensive recreational use. Finally, this portion of the Chuckwalla Critical Habitat Unit also includes a herd management area for burros.

Although portions of the critical habitat unit are not within the desert wildlife management area, other land use designations made by the Bureau offer protection above the standard multiple-use classes. For example, the areas to the west of Joshua Tree National Park, in the northernmost portion of the critical habitat unit, and another small parcel on the eastern edge of the critical habitat unit, totaling 12,881 acres, are located within wildlife habitat management areas that were established to protect desert bighorn. An additional 43,000 acres are located within multi-species wildlife habitat management areas; most of this acreage is south of Highway 178. Finally, 697 acres of critical habitat that were not included in the Chuckwalla Desert Wildlife Management Area are located within designated wilderness.

The information in the following paragraphs is from Crowe (2005b). The dominant plant community within the Chuckwalla Critical Habitat Unit is Sonoran desert scrub. Desert dry wash woodland is scattered in small and large tracts throughout the area. Habitat modeling shows that an area extending from Joshua Tree National Park to the Colorado River and running through the Chuckwalla Bench has high plant and animal species richness and habitat diversity. The same area also contains the highest quality habitat for the desert tortoise. The Bureau characterizes the habitat for the desert tortoise to be in excellent condition, primarily due to a history of very little development.

On lands managed by the Bureau, the cumulative visible surface disturbance from over the last 100 years is approximately 0.8 percent of the area of critical habitat. Most of this disturbance is in the form of roads for vehicles, utilities, the Colorado Aqueduct, and the Eagle Mountain Railroad. The remaining areas of existing disturbance were caused by current and historic mining (including the large, open pit Mesquite Mine), military bombing areas, winter-use recreation campgrounds, a few former jojoba farms, and historic camps from World War II.

Within critical habitat, the density of roads averages 0.7 miles per square mile. Roads are lightly to moderately used. The Eastern Colorado Desert Recovery Unit experiences low to moderate use and recreation.

The number of feral burros that occur within critical habitat is very low; they have been almost completely eliminated from critical habitat. No grazing allotments occur in the Chuckwalla Critical Habitat Unit.

Non-native plants occur throughout the critical habitat unit. The lack of fire and grazing may be responsible for the fact that they are not currently a substantial part of the flora. Cultural and Native American values in the area are not visibly outstanding. They include lithic scatters along nomadic pre-historic trails that extend through the area from the Colorado River,

historic trails, mining camps and homesteads from the last 100 years, and World War II training camps. The area includes perhaps a thousand known sites. Within critical habitat, areas near the Colorado River are most sacred to Native Americans.

Several major power lines and pipelines are located in a single utility corridor along Interstate 10. The only two communities within the boundaries of the Chuckwalla Critical Habitat Unit, Desert Center and Chiriaco Summit, also occur within this corridor. The core of the critical habitat unit is free of corridors.

The Eagle Mountain Railroad is one of two major obstacles to the movement of desert tortoises within this critical habitat unit. On average, approximately 2.5 trestles per mile along this railroad allow passage by desert tortoises. The other major obstacle, Interstate 10, includes bridges and culverts at approximately one-mile intervals.

The Bureau characterizes the amount of extensive recreation in the critical habitat unit as modest. Most activity occurs from fall to spring; bird and deer hunters in November, snowbirds, rock hounders, and family camping are the most frequent users. Snowbirds and campers tend to wander county and other designated routes to explore, picnic, and camp. Rock hounders have known, favorite collecting areas with road access. Most recreationists (hunters and explorers) also drive in drivable washes in desert dry wash woodland habitat.

Washes in the southern part of the planning area are quite different from those in the northern part and other parts of the Mojave Desert in that they are wide, flat, sandy, relatively free of rocks, and lined with tall trees. These features are attractive to recreational users.

Snowbirds congregate in the Wiley Well and Coon Hollow campgrounds that are included in a much larger long-term visitor area. A third campground, Corn Springs, lies in the middle of the Chuckwalla Mountain. Recreationists tend to leave the long-term visitor area and washes during March; they return in October or November.

No modern-day mining occurs except in the disseminated gold-bearing area south and east of the Chocolate Mountains Aerial Gunnery Range. The Mesquite Mine near the southern point of the critical habitat unit is closing but may be replaced with a long-term, large-scale landfill; the old Eagle Mountain Mine, which lies mostly outside of the critical habitat unit, has also been proposed for use as a landfill. The Glamis-Imperial goldmine project (east of Mesquite Mine and Ogilby Road) has been proposed but is not permitted at this time. Small-scale mining and prospects as practiced a hundred years ago are evidenced at the base of the mountains and at the edge of critical habitat. Most of the mineral potential within this critical habitat unit is located within wilderness areas and Joshua Tree National Park. Sand and gravel operations occur now and then along highways to support routine freeway and highway maintenance activities.

Two large areas of private land checkerboard overlay the Chuckwalla Critical Habitat Unit. One runs unevenly over a large area along both sides of Interstate 10 between Chiriaco Summit and just east of Indio. The other is a large area of about 100,000 acres lying in the up-stream portion

of the huge Milpitas Wash complex. In both locations, the private land sections are fractured into multiple owners; varying from 10 to more than 100 per section in some cases, this pattern of ownership greatly complicates resource management and land acquisition. Given remoteness, lack of water and infrastructure, the Bureau believes that very little threat of development exists with the private lands in Milpitas Wash; more potential for development occurs on the western side of the planning area, on the eastern edge of the Coachella Valley. The large percentage of critical habitat that is in federal ownership provides a very high degree of management certainty.

In summary, this recovery unit is remote, receives little use, has extensive but little multiple uses of public lands, and is not urbanizing or developing. The Bureau characterizes critical habitat as being in excellent condition.

Western Mojave Recovery Unit

To offset the impacts of the use of additional training lands at Fort Irwin, the Army has acquired slightly more than 99,000 acres within the Western Mojave Recovery Unit (Kernek pers. comm., 2005). We mention this fact here because the acquired lands occur in both the Superior-Cronese and Ord-Rodman critical habitat units.

Ord-Rodman Critical Habitat Unit. Unless otherwise noted, the information in the following paragraphs is from LaPre (2005a). The Ord-Rodman Critical Habitat Unit covers approximately 254,142 acres. Of this total, 60,768 acres are within Class C lands, 71,397 acres are in Class L, 115,429 acres are in Class M, and 5,865 acres are in Class I. Unclassified lands cover 111 acres. The Marine Corps Logistics Base at Nebo includes 571 acres.

The Bureau (2004c) provided the following information regarding grazing in the Ord-Rodman Critical Habitat Unit. Large portions of the Ord Allotment are located at 4,000 feet or higher in elevation; although the Service conducts line distance sampling up to elevations of 4,200 feet, most desert tortoises reside at elevations between 1,000 and 3,000 feet (Luckenbach 1982). A visual comparison of preliminary data points from line distance sampling (Everly 2005) and elevation maps of the Ord Allotment (Bureau 2004b) indicates that few desert tortoises have been detected at elevations over 4,000 feet. Although the areas over 4,000 feet in elevation are within the boundaries of the Ord-Rodman Critical Habitat Unit, they likely do not support the primary constituent elements of critical habitat in sufficient quality and quantity to provide high quality habitat for desert tortoises.

Two out of the five key areas on the Ord Allotment are located below 4,000 feet in elevation; consequently, these areas are of interest in assessing the baseline conditions of this critical habitat unit relative to grazing. Key Area #1 had utilization levels ranging from 10 to 50 percent on key species; the average utilization level over a 12-year period is 21 percent, which the Bureau characterizes as light. From 1988 to 1994, utilization at Key Area #5 ranged from 2.5 to 10 percent, with an average of 3 percent; the Bureau characterizes this level as non-use.

Between 1995 and 1997, the Bureau conducted utilization transects at sites other than the key areas. Most of the transects were located above 4,000 feet; however, two sites located in the southwest portions of the allotment are located below 4,000 feet and within critical habitat. Utilization levels at these two sites ranged from 12 to 68 percent, with an average close to 50 percent.

The Bureau estimates that cattle are present within critical habitat over 90 percent of the year, although 75 percent of the area they occupy is above 4,000 feet in elevation. All of the developed water sources are within critical habitat. Between 1990 and 2003, the number of head of cattle within the allotment has ranged from 145 to 385. In 6 of those years, more than 300 head were present; less than 200 were present during 4 years.

Over the last 12 years, the overall densities of key species, especially perennial bunch grasses, have decreased. Galleta grass (*Hilaria rigida*) and spiny hopsage (*Grayia spinosa*) at Key Area #1 have all but died off, probably resulting from a combination of prolonged drought and overgrazing. Desert needlegrass (*Stipa* spp.) occurs primarily within the protection of shrubs and is rarely found in inter-shrub spaces.

The Ord-Rodman Critical Habitat Unit contains three active utility corridors. Corridor G, which is 2 miles wide, lies along Interstate 40 at the northern boundary; most of the facilities associated with the one 30-inch pipeline in this corridor are placed outside the critical habitat unit. Corridor D is 2 miles wide; it contains two 287-kilovolt power lines and one 500-kilovolt power line. Corridor H contains one 34-inch pipeline; it is 2 miles wide.

Several off-highway vehicle routes are found within the Ord-Rodman Critical Habitat Unit, which is situated between the Johnson Valley and Stoddard Valley off-highway vehicle management areas. The Western Mojave Off-Road Vehicle Designation Project, completed by Bureau in June 2003, designated all routes as open, closed or limited in use within the critical habitat unit. The Service issued a biological opinion for this recreational use in 2003 (1-8-03-F-21, Service 2003b); this consultation evaluated the effects of route designation throughout the western Mojave Desert, including the other three critical habitat units in the Western Mojave Recovery Unit.

The Newberry Mountains Wilderness, which includes 26,453 acres, is located entirely within the critical habitat unit. The 34,315-acre Rodman Mountains Wilderness is also located within the Ord-Rodman Critical Habitat Unit.

Fremont-Kramer Critical Habitat Unit. The following information is from LaPre (2005b). The Fremont-Kramer Critical Habitat Unit consists of 518,000 acres. Of this total, Class C includes

185 acres, Class L includes 299,074 acres, Class M includes 103,383 acres, and Class I includes 403 acres. Approximately 10,956 acres of public lands are unclassified.

The Department of Defense manages 65,486 acres. These areas are within the critical habitat unit but outside of the action area of this consultation. The California Department of Fish and Game's Fremont Valley Ecological Reserve consists of 1,090 acres in 5 properties. The California Department of Fish and Game also manages the West Mojave Desert Ecological Reserve, which consists of 22 properties totaling 11,817 acres northeast of Kramer Junction. The parcels managed by the California Department of Fish and Game are scattered within public lands and are thus considered to be within the action area.

The California Desert Conservation Area Plan of 1980 designated lands north of California City in Kern County as an area of critical environmental concern and a research natural area. The Desert Tortoise Research Natural Area, which includes 25,695 acres, is managed jointly by the Bureau, California Department of Fish and Game, and the Desert Tortoise Preserve Committee, a non-profit group established to acquire and manage lands for protection of the desert tortoise. The northern portion of the Desert Tortoise Research Natural Area (3,045 acres) is within the Fremont-Kramer Critical Habitat Unit.

Approximately 174 acres of the Golden Valley Wilderness is included within the Fremont-Kramer Critical Habitat Unit, just outside the southwestern corner of the U.S. Navy's Mojave B Range. The remaining wilderness extends the protected habitat to the northwest.

In past years, sheep grazed this critical habitat unit in several allotments. No sheep grazing has occurred within the vast majority of the critical habitat unit since at least the early 1990s, as a result of section 7(a)(2) consultations between the Bureau and Service. A portion of the Pilot Knob Allotment, which was grazed by cattle, overlies this critical habitat unit. It has not been grazed for approximately 10 years; the private interests in that allotment have been acquired by a conservation group.

Contingent corridor P, which is 2 miles wide, traverses the critical habitat adjacent to Highway 395; this corridor contains two 115-kilovolt power lines, a coaxial cable, and a 12-inch pipeline. Utility corridors G and Q cross the Fremont-Kramer Critical Habitat Unit. Corridor G is 2 miles wide and contains a 30-inch pipeline. Corridor Q is also 2 miles wide; it contains a 12-inch pipeline.

Several popular off highway vehicle routes are found within the Fremont-Kramer Critical Habitat Unit. The Rand Mountains, which are located between the Desert Tortoise Research Natural Area on the west and the Rand Mining District on the east, are extremely popular with off-highway vehicle users. The Bureau has expended considerable effort to control recreational use in this area.

Superior-Cronese Critical Habitat Unit. The following information is from LaPre (2005c). The Superior-Cronese Critical Habitat Unit includes approximately 766,900 acres. Within this area, Class C lands cover 55,481 acres, Class L lands cover 354,526 acres, and Class M lands cover 139,400 acres; this critical habitat unit does not include any lands within Class I. Unclassified lands comprise small parcels at the edge of the critical habitat unit that total 1,013 acres.

The critical habitat unit is contiguous with critical habitat on the Mojave B Range of the Naval Air Weapons Station and the Fort Irwin National Training Center; however, these areas, which include 201,914 acres, are outside of the action area of this biological opinion. The Air Force Cuddeback Gunnery Range, which is no longer in use, is entirely contained within critical habitat.

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

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

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

Pinto Mountain Critical Habitat Unit. The following information is from LaPre (2005d). The Pinto Mountain Critical Habitat Unit is approximately 171,700 acres in size; it includes 19,291 acres in Joshua Tree National Park, which is outside of the action area of this biological opinion. Approximately 111,700 acres of the critical habitat unit are within the planning area for the West Mojave Plan; the remainder of the critical habitat unit lies within the boundaries of the Northern and Eastern Colorado Desert Coordinated Management Plan. Over 90 percent of this area is managed by the Bureau of Land Management.

Within the public lands, the Bureau manages 683 acres as Class C and 109,510 acres as Class M. This area currently does not contain any Class L or I lands. Unclassified lands comprise 1,502 acres.

The northwestern corner of the critical habitat unit is within the city of Twentynine Palms. This segment contains nearly all of the private land within the Pinto Mountain Critical Habitat Unit.

This area represents a transition between Colorado Desert and Mojave Desert flora and fauna. Wash species include smoke trees, palo verdes, and ironwoods. Ocotillo and barrel cacti are present, though these species are more common to the south.

This critical habitat unit does not contain any livestock allotments or utility corridors. Off-highway vehicle routes are utilized primarily by prospectors, rockhounds, and claimholders.

Most of the Pinto Mountain Critical Habitat Unit is within the Old Dale Mining District. Many small-scale historical mines are present.

A small portion of the Sheephole Valley Wilderness lies within the critical habitat unit. It occupies approximately 683 acres.

Summary of the Status of Critical Habitat in the Action Area

The eight critical habitat units within the California Desert Conservation Area contain numerous types of habitats, cover the full range of the elevations used by desert tortoises, and are subject to varying degrees of human use. We have historically measured the degree of functionality of the primary constituent elements of critical habitat of the desert tortoise by evaluating the amount of ground disturbance. In recent years, however, research conducted by Oftedal (2005) that we discussed previously in this biological opinion, indicates that other, more subtle changes in some of the primary constituent elements may also be important. Oftedal postulates that changes in the composition of annual plants, from certain native species that are high in protein and water to less nutritive non-native species, may be placing desert tortoises in a state of chronic stress. At this time, we continue to consider that evaluation of the degree of ground disturbance is the most pertinent indicator of the health and status of the critical habitat units; however, we should closely track the development of new information with regard to environmental factors and how they may affect the physiology of desert tortoises.

The critical habitat units within the Western Mojave Recovery Unit clearly experience the most visitation by recreational users and economic interests, primarily because of their proximity to the Los Angeles Basin. Despite this level of use, large areas of critical habitat in the western Mojave Desert remain undisturbed. We base this statement on information provided by the Bureau that was gathered in support of the West Mojave Plan. Using aerial photographs from 1994 of the proposed desert wildlife management areas in the planning area for the western Mojave Desert region, the Bureau used numerous conservative calculations (i.e., it erred on the side of overestimating the amount of disturbance) and concluded that approximately 1.3 percent of the proposed desert wildlife management areas have been disturbed to date (LaPre 2005e). Given that the critical habitat units throughout the remainder of the California Desert Conservation Area have been disturbed to a lesser degree than those in the western Mojave Desert planning area, we conclude that all of the critical habitat units within the action area are

capable of supporting their conservation role and function. We acknowledge that the critical habitat units and desert wildlife management areas do not overlap completely; however, this information comprises the best available data with regard to surface disturbance in the planning area. At this level of disturbance, we anticipate that the critical habitat units should function fully to support the conservation of the desert tortoise.

EFFECTS OF THE ACTION

Methodology

We conducted our analysis in a stepwise fashion. We began our analysis with a general description of how various anthropogenic activities could affect the desert tortoise and its habitat, including its critical habitat.

We then reviewed the potential effects of the overall management direction provided by the California Desert Conservation Area Plan, as amended and modified, on the desert tortoise and its critical habitat. The California Desert Conservation Area Plan provides program guidance to the Bureau for its activities within the California desert; the multiple-use classes and elements of the California Desert Conservation Area Plan direct how the Bureau balances resource conservation and use. The California Desert Conservation Area Plan also provides the fundamental authorization for many ongoing activities, such as casual recreational use, that do not require site-specific analysis by the Bureau. We analyzed the effects of the implementation of both the elements and the multiple-use classes on the various future activities that the Bureau may undertake; we also evaluated the potential effects of ongoing uses, as authorized by the California Desert Conservation Area Plan itself. We did not analyze the effects of any site-specific future actions. As the California Desert Conservation Area Plan notes, site-specific actions may be allowed after they are analyzed pursuant to the National Environmental Policy Act; the Bureau must also comply with section 7(a)(2) of the Act when it is considering these future actions.

Finally, we analyzed the effects of the interim measures enacted in the western Mojave Desert planning area and actions contained in the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan. In some cases, these modifications have altered the manner in which the guidelines for multiple-use classes, elements, and the designation of special management areas under the California Desert Conservation Area Plan may affect the desert tortoise and its critical habitat. Where these modifications have eliminated the likelihood of adverse effects, we have noted that in the Description of the Proposed Action section of this biological opinion; such modifications are not considered elsewhere in this document.

We considered other factors in our analysis of whether the Bureau's guidance and ongoing activities were likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. Our consideration of the overall effects of the Bureau's project-planning guidance on the desert tortoise and its critical habitat includes, at least to some degree,

an evaluation of how likely an action is to occur. For example, gold mining is not likely to occur in an area that does not contain gold; therefore, even though the multiple-use class and element guidelines may allow for this activity, it is unlikely to occur. Therefore, this program guidance will not affect the desert tortoise or its critical habitat.

To summarize the manner in which we conducted our analysis, we initially evaluated how various types of human activities affect the desert tortoise and its habitat. We then provided an analysis of the impacts to the desert tortoise and its habitat of the various activities that could potentially occur under the program guidance of the California Desert Conservation Area Plan. In the third step, we analyzed the specific effects of the actions proposed in the northern and eastern Mojave Desert and northern and eastern Colorado Desert regional plans and the interim measures for the western Mojave Desert planning area. We evaluated all of these effects, whether beneficial or adverse to the desert tortoise and its critical habitat, within the action area in relation to the survival and recovery needs of the desert tortoise and to the function of designated critical habitat, respectively.

We also note that the Bureau's proposed action includes management guidance regarding many types of actions that may affect the desert tortoise and its critical habitat over a very large area; we have also evaluated the effects of specific proposals, such as those contained in the Northern and Eastern Mojave Desert Management Plan and the Northern and Eastern Colorado Desert Coordinated Management Plan. We used the process described in the previous paragraphs of this section to analyze the management guidance provided by the California Desert Conservation Area Plan and the specific amendments in a logical fashion. We frequently do not have extensive data upon which to base our analyses when it covers numerous actions conducted over broad areas. To assist us in this process, we also considered the guidance provided by the implementing regulations for section 7(a)(2) of the Endangered Species Act in developing this biological opinion. Specifically, 50 *Code of Federal Regulations* 402.14(d) requires the Federal agency requesting formal consultation to provide us "with the best scientific and commercial data available or which can be obtained during the consultation for an adequate review of the effects that an action may have upon listed species or critical habitat." The consulting Federal agency bears the responsibility, "to the extent practicable," to obtain the requested data "which can be developed within the scope of the extension" (50 *Code of Federal Regulations* 402.14(f)). Finally, 50 *Code of Federal Regulations* 402.14(g)(8) states that "In formulating its biological opinion, any reasonable and prudent alternatives, and any reasonable and prudent measures, the Service will use the best scientific and commercial data available and will give appropriate consideration to any beneficial actions taken by the Federal agency or applicant, including any actions taken prior to the initiation of consultation."

Finally, the Bureau would consult on each future action that it proposes to approve, undertake, or fund, pursuant to the requirements of section 7(a)(2) of the Act. The potential exists that, in this biological opinion, we may find that the Bureau's guidance is not likely to jeopardize the continued existence of the desert tortoise or adversely modify its critical habitat. However, a specific action may be proposed in the future that could result in a finding of jeopardy or adverse modification of critical habitat. Such a circumstance could occur when permit applications

contain project-specific details that cannot be evaluated at this programmatic level.

General Effects of Human Activities on the Desert Tortoise and its Critical Habitat

Numerous activities are likely to occur as a result of implementing the management direction proposed under the California Desert Conservation Area Plan. These activities have the potential to adversely affect the desert tortoise and its critical habitat by: injuring or killing individuals; disrupting their breeding, feeding, or sheltering behavior; and by disturbing or degrading the primary constituent elements of critical habitat.

Effects of Human Activities on the Desert Tortoise

Vehicles that are driving on paved and unpaved roads and cross-country can strike desert tortoises (Boarman and Sazaki 1996). Cross-country travel can also result in the destruction of burrows; desert tortoises could either be trapped inside the burrows or find them unavailable when they are needed to escape predation or extreme weather conditions. In general, cross-country travel occurs less frequently than travel on roads but can cause substantial impacts because of the presence of burrows and the greater difficulty in detecting and avoiding desert tortoises. As in virtually every instance, hatchling desert tortoises are the most difficult individuals to detect.

We are unaware of any research that conclusively shows the density at which roads would be likely to extirpate desert tortoises from a region; based on their research, Hoff and Marlow (2002) contend that a large portion of an area conserved for desert tortoises in Nevada is degraded by heavily used roads. Although they also showed that less frequently traveled unpaved roads also affect the distribution of desert tortoise sign, we cannot extrapolate this information directly to roads elsewhere because of varying factors, such as the amount of traffic, the density of desert tortoises, and probably, to some extent, the local terrain. Intuitively, fewer desert tortoises are likely to be killed if fewer roads are available for travel. Factors other than density also likely enter into the effects of roads; for example, few desert tortoises are likely killed on a lightly used road but this number may rise if the road becomes more heavily used as a result of closures elsewhere.

Although desert tortoises are generally more easily observed on roads, vehicles can travel at increased speed that again reduces the ability of drivers to detect and avoid desert tortoises. Rises and turns in roads also decrease the ability of drivers to detect desert tortoises. The actual level of injury or mortality that would occur along a specific road will be influenced by many variables and is difficult to predict; the level and type of use of the road by vehicles and the number of desert tortoises present during periods of heavy use are two of the primary factors that are difficult to predict. Mortality associated with vehicle strikes, both on and off roads, will be greatest in the spring and fall, in areas where desert tortoises are most common. Along heavily used roads, the number of desert tortoises is depressed for some distance from the edge of the road as a result of road-associated mortality; this distance varies with the level of use of the road. For example, Hoff and Marlow (2002) found that “reductions in (desert) tortoise sign are easily

detectable more than (2.48 miles) from the roadway” on heavily used paved roads. They also found “evidence from unpaved utility access roads ... that even lower traffic levels may have a significant detectable impact.” Of the roads that Hoff and Marlow (2002) investigated, only a poorly maintained paved road, with a traffic volume of approximately 25 vehicles per day seemed to have no effect on the distribution of sign of the desert tortoise.

The Bureau also authorizes vehicles to use washes as routes of travel; vehicles using washes may kill or injure desert tortoises. The risk to desert tortoises of being struck by a vehicle while in a wash may be different than that associated with a road. For example, desert tortoises are likely more difficult to see when they are in washes because of the generally greater variation in contours and substrates in washes as compared to those on roads; desert tortoises likely also spend more time in washes than on roads because washes support resources that they require, such as shrubs for cover and annual plants for forage. However, vehicles traveling on roads usually do so at greater speeds than can be used in washes, thus reducing the ability of the driver to see desert tortoises; finally, more vehicles use roads than washes. Note that these statements are generalizations and exceptions likely apply to each statement. Desert tortoises may use washes to varying degrees in different portions of their range. (See page 20 in Service [1994c]. For the Northern Colorado Recovery Unit: “Here desert tortoises are found in the valleys, on bajadas and desert pavements, and to a lesser extent in the broad well-developed washes. They den singly in burrows, under shrubs, in intershrub spaces, and rarely in washes.” For the Eastern Colorado Recovery Unit: “Desert tortoises in the eastern Colorado recovery unit ... occupy well-developed washes”)

Desert tortoises would be at risk during the construction, operation, and maintenance phases of any projects that would employ large equipment. Animals can be crushed on the ground’s surface, trapped in their burrows, and buried in overburden piles. During the construction of the Kern and Mojave pipelines, numerous desert tortoises were killed by vehicles traveling to and from the project sites on the rights-of-way; although this mortality was not directly caused by the heavy equipment at the construction sites, the right-of-way traffic was occurring in direct support of that activity.

Because of their small size, hatchlings and slightly larger desert tortoises could be trampled by foot traffic of people working or recreating in the desert. Nests are also vulnerable, but their typical location, near the mouth of a burrow, likely protects them to some degree.

Desert tortoises have died as a result of other factors associated with human activities. They have fallen into trenches or adits that were excavated for various types of projects. Approximately 45 desert tortoises were rescued from abandoned mine shafts on one weekend in the El Paso Mountains in 1983 (Aardahl pers. comm. 2005); in the mid-1990s, we heard of similar rescues of smaller numbers of desert tortoises from adits near Daggett Ridge. Improperly constructed cattle guards can also trap smaller individuals. Desert tortoises have become entangled in netting or wire. Desert tortoises may seek shelter in the shade of vehicles and be crushed when those vehicles are subsequently moved. Improper disposal of food wastes and trash often attracts predators of the desert tortoise, especially common ravens. Pet dogs brought

onto public lands by recreationists or workers associated with specific projects can disturb, injure, or kill desert tortoises. Desert tortoises have also been found trapped in guzzlers and between the rails of a railroad track.

Some ill, dying, and recently dead desert tortoises have been found to contain elevated levels of potential toxicants, such as cadmium, chromium, mercury, nickel, and lead (Jacobson et al. 1991, Homer et al. unpublished data in Chaffee and Berry 1999). Chaffee and Berry (1999) compared concentrations of elements found in plants and soils and found elevated concentrations of cadmium, potassium, and zinc in all plants; other elements, such as chromium, nickel, and selenium were enriched only in certain plants. Because desert tortoises seem to forage selectively on certain plant species, they may eat or avoid those species containing elevated levels of potential toxicants. They also found anomalous concentrations of arsenic, which could be toxic to desert tortoises in large quantities, near areas that have been mined for gold; arsenic occurs in some gold ores. Avery (1998) notes that concentrations of heavy metals, such as chromium, iron, copper, zinc, and aluminum, were higher in Mediterranean grass (*Schismus barbatus*) than in evening-primrose (*Camissonia boothii*), four o'clocks (*Mirabilis bigelovii*), or filaree (*Erodium cicutarium*). Avery (1998) found that Mediterranean grass had greater concentrations of chromium, iron, copper, zinc, and aluminum than the latter three species. He speculated that, because its fibrous roots are near the surface of the soil, it may accumulate heavy metals that are deposited from airborne pollution more readily than the other species, which have tap roots. Mediterranean grasses (*S. barbatus* and *arabicus*) are widely distributed, non-native plants that are common in disturbed soils and readily consumed by desert tortoises. To date, although desert tortoises seem to have been exposed to elevated levels of potentially toxic elements, we do not know if this exposure has caused any adverse effects.

The use of pesticides could result in direct mortality of desert tortoises; we are unaware of specific studies regarding the effects of pesticides on the desert tortoise. Herbicides may reduce or eliminate the abundance of plants that the desert tortoise uses for forage or shelter; other pesticides could reduce the abundance of pollinators, which, in turn, could reduce the germination success of plant species that are important to the desert tortoise. Both the active ingredient and surfactants may be toxic to desert tortoises, plant species that it uses for forage and shelter, and the pollinators of these plant species.

Through legitimate and authorized use of desert lands, people make contact with desert tortoises. This contact can lead to uninformed or malicious interactions that result in injury or mortality of desert tortoises. For example, unauthorized handling or restraint of a desert tortoise could induce physiological stress that reduces the animal's ability to withstand high temperatures. Desert tortoises are occasionally killed by gunshots. Some mortality associated with gunshots may be accidental; however, most are probably intentional simply because of the low likelihood of a bullet randomly striking a desert tortoise. Although this consultation addresses only legal actions that are implemented or authorized by the Bureau, the access provided by the Bureau's authorizations can increase the number of adverse interactions between desert tortoises and people.

The presence of people in the desert has provided subsidies that allow at least some species, including some predators of the desert tortoise, to be present in greater numbers than they were prior to the development of cities, towns, agriculture, and other human features. Perhaps most importantly, the number of common ravens in the Mojave Desert increased ten-fold between 1968 and 1992 (Boarman and Berry 1995). Common ravens find human-produced subsidies in many forms; they nest on power pylons, drink at artificial water sources, and eat road-killed animals, refuse at landfills, and the products of agricultural areas. Activities that the Bureau authorizes under the auspices of the California Desert Conservation Area Plan have the potential to add to these subsidies. Although alterations to habitat have increased the number of common ravens, we included a discussion of these in this section because the direct impact of subsidies to the desert tortoise is an increased level of predation, which was, as we mentioned in the Status of the Species section of this biological opinion, one of the factors that influenced the listing of the species as threatened.

Human activities in the desert increase the spread of non-native plants. These species can increase the ability of the desert to carry wild fires (Lovich and Bainbridge 1999). Desert tortoises are not adapted to fire; consequently, fires could result in a substantial loss of desert tortoises.

In summary, desert tortoises may be killed or injured by a wide variety of human activities that the Bureau can authorize under the program guidance of the California Desert Conservation Area Plan. The number of desert tortoises that may be killed or injured by any given activity depends on a variety of factors. The nature of the activity, its location and timing, and the density of desert tortoises in the action area are key factors that affect the number of animals that may be killed or injured. Given the broad nature of this consultation, we are unable to estimate the number of desert tortoises that may be killed or injured. However, we note that, because desert wildlife management areas and critical habitat were established to include the largest aggregations of desert tortoises, activities occurring in these areas are generally more likely to kill or injure desert tortoises than those occurring outside their boundaries.

Finally, to restate the methodology we are using in this biological opinion, the discussion in this section provided an general overview of the effects of human activities on the desert tortoise; we did not intend for it to address the scale or intensity of potential impacts associated with implementation of the elements and guidelines of the California Desert Conservation Area Plan in general or of the Northern and Eastern Mojave Desert Management Plan or Northern and Eastern Colorado Desert Coordinated Management Plan in particular. A complete analysis of the elements and guidelines of the California Desert Conservation Area Plan in general is contained in the Effects of Multiple-Use Classes, Guidelines, and Elements on the Desert Tortoise and its Critical Habitat section of this biological opinion. Complete analyses of the two completed bioregional plans are contained in the Effects of the Northern and Eastern Mojave Desert Management Plan on the Desert Tortoise and its Critical Habitat and Effects of the Northern and Eastern Colorado Desert Coordinated Management Plan on the Desert Tortoise and its Critical Habitat sections of this biological opinion.

Effects of Human Activities on Critical Habitat

The final rule for designation of critical habitat for the desert tortoise describes the specific primary constituent elements of its critical habitat. These primary constituent elements are: sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper substrate conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality (59 *Federal Register* 5820).

The implementation of the guidelines and elements of the California Desert Conservation Area Plan can remove, disturb, or fragment habitat of the desert tortoise, including the primary constituent elements of critical habitat. We conducted the following analysis by generally using the primary constituent elements as the basis for our discussion.

Note that, regardless of whether a specific area is within the boundaries of critical habitat, various activities generally affect the physical and biological attributes of habitat that supports desert tortoises in the same manner. In the analysis that follows and throughout the biological opinion, we discuss how the primary constituent elements of critical habitat of the desert tortoise may be affected by various activities. The same principles apply to suitable habitat that has not been designated as critical by the Service. Therefore, for example, livestock grazing has the same general effects on desert tortoise habitat, regardless of whether that habitat has been designated as critical. For the purposes of this biological opinion, we do not consider the effects on habitat outside of critical habitat in our conclusions regarding any effects to designated critical habitat.

Sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow. This primary constituent element addresses the need to conserve sufficiently large areas to maintain the ecological processes that are necessary to support the recovery of the species. The final rule designating critical habitat also notes that these large reserve areas allow desert tortoises to move, disperse, and maintain gene flow.

We will conduct a specific analysis of the desert wildlife management areas established by the Bureau and the means by which the Bureau proposes to maintain the viability of these areas later in this document. At this point in our review, we note that the implementation of the guidelines and elements of the California Desert Conservation Area Plan has the potential to reduce the amount of space that is available to the desert tortoise to recover. Such reductions can result from disturbance or removal of habitat by a variety of means and scales. For example, the installation of a small informational kiosk at the side of a road to provide information to recreationists may cause the loss of a few hundred square feet of suitable habitat. However, this loss, in and of itself, is inconsequential in relation to the acreage of suitable habitat in any given desert wildlife management area; in fact, the possibility exists that the benefits to the desert tortoise of a more informed public may outweigh any adverse effects of the habitat loss.

Conversely, removal of habitat on a sufficiently large scale can eliminate the ability of entire regions to support desert tortoises. In the worst cases, such large removals may also fragment and isolate additional aggregations of desert tortoises. Such isolation or fragmentation reduces the ability of desert tortoises to move over large areas in response to changes in habitat conditions, prevents genetic interchange, and substantially reduces the likelihood of the re-establishment of desert tortoises in the event of local extirpations. Desert tortoises may be substantially isolated from larger populations by natural features, such as mountain ranges or low valleys, or, in more limited circumstances, by canals, roads, and other human activity. Although the adverse effects of isolation are likely to outweigh the benefits over the long term, isolated groups of desert tortoises may be less susceptible to the transmission of disease on a short-term basis. Few areas that support desert tortoises are likely completely isolated from all other populations. For example, desert tortoises have been found at elevations of 7,000 feet in mountain passes, between two valleys of more suitable habitat. Additionally, desert tortoises occasionally cross even the busiest roads during periods of low traffic or when assisted by concerned motorists.

Heavily used roads, even if they do not pose a physical barrier to desert tortoises, cause fragmentation because animals cannot cross them safely. Some roads, such as Highway 58, have been fenced to exclude desert tortoises and fitted with underpasses that allow animals to move from side to side; such roads may reduce mortality levels and allow passage of animals to the degree that the potential has increased for the desert tortoise to recover in these areas (Boarman et al. 1998).

Unpaved roads that are used infrequently likely do not pose a threat of fragmentation. However, ongoing road maintenance can lower the bed of the road and raise berms to a degree that desert tortoises which enter the roadway cannot exit. These animals are subsequently threatened with predation, exposure to extreme temperatures, collection, and collision with vehicles.

Sufficient quality and quantity of forage species and the proper substrate conditions to provide for the growth of these species; and sufficient vegetation for shelter from temperature extremes and predators. We have combined a discussion of the potential effects of implementation of the California Desert Conservation Area Plan on these two primary constituent elements because

they both deal with the plant communities that support desert tortoises; additionally, the effects are similar in that the disturbance or removal of annual and perennial plants often occurs as a result of the same activities.

The most direct and obvious potential effect of the implementation of the guidelines and elements of the California Desert Conservation Area Plan is the direct removal of annual and perennial plants that desert tortoises use for food and cover. When such effects occur within the boundaries of critical habitat, the specific primary constituent elements that may be affected are the quality and quantity of forage species, the proper substrate conditions to provide for the growth of these species, and vegetation for shelter from temperature extremes and predators. Simply stated, the disturbance or removal of annual plants and shrubs reduces the ability of the desert tortoise to find food and shelter. Without a diverse assemblage of plant species upon which to forage, desert tortoises cannot maintain an appropriate nutritive balance (Ofstedal 2005); without the cover of shrubs, desert tortoises are more vulnerable to predators and the temperature extremes that are common in the desert. Note that the discussion of the effects of livestock grazing on desert tortoises and their habitat, which is located under the analysis of the livestock grazing element, contains a more detailed evaluation of the relationship between desert tortoises and their habitat.

Numerous activities can result in the removal or disturbance of vegetation at varying scales and intensities. For example, parking of vehicles off of established routes may crush shrubs or annual species and affect smaller amounts of habitat on a relatively short-term scale. Large-scale mines, on the other hand, generally cause the complete removal of plant communities over substantial areas, most likely on a permanent basis. Note that the degree of restoration at a large mine is subject to some variation; substantial efforts to restore habitat have occurred at Viceroy Mine in the eastern Mojave Desert but reclaiming as habitat the pit made by U.S. Borax at Boron is likely impossible.

In general, short-term disturbances that cover small areas likely do not cause an appreciable reduction in the value of habitat to support desert tortoises; however, if such disturbances are repeated numerous times in a localized area, the aggregate effects of this disturbance are likely to result in the complete loss of habitat value. Large-scale removal of habitat renders the area completely unsuitable for desert tortoises; in the worst case, large areas of removal of habitat may fragment and isolate aggregations of desert tortoises.

Suitable substrates for burrowing, nesting, and overwintering; and burrows, caliche caves, and other shelter sites. We have combined a discussion of the potential effects of implementation of the California Desert Conservation Area Plan on these two primary constituent elements because they both deal with shelter sites; additionally, the potential effects to these primary constituent elements are similar in that the disturbance or removal of shelter sites or the substrates in which they are constructed often occurs as a result of the same activities.

The use of heavy equipment and driving of vehicles off of designated routes causes compaction of substrates. If the level of compaction is sufficient, substrates could become unsuitable for

burrowing by desert tortoises. Additionally, the complete removal of all available habitat from an area would preclude the construction of burrows by desert tortoises. If the local area affected by human activities is extensive, desert tortoises may be precluded from using that area on a long-term basis.

Vehicle use or other ground disturbance, such as construction activities, in areas where caliche caves are present can result in the destruction of these shelter sites. Caliche caves are an important resource for desert tortoises; individuals often use the same caves for extended periods of time. Additionally, desert tortoises cannot construct caliche caves as they do burrows; instead, they are dependent upon finding appropriate sites. Consequently, their loss may have a longer term effect on a desert tortoise than the loss of a burrow.

Most burrows of desert tortoises occur in areas that exhibit less topographical relief than do sites where caliche caves are present. Consequently, cross-country travel by vehicles can result in the destruction of burrows.

In general, the loss of shelter sites renders desert tortoises more vulnerable to predation and exposure to the temperature extremes that are common in the desert. Additionally, if desert tortoises spend time constructing new burrows, they are likely less able to seek mates or spend appropriate amounts of time foraging. Potentially, if desert tortoises are frequently forced to construct new burrows, their energy budgets may be adversely affected.

Habitat protected from disturbance and human-caused mortality. The establishment of open routes and development of various facilities have the potential of increasing the degree to which people interact with desert tortoises and of affecting the other primary constituent elements of their critical habitat. Even if proposed actions are planned carefully and potential impacts to desert tortoises and their habitat carefully considered, their proximity to the primary constituent elements increases the potential that some effects, whether direct or indirect, may accrue to critical habitat. In addition, the indirect effects of at least some development activities often lead to increased disturbance of habitat and human-caused mortality (e.g., stray and feral dogs from housing developments kill desert tortoises beyond the foot print of the housing, common ravens attracted to a poorly managed landfill consume desert tortoises for miles around the site); at times, these indirect effects cause more serious and long-term degradation of habitat value than the initial action.

Additional effects of human activities on critical habitat. The final rule for designation of critical habitat for the desert tortoise did not include a specific primary constituent element that discussed invasive non-native plant species. However, we have recognized that, in recent years, the desert is being continually invaded by such species.

Disturbance of substrates that can result from implementation of many of the elements of the California Desert Conservation Area Plan can accelerate the spread of invasive non-native plant species by destruction of substrate crusts and cryptogams; these non-native species, in turn, can compete with the native plant species (Lovich and Bainbridge 1999) that the desert tortoise requires for nutrients and shelter. Non-native plants can also increase the ability of the desert to carry wild fires (Lovich and Bainbridge 1999). The plant species upon which desert tortoises depend are not adapted to fire; consequently, fires could severely alter the plant community structure by removing species upon which the desert tortoise is dependent and facilitating the spread of fire-tolerant taxa.

In summary, desert tortoise habitat (including both its critical habitat and other areas not so designated) may be disturbed or removed by a wide variety of human activities that the Bureau can authorize under the program guidance of the California Desert Conservation Area Plan. The amount and quality of the habitat that may be disturbed or removed by any given activity depends on a variety of factors. The nature of the activity, its location, and the quality of the habitat in the action area are key factors that determine the extent and intensity of the effect on the primary constituent elements of critical habitat and habitat of the desert tortoise in general. Given the broad nature of this consultation, we are unable to estimate the amount of desert tortoises that may be disturbed or removed, other than that the Bureau has proposed to limit the amount of new surface disturbance to less than one percent of the area within each desert wildlife management area. However, we note that, because desert wildlife management areas and critical habitat were established in the best quality habitat for desert tortoises, activities occurring in these areas are generally more likely to disturb or remove habitat that supports desert tortoises than those occurring outside their boundaries. Note that, through the amendments to the California Desert Conservation Area Plan, the Bureau has changed the multiple-use class within desert wildlife management areas from Class M to Class L; as noted previously in this biological opinion, lands within Class L include areas that are managed to provide for lower density, carefully controlled multiple uses of resources while ensuring that sensitive values are not significantly diminished.

Effects of Multiple-Use Classes, Guidelines, and Elements on the Desert Tortoise and its Critical Habitat

In the following sections, we combined our evaluations of the guidelines for the relevant multiple-use classes and elements of the California Desert Conservation Area Plan. Where appropriate, we also evaluated the potential impacts of ongoing uses; note that this biological opinion does not analyze the potential effects of any future, specific actions requiring approval or authorization by the Bureau.

Multiple-Use Classes

The Bureau's program guidance is designed to protect biological resources and other values to the greatest degree on Class C lands. The discussion in the following paragraphs provides general information on how the intensity of use under the various land-use classes may affect the

desert tortoise and its habitat, including critical habitat. We will provide more detailed information on the effects of human activities on the desert tortoise and its habitat, including its critical habitat, by element and land-use class type in subsequent sections of this biological opinion.

Most Class C lands do not support substantial numbers of desert tortoises because these areas are usually steep, rocky, and high in elevation. However, substantial portions of the Chemehuevi and Shadow Valley Desert Wildlife Management Areas lie within Class C lands and support desert tortoise habitat. Therefore, in regions where desert tortoise habitat overlaps Class C lands, the benefit of this type of management to the desert tortoise is substantial.

In contrast, biological resources are the least protected within Class I lands. Generally, desert tortoises are not abundant within Class I lands, because habitat on these lands has been subjected to extensive disturbance by human activity. Although current human activity may be extensive within Class I areas, the long history of disturbance in these areas has, in general, decreased their value biologically; consequently, the program guidance with regard to these areas may not substantially affect the desert tortoise. To the best of our knowledge, Class I lands do not overlap critical habitat; a possible exception may occur where the method we used to map critical habitat caused its boundaries to overlap slightly into Class I lands, such as along the boundary between the Johnson Valley Off-highway Vehicle Management Area and the Ord-Rodman Critical Habitat Unit. Although the habitat may be substantially degraded, the overall status of the desert tortoise and the potential for Class I areas to be restored should be evaluated as part of any long-term planning process.

Class L and M lands likely contain most of the desert tortoise habitat within the California Desert Conservation Area; they certainly include most of the species' critical habitat. The guidance for Class L lands is more protective of biological resources, including listed species and critical habitat, than the guidance for Class M lands, although the Bureau can authorize actions on Class L lands that adversely affect the desert tortoise and its habitat. The Bureau's proposals in the Northern and Eastern Mojave Desert Management Plan and Northern and Eastern Colorado Desert Coordinated Management Plan to change the multiple-use class of all Class M lands within desert wildlife management area to Class L would improve management direction relative to the protection of the desert tortoise and the primary constituent elements of its critical habitat, to some degree.

Cultural and Paleontological Resources, and Native American Values

We have combined these elements because the Bureau's program guidance is generally similar for cultural and paleontological resources and Native American values. It calls for the preservation and protection of archaeological and paleontological values and sites of value to Native Americans that occur in both Class L and M lands. Activities that the Bureau may

authorize that are associated with these resources and values include the stabilization or protection of a site or research that may result in ground disturbance, use of vehicles on existing routes of travel, and walking through habitat of the desert tortoise.

Effects on the Desert Tortoise

Desert tortoises may be struck by vehicles on existing routes or trampled by workers walking through suitable habitat. Stabilization of a site or research that involves ground disturbance has the potential to kill desert tortoises, both on the surface of the ground and in their occupied burrows. However, the extent of the work that would likely be conducted under the program guidance for cultural and paleontological resources or Native American values is expected to be minor because the sites are generally small and cumulatively do not cover a large area in relation to the size of the California Desert Conservation Area. For this reason, we have concluded that the activities that may occur under this program guidance are unlikely to kill or injure many desert tortoises.

The small magnitude of the effects of work at specific cultural, paleontological, or Native American sites is not likely to reduce appreciably the reproduction, numbers, or distribution of desert tortoises in a local area. Consequently, implementation of the guidelines for these elements is not likely to affect desert tortoises in the action area in a substantially adverse manner.

Effects on Critical Habitat

Stabilization of a site or research that involves ground disturbance could result in the destruction of burrows and loss of vegetation, which would adversely affect some of the primary constituent elements of critical habitat. However, the extent of the work that would likely be conducted under the program guidance for cultural and paleontological resources or Native American values is expected to be minor because the sites are generally small and cumulatively do not cover a large area in relation to the size of the California Desert Conservation Area. These activities are likely to disturb extremely small areas of habitat, including critical habitat. For this reason, implementation of the guidelines for these elements is not likely to affect the function and conservation role of affected critical habitat units in the action area in a substantially adverse manner.

Energy Production and Utility Corridors

This element of the California Desert Conservation Area Plan provides guidance for four land use activities. To facilitate our analysis, we have segmented this element into four components: the identification of potential sites for energy-generating facilities, a network of transmission facilities located in designated utility corridors, distribution lines that lead from the utility corridors, and constraints and siting procedures for telecommunications facilities.

Electrical Generation Facilities

The guidelines and elements of the California Desert Conservation Area Plan allow the establishment of nuclear, fossil fuel, wind, solar, and geothermal facilities on Class M and I lands and of wind, solar, and geothermal facilities on Class L lands.

Effects on the Desert Tortoise

The construction of a power plant is likely to involve the use of large amounts of equipment and vehicles; desert tortoises would be at risk of being killed or injured at the work site and along any rights-of-way. The number of desert tortoises that would be at risk would depend greatly on the nature of construction activities and the location of the site.

The California Desert Conservation Area Plan notes that a typical power plant occupies 2,500 to 3,000 acres (Bureau 1999). Construction of power plants, such as the existing facilities at Kramer Junction, Harper Dry Lake, and the former George Air Force Base, involves use of heavy equipment that could kill or injure numerous desert tortoises. The operation and maintenance of solar, nuclear, and fossil fuel power plants would be unlikely to kill or injure many desert tortoises because the facilities are generally contained within a fence. Because desert tortoises would likely remain within the boundaries of a wind farm or geothermal plant, the use of vehicles within the area operate and maintain the extensive system of turbines, pipelines, wells, other facilities, and roads could cause ongoing mortality of desert tortoises for the life of the plants. If the facility were not fenced, desert tortoises would likely continue to enter the area for the life of the project; the lack of a fence may further increase the level of mortality.

The degree to which a specific power plant would kill or injure desert tortoises depends greatly on the type of facility and its location in relation to aggregations of desert tortoises. For example, power plants located in previously disturbed areas, near major roads, and at sites that are marginally appropriate for desert tortoises may not cause substantial loss of animals. Conversely, a power plant that is constructed in optimal habitat could decrease the viability of the overall population because of loss of individual desert tortoises during construction, operation, and maintenance of the facility.

Pursuant to the Bureau's program guidance, power plants cannot be built in wilderness areas; where Class C lands support desert tortoises, such as in the Chemehuevi and Shadow Mountain Desert Wildlife Management Areas, this program guidance is beneficial to the species. The effect of the development of power plants within most Class I lands would be minimal because the number of desert tortoises in these areas has declined because of past and existing management. A possible exception is the northern portion of the Johnson Valley Off-highway Vehicle Management Area. This area has not been heavily used for recreation and may support good densities of desert tortoises.

Since the listing of the desert tortoise in 1989, no energy-generating facilities have been built on public lands in the California Desert Conservation Area. Additionally, all public lands within desert wildlife management areas in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas have been designated as Class L; this land-use class reduces the potential facilities that could be constructed to geothermal, wind, and solar power plants, thereby potentially placing desert tortoises at less risk than those on Class M lands. Conversely, the geothermal, wind, and solar power plants that can be authorized on Class L lands tend to occupy a larger surface area than the types of power plants that can occur on Class M and I lands.

In recent years, the Bureau has been contacted by energy companies interested in exploring the potential suitability for wind and geothermal energy development in the California desert (e.g., along Daggett Ridge near Barstow, north of the Naval Air Weapons Station at China Lake, near the Little Picacho Wilderness Area in southern Imperial County, and on the Chuckwalla Bench in northern Imperial County; see Bransfield, notes to Service file, 2004). Daggett Ridge is located within a desert wildlife management area proposed in the West Mojave Plan; the Chuckwalla Bench is located within the Chuckwalla Desert Wildlife Management Area, as defined in the Northern and Eastern Colorado Desert Coordinated Management Plan.

If construction and operation of an electrical generating facility were to occur within a desert wildlife management area in regions where desert tortoises are fairly abundant, numerous individuals could be killed or injured; the mortalities and injuries would likely be ongoing if desert tortoises continue to encounter vehicles for the life of the project. Such adverse effects could be potentially substantial, particularly if several facilities were to be constructed, given the intended role of desert wildlife management areas in the survival and recovery of the desert tortoise. We cannot, at this time, estimate the number of desert tortoises that may be killed or injured during construction and operation of any future electrical generating facility; we would be able to provide a more accurate estimate based on our review, pursuant to section 7(a)(2), of specific projects. The uneven distribution of desert tortoises across the landscape and the pattern of declines in local aggregations increase the importance of project- and site-specific consultations. We note that the California Desert Conservation Area Plan provides only general guidance concerning the siting of electrical generating facilities and does not authorize their construction. As with all future discretionary activities that the Bureau may propose to undertake, fund, or authorize, any proposed electrical generating facility would undergo a separate analysis pursuant to the National Environmental Policy Act and section 7(a)(2) of the Act, which would allow the Bureau and Service to consider its potential impacts on the desert tortoise and how to best avoid, reduce, or offset those effects.

Effects on Critical Habitat

The California Desert Conservation Area Plan notes that a typical power plant occupies 2,500 to 3,000 acres (Bureau 1999). Therefore, the construction of a power plant has the potential to

disturb or remove the primary constituent elements from large areas of critical habitat within the footprint of the project; the construction of access roads and transmission lines associated with the power plant would also involve disturbance or removal of primary constituent elements.

The operation and maintenance of solar, nuclear, and fossil fuel power plants would be unlikely to disturb or remove habitat because the facilities are generally contained within a fence. Because the boundaries of a wind farm or geothermal plant generally include undisturbed habitat, the operation and maintenance of the extensive system of turbines, pipelines, wells, other facilities, and roads could cause ongoing disturbance or removal of habitat for the life of the plants. Although large areas within the borders of a wind farm or geothermal plant may not be physically disturbed by construction and maintenance, the overall frequency of human-caused disturbance and the large network of roads would likely cause non-native invasive plants to spread throughout the facility to a greater extent than would likely occur in the absence of this type of facility.

The degree to which a specific power plant would disturb or remove the primary constituent elements of critical habitat of the desert tortoise depends greatly on the type of facility and its location in relation to suitable habitat for desert tortoises. For example, power plants located in previously disturbed areas, near major roads, and at sites that lack all or most of the primary constituent elements may not cause substantial disturbance or removal of critical habitat. Conversely, a power plant that is constructed in an area that supports all of the primary constituent elements could cause the disturbance or removal of a substantial amount of critical habitat during construction and possibly also during operation, and maintenance of the facility.

Pursuant to the Bureau's program guidance, power plants cannot be built in wilderness areas; where Class C lands overlie critical habitat, such as in the Chemehuevi and Shadow Mountain Desert Wildlife Management Areas, this program guidance would preclude the disturbance or removal of critical habitat in these areas. The effect of the development of power plants within most Class I lands would be minimal because desert tortoise habitat in these areas is already degraded due to past and existing activities. A possible exception is the northern portion of the Johnson Valley Off-highway Vehicle Management Area. This area has not been heavily used for recreation and seems to support good quality critical habitat for the desert tortoise. As we noted previously in this biological opinion, with some minor exceptions that are artifacts of critical habitat mapping, little overlap exists between critical habitat and Class I lands; an example of this overlap occurs in the Johnson Valley Off-highway Vehicle Management Area, where approximately 5,000 acres of critical habitat overlie the recreation area. Consequently, any substantial effects of energy-generating facilities to critical habitat of the desert tortoise would be limited to lands within Classes L and M.

Since the listing of the desert tortoise in 1989, no energy-generating facilities have been built on public lands in the California Desert Conservation Area. Additionally, all public lands within desert wildlife management areas in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas have been designated as Class L; this land-use class reduces the potential facilities that could be constructed to geothermal, wind, and solar power

plants, thereby potentially placing critical habitat at less risk than that on Class M lands. Conversely, the geothermal, wind, and solar power plants that can be authorized on Class L lands tend to occupy a larger surface area than the types of power plants that can occur on Class M and I lands.

In recent years, the Bureau has been contacted by energy companies interested in exploring the potential suitability for wind and geothermal energy development in the California desert (e.g., along Daggett Ridge near Barstow, north of the Naval Air Weapons Station at China Lake, near the Little Picacho Wilderness Area in southern Imperial County, and on the Chuckwalla Bench in northern Imperial County; see Bransfield, notes to Service file, 2004). Daggett Ridge is located within a desert wildlife management area proposed in the West Mojave Plan; the Chuckwalla Bench is located within the Chuckwalla Desert Wildlife Management Area, as defined in the Northern and Eastern Colorado Desert Coordinated Management Plan.

The construction of an energy-generating facility could cause the complete removal of the primary constituent elements of critical habitat from the area of the facility and from any access roads. The primary constituent elements may recover, to some degree, in adjacent areas that are disturbed temporarily during construction. If non-native plant species invade the area as a result of ground disturbance and repeated access by vehicles, the disturbed areas are less likely to recover their full biological value for the desert tortoise; additionally, the value of adjacent undisturbed areas may decrease.

In summary, the construction and operation of an energy-generating facility could result in substantial, localized adverse impacts on the primary constituent elements, if they are present, that make this habitat important for the conservation of the desert tortoise. The effects of these impacts would be exacerbated if several facilities were to be constructed within the same critical habitat unit. In some circumstances, particularly with geothermal and wind-energy plants, these impacts would likely be long-term and ongoing. The mechanisms by which these impacts would occur are described in the Effects of Human Activities on Critical Habitat section of this biological opinion. The degree to which the function and conservation role of an affected critical habitat unit would be impaired would need to be based on a site- and project-specific review, which is beyond the scope of the action analyzed in this biological opinion. We note that the California Desert Conservation Area Plan provides only general guidance concerning the siting of electrical generating facilities and does not authorize their construction. As with all future discretionary activities that the Bureau may propose to undertake, fund, or authorize, any proposed electrical generating facility would undergo a separate analysis pursuant to the National Environmental Policy Act and section 7(a)(2) of the Act, which would allow the Bureau and Service to consider its potential impacts on critical habitat of the desert tortoise and how to best avoid, reduce, or offset those effects.

Transmission Facilities

The California Desert Conservation Area Plan identifies 16 utility corridors for transmission facilities. These facilities may include new electrical transmission lines of or greater than 161 kilovolts, all pipelines with diameters greater than 12 inches, fiber optic and other cables for interstate communications, and major aqueducts or canals for interbasin transfers of water. The corridors vary in width from 2 to 5 miles.

Effects on the Desert Tortoise

The restriction of transmission facilities to designated corridors is beneficial to the desert tortoise because it concentrates the effects of certain classes of human activities to specific areas. Although desert tortoises that reside near transmission lines may be subjected to more human activity than those on surrounding lands, their restriction to specific corridors ensures that the vast majority of desert tortoises in the California Desert Conservation Area are not affected.

The construction of transmission facilities can result in substantial loss of desert tortoises. The number of desert tortoises killed or injured during construction depends, to a large degree, on the type of facility. For example, few desert tortoises are likely to be killed or injured by the installation of fiber optic cables because the work typically occurs in a very small area, relatively few workers and fewer and smaller pieces of equipment are involved, and the cable is installed in a short period of time. On the other hand, the installation of large pipelines requires extensive work areas, hundreds of workers, numerous pieces of heavy equipment, and long periods of time spent in occupied habitat. As we mentioned in the previous section on energy-generating facilities, other factors, such as the time of the year and the density of desert tortoises in work areas, also affect the number of animals that may be killed or injured.

The maintenance of existing facilities, including access roads, can kill or injure desert tortoises. Maintenance of underground facilities, particularly large pipelines, has the greatest potential to kill or injure desert tortoises because heavy equipment is used to excavate the pipeline; desert tortoises, both within burrows and on the surface of the ground, are susceptible to being crushed by the heavy equipment used to maintain pipelines. Note that, although local activities associated with maintenance of transmission lines may be intense, relatively small portions of the line undergo such work at any given time.

Electrical transmission lines also provide numerous sites for common ravens to nest and roost. Lines that cross areas where natural or artificial nest and roost sites are rare or absent can substantially alter the distribution of common ravens in a region (Knight et al. 1999, Lovich and Bainbridge 1999) and subject desert tortoises to greater predation pressure than they would experience without the artificial substrates provided by the transmission line.

An important factor to consider in an analysis of the effects of transmission lines is that the effects are linear and spread, at times, over hundreds of miles. Generally, a linear disturbance is likely less damaging to the species as a whole; the losses of individuals are not concentrated in

one area and local recovery of populations may proceed more quickly because of the edge effect of large aggregations of desert tortoises that were not disturbed.

In general, the construction and maintenance of transmission facilities have the potential to cause the deaths of numerous desert tortoises. However, the Bureau's guidance that these facilities should be restricted to defined corridors is beneficial in that impacts can be localized. We also note that the number of desert tortoises killed during construction of the Mojave and first Kern pipelines indicates the great potential the construction of pipelines has to degrade the status of a population. We also note that the combined efforts of the Service, Bureau, and Federal Energy Regulatory Commission did little to reduce the source of mortality, which was occurring largely through disregard of the project's protective stipulations. Finally, we note that, when an additional pipeline of similar size was constructed adjacent to the original Kern Pipeline in recent years, no desert tortoises were killed or injured. The elimination of the injury and mortality of desert tortoises may have resulted from a combination of factors, such as the timing of the construction and changes in density of animals near the right-of-way. However, the protective measures may have been implemented more successfully on this occasion, with a concomitant decrease in the level of mortality and injury.

The construction of a transmission facility has the potential to kill or injure numerous desert tortoises along its right-of-way; maintenance of transmission facilities likely has far less potential for killing or injuring desert tortoises because the level of activity is minor compared to that of construction. However, the loss of individuals from construction of a transmission facility would likely be distributed along hundreds of miles of right-of-way. In this case, the loss of these individuals would not appreciably affect the reproduction, numbers, and distribution of desert tortoises within a desert wildlife management area. The restriction of transmission facilities to specific corridors ensures that they will not affect the vast majority of desert tortoises in the California Desert Conservation Area. Given the large size of desert wildlife management areas within the action area and the relatively small area affected by transmission facilities, the level of adverse effect to the desert tortoise is not expected to be substantial at the population scale. The number of desert tortoises that would be killed or injured by construction or operation of any transmission facility can only be estimated based on a site-specific project review which is beyond the scope of the proposed action; such reviews will be the subject of future consultations under section 7(a)(2) of the Act, as appropriate.

Effects on Critical Habitat

The restriction of transmission facilities to designated corridors reduces their impacts on critical habitat because it concentrates the effects of certain classes of human activities to specific areas. Although these areas may be more highly disturbed than surrounding lands, the utility corridors designated by the Bureau would not seem to contribute to long-term fragmentation of habitat, provided that access roads are maintained properly, because human presence is intermittent and most disturbance of the primary constituent elements is temporary.

The construction of transmission facilities can result in substantial disturbance of the primary constituent elements of critical habitat. The extent of the disturbance depends, to a large degree,

on the type of facility. For example, the installation of fiber optic cables causes relatively little disturbance of primary constituent elements because the work typically occurs in a very small area and the equipment is generally relatively small in size. Conversely, the installation of large pipelines requires extensive work areas and numerous pieces of heavy equipment; thousands of acres of primary constituent elements can be disturbed on a long-term basis.

The maintenance of existing facilities, including access roads, can disturb at least some of the primary constituent elements of critical habitat. In some cases, such as frequently used access roads, the areas that are disturbed by maintenance still show the effects of the initial construction or previous maintenance and operations. On occasion, however, maintenance can occur so infrequently that the substrates and vegetation within the right-of-way have recovered to nearly pre-project conditions; large pipelines often exhibit a large degree of recovery of the primary constituent elements. The effects of maintenance on primary constituent elements are more severe under circumstances where recovery has occurred. Maintenance of underground facilities, particularly large pipelines, has the greatest potential to disturb habitat because heavy equipment is used for excavation. Note that, although local activities associated with maintenance of utility lines may be intense, relatively small portions of the line undergo such work at any given time.

An important factor to consider in an analysis of the effects of transmission lines is that the effects are linear and spread, at times, over hundreds of miles. Generally, a linear disturbance is likely less damaging to the species as a whole; the losses of habitat are not concentrated in one area and local recovery of habitat may proceed more quickly because of the edge effect of undisturbed habitat. Conversely, an adverse aspect of linear projects is that they may speed the spread of non-native plant species or introduce them to an area during construction or maintenance. The recent and rapid spread of the non-native Sahara mustard (*Brassica tournefortii*) may have been aided by vehicle travel along both roads and transmission line corridors and the ongoing maintenance along these routes that promotes constant disturbance of soils.

In summary, the construction of transmission lines would lead, at least initially, to the complete removal of the primary constituent elements of critical habitat from the area of the lines and from the access roads. Over time, the primary constituent elements are likely to recover, to some degree, in areas that are disturbed temporarily during construction; we have observed substantial recovery of the primary constituent elements of critical habitat over some of the older pipelines in the California desert. If non-native plant species invade the area as a result of ground disturbance and repeated access by vehicles, the disturbed areas are less likely to recover their full biological value for the desert tortoise; additionally, the value of adjacent undisturbed areas may decrease. In general, the guidelines contained in the California Desert Conservation Area Plan for this element restrict the construction of transmission lines to specific corridors, which ensures that the vast majority of critical habitat in the action area is not affected. The degree to which the function and conservation role of specific critical habitat units would be impaired by the construction of new transmission lines, and the importance of that effect, would need to be based on a site- and project-specific review, which is beyond the scope of the proposed action.

Given the large size of critical habitat units within the action area and the relatively small area that could be affected by new transmission lines, the level of impairment is not expected to be substantial.

Distribution Facilities

The Bureau's guidance allows for the development of new distribution facilities in Class L, M, and I lands. Existing facilities within all multiple-use classes can be maintained and upgraded or improved in accordance with existing right-of-way grants. Distribution facilities may be allowed outside of existing rights-of-way, when these are not reasonably available.

Effects on the Desert Tortoise

These activities could result in the loss of desert tortoises. In general, the effects would be similar to those described for transmission lines; however, because distribution facilities tend to be smaller than those used for transmission, the effect of any single project is likely to be less than that of a transmission line. Facilities outside of existing rights-of-way would likely be particularly detrimental; in such cases, the new roads used to provide access to the facilities during construction and maintenance could allow additional potential for unauthorized use of areas inhabited by the desert tortoise. Desert tortoises could be killed or injured in subsequent encounters with people using these areas in an unauthorized manner; desert tortoises may also be trapped within the beds of access roads that are not properly maintained.

The supporting poles for overhead distribution lines may provide additional nesting areas for common ravens if they are not properly designed. The effects on the desert tortoise of providing additional nesting sites for common ravens were described previously in this biological opinion.

Because of their smaller size and the more restricted length of distribution facilities, the construction and operation of any specific distribution facility are unlikely to kill or injure numerous desert tortoises along its right-of-way because the level of activity is minor compared to that of a transmission facility.

Because of the smaller size and more restricted length of distribution facilities, the vast majority of desert tortoises in the California Desert Conservation Area are not likely to be affected by this type of activity. Given the large size of desert wildlife management areas within the action area and the relatively small area likely to be affected by distribution facilities, the level of adverse effect to the desert tortoise is not expected to be substantial at the population scale. The number of desert tortoises that would be killed or injured by construction or operation of any distribution facility can only be estimated based on a site-specific project review which is beyond the scope of the proposed action; such reviews will be the subject of future consultations under section 7(a)(2) of the Act, as appropriate.

Effects on Critical Habitat

These activities could result in the disturbance and loss of the primary constituent elements of critical habitat of the desert tortoise. In general, the effects would be similar to those described for transmission lines; however, because distribution facilities tend to be smaller than those used for transmission, the effect of any single project is likely to be less than that of a transmission line. As noted in the previous paragraph, facilities outside of existing rights-of-way would likely be particularly detrimental; in such cases, the roads used to provide access to the facilities during construction and maintenance could fragment habitat to a limited degree if they are not properly maintained.

The construction of distribution lines would lead to the complete removal of the primary constituent elements of critical habitat from the area of the lines and from the access roads. Primary constituent elements may recover, to some degree, in adjacent areas that are disturbed temporarily during construction. If non-native plant species invade the area as a result of ground disturbance and repeated access by vehicles, the disturbed areas are less likely to recover their full biological value for the desert tortoise; additionally, the value of adjacent undisturbed areas may decrease.

The guidelines under the California Desert Conservation Area Plan for this element restrict the construction of distribution facilities to relatively small areas, which ensures that the vast majority of critical habitat in the action area is not affected. The degree to which the function and conservation role of specific critical habitat units would be impaired by the construction of new distribution facilities, and the importance of that effect, would need to be based on a site- and project-specific review, which is beyond the scope of the proposed action; such reviews will be the subject of future consultations under section 7(a)(2) of the Act, as appropriate. However, given the large size of critical habitat units within the action area and the relatively small area that is likely to be affected by new distribution facilities, the level of impairment is not expected to be substantial.

Communication Sites

The guidelines allow the development of new sites within Class L, M, and I lands. The guidelines also allow for the maintenance and use, in accordance with right-of-way grants and applicable regulations, of existing facilities within all multiple-use classes. The Bureau's program guidance does not, at this time, contain any specific direction with regard to the management of communication sites.

Effects on the Desert Tortoise

In general, communication sites are small enough that the construction of a new facility could possibly occur without the loss of desert tortoises. Because communication companies seek to locate sites at higher elevations, some sites are located outside of areas occupied by the desert tortoise, although access to these sites may be through occupied habitat. The construction and

maintenance of access roads to communication sites likely pose a greater potential for desert tortoises to be killed or injured than that of the site itself. If a new access road to a communication site is needed, the most long-term and deleterious effects of the site may be the increased human intrusion into an area as a result of the road; travel along the new access route, by both workers associated with the communication site and casual users of the desert, could provide an additional source of mortality for desert tortoises in the local area. Communication sites may also provide additional nesting substrate for common ravens. The effects on the desert tortoise of providing additional nest sites to common ravens were discussed previously in this biological opinion.

The continuing proliferation of communication sites raises the potential that the activities allowed by this guideline could result in substantial loss of desert tortoises over time. The desire to locate most communication sites along major highways may ameliorate the effects of the increase in their number to some degree; the long-term effects of the heavily used roads may have already reduced the numbers of desert tortoises in areas that would be likely to support communication sites.

Because of their generally small size, the construction and operation of any specific communication site are unlikely to kill or injure numerous desert tortoises; as noted previously in this section, the construction and use of access roads to the site would likely result in higher levels of mortality than the communications site itself. The location of most communication sites along major highways, where the long-term effects of heavily used roads have likely already reduced the numbers of desert tortoises, may ameliorate the impact of numerous facilities. On that basis, we do not anticipate substantial adverse effects to desert tortoise populations from implementation of program guidance for this element. The number of desert tortoises that could be killed or injured by construction or operation of new communication sites can only be estimated based on a site-specific project review which is beyond the scope of the proposed action; such reviews will be the subject of future consultations under section 7(a)(2) of the Act, as appropriate.

Effects on Critical Habitat

The construction of access roads to communication sites, which can occasionally be several miles in length, likely removes more area containing the primary constituent elements of critical habitat of the desert tortoise than the site itself because these facilities are generally fairly small in size. As noted in the previous section, some sites are located outside of desert tortoise habitat, although the access roads to these sites may cross suitable habitat. As we also noted previously in this biological opinion, vehicles using access roads can accelerate the spread of non-native plants into local areas. The continuing proliferation of communication sites raises the potential that the activities allowed by this guideline could result in substantial degradation of desert tortoise habitat over time.

The construction of communication sites leads to the complete removal of the primary constituent elements of critical habitat from the area of the site itself and from the access roads.

Primary constituent elements may recover, to some degree, in adjacent areas that are disturbed temporarily during construction. If non-native plant species invade the area as a result of ground disturbance and repeated access by vehicles, the disturbed areas are less likely to recover their full biological value for the desert tortoise; additionally, the value of adjacent undisturbed areas may decrease. Because most communication sites will likely be located along major highways, the effects of the removal and degradation of primary constituent elements are expected to be very localized. Given the large size of the critical habitat units within the action area and the relatively small area that could be adversely affected by new communication sites, the level of impairment to the function of critical habitat is not expected to be extensive or substantial.

Fire Management

The Bureau's guidance states that measures to suppress fires will be taken in accordance with specific fire management plans subject to such conditions as the authorized officer deems necessary. Fire management plans provide a framework that describes the use of motorized vehicle, aircraft, and fire retardant chemicals that could be used to combat fires.

Effects on the Desert Tortoise

In prehistoric desert plant communities, the limited biomass and large distances between shrubs were factors that reduced the frequency of fire (Humphrey 1974, O'Leary and Minnich 1981, Minnich 1983, Brown and Minnich 1986 in Lovich and Bainbridge 1999). Non-native annual species have altered plant communities through the California desert. These non-native species, which often persist in a more woody form than many natives, have increased the ability of desert communities to carry wild fire. Consequently, at least some desert plant communities are now more capable of carrying fires than they were previously; fires occur more frequently and affect larger areas than they did historically. In the 10 years prior to 1992, approximately 175 fires occurred each year in the California Desert District (Lovich and Bainbridge 1999). The area affected by these fires annually ranged from 1,500 to 85,000 acres, with an average of approximately 27,000 acres per year. Although at least portions of the areas that burned did not support desert tortoises, fires have affected some areas that were occupied. Within the northern and eastern Colorado Desert planning area, approximately 920 acres of critical habitat have burned (Crowe and Foreman 1997).

The use of motorized vehicles to suppress fires within areas occupied by the desert tortoise may result in the crushing of animals. The potential effects of chemical fire retardants on the desert tortoise have not been studied. However, the desert tortoise is not ecologically adapted to fire. They are killed by fires if trapped above ground; if a fire occurred over a large area when desert tortoises were active, many individuals could be killed. Consequently, although some desert tortoises may be killed or injured by wildfire suppression activities, these activities are, on balance, beneficial because they are substantially less damaging than the wildfires.

In summary, the suppression of wildfires may result in the death or injury of a limited number of desert tortoises. However, the overall effect of this program guidance is likely positive because unsuppressed wildfires likely pose more risk to desert tortoises than the suppression activities.

The number of desert tortoises that may be killed or injured during a specific suppression event would be difficult to determine and would need to be based on a site- and fire-specific review.

Effects on Critical Habitat

The use of motorized vehicles within critical habitat of the desert tortoise would likely result in the disturbance of annual and perennial plants that were not directly affected by fire and disturbance of soils that may later facilitate the colonization of invasive, non-native species. The potential effects of chemical fire retardants on annual and perennial plants and substrates found in critical habitat of the desert tortoise have not been studied.

As discussed in the previous section, fire was not an important factor in pre-historic desert communities. Now, however, at least some desert plant communities are more capable of carrying fires than they were previously because of the invasion of non-native annual plants.

The habitat of the desert tortoise is not ecologically adapted to fire (Lovich and Bainbridge 1999); fires can eliminate the shrubs on which desert tortoises depend for shelter and alter the composition of plant communities by reducing the abundance of native annuals and perennials and increasing that of non-native annual grasses. These non-native grasslands do not contain the necessary diversity of plant species to support viable populations of desert tortoises.

Because desert tortoise habitat is not adapted to wild fires, the suppression of wildfires should be beneficial overall because it can slow or prevent the conversion of desert scrub communities into grasslands. Fire suppression likely results in some low level of deleterious effect to the habitat of the desert tortoise; most effects of suppression activities on the primary constituent elements of critical habitat are likely to be minor in scale and intensity, particularly in relation to the impacts of a wild fire. On that basis, we do not anticipate any substantial adverse effects to the primary constituent elements of critical habitat of the desert tortoise in conjunction with implementation of this element.

Vegetation Harvesting

The Bureau can allow, by permit on all lands except for Class C, the removal of native plants for commercial and non-commercial purposes and harvesting by mechanical means. On Class M and I lands, mechanical control of vegetation may be allowed after consideration of possible impacts. After site-specific planning, the Bureau's program direction allows the eradication of noxious weeds on Class L lands by chemical means and spot application of pesticides on Class M and I lands. The Bureau's program direction allows enclosures within Class L, M, and I lands and, after development of a site-specific management plan, prescribed burning within Class L, M, and I lands.

Effects on the Desert Tortoise

The removal of native plants for commercial and non-commercial purposes and harvesting by mechanical means could affect the desert tortoise through loss of individuals, particularly if the

harvesting method involves the use of machinery. The severity of these effects would vary directly in relation to the scale and method of harvesting. The collection of a few samples of plants by hand while walking cross-country would have far less impact than the mechanical harvest of a large area. To date, the only proposals, of which we are aware, to harvest plants within habitat of the desert tortoise have involved the limited removal of portions of Lane Mountain milk-vetch plants for research; these activities were reviewed by both the Service and Bureau under their respective authorities. At this time, the removal of vegetation does not appear to be a substantial threat to the desert tortoise. The mechanical control of vegetation on Class M and I lands could affect the desert tortoise in ways similar to those described with regard to the harvesting of plants by mechanical means.

The eradication of noxious weeds on Class L lands by chemical means and spot application of pesticides on Class M and I lands could expose desert tortoises to various chemicals. We do not have specific information regarding the direct effects of herbicides on desert tortoises. The Bureau's program guidance prohibits the use of pesticides in wilderness; this direction would avoid any potential adverse effects to desert tortoises residing in those areas.

The establishment of enclosures within Class L, M, and I lands presents the potential that desert tortoises may be trampled during installation and maintenance of enclosures. Enclosures can be useful in protecting sensitive resources and can assist in conducting research that may provide information important for the recovery of the desert tortoise. Overall, this program direction is likely more beneficial to the desert tortoise because the direct negative effects of the installation of enclosures are minor and the information to be gained can be vital to recovery efforts.

Prescribed burning within Class L, M, and I lands could have severe detrimental effects on the species; as we mentioned previously in this biological opinion, any desert tortoises that are above ground during a fire would probably be killed. At this time, the use of prescribed burning within desert tortoise habitat is not appropriate, because fire is hazardous to desert tortoises and the plant communities upon which they depend are not adapted to fire. For these reasons, the Bureau is not likely to conduct prescribed burns within the habitat of the desert tortoise; therefore, this program direction poses a low degree of threat.

The various methods of harvesting or managing vegetation have the potential to kill or injure desert tortoises. We note, however, that, to the best of our knowledge, the Bureau primarily conducts management activities for non-native invasive plant species in riparian areas; desert tortoises are extremely unlikely to occur in these areas and are therefore at little risk from the vegetation management that the Bureau typically conducts in the California Desert Conservation Area. On that basis, we do not anticipate any substantial adverse effects on the desert tortoise in conjunction with implementation of this element. The number of desert tortoises that may be killed or injured as a result of actions planned in accordance with the Bureau's guidelines with regard to vegetation harvesting would need to be based on a site- and project-specific review, which is beyond the scope of the proposed action.

Effects on Critical Habitat

The removal of native plants for commercial and non-commercial purposes and harvesting by mechanical means could disturb the plant communities upon which the desert tortoise depends, particularly if the harvesting method involves the use of machinery. Such removal could also lead to fragmentation of habitat, if the harvesting is extensive and results in some conversion of habitat; it could also facilitate the expansion of non-native species. If harvesting equipment is used in numerous locations, the potential for spreading non-native species could be substantial.

The prohibition of mechanical and commercial harvesting within Class C lands is beneficial to desert tortoise critical habitat where these lands overlap appropriate habitat for the species. The mechanical control of vegetation on Class M and I lands could affect habitat of the desert tortoise in ways similar to those described previously in this biological opinion with regard to the harvesting of plants by mechanical means.

The severity of these effects would vary directly in relation to the scale and method of harvesting. The collection of a few samples of plants by hand while walking cross-country would have far less impact on habitat features than the mechanical harvest of a large area. To date, the only proposals, of which we are aware, to harvest plants within habitat of the desert tortoise have involved the limited removal of portions of Lane Mountain milk-vetch plants for research; these activities were reviewed by both the Service and Bureau under their respective authorities. At this time, the removal of vegetation does not appear to be a substantial threat to critical habitat of the desert tortoise. The mechanical control of vegetation on Class M and I lands could affect critical habitat of the desert tortoise in ways similar to those described with regard to the harvesting of plants by mechanical means.

The eradication of noxious weeds on Class L lands by chemical means and spot application of pesticides on Class M and I lands could result in mortality of some native plants that desert tortoises use for forage and cover. Conversely, the control of weeds within habitat of the desert tortoise can provide important benefits by preventing these species from degrading the primary constituent elements of critical habitat. Given the potential benefits, the overall program direction with regard to the use of pesticides on Class L, M, and I lands is positive. The Bureau's program guidance prohibits the use of pesticides in wilderness; this direction eliminates a potentially useful tool for restoration efforts.

Some disturbance of annual and perennial vegetation and of surface substrates may occur during installation and maintenance of enclosures within Class L, M, and I lands. Enclosures can be useful in protecting sensitive resources and can assist in conducting research that may provide

information important for the recovery and management of lands that support the desert tortoise. Overall, such effects of disturbance are likely to be very minor in scale and, on that basis, are not likely to degrade the function of the critical habitat units in the action area.

Prescribed burning within Class L, M, and I lands could have severe detrimental effects on the habitat of the desert tortoise. As we mentioned previously in this biological opinion, fire is not a necessary ecological factor within the habitats in which the desert tortoise occurs. At this time, the use of prescribed burning within desert tortoise habitat is not appropriate, because fire is hazardous to the plant communities upon which desert tortoises depend. For these reasons, the Bureau is not likely to conduct prescribed burns within the habitat of the desert tortoise; therefore, this program direction poses a low degree of threat.

The various methods of harvesting or managing vegetation have the potential to remove or degrade the primary constituent elements of critical habitat of the desert tortoise. We note, however, that, to the best of our knowledge, the Bureau primarily conducts management activities for non-native invasive plant species in riparian areas. Riparian habitat is not an important habitat type for desert tortoises; therefore, critical habitat of the desert tortoise is at little risk from the vegetation management that the Bureau typically conducts in the California Desert Conservation Area. On that basis, we do not anticipate any substantial adverse effects to the primary constituent elements of critical habitat of the desert tortoise in conjunction with implementation of this element.

Land-tenure Adjustment

The goal of this element is to direct the acquisition and disposal of public lands to maximize the efficiency and consistency of their management.

Effects on the Desert Tortoise

The disposal of Class M lands, in and of itself, does not directly affect desert tortoises. Desert tortoises on lands that are no longer being managed by a Federal or other resource agency would likely receive less protection because of the absence of the Bureau's law enforcement personnel.

On non-federal lands, the level of protection that these individuals are afforded by the Endangered Species Act would decrease because of the different requirements of sections 7(a)(2) and 9 of the Endangered Species Act. Absent federal ownership, the requirement to consult, pursuant to section 7(a)(2) of the Act, would cover a more narrow range of activities; that is, a federal agency no longer has ultimate control over the use of the land. Ultimately, the Bureau often exchanges lands with entities that are interested in achieving economic return from the parcels they acquire. The prohibitions contained in section 9 of the Endangered Species Act would lead many potential developers to apply for an incidental take permit from the Service under the authorities of section 10(a)(1)(B); the provisions of section 10(a)(1)(B) would likely lead to at least some conservation benefit for the species as a whole as a result of subsequent development.

We are aware that desert tortoises continue to occur in low numbers on isolated parcels of

Bureau land that are adjacent to some developed areas; we also recognize the difficulty in managing these parcels, their overall low biological value in terms of the long-term conservation of wildlife, and the high value these parcels can sometimes have during exchanges. In short, the Bureau can exchange these lands of low biological value near existing development for more remote lands of greater ecological importance and, in so doing, consolidate the land ownership pattern and improve its management capability. Additionally, because the exchanges are conducted for the fair market value, the Bureau often receives a net increase in its land base. Consequently, the use of selected parcels of Class M lands to consolidate the public land base upon which the desert tortoise must be recovered is beneficial to the desert tortoise.

The disposal of Class M lands likely decreases the level of protection of any desert tortoises that may reside within these areas. Because the Bureau has designated all lands with the desert wildlife management areas as Class L, those lands that are most important for the recovery of the desert tortoise will not be disposed; that management direction benefits the recovery of the species. Additionally, areas that support few or no desert tortoises can provide the Bureau with an exchange base with which to acquire lands that are important for recovery; this component of the land-tenure program provides an important benefit because it assists in the securing of reserve areas as recommended by the recovery plan for the desert tortoise. Because the Bureau generally disposes of parcels that are isolated from large blocks of managed habitat and occasionally adjacent to developing areas, few desert tortoises are likely to be adversely affected by the land-tenure adjustment program. On that basis, implementation of this element is likely to benefit the survival and recovery of the desert tortoise.

Effects on Critical Habitat

The disposal of Class M lands, in and of itself, does not directly affect desert tortoise habitat. Non-federal land that does not support desert tortoises and is outside the boundaries of critical habitat would receive little or no protection for the purpose of conserving desert tortoises. The consultation requirement of section 7(a)(2) would continue to apply to unoccupied critical habitat if a Federal permit or grant was involved with the subsequent development. Given the guidelines under which the Bureau disposes of lands (i.e., Class M lands are available for disposal) and the inclusion of most critical habitat within desert wildlife management areas, where it is managed as Class L, little potential exists for the disposal of critical habitat of the desert tortoise.

The disposal of Class M lands likely decreases the level of protection of any habitat that may exist within these areas. Because the Bureau has designated all lands with the desert wildlife management areas as Class L, those lands that are most important for the recovery of the desert tortoise will not be disposed; that management direction benefits the recovery of the species. Additionally, lands that are available for disposal can provide the Bureau with a resource base with which to acquire lands that are important for recovery; this component of the land-tenure program provides an important benefit because it assists in the securing of reserve areas as

recommended by the recovery plan for the desert tortoise. On that that basis, implementation of this element is likely to benefit the function and conservation role of the critical habitat units in the action area.

Livestock Grazing

The goals of this element are to use range management to maintain or improve vegetation to meet the needs of livestock and other objectives in the California Desert Conservation Area Plan, continue to use the California Desert Conservation Area for production of livestock to contribute to satisfying the need for food and fiber from public land, and maintain good and excellent range condition and improve poor and fair range condition by one condition class through the development and implementation of feasible grazing systems or allotment management plans.

Effects on the Desert Tortoise

Livestock grazing affects desert tortoises in several ways. Desert tortoises can be killed or injured during the construction, maintenance, and use of range improvements. Cattle have trampled desert tortoises. They also damage or destroy the burrows of desert tortoises. Predators, such as common ravens, can be attracted to and subsidized by livestock waters, carcasses of livestock, and some range improvements; predators attracted to or subsidized by these features could feed on desert tortoises.

The construction, maintenance, and use of range improvements would affect desert tortoises in a manner generally similar to other smaller projects. Vehicles and workers could trample desert tortoises during any phase of these operations. In comparison with a large-scale development such as a solar power plant, the construction, maintenance, and use of range improvements likely result in the injury and mortality of few desert tortoises.

Desert tortoises have been trampled by livestock; trampling can kill or injure desert tortoises either above ground or while they are in their burrows. Although documented instances exist of cattle crushing adult desert tortoises in their burrows, neonate and juvenile desert tortoises are likely at some greater risk of trampling because they use rodent burrows for shelter. Rodent burrows are often shallowly excavated and run parallel to the surface of the ground; therefore, they are more vulnerable to trampling by livestock than burrows of sub-adult and adult desert tortoises. The propensity for rodents to place their burrows near and under shrubs may offer some degree of protection.

No data exist on the frequency at which cattle trample desert tortoises. Cattle likely pose a low degree of risk to adult desert tortoises and possibly sub-adults above ground, simply because cattle would likely try to avoid stepping on what essentially would appear to them to be a rock (Boarman 2002). Cattle would be more likely to trample desert tortoises when they are being herded; while traveling in groups and at a faster rate, cattle are less likely to be aware of their surroundings. Finally, an important concept to consider is that numerous cattle, distributed over large areas of desert tortoise habitat, present a greater likelihood of killing or injuring more

desert tortoises than fewer cattle grazing over a smaller area; simply stated, fewer hooves in proximity to fewer desert tortoises are less likely to cause trampling.

Avery and Neibergs (1997) found that more burrows of desert tortoises were partially or completely destroyed in areas that were grazed by cattle than in a fenced area. Within the enclosure, desert tortoises remained in their burrows all night significantly more than animals located outside the enclosure, which would be expected because more burrows were damaged outside of the enclosure. The increased time spent outside of their burrows likely exposes desert tortoises to greater risk of predation and to environmental extremes.

Common ravens can be attracted to livestock waters, carcasses of livestock, and some range improvements. Carcasses and range improvements also provide subsidies to common ravens; common ravens are likely better able to survive and have greater reproductive success because of ranching activities. Increasing the number of potential predators poses a greater level of risk of predation to desert tortoises; additionally, common ravens attracted to carcasses and range improvements may also feed on desert tortoises. In a similar vein to that discussed in the previous paragraph, more range improvements over a greater area likely provide greater level of subsidy than a limited number of cattle facilities; large subsidies likely lead to greater numbers of common ravens, which, in turn, would be able to consume more desert tortoises.

We do not have information that conclusively links livestock grazing to recent declines in the numbers of desert tortoises in California. Until recently, the eastern Mojave Desert supported the highest densities of desert tortoises and was also the region most heavily used for cattle grazing. However, when populations of a long-lived animal, such as the desert tortoise, decline so precipitously, the continued loss of individuals in any age class is deleterious to the species' viability. The effects of grazing may function in combination with other factors in the environment to lower the fitness of desert tortoises.

Livestock grazing, as implemented under the direction of the California Desert Conservation Area Plan, likely kills or injures desert tortoises. The magnitude of the mortality of desert tortoises attributable to the trampling of individuals or their burrows and increased predation by common ravens is extremely difficult to quantify, simply because cattle, common ravens, and desert tortoises are so widely distributed.

As noted previously in this section, until recent declines occurred, desert tortoises in the eastern Mojave Desert of California seemed to persist in the presence of cattle. For this reason, we assume that cattle do not likely kill many desert tortoises, although we are aware that some individuals are killed by grazing livestock. We are unaware of any positive effects of livestock on desert tortoises.

Sheep grazing affects desert tortoises in ways that are similar to grazing by cattle. The primary differences are related to the timing of sheep grazing and their management within tight bands. Because sheep are grazed in the Mojave Desert only during the spring months, the range improvements used for their grazing are temporary; additionally, sheep carcasses would be

unavailable for most of the year. Therefore, any subsidies that common ravens receive from sheep would be of limited duration; however, these temporary subsidies may increase reproductive success of some pairs of common ravens because the sheep grazing overlaps temporally with their nesting period. Sheep are more likely to trample desert tortoises than cattle because they are managed in tight bands of over 1,000 animals; as with cattle, smaller desert tortoises are at greater risk of being trampled than larger individuals. In a study using various sizes of Styrofoam models, sheep trampled 20 percent of the juvenile “desert tortoises” and only 2 and 3 percent of the adult- and subadult-sized models (Tracy 1996 in Boarman 2002). Other studies have demonstrated that sheep also destroy desert tortoise burrows (Berry 1978, Nicholson and Humphreys 1981, Tracy 1996, and Webb and Stielstra 1979 in Boarman 2002).

In summary, we cannot estimate the number of desert tortoises that may be killed or injured as a result of the Bureau’s guidelines with regard to livestock grazing for the reasons described previously in this section of the biological opinion. Grazing of sheep and cattle at higher levels of use over wider areas is likely to result in greater levels of mortality of desert tortoises, both from trampling and from ranchers operating and maintaining the allotments. As we noted previously in this section, cattle likely do not trample many desert tortoises; sheep likely pose a greater degree of threat, particularly to smaller desert tortoises. We will review the Bureau’s specific proposals for grazing of livestock in the planning areas for the northern and eastern Mojave Desert and northern and eastern Colorado Desert in the sections of this biological opinion that discuss those planning efforts.

Effects on Critical Habitat

Livestock grazing affects habitat of the desert tortoise in numerous ways. Most of the effects are subtler than those of construction projects where the primary constituent elements of critical habitat are removed quickly, totally, and permanently. For this reason, we have generally described each primary constituent element of critical habitat of the desert tortoise and then evaluated the effects of livestock grazing on specific aspects of the primary constituent element.

A primary constituent element of critical habitat of the desert tortoise is the maintenance of sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow. Livestock grazing does not result in the complete and total removal of the primary constituent elements of critical habitat on every acre of every allotment. The development of range improvements within an allotment, such as the construction of stock tanks and corrals, could remove some areas that support the primary constituent elements of critical habitat; in some cases, these facilities could be located in previously disturbed areas that do not support the primary constituent elements. The primary constituent elements of critical habitat may also be completely removed from areas where livestock congregate in large numbers for extended periods of time. In relation to the size of the allotments, these areas are very restricted in size. Most of the activity associated with grazing of cattle and its effects are more widely scattered over space and time; the effects of sheep grazing are somewhat different because they graze in tight bands. Because of the nature of grazing within the allotments designated in the California Desert Conservation Area, we do not

anticipate that implementation of the Bureau's program guidance for livestock grazing would remove sufficient habitat or fragment the landscape to the degree that the function of this primary constituent element is likely to be compromised.

The second primary constituent element of critical habitat of the desert tortoise comprises sufficient quality and quantity of forage species and the proper substrate conditions to provide for the growth of these species. Livestock grazing decreases the amount of plant cover and biomass and can change the species composition of plant communities over large areas (Lovich and Bainbridge 1999). Humphrey (1958, 1987 in Boarman 2002) noted that livestock was implicated in the conversion of grass-dominated communities to shrub lands; however, other factors such as fire suppression, rodents and other herbivores, and competition probably influenced the conversion. (Note that this review primarily evaluated native grasslands of Arizona, New Mexico, and Texas; the Mojave and Colorado Deserts in California likely did not support extensive grasslands in historic times.) Other authors note that grazing reduces the amount of herbaceous species and increases that of woody species (Roundy and Jordan 1988, Vaughan 1982 and 1984 in Service 1994b) and that non-native species, such as Mediterranean grass and cheatgrass (*Bromus tectorum*), benefit from grazing (Berry and Nicholson 1984 and Kie 1990 in Service 1994b). Desert tortoises feed primarily on herbaceous species; therefore, the replacement of native herbaceous species with shrubs, which they generally do not consume, results in a net loss of appropriate forage for desert tortoises.

Avery (1998) found that a grazed area had a significantly lower diversity of winter annuals when compared to an ungrazed area. Conversely, the ungrazed area contained more individuals of the desert dandelion (*Malacothrix glabrata*), a forage plant preferred by desert tortoises. The ungrazed and grazed areas did not differ in biomass, cover, density and species richness of annual plants. Boarman (2002) notes that, because the ungrazed area had been fenced to exclude cattle for only 12 years, the effects of previous grazing may still be present. Changes in species composition could be unfavorable to desert tortoises if palatable and nutritious plants are replaced by those that do not provide adequate nutrition.

Non-native grasses have spread to the deserts and other arid areas of North America and reduced the relative abundance of native species (Mack 1981, D'Antonio and Vitousek 1992, and Rundel and Gibson 1996 in Avery 1998); livestock grazing has, at least, contributed to their spread. Regardless of whether they are native or introduced, annual desert grasses contain less crude protein, calcium, sodium, and water than desert forbs (Ofstedal et al. 1993 and McArthur et al. 1994 in Avery 1998). Avery (1998) found that desert tortoises eating Mediterranean grass (*Schismus* spp.) *ad libitum* exhibited a negative nitrogen balance. Generally, turtles consuming a diet low in protein (i.e., where the nitrogen concentration in forage is low) experience reduced growth rates (Gibbons 1967, 1970, Parmenter 1980, Vogt and Guzman 1988, and Avery et al. 1993 in Avery 1998) and lower egg production (White 1993 and Henen 1993, 1997 in Avery 1998). Because desert tortoises are more vulnerable to predation when they are smaller, reducing their rate of growth may eventually result in fewer individuals reaching breeding age. Additionally, decreases in the number of eggs would reduce eventual recruitment into the adult population. If growth rates and egg production are lowered over wide areas for long periods of

time, a decline in the population would be likely. Finally, Avery (1998) noted that Mediterranean grass had high concentrations of heavy metals; we are uncertain how these elements affect the desert tortoise. Because desert tortoises require a diet of a variety of herbaceous species that provided important nutrients, the replacement of native herbaceous species with non-native herbaceous species, which are less nutritious, results in a net loss of appropriate forage for desert tortoises. Finally, desert habitats that have been invaded by Mediterranean grass, brome grass (*Bromus* spp.), and Sahara mustard are prone to wildfire; the effects of fire on desert tortoises and their habitat are discussed elsewhere in this biological opinion.

As discussed in the Status of the Species section of this biological opinion, neonate desert tortoises consume germinating annual plants. These small plants would be trampled by livestock and, depending on the number and distribution of livestock, could be eliminated from the forage base in a local area. Because neonate desert tortoises are less likely to be able to travel great distances in safety for food, the effects of grazing in a local area may be relatively greater on them than on sub-adults and adults.

Livestock grazing can also damage soil crusts (Lovich and Bainbridge 1999) and thereby affect the ability of the land to maintain the proper substrate conditions to provide for the growth of sufficient quality and quantity of forage species. Disturbance to soil crusts may increase erosion by wind and water, which could result in further damage to plants in surrounding areas. The loss of cryptogamic or microbiotic crusts, which are composed of nitrogen-fixing lichens and fungi, may reduce the ability of substrates to support native annual plants; the disturbance of crusts also likely reduces the amount of favorable germination sites for seeds of native annual plants and the moisture-holding capacity of the soils. A study by DeFalco (et al. 2001) demonstrated that the higher nitrogen content of substrates with microbiotic crusts may allow non-native herbaceous species to grow faster and thus attain a competitive advantage over native plant species. An implication of this study is that the spread of non-native species may be more detrimental to native ecosystems than was previously thought because undisturbed substrates may not provide a competitive advantage to native plant species.

As we noted in the preceding paragraphs, livestock grazing can have numerous effects on the types of plants that are available to the desert tortoise for its nutritional needs. Approximately 1,443,240 of the 4,754,000 acres of critical habitat in California occur within grazing allotments, as defined in the California Desert Conservation Area Plan (sources for acreage of critical habitat within allotments: western Mojave Desert, Bureau et al. 2003; northern and eastern Mojave Desert, Foreman 1998; northern and eastern Colorado Desert, Crowe and Foreman 1997). If all critical habitat was grazed within every allotment at the highest level of use authorized by the California Desert Conservation Area Plan, the quality and quantity of forage species and the proper substrate conditions to provide for the growth of these species could be altered. However, grazing does not normally occur throughout entire allotments. Furthermore, the amount of grazing that actually occurs within critical habitat is substantially less than the amount described previously in this paragraph. We will review the Bureau's specific proposals for grazing of livestock in the planning areas for the northern and eastern Mojave Desert and

northern and eastern Colorado Desert in the sections of this biological opinion that discuss those planning efforts.

The third primary constituent element comprises suitable substrates for burrowing, nesting, and overwintering. The desert tortoise spends a considerable portion of its life underground, where it can avoid predators and the temperature extremes of the desert; they also lay their eggs at the mouths of their burrow in shallow holes. Therefore, substrates that are suitable for these functions are crucial for the recovery of the species. Although livestock may occasionally trample a burrow, they generally do not alter the substrates throughout allotments to the degree that burrowing is no longer possible. Livestock can, however, substantially alter the substrate in areas where they congregate on a frequent basis. Through alteration of the basic structure of the substrate, livestock render these areas unsuitable for burrowing or placement of nests. Livestock tend to congregate near salt licks and tanks and are occasionally restrained in corrals; the substrates in these areas are highly unlikely to be able to support burrowing and nesting by desert tortoises. Because these areas are relatively small in size compared to the area of critical habitat occupied by desert tortoises in the California Desert Conservation Area, we do not anticipate that implementation of the Bureau's program guidance for livestock grazing would affect suitable substrates for burrowing, nesting, and overwintering to the degree that the function of this primary constituent element would likely be compromised.

Burrows, caliche caves, and other shelter sites comprise the fourth primary constituent element of critical habitat. Livestock can crush burrows that are not protected from trampling. They also can damage shrubs to the extent that the plants no longer provide adequate cover for desert tortoises; livestock damage shrubs when they push into them to graze herbaceous plants growing on coppice mounds at the base of the shrubs and to seek shade. Most caliche caves are likely protected from crushing by their location in steeper banks and by the harder composition of the substrate. A reduction of the number of shelter sites within the territory of the desert tortoise is likely to cause the resident animal to spend more time in the open and seeking or constructing burrows; energy expended in these activities cannot be used for foraging and reproduction. If critical habitat of the desert tortoise was grazed in every location where it coincided with an allotment in a manner where these effects were causing a substantial alteration in the quantity of shelter sites, the function of this primary constituent element could be impaired as a result of the Bureau's guidance for its livestock grazing program.

The fifth primary constituent element of critical habitat of the desert tortoise is sufficient vegetation for shelter from temperature extremes and predators. Avery (1998) found that a grazed area had significantly larger creosote bushes (*Larrea tridentata*), more dormant or dead burrobushes (*Ambrosia dumosa*), fewer and smaller individuals of galleta grass (*Hilaria rigida*), and more individuals of cheesebush (*Hymenoclea salsola*, an indicator of disturbance) when compared to an ungrazed area. Boarman (2002) notes that, because the ungrazed area had been fenced to exclude cattle for only 12 years, the effects of previous grazing may still be present. Changes in species composition could be unfavorable to desert tortoises if plants that provide less cover are replaced by those that do not provide desert tortoises with adequate protection. Note that the differences in shrub cover (larger creosote bushes, more dormant or dead

burrobushes, more individuals of cheesebush) Avery described, as discussed in this paragraph, do not universally constitute adverse effects on the desert tortoise. Because of their usual structure, burrobushes generally provide better shelter sites than cheesebush; however, larger creosote bushes are likely more than suitable cover sites. If all critical habitat was grazed within every allotment at the highest level of use authorized by the California Desert Conservation Area Plan, the quality and quantity of shelter sites provided by perennial plants could be altered. However, grazing does not normally occur throughout entire allotments. Furthermore, the amount of grazing that actually occurs within critical habitat is substantially less than the amount described previously in this section of the biological opinion. We will review the Bureau's specific proposals for grazing of livestock in the planning areas for the northern and eastern Mojave Desert and northern and eastern Colorado Desert in the sections of this biological opinion that discuss those planning efforts.

The final primary constituent element is habitat protected from disturbance and human-caused mortality. As discussed in the Effects on the Desert Tortoise section of this livestock element, implementation of the Bureau's guidance for livestock grazing likely results in few desert tortoises being directly killed or injured. Except for times when cattle are being actively driven, activity levels associated with cattle grazing seems to be relatively minor. The transport of sheep into grazing areas and the movement of sheep in tight bands provides a greater level of activity. For these reasons, the level of disturbance associated with livestock grazing is sufficiently low that it is unlikely to compromise the function of this primary constituent element.

In summary, livestock grazing adversely affects the primary constituent elements of critical habitat of the desert tortoise. If sheep and cattle were grazed in every area where critical habitat and allotments overlap in California at the highest levels that could be authorized under the California Desert Conservation Area Plan, the primary constituent elements could potentially be altered to a substantial degree. As we noted previously in this section, however, the extent to and manner in which livestock grazing occurs within the California Desert Conservation Area are important factors in determining the degree to which critical habitat is affected. We will review the Bureau's specific proposals for grazing of livestock in the planning areas for the northern and eastern Mojave Desert and northern and eastern Colorado Desert in the sections of this biological opinion that discuss those planning efforts.

Mineral Exploration and Development

The Bureau's guidelines allow for the exploration and development of minerals on Class L, M, and I lands. Extraction of geothermal, oil, and gas reserves may take place within Class L, M, and I lands.

Casual Use

Casual use includes activities that cause no or negligible surface disturbance to public lands or resources. Mining conducted under the casual use category includes the collection of geochemical, rock, soil, or mineral specimens using hand tools, hand panning, sluicing, and small portable suction dredges. It also generally includes use of metal detectors, gold spears and other battery-operated devices for sensing the presence of minerals, and hand and battery-operated drywashers. If exploration for and development of minerals are conducted under the casual use category, as described in the California Desert Conservation Area Plan and the Description of the Proposed Action section of this biological opinion, operators are not required to send the Bureau a notice or plan of operation that describes the mining-related actions prior to their implementation.

Effects on the Desert Tortoise

Desert tortoises could be crushed by the foot traffic of operators or equipment during exploration. Without off-road vehicle use, the amount and size of other equipment that may be employed during casual use is likely to be limited. For this reason, the amount of mortality of desert tortoises that may occur as a result of casual use under the mining guidance of the California Desert Conservation Area Plan is likely to be limited.

Note that casual use without specific approval by the Bureau may occur in any area that is open to mineral entry; therefore, site-specific consultation will not occur on casual use activities and the Bureau likely does not have data on the level of use. Given commercial and recreational interest in mineral exploration, the level of use is likely fairly common in areas that may have potential to contain geothermal, oil, gas, or mineral resources. Maps 11 through 15 in the California Desert Conservation Area Plan (Bureau 1999) depict areas within the California Desert Conservation Area that have been identified as potential or known resource areas for various types of resources for which the Bureau provides program guidance under this element; based on a visual comparison of these maps with areas known to support desert tortoises, a substantial amount of overlap seems to exist.

In summary, casual use related to mining operations in the California Desert Conservation Area likely occurs in a scattered fashion throughout the area occupied by desert tortoises. Because of the low-intensity nature and localized scale of activities involved with casual use, few desert tortoises are likely to be killed or injured as result of activities implemented under the authorization provided by this element of the California Desert Conservation Area Plan. We do not anticipate that mining activities, conducted under the casual use provisions of the California

Desert Conservation Area Plan, are likely to cause substantial effects to the reproduction, numbers, and distribution of the desert tortoise within the action areas. Note that casual use may occur in any area that is open to mineral entry without specific approval by the Bureau; therefore, site-specific consultation will not occur on casual use activities. Note also that we will not conduct any further evaluation of the potential effects on the desert tortoise of casual use with regard to mining in this biological opinion because its fundamental authorization occurs under the auspices of the California Desert Conservation Area Plan.

Effects on Critical Habitat

Foot traffic of operators or equipment during exploration may disturb habitat and subsequently lead to an invasion of non-native plants. Under most mining activities that could be conducted under the casual use provisions, the primary constituent elements of critical habitat could be removed from a small area; the impacts of casual use on the maintenance of sufficient space to support viable populations of desert tortoises within each of the six recovery units and to provide for their movement, dispersal, and gene flow, are likely to be minor, given that, by definition, these activities are minor in size and intensity.

The guidelines require that disturbances created during casual use be restored. Restoration attempts often fail in the harsh climate of the desert. However, because the disturbance allowed under casual use is minimal, the required restoration may be attainable. A possible exception would be invasion by non-native plants, in part, because this effect would likely not be seen for months after the casual use and restoration occurred.

Without off-road vehicle use, the amount and size of other equipment that may be employed during casual use is likely to be limited. For this reason, the amount of disturbance to critical habitat of the desert tortoise that may occur as a result of casual use under the mining guidance of the California Desert Conservation Area Plan is likely to be limited and fairly close to authorized routes of travel.

As we noted in the previous section, the level of casual use is likely to be fairly common in areas that may have potential to contain geothermal, oil, gas, or mineral resources. Such areas have a substantial degree of overlap with critical habitat of the desert tortoise.

Because casual use generally has minor effects on relatively small areas and these activities are likely to be scattered over large areas, it would be highly unlikely to affect the primary constituent elements of critical habitat of the desert tortoise in a manner or at a scale that would compromise the function and conservation role of any critical habitat unit. Note that casual use may occur in any area that is open to mineral entry without specific approval by the Bureau; therefore, site-specific consultation will not occur on casual use activities. Note also that we will

not conduct any further evaluation of the potential effects on critical habitat of causal use with regard to mining in this biological opinion because its fundamental authorization occurs under the auspices of the California Desert Conservation Area Plan.

Plans of Operation

Before beginning any exploration for minerals or conducting mining activities that would have impacts greater than would be expected under the casual use or notice categories, an operator would need to develop a plan of operations that is approved by the Bureau. A plan of operation is also required for any bulk sampling in which the operator will remove 1,000 tons or more of presumed ore for testing.

Effects on the Desert Tortoise

Activities associated with plans of operation could result in the loss of desert tortoises. As one would expect, larger mines are more likely to kill or injure more desert tortoises because of their size, the greater number of large vehicles that would be in use, and the greater number of employees. The size of the area to be mined under a plan of operation can vary greatly, from the rather small decorative rock mines that are fairly common in the vicinity of Barstow to large open pit mines, such as the Mesquite Mine near Glamis in Imperial County and Viceroy Mine in the eastern Mojave Desert. The development of geothermal, oil, gas, or mineral resources within occupied habitat could result in substantial mortality of desert tortoises because of the generally large scale of the associated facilities. Vehicles accessing mines or other facilities along unpaved roads through desert tortoise habitat are also potential sources of mortality; the level of mortality would vary according to the length of the road, the level of use, and the density of desert tortoises in the area that it traverses.

Mineral development may have indirect effects on desert tortoises. Preliminary work indicates that desert tortoises near hard rock mines may contain elevated levels of metals (Chaffee and Berry 1999). We do not understand the full implications of this research to date or the pathway by which the metals entered the desert tortoise. The metals could have been ingested by desert tortoises as dust that was carried by wind from the mine site; the dust could be ingested by desert tortoises when they were eating plants or mining soil. Alternatively, substrate and plants may normally contain higher levels of these metals because they are located in heavily mineralized areas. If the metals are emanating from mines and are found to affect desert tortoises negatively, the impacts of specific mines would need to be revisited. If mines or other sites maintain ponds as part of the processing facility that desert tortoises can access, animals may die from drinking contaminated water or drown if the sides are too steep. Common ravens may be attracted to waters and other subsidies offered by mines or energy developments.

To date, large-scale development of mineral resources has generally been relatively limited in the California Desert Conservation Area, although substantial overlap exists between occupied habitat of the desert tortoise and areas that contain geological resources (see maps, 12, 13, and 14 in Bureau 1999). Some mines (e.g., Yellow Aster, Coliseum, Viceroy, Molycorp) are located

at higher elevations where desert tortoises are less abundant; however, the access roads to these mines may cross areas where desert tortoises are common. Fewer mines are located on bajadas and in the valleys where desert tortoises are more abundant; desert tortoises are generally more abundant within the actual mine site in these areas. The Hector Mine, which lies north of the Marine Corps Air Ground Combat Center, is such a facility. Numerous factors are involved in whether a large mine can be developed; the presence of minerals of sufficient quality and in sufficient quantity and the ability of operators to consolidate a sufficient number of claims are pertinent factors. Consequently, to date, the large-scale development of mineral resources has not caused a substantial amount of direct mortality of desert tortoises in the California Desert Conservation Area.

To date, large-scale development of energy from geological resources has generally been limited in the California Desert Conservation Area. Geothermal development has been limited to the East Mesa area of Imperial County and the Coso region at the Naval Air Weapons Station, China Lake; desert tortoises do not occur in the former area and the latter area is managed by the U.S. Navy. In general, high potential for geothermal resources does not occur in areas occupied by the desert tortoise (see map 15 in Bureau 1999). Consequently, the likelihood of geothermal development in areas occupied by the desert tortoise in the California Desert Conservation Area seems to be low.

To the best of our knowledge, development of oil and gas resources in the California Desert Conservation Area has not been proposed since the listing of the desert tortoise in 1990. Based on the lack of this activity in the last 15 years, the development of oil and gas resources in the California Desert Conservation Area is unlikely to occur in areas occupied by the desert tortoise in the foreseeable future.

Numerous small mines that produce decorative rock and sand and gravel have been developed; we anticipate that these facilities will continue to be developed under the guidelines for plans of operation contained in the California Desert Conservation Area Plan. Because of the location of these mines in rockier areas and their small size, few desert tortoises are likely to be killed or injured as a result of this type of mining activity. For those reasons, we do not anticipate substantial impacts to the reproduction, numbers, or distribution of the desert tortoise with respect to the guidance for this element of the California Desert Conservation Area Plan.

The California Desert Conservation Area Plan incorporates the Bureau's guidelines and regulations that implement mining laws relative to the approval of mining activities. The Bureau may refuse to approve a plan of operations until the plan meets its mitigation and compensation requirements. The mitigation required by the Bureau could reduce the level of the adverse effects of a mining operation by requiring operators to implement measures to reduce the level of mortality of desert tortoises.

The mining laws and regulations incorporated into the California Desert Conservation Area Plan require avoidance of unnecessary and undue degradation of public lands and reclamation of disturbed areas. If the Service found that a proposed plan of operations developed under the guidelines for this element in the California Desert Conservation Area Plan was likely to jeopardize the continued existence of the desert tortoise, the Bureau, with the authorities at 43 *Code of Federal Regulations* 3809.411(d)(3)(iii), “may disapprove of or withhold a plan of operations if the proposed operations ‘would result in unnecessary or undue degradation of public lands’” (Bureau 2002a). Unnecessary or undue degradation is defined as “conditions, activities, or practices that, among other things, ‘fail to comply with ... other Federal or State laws related to environmental protection...” (Bureau 2002a). The Bureau also noted that a biological opinion from the Service concluding that a plan of operations would likely jeopardize the continued existence of a species “would certainly indicate a failure to comply with the standards of the Endangered Species Act, and would, therefore, constitute unnecessary and undue degradation (Bureau 2002a).”

This aspect of the California Desert Conservation Area Plan ensures that large scale mines will not be developed in a manner that would likely jeopardize the continued existence of the desert tortoise. We are unable to provide an estimate of the level of mortality of desert tortoises that mining activities may cause. We would be better able to provide such estimates during site- and project-specific reviews, conducted under the authorities of section 7(a)(2) of the Act.

Effects on Critical Habitat

Activities associated with plans of operation could result in the temporary or permanent loss of desert tortoise habitat and the introduction or spread of non-native plant species. Under most mining activities that would require a plan of operations, the mining would likely remove or seriously degrade most of the primary constituent elements of critical habitat. The impacts of a mining action on the first primary constituent element, the maintenance of sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow, could only be evaluated on a site- and project-specific basis.

Under the authority and guidelines of the California Desert Conservation Area Plan, the Bureau will require restoration of lands disturbed during mining activities conducted under plans of operations. However, restoration efforts may not be successful in re-establishing the same quality and type of habitat that existed prior to the mining activity. Large areas are more difficult to restore; however, large mining companies have devoted extensive funding and resources to at least some restoration efforts (e.g., Viceroy Mine in the eastern Mojave Desert near Lanfair Valley). To date and to the best of our knowledge, desert tortoises have not used large mines that have been reclaimed from past mining activities.

Preliminary work indicates that desert tortoises near hard rock mines may contain elevated levels of metals. As we discussed in the previous section, we do not understand the full implications of this research to date or the pathway by which the metals entered the desert tortoise. If the metals are emanating from mines and are found to compromise negatively the primary constituent

elements of critical habitat of the desert tortoise, the impacts of specific mines would need to be revisited.

To date, large-scale development of mineral resources has generally been relatively limited in the California Desert Conservation Area, although substantial overlap exists between critical habitat of the desert tortoise and areas that contain geological resources (see maps, 12, 13, and 14 in Bureau 1999). Some mines (e.g., Yellow Aster, Coliseum, Viceroy, Molycorp) are located at higher elevations that do not support the primary constituent elements of critical habitat. The access roads to these mines may cross areas where the primary constituent elements are present. Fewer mines are located on bajadas and in the valleys where the primary constituent elements are usually present. The Hector Mine, which lies north of the Marine Corps Air Ground Combat Center, is such a facility. Numerous factors are involved in whether a large mine can be developed; the presence of minerals of sufficient quality and in sufficient quantity and the ability of operators to consolidate a sufficient number of claims are pertinent factors. Consequently, to date, the large-scale development of mineral resources in the California Desert Conservation Area has not caused the removal of substantial amounts of critical habitat that support primary constituent elements.

To date, large-scale development of energy from geological resources has generally been limited in the California Desert Conservation Area. Geothermal development has been limited to the East Mesa area of Imperial County and the Coso region at the Naval Air Weapons Station, China Lake; neither area is within the boundaries of critical habitat of the desert tortoise. In general, high potential for geothermal resources does not occur within critical habitat of the desert tortoise (see map 15 in Bureau 1999). Consequently, the likelihood of geothermal development within critical habitat of the desert tortoise in the California Desert Conservation Area seems to be low.

To the best of our knowledge, development of oil and gas resources in the California Desert Conservation Area has not been proposed since the listing of the desert tortoise in 1990. Based on the lack of this activity in the last 15 years, the development of oil and gas resources in the California Desert Conservation Area is unlikely to occur in areas that support the primary constituent elements of critical habitat of the desert tortoise in the foreseeable future.

Numerous small mines that produce decorative rock and sand and gravel have been developed; we anticipate that these facilities will continue to be developed under the guidelines for plans of operation contained in the California Desert Conservation Area Plan. Because of the location of these mines in rockier areas and their small size, we anticipate that they will cause localized and minor effects to the primary constituent elements of critical habitat of the desert tortoise.

The California Desert Conservation Area Plan incorporates the Bureau's guidelines and regulations that implement mining laws relative to the approval of mining activities. The Bureau

may refuse to approve a plan of operations until the plan meets its mitigation and compensation requirements. The mitigation required by the Bureau could reduce the level of the adverse effects of a mining operation to the primary constituent elements of desert tortoise critical habitat.

The mining laws and regulations incorporated into the California Desert Conservation Area Plan require avoidance of unnecessary and undue degradation of public lands and reclamation of disturbed areas. If the Service found that a proposed plan of operations developed under the guidelines for this element in the California Desert Conservation Area Plan was likely to jeopardize the continued existence of the desert tortoise, the Bureau, with the authorities at 43 *Code of Federal Regulations* 3809.411(d)(3)(iii), “may disapprove of or withhold a plan of operations if the proposed operations ‘would result in unnecessary or undue degradation of public lands’” (Bureau 2002a). Unnecessary or undue degradation is defined as “conditions, activities, or practices that, among other things, ‘fail to comply with ... other Federal or State laws related to environmental protection...” (Bureau 2002a). The Bureau also noted that a biological opinion from the Service concluding that a plan of operations would likely jeopardize the continued existence of a species “would certainly indicate a failure to comply with the standards of the Endangered Species Act, and would, therefore, constitute unnecessary and undue degradation (Bureau 2002a).” Adverse modification of critical habitat would also constitute unnecessary and undue degradation because it would violate section 7(a)(2) of the Act (Lorentzen pers. comm. 2005a).

In summary, the Bureau’s unnecessary and undue degradation standard provides assurance that mining activity is unlikely to cause the permanent loss or temporary disturbance of large amounts of critical habitat. The unnecessary and undue degradation standard and the low likelihood that large-scale mines would be developed in numerous locations throughout the desert should ensure that the program direction for mining activities does not diminish appreciably the function and conservation role of critical habitat of desert tortoise. We are unable to provide any estimate of the amount of critical habitat of the desert tortoise that mining activities may disturb or remove. We would be better able to provide such estimates during site- and project-specific reviews.

Motorized-vehicle Access and Transportation

Under the Bureau’s existing guidance, vehicles would be allowed within Class C areas on a very infrequent basis; new roads and ways may be developed within Class L, M, and I lands. The Bureau’s guidance allows the use of motorized vehicles on existing routes of travel until designation of routes is accomplished. Within Class L, M, and I lands, railroads and trams may be allowed. Under certain conditions, temporary landing strips may be allowed in Class L lands and airports and landing strips may be allowed within Class M and I lands.

Effects on the Desert Tortoise

The potential effects of vehicles using existing routes of travel on the desert tortoise were discussed in Effects of Human Activities on the Desert Tortoise section of this biological opinion. Vehicle use is likely to result in at least some mortalities of and injuries to desert tortoises; the extent of the loss is related to the condition of the road, the time of the year, the abundance of desert tortoises, and the awareness of the driver. Even the most careful drivers may occasionally strike a desert tortoise. An indirect effect of routes of travel is the access that they provide; people using authorized routes of travel are able to engage in unauthorized activities, which may kill or injure desert tortoises.

Where desert tortoises occur in Class C areas, the Bureau's program guidance of allowing vehicle use on a very infrequent basis will reduce the number of animals that are killed and injured. Generally, this element provides a high degree of protection to desert tortoises within Class C areas.

The development of new roads and ways, as the program guidance allows in the other land use classes, could result in the loss of desert tortoises. All roads increase the level of access by people into habitat of the desert tortoise. The extent of mortality of desert tortoises will increase as the density of roads increases. At some point, vehicle use on roads (and other activities that accompany vehicle use) would likely reduce the number of desert tortoises to a point where the level of mortality also decreases, simply because fewer desert tortoises will occur within the affected areas.

The guidance in the California Desert Conservation Area Plan that was approved in 1980 allows cars and trucks to drive and park up to 300 feet from a route of travel in most of the California Desert Conservation Area. Such off-road travel can crush desert tortoises. Neither the Service nor the Bureau can provide any quantitative information on how frequently desert users leave routes of travel for these distances to camp, stop, and park outside of existing disturbed areas. In at least some areas that are occupied by the desert tortoise, the density of vegetation and the terrain would prevent many desert users from leaving the routes of travel.

The presence of routes of travel through or near the occupied habitat of the desert tortoise presents an ongoing level of threat from illegal vehicle use and other unauthorized activities. Although the section 7 process is not intended to review illegal activities, unauthorized off-road use occurs at least partially as a result of authorized activities. We are aware of areas where unauthorized off-road vehicle use seems to be a common occurrence, as recreationists use legal routes to gain access to previously disturbed sites to stage and camp; these areas then serve as the center of a network of unauthorized routes.

Railroads, trams, temporary landing strips, and airports, if developed within Class L, M, and I lands, could result in the loss of desert tortoises. These facilities also have the potential to increase the level of use of adjacent areas, thereby affecting desert tortoises indirectly. In summary, the development of roads and other types of access would result in mortality and

injury of desert tortoises and increase their level of exposure to authorized and unauthorized human activities. We do not anticipate that the Bureau will propose major new roads and other types of access within desert wildlife management areas because these facilities would compromise the purpose of the reserves; consequently, although new roads and other types of access are likely to be developed in the future, they will most likely be relatively minor in scale and located near existing facilities.

Ongoing use of roads also contributes to a continuing loss of desert tortoises; desert tortoises are more likely to be struck by vehicles, collected, and vandalized when they are on or near authorized routes. We cannot quantify the number of desert tortoises that are killed or injured on or near designated routes of travel because of the large number of variables involved. However, because large areas of the desert wildlife management areas are located away from roads at distances that desert tortoises do not normally travel routinely, the number of animals that are killed or injured by authorized use of designated routes is likely low.

Effects on Critical Habitat

The potential effects of vehicles using existing routes of travel on habitat, including critical habitat, of the desert tortoise were discussed in the Effects of Human Activities on Critical Habitat section of this biological opinion. The use of vehicles on roads that are designated as open or limited will not, in general, adversely affect the primary constituent elements of critical habitat because these biological and physical attributes are not present within roadbeds. Some roads support annual plants, possibly even at greater local densities than on adjacent, undisturbed habitat, because of alterations in the hydrological regime caused by the road. Although such areas may be of value to a few desert tortoises, they are not so extensive that they substantially alter the patterns of the distribution of forage plants.

The development of roads can eliminate the primary constituent elements of critical habitat within the footprint of the road; larger roads can fragment habitat. Roads also provide a mechanism for non-native plants to spread more quickly through an area. An indirect effect of routes of travel is the access that they provide; people using authorized routes of travel are able to engage in both authorized and unauthorized activities, which may further degrade or remove the primary constituent elements of critical habitat.

Where critical habitat occurs in Class C areas, the Bureau's program guidance of allowing vehicle use on a very infrequent basis will reduce the level of effect to the primary constituent elements of critical habitat that are present. Generally, this element provides a high degree of protection to critical habitat within Class C areas.

The development of new roads and ways, as the program guidance allows in the other land use classes, could result in the fragmentation and loss of desert tortoise habitat. New roads increase

the likelihood of invasion by non-native plant species, which degrade the primary constituent elements of critical habitat by reducing the abundance and diversity of forage plants for the desert tortoise.

The Bureau's guidance allows cars and trucks to drive and park up to 300 feet from a route of travel in most of the California Desert Conservation Area. Such off-road travel can degrade critical habitat (particularly when vehicles need to be extracted from deep sand, damp areas, or rocky terrain) in a relatively localized manner and cause the spread of non-native plant species over larger areas. Neither we nor the Bureau can provide any quantitative information on how frequently desert users leave routes of travel for these distances to camp, stop, and park outside of existing disturbed areas. In at least some areas of critical habitat, the density of vegetation and terrain would likely prevent many desert users from leaving the routes of travel.

The presence of routes of travel through or near critical habitat presents an ongoing level of threat from illegal vehicle use and other unauthorized activities. Although the section 7 process is not intended to review illegal activities, unauthorized off-road use occurs at least partially as a result of authorized activities. We are aware of areas where unauthorized off-road vehicle use seems to be a common occurrence, as recreationists use legal routes to gain access to previously disturbed sites to stage and camp; these areas then serve as the center of a network of unauthorized routes.

In summary, the development of roads and other transportation facilities leads to the complete removal of the primary constituent elements of critical habitat from the affected site. Primary constituent elements may recover, to some degree, in adjacent areas that are disturbed temporarily during construction. If non-native plant species invade the area as a result of ground disturbance and repeated access by vehicles, the disturbed areas are less likely to recover their full biological value; additionally, the value of adjacent undisturbed areas may decrease. We do not anticipate that the Bureau will propose major new roads and other types of access within most areas of critical habitat because, to a large degree, critical habitat overlaps desert wildlife management areas and these facilities would compromise the purpose of the reserves; consequently, although new roads and other types of access are likely to be developed in the future, they will most likely be relatively minor in scale and located near existing facilities.

Ongoing use of roads also contributes to a continuing disturbance and degradation of the primary constituent elements of critical habitat in an indirect manner; although the roads do not support the primary constituent elements, stopping, parking, and camping up to 300 feet from the centerline of the road in adjacent critical habitat has the potential to degrade habitat quality and accelerate the spread of non-native plants. We cannot quantify the acreage of critical habitat that may be affected adjacent to designated routes of travel because of the large number of variables involved. However, because physical constraints will limit stopping, parking, and camping up to 300 feet from the centerline of the road in many areas of the critical habitat units, we do not anticipate extensive disturbance from this activity. We cannot anticipate the rate of spread of non-native plant species; we expect that the use of areas up to 300 feet from the centerline of the road may not substantially increase the rate at which these species spread, particularly if one

considers the time frames required for recovery of the desert tortoise. The degree to which the function and conservation role of specific critical habitat units would be impaired as a result of new road construction would need to be based on a site- and project-specific review.

Recreation

The nature and intensity of recreational use allowed by the Bureau's program guidance increases from Class C through Class I lands. As an example, motorized vehicles are essentially prohibited in Class C areas but can travel anywhere within Class I areas that are designated as open. For the most part, vehicular use is restricted to designated routes within Class L and M lands; exceptions, such as the wash open zones in the northern and eastern Colorado Desert planning area, will be discussed later in this biological opinion. Because of the vast distances and harsh environment, most recreational uses are tied, at least to some degree, to vehicle use.

Note that recreational use occurs on two basic levels. Casual use is fundamentally authorized under the auspices of the California Desert Conservation Area Plan; the Bureau may also permit organized events on a case-by case basis.

Effects on the Desert Tortoise

The degree of threat posed to desert tortoises by recreation increases with the speed, weight, and numbers of recreational units. For example, a small group of hikers poses much less threat to the desert tortoise than a race involving numerous all-terrain vehicles. However, the Bureau's program guidance generally allows the latter use only in Class I areas; the density of desert tortoises in these areas has decreased due to previous activities and impacts are therefore likely to be minimal.

Although small individual tortoises may be trampled by people on foot or by horses, vehicles using designated routes of travel constitute the greatest threat of the recreation program to desert tortoises. The number of desert tortoises killed or injured by recreational activities is likely low, because desert tortoises are generally inactive for large parts of the year and are therefore unlikely to be in harm's way; limiting vehicular use to designated routes of travel within Class L and M lands also reduces the level of mortality by separating desert tortoises and vehicles to some degree.

Vehicles are not permitted within wilderness (i.e., Class C lands). Consequently, recreational activities in such areas typically involve hiking or equestrian use and have a low potential for killing or injuring desert tortoises.

Desert tortoises are at greater risk of being killed or injured by recreational activities within Class L and M lands, where vehicular use on designated routes of travel is allowed. The risk of recreational activities killing or injuring desert tortoises decreases when recreational users are on foot or horseback in these areas.

Unauthorized activities, particularly off-road vehicle use, have killed some desert tortoises. The access provided by the Bureau for legitimate uses, such as recreation, facilitates some degree of

unauthorized use. Although the data are not available to provide documentation, more desert tortoises may be killed or injured by unauthorized activities than by legitimate recreational users, simply because these uses, such as driving off of established routes, place more desert tortoises at greater risk.

Recreational use of the desert may benefit the desert tortoise in an indirect manner. Many people view the California desert as a unique place to enjoy nature and solitude; the enjoyment of this special place may promote actions on their part to assist in volunteer projects to restore habitats, clean up trash, report problems to the Bureau, and educate other users. The Bureau's own educational programs also strive for these goals.

In summary, the promotion of recreational use leads to some level of mortality of desert tortoises. The greatest risk of mortality is associated with vehicular use; in general, we expect the level of mortality of desert tortoises resulting from authorized recreational activities to be low. Because of the dispersed nature of recreation in the California desert, we cannot estimate the numbers of desert tortoises that may be killed or injured as the result of these activities. Recreational use of the California desert may benefit desert tortoises to some degree if users gain an appreciation for the land and its wildlife and undertake actions to conserve it. We will not conduct any further evaluation of the potential effects on the desert tortoise of causal use with regard to recreation in this biological opinion because its fundamental authorization occurs under the auspices of the California Desert Conservation Area Plan.

Effects on Critical Habitat

The degree of threat posed to critical habitat by recreation increases with the speed, weight, and numbers of recreational units. For example, a small group of hikers poses much less threat to the primary constituent elements of critical habitat than a race involving numerous all-terrain vehicles. The Bureau's program guidance generally allows the latter use only in Class I areas. The habitat values of these areas have been degraded by previous activity and impacts are now likely to be minimal. Additionally, the overlap of critical habitat with Class I lands is minimal and a result of the manner in which the Service mapped critical habitat. That is, we mapped portions of the boundaries along section lines; where the boundaries of Class I areas were not also drawn along section lines, Class I lands and critical habitat overlap.

Vehicles are not permitted within wilderness (i.e., Class C lands). Consequently, recreational activities in such areas are typically involve hiking or equestrian use and have minor, if any, impacts on the primary constituent elements of critical habitat.

With the exception of stopping, parking, and camping adjacent to designated routes of travel and wash open zones in the northern and eastern Colorado Desert planning area, vehicles are restricted to designated open routes within Class L and M lands; we will discuss the effects of these exceptions on critical habitat of the desert tortoise later in this biological opinion. Because of this restriction, vehicular use within Class L and M lands has little potential to disturb or remove the primary constituent elements of critical habitat. Some potential exists that dust from

use of vehicles on roads may impair the growth and pollination of annual and perennial plants adjacent to the route. We have no evidence that such effects compromise these primary constituent elements in any substantial manner; additionally, such effects would likely not extend far from the route and would therefore affect only a minor portion of the critical habitat. Hiking or equestrian use recreational activities within Class L and M lands likely have minor, if any, impacts on the primary constituent elements of critical habitat.

Unauthorized activities, particularly off-road vehicle use, have degraded the primary constituent elements of critical habitat. The access provided by the Bureau for legitimate uses, such as recreation, facilitates some degree of unauthorized use. In addition to unauthorized roads and trails, areas that are frequently used for loading and unloading vehicles can be severely degraded to the point that at least some of the primary constituent elements of critical habitat are removed.

Recreational use of the desert may benefit critical habitat of the desert tortoise in an indirect manner. Many people view the California desert as a unique place to enjoy nature and solitude; the enjoyment of this special place may promote actions on their part to assist in volunteer projects to restore habitats, clean up trash, report problems to the Bureau, and educate other users. The Bureau's own educational programs also strive for these goals.

We do not anticipate that the implementation of the Bureau's recreation element will have substantial adverse effect on the primary constituent elements of critical habitat for the following reasons. Only light, dispersed recreation, on foot or horseback, can occur in wilderness areas that overlap critical habitat; this level of recreation will have little effect on the primary constituent elements of critical habitat. Most recreational use within Class L and M lands is restricted to authorized routes of travel; the primary constituent elements of critical habitat of the desert tortoise are generally absent from these routes. Consequently, implementation of the guidance provided by the California Desert Conservation Area Plan with regard to recreation is unlikely to affect the conservation role and function of critical habitat units in the California Desert Conservation Area Plan in a substantial manner. We will not conduct any further evaluation of the potential effects on critical habitat of causal use with regard to recreation in this biological opinion because its fundamental authorization occurs under the auspices of the California Desert Conservation Area Plan.

Wildlife Species and Habitat

The Bureau manages wildlife through a variety of mechanisms that include the development of habitat management plans or activity plans for areas of critical environmental concern, the designation of special management areas or vehicle routes, or the development of Sikes Act agreements. This element calls for baseline monitoring of certain wildlife populations and how use of the desert may be affecting this resource. The control of predators and re-introduction or introduction of established exotic species is allowed on Class L, M, and I lands.

Effects on the Desert Tortoise

Because one of the goals of the Bureau's wildlife management program is to control pests and predators as needed, the basic guidance it provides is likely to benefit the desert. As specific

projects are implemented, desert tortoises could be killed or injured by vehicular, foot traffic, or heavy equipment, as discussed for other types of actions in this biological opinion. We have discussed the potential effects that chemical or mechanical manipulation may have on the desert tortoise in the Vegetation Harvesting – Effects on the Desert Tortoise section of this biological opinion.

Baseline monitoring could adversely affect the desert tortoise if animals are crushed by workers traversing occupied habitat. However, in general, the level of activity associated with monitoring would likely result in minor impacts; additionally, the information gained during such monitoring could be useful in management of the desert tortoise.

The control of predators and re-introduction or introduction of established exotic species on Class L, M, and I lands could have indirect effects on the desert tortoise. For example, the control of larger predators could potentially cause an increase in the number of meso-predators that may prey on desert tortoises at greater rates; however, we are unaware of any extensive control of predators on public lands in the California Desert Conservation Area Plan. Conversely, the control of specific predators, such as common ravens, may reduce predation on desert tortoises. The likelihood that the Bureau would approve the introduction of established exotic species into areas that are important for the recovery of the desert tortoise appears to be low.

Implementation of the Bureau's guidelines for managing wildlife and habitat are likely to cause very localized adverse effects to the desert tortoise; it also has the potential to provide substantial benefits, such as the removal of predators of the desert tortoise. Therefore, we do not anticipate that implementation of the Bureau's guidelines for managing wildlife and habitat will cause substantial reductions in the reproduction, numbers, or distribution of the desert tortoise within the California Desert Conservation Area.

Effects on Critical Habitat

The basic guidance provided for wildlife management is intended to enhance the quality of habitat and is therefore likely to benefit habitat of the desert tortoise. As specific projects are implemented, desert tortoise habitat could be disturbed by vehicles, foot traffic, or heavy equipment. We have already discussed the potential effects that chemical or mechanical manipulation may have on habitat of the desert tortoise.

Baseline monitoring could adversely affect habitat of the desert tortoise if ground is disturbed or non-native plant species are spread. In general, however, the level of activity associated with

monitoring would likely result in minor impacts; additionally, the information gained during such monitoring could be useful in management of habitat of the desert tortoise.

The control of predators and re-introduction or introduction of established exotic species is allowed on Class L, M, and I lands. Such manipulations of wildlife populations could have indirect effects on the desert tortoise and its habitat. For example, the control of predators could potentially cause an increase in the number of rapidly reproducing herbivorous species, which could then compete with desert tortoises for food and thereby affect a primary constituent element of critical habitat (sufficient quality and quantity of forage species). With the exception that the Bureau is cooperating on a program to kill nesting common ravens that are known to prey on desert tortoises, we are unaware of any extensive control of predators on public lands in the California Desert Conservation Area Plan. The likelihood that the Bureau would approve the introduction of established exotic species into areas that are important for the recovery of the desert tortoise appears to be low. Consequently, we anticipate that little potential exists for the control of predators and re-introduction or introduction of established exotic species to pose an appreciable risk to habitat of the desert tortoise. The Bureau's program guidance for wildlife may have a net beneficial effect on habitat of the desert tortoise if it implements actions to restore disturbed areas.

In summary, implementation of the Bureau's program guidance for wildlife and habitats may have minor and localized adverse impacts on the primary constituent elements of critical habitat of the desert tortoise. Restoration programs and the control of common ravens conducted under this guidance are likely to improve the quality and function of affected critical habitat units.

Wilderness

The Bureau's program guidance for managing wilderness includes maintenance of an enduring system of high-quality wilderness, maintenance of the plants and animals indigenous to the area, consideration of the needs of listed species and their habitats, and maintenance of stable watersheds.

Effects on the Desert Tortoise

Many wilderness areas have been designated in steep, mountainous terrain that does not usually support an extensive amount of suitable habitat; however, several wilderness areas support numerous desert tortoises. The Bureau's guidance with regard to wilderness should ensure the level of activities that may occur in these areas will remain at a low intensity and result in minimal mortality of desert tortoises. Therefore, the Bureau guidelines for the management of wilderness will benefit the desert tortoise; in local situations, the benefits may be substantial.

Effects on Critical Habitat

Many wilderness areas have been designated in steep, mountainous terrain that does not usually support the full component of the primary constituent elements of critical habitat of the desert tortoise; however, several wilderness areas contain important areas of critical habitat for the desert tortoise. The Bureau's guidance with regard to the management of wilderness should ensure the level of activities that may occur in these areas will remain at a low intensity and result in minimal adverse effects to the primary constituent elements of critical habitat.

Therefore, the Bureau's guidelines for the management of wilderness will benefit the conservation function of critical habitat of the desert tortoise; in local situations, wilderness management substantially contributes to the integrity of desert wildlife management areas and the conservation function of critical habitat units.

Wild Horses and Burros

The Bureau's guidance for the management of wild horses and burros calls for the maintenance of healthy, stable herds that are subject to controls to protect sensitive resources. Burros and wild horses are removed from public lands to ensure that appropriate herd levels are maintained and to prevent damage to other resources.

Effects on the Desert Tortoise

No studies of the effects of wild horses or burros on desert tortoise populations have been published (Boarman 2002). Wild horses and burros could trample desert tortoises and their burrows; we suspect that, as is the case for cattle, they would likely try to avoid stepping on larger desert tortoises. We have no information on the frequency with which burros and wild horses may trample desert tortoises during the course of their normal activities. In some areas, the effects of wild horses and burros may be more detrimental than those of cattle because they reproduce and move through areas without management. To the best of our knowledge, horses do not occur within areas that are considered important to the survival and recovery of the desert tortoise.

Desert tortoises can also be killed or injured when burros and horses are removed from public lands. The extent of the impact would vary, depending on the method of removal that is used, but is likely to be very localized. For example, water trapping of burros would likely not affect desert tortoises to a great degree because the capture is passive. The capture of burros through horseback wrangling, helicopter-assisted roping and trapping, and net gunning could result in trampling of desert tortoises because the burros would be attempting to escape and would likely not be as aware of desert tortoises or their burrows. We cannot predict how many desert tortoises may be killed or injured as a result of horseback wrangling, helicopter-assisted roping and trapping, and net gunning because these activities occur opportunistically when and where the burros are found. Pre-round-up inventories of desert tortoises are not possible because they would delay the round-up and likely cause the burros to move into different areas.

The removal of burros benefits the desert tortoise by eliminating or at least greatly reducing a

potential source of mortality. The removal of horses may also benefit the desert tortoise, but to a lesser degree because horses and desert tortoises do not seem to co-occur over large areas.

In summary, wild horses and burros can trample desert tortoises both during round-ups and the course of normal activities. We do not have any information regarding the frequency of trampling of desert tortoises by wild horses or burros. We do not anticipate conducting any site-specific or project-specific reviews of round-ups because the Bureau generally conducts these activities when opportunities present themselves. To be effective, the round-ups must occur when the burros are optimally located; following the standard consultation process for specific round-ups would greatly reduce the effectiveness of this management tool.

Effects on Critical Habitat

Boarman (2002) states that the primary effect of wild horses and burros on desert tortoises is likely compaction of substrates and alteration of vegetation. We concur that reducing the value of the primary constituent elements that address the food and shelter needs of the desert tortoise is likely the most deleterious impact of these non-native ungulates with regard to conservation of the desert tortoise. We have no information on the amount of habitat that wild horses and burros disturb during the course of their normal activities; we have observed local areas in which the substrate and plant community had been severely degraded by burros (Bransfield pers. obs.). In some areas, the effects of wild horses and burros may be more detrimental than those of cattle because they reproduce and move through areas without management. To the best of our knowledge, horses do not occur within critical habitat of the desert tortoise.

The primary constituent elements of critical habitat can also be affected when burros and horses are removed from public lands. The extent of the impact would vary, depending on the method of removal that is used. For example, water trapping of burros would likely not affect the primary constituent elements to a great degree because the capture is passive; also, the corrals have generally been in place for long periods of time and occupy a small portion of the available habitat. The capture of burros through horseback wrangling, helicopter-assisted roping and trapping, and net gunning could result in a fairly limited amount of trampling of annual plants and disturbance of substrates; this localized adverse effect is likely to be temporary. Although habitat disturbance during a round-up may be more intense than under the normal daily activities of a group of burros, the aggregative amount of habitat that would be disturbed is minimal in relation to the area of critical habitat of the desert tortoise. Despite the limited amount of disturbance to critical habitat that may occur during a round-up, removing burros from areas occupied by the desert tortoise is a highly beneficial action because it eliminates or reduces an ongoing source of disturbance that reduces the conservation value and function of the primary constituent elements of critical habitat of the desert tortoise. We conclude that implementation of this element under the California Desert Conservation Area Plan is likely to benefit the conservation role and function of critical habitat of the desert tortoise.

Natural and Artificial Waters and Exclosures

The Bureau constructs and maintains artificial waters and exclosures to enhance wildlife populations, particularly those of game species.

Effects on the Desert Tortoise

The construction and maintenance of artificial waters and exclosures could pose some risk of mortality or injury to desert tortoises; because of the generally limited size of these features and their nature, most artificial waters and exclosures could be constructed with minimal mortality of desert tortoises. If new roads are required to access the artificial waters and exclosures, additional loss of desert tortoises would occur; the number of individuals killed by construction and use of the road would likely be greater than that associated with construction of the artificial water or exclosure.

If designed to enable desert tortoises to enter and leave, the presence of most exclosures is not likely to affect desert tortoises directly. Exclosures that reduce the level of adverse effects from other sources may benefit desert tortoises by providing local refugia.

Desert tortoises have, in the past, drowned or been trapped in certain types of watering devices, when the slope of the device to the water's surface was steep and slippery with algae; Hoover (1988 in Boarman 2002) found 26 carcasses in 89 watering devices for upland game in California. Since this situation was detected, new watering devices have been built in a manner that should prevent such mortalities. The location of a watering device is an additional factor to consider; artificial waters that are placed at higher elevations and in unsuitable habitat pose little risk to desert tortoises.

Enhancing the water supply for wildlife has the potential to increase the density of predators which may result in increased predation on desert tortoises. In general, we have not observed any effects on populations of desert tortoises that can be attributed to increases in the numbers of individuals of native species caused by human-augmented sources of water. The common raven provides an exception to this statement. Common ravens are known to use numerous types of water sources; such subsidies likely increase their distribution and abundance in the California Desert Conservation Area. We have no information on whether the presence of artificial waters substantially increases the range or reproductive capabilities of the common raven beyond those afforded by other sources of water. Knight et al. (1998) have demonstrated that common ravens are found more often at stock tanks than at natural springs and in the open desert, but similar data do not exist for guzzlers.

In summary, the construction of artificial waters and exclosures could kill or injure few desert tortoises. Desert tortoises can drown in inappropriately designed artificial waters; depending on the local density of desert tortoises, the artificial waters could conceivably entrap numerous animals. Common ravens will use artificial waters and, as a result, may be more able to prey on

desert tortoises over wider areas, although we have no direct evidence that artificial waters increase the intensity of predation of desert tortoises by common ravens.

We cannot predict how many desert tortoises would be killed or injured by the construction and operation of artificial waters and exclosures at this time. We would be able to provide a more accurate estimate of the level of mortality that may occur during the construction of specific artificial waters and exclosures; given the measures that are available to the Bureau to protect desert tortoises during construction, we expect that few individuals would be killed or injured. Even at the time of a project-specific review, we would be unable to predict the level of mortality of desert tortoises in artificial waters because we cannot assess when animals would encounter the waters and the precise circumstances under which they may become trapped; however, appropriately designed waters are unlikely to entrap many desert tortoises.

Effects on Critical Habitat

The construction of artificial waters and exclosures could cause disturbance or loss of a minimal amount of critical habitat of the desert tortoise. If new roads are required to access the artificial waters and exclosures, additional loss of habitat would occur; the amount of habitat lost to the construction of a new road would likely be greater than that associated with the artificial water or exclosure.

The construction of exclosures is likely to cause a minimal level of temporary disturbance in a linear manner; therefore, the effects to the primary constituent elements of critical habitat are likely to be negligible. If the exclosure is designed to preclude entry by desert tortoises, the amount of critical habitat that would no longer be available for the conservation of the species would be reduced; conversely, if the exclosure is designed to protect the species, the impact on critical habitat would be beneficial. The amount of adverse or beneficial effect, as described in the previous sentence would be linked to the size of the exclosure; given the landscape-scale size of critical habitat units for the desert tortoise in the California Desert Conservation Area, the effects of most exclosures would likely be relatively negligible, except at a local level.

The extent of the loss of the primary constituent elements of critical habitat associated with the construction of an artificial water would be minor in comparison with the size of the affected critical habitat unit. Even the construction of numerous waters, spread over a critical habitat unit, would not appreciably reduce the extent of available habitat.

The actions carried out under this element are likely to be dispersed across critical habitat units and cause localized adverse effects to the primary constituent elements. Consequently, we anticipate this element is unlikely to adversely affect the conservation role and function of critical habitat units in the California Desert Conservation Area in a substantial manner.

Effects of the Northern and Eastern Mojave Desert Management Plan on the Desert Tortoise and its Critical Habitat

Establishment of Desert Wildlife Management Areas

The Bureau has established three desert wildlife management areas within this planning area in accordance with the guidance provided by the recovery plan for the desert tortoise (Service 1994c). These areas, which have also been designated as areas of critical environmental concern, are the Piute-Fenner (173,850 acres), Ivanpah Valley (36,795 acres), and Shadow Valley (101,355 acres) desert wildlife management areas.

Effects on the Desert Tortoise

As described in the section of this biological opinion entitled Special Management Areas, the Bureau's designation of areas of critical environmental concern provides the framework to identify clearly the management objectives of these desert wildlife management areas. It also serves as an informational guide to users of the desert that future uses, activities, or management practices must be compatible with the recovery of the desert tortoise. This designation will not have direct, on-the-ground effects, on the desert tortoise; however, it appropriately sets the stage for future management of public lands and the implementation of recovery actions for the desert tortoise. On that basis, this portion of the California Desert Conservation Area Plan is very beneficial to the desert tortoise.

Effects on Critical Habitat

The Bureau established the 272-square mile Piute-Fenner and the 158-square mile Shadow Valley desert wildlife management areas within the Eastern Mojave Recovery Unit. Within the Northeastern Recovery Unit, the Bureau established the Ivanpah Desert Wildlife Management Area, which covers approximately 57 square miles. With the exceptions discussed in the following paragraphs, these areas encompass all designated critical habitat for the desert tortoise in this portion of its range.

The recovery plan recommends that each desert wildlife management area be at least 1,000 square miles in area and that more than one desert wildlife management area be included within each recovery unit. On-the-ground circumstances, however, dictate what any single agency can accomplish. Although these desert wildlife management areas are smaller than the size recommended in the recovery plan, they are connected to the Mojave National Preserve, which is managed in the manner of a desert wildlife management area. Consequently, although the Bureau did not designate areas that meet the specific recommendations for the size of desert wildlife management areas recommended by the recovery plan, their connection to the Mojave National Preserve effectively increases the size of the areas to be managed for the conservation of critical habitat. With the exceptions of the approximately 13,000 acres of critical habitat that the Bureau did not include within desert wildlife management areas, all of the 632,400-acre Ivanpah Critical Habitat Unit is included either within the Bureau's desert wildlife management

areas or the Mojave National Preserve; additionally, this critical habitat unit is surrounded by additional Bureau and National Park Service lands that further enhance the ecosystem functions within critical habitat. Note also that the Bureau has designated virtually all available critical habitat within the northern and eastern Mojave Desert planning area as desert wildlife management areas; the designation of additional areas to meet the 1,000-square mile recommendation of the recovery plan would do little to benefit critical habitat if these areas do not contain its primary constituent elements. As we noted in the previous section, this designation sets the stage for future management of public lands and the implementation of recovery actions but will not have direct, on-the-ground effects on critical habitat of the desert tortoise.

Two instances exist in which the Bureau did not include all critical habitat for the desert tortoise within a desert wildlife management area in the northern and eastern Mojave Desert planning area. The Bureau did not include approximately 12,700 acres of critical habitat within the Ivanpah Critical Habitat Unit west of Turquoise Mountain Road in the Shadow Valley Desert Wildlife Management Area; this area, which is on the westernmost edge of the desert wildlife management area, borders Interstate 15. The Bureau did not include this relatively small portion of critical habitat in the desert wildlife management area because the density of desert tortoises seemed to be low (0 to 20 per square mile) and the primary constituent elements of critical habitat were lacking to some degree as a result of a sandier substrate than desert tortoises generally inhabit and a relatively high degree of use by various recreationists. We do not view this exclusion as a fatal flaw in the design of the desert wildlife management area. First, the area encompasses only 2 percent of the entire critical habitat unit and supports a lower density of desert tortoises, at least in part due to its substrates, which reflects a lower potential function of the primary constituent elements in this area. Additionally, the attractiveness of the area to recreationists would have demanded resources from the Bureau that would be more effectively expended in areas of higher densities of desert tortoises. For these reasons, the exclusion of this area from the Shadow Valley Desert Wildlife Management Area will not impair the conservation role and function of the Ivanpah Critical Habitat Unit.

The second instance involves that removal of approximately 60 acres of private land and 425 acres of public lands from the Ivanpah Valley Desert Wildlife Management Area. Although these lands, which are also within the Ivanpah Critical Habitat Unit, were removed from the desert wildlife management area, the function and conservation role of the critical habitat should not be affected to an appreciable degree because this change constitutes only approximately 1.3 percent of the area within the Ivanpah Valley Desert Wildlife Management Area and collectively only 0.07 percent of the critical habitat within this unit.

In summary, the Bureau's desert wildlife management areas include most of the critical habitat of the desert tortoise on public lands. The inclusion of the vast majority of these critical habitat units within desert wildlife management areas will benefit the function of these units for the conservation of the desert tortoise.

General Management Strategy

The Bureau's general management strategy includes a one percent limit on cumulative surface disturbance within desert wildlife management areas, adoption of management prescriptions and measures to reduce the effects of proposed projects on the desert tortoise and its critical habitat, a program to reduce predation by common ravens on the desert tortoise, and a requirement for project proponents to compensate for loss or disturbance of habitat of the desert tortoise.

Effects on the Desert Tortoise

Limiting the amount of cumulative surface disturbance to one percent of the public lands in each of the desert wildlife management areas will likely ensure that proposed actions do not cause injury to or mortality of a large number of desert tortoises. This cap indicates that the desert tortoises on approximately 1,738 acres of the Piute-Fenner Desert Wildlife Management Area, 368 acres of the Ivanpah Valley Desert Wildlife Management Area, and 1,013 acres of the Shadow Valley Desert Wildlife Management Area may be subjected to project-induced threats.

Given the success that the Bureau generally has had in reducing the number of desert tortoises killed or injured during the implementation of proposed actions, combined with these limitations on the amount of activity that will be permitted in these desert wildlife management areas, we anticipate that few desert tortoises are likely to be killed or injured during future activities. We cannot, at this time, predict how many desert tortoises are likely to die or be injured as a result of actions proposed within the one percent limit on habitat loss or disturbance because we do not know the location of such actions, the number of desert tortoises in these areas, and other specific attributes of any given future action. Such effects will be analyzed in future section 7(a)(2) consultations on specific projects developed under the direction of the California Desert Conservation Area Plan, as appropriate.

Through numerous consultations, the Bureau, Service, and others have developed management prescriptions and protective measures to reduce the effects of proposed projects on the desert tortoise; in general, these measures seem to be effective. The Bureau's adoption of such measures should, in general, ensure that projects implemented throughout occupied habitat of the desert tortoise in the northern and eastern Mojave Desert planning area are implemented in a manner that reduces adverse effects to the desert tortoise. Note that these measures are not actions, in and of themselves, and will be implemented, as necessary, in conjunction with future activities. We cannot, at this time, predict how effective any given measure will be because of the large degree of differing circumstances that surround future actions.

Implementation of a management program for the common raven has the potential to promote the conservation of the desert tortoise. If the program is successful in reducing the number of desert tortoises that are killed by common ravens, it will increase reproductive success, which is a key need for recovery of the desert tortoise. Workers implementing the program may kill or injure desert tortoises as they travel through the desert both on foot and in vehicles, but these effects are likely to be very minimal and involve few desert tortoises. Any program to kill individual common ravens will need additional permitting because of the Migratory Bird Treaty Act; the lead agency for implementing the program will also need to consider whether the desert

tortoise (or its critical habitat) may be affected. Because any program to manage common ravens will require future review, we will not discuss this issue further in this biological opinion. The Bureau's requirement that project proponents compensate for loss or disturbance of habitat of the desert tortoise within desert wildlife management areas at a ratio of five acres of acquisition for every acre adversely affected will promote the conservation of the desert tortoise. This requirement will assist the Bureau in acquiring non-federal lands. Once acquired, the provisions of section 7(a)(2) would be in force; the consultation mandate for Federal agencies provides greater protection to listed species than the prohibitions contained in section 9 of the Act. Additionally, the Bureau can close roads and regulate other activities on acquired parcels and ultimately reduce the level of threat to desert tortoises.

The disposal of public lands with lower resource value may result in the desert tortoises that reside on these parcels being exposed to a greater degree of risk after the land transfer. We anticipate that a limited number of individuals would be placed at such increased risk, because the California Desert Conservation Area Plan only allows the disposal of Class M lands; most lands with higher densities of desert tortoises have been classified as Class L. Additionally, the parcels that the Bureau disposes are generally adjacent to developed lands and, as such, have been subjected to the indirect effects of human habitation for some time. Note that the disposal of land does not always result in the acquisition of habitat supporting the same resources, although it may.

The Bureau may exchange Class L lands; the Bureau's policy with regard to such exchanges is that they must provide a net benefit to the listed species. Such exchanges often allow the acquisition of lands that are important for the conservation of the desert tortoise.

We discussed the benefits of such acquisitions previously in this section; we also note that the Bureau generally acquires much more land through disposals and exchanges than it does through compensation. Therefore, we anticipate that the Bureau typically will use its land tenure program to dispose of lands that have lower biological value in exchange for expanding Federal protection over higher value lands within desert wildlife management areas; this action constitutes a net benefit to the desert tortoise. The effects of specific land transfers on the desert tortoise will be analyzed under section 7(a)(2) consultations on specific projects developed under the direction of the California Desert Conservation Area Plan, as appropriate.

A small number of desert tortoises may be killed or injured during monitoring of populations of desert tortoises or while conducting research activities, both by vehicles on roads or, to a lesser degree, by foot traffic. We expect the number of individuals to be killed or injured to be low because relatively few monitors and researchers will be in the field in comparison to the overall use of the desert; additionally, these workers are likely to be more aware of desert tortoises than the average recreationist and thus more likely to avoid striking a desert tortoise with a vehicle. The information gained through research on and monitoring of the desert tortoise is likely to benefit its conservation. We will evaluate the value and effects on the desert tortoise of future monitoring and research efforts, under the appropriate authorities of the Endangered Species Act, when a specific proposal is submitted.

Providing information to the public on the status of and conservation efforts for the desert tortoise will likely promote a better understanding of its recovery needs and therefore is beneficial to the desert tortoise. Some specific proposals, such as building informational kiosks, may pose a risk to a small number of desert tortoises. Such proposals will be subject to the consultation requirements of section 7(a)(2) of the Act.

Effects on Critical Habitat

Limiting the amount of cumulative surface disturbance to one percent of the public lands in each of the desert wildlife management areas will likely ensure that proposed actions do not appreciably compromise the function and conservation role of critical habitat units in the northern and eastern Mojave Desert planning area. This cap indicates that up to approximately 1,738 acres of the Piute-Fenner Desert Wildlife Management Area, 368 acres of the Ivanpah Valley Desert Wildlife Management Area, and 1,013 acres of the Shadow Valley Desert Wildlife Management Area may be subjected to project-induced threats. Although the primary constituent elements of critical habitat may be disturbed or lost within areas of disturbance, the relatively small amount of disturbance or loss (in relation to the size of the critical habitat unit) that the Bureau would potentially authorize will likely ensure that the conservation role and function of the affected critical habitat unit will not be impaired. Additionally, because the disturbance and loss of habitat would likely occur through the implementation of numerous actions, separated throughout the critical habitat unit by distance and over time, adverse effects to the primary constituent elements of the affected critical habitat unit are likely to be minor. Conversely, approximately 99 percent of the critical habitat within the desert wildlife management areas will remain undisturbed; this lack of disturbance will clearly promote the ability of the critical habitat unit to achieve its conservation role and function.

We note that the one percent limit is tied to the size of the desert wildlife management area but not to the critical habitat unit. For this reason and because we do not know where future actions may occur, we cannot, with absolute certainty, state that only one percent of the critical habitat unit will be affected. We expect, however, that project impacts within the portions of the Ivanpah Critical Habitat Unit managed by the Bureau will also not exceed the one percent limit for several reasons. First, given the past history of this area, most actions will be relatively small in scale and will be spread across the critical habitat unit. Second, the large degree of overlap between the desert wildlife management areas and critical habitat should ensure that many actions will not be concentrated within critical habitat but outside of the desert wildlife management areas. Finally, at least some projects will likely occur within the desert wildlife management area but outside of critical habitat. Consequently, we conclude that the one percent

limit on cumulative surface disturbance within desert wildlife management areas is also likely to confer a high degree of protection to critical habitat.

As we noted in the previous section, we expect the adopted standard measures to reduce the effects of specific proposed activities on critical habitat of the desert tortoise to be generally effective because of past successes. Reclaiming habitat that is lost or disturbed by new projects and using disturbed areas to the degree possible for new facilities will promote more timely recovery of habitat values and avoid future impacts, respectively, to some degree and are important means of reducing adverse effects on habitat of the desert tortoise. Note that these measures are not actions, in and of themselves, and will be implemented, as necessary, in conjunction with future activities.

The Bureau's requirement that project proponents compensate for loss or disturbance of habitat of the desert tortoise within desert wildlife management areas at a ratio of five to one will promote the conservation role and function of critical habitat of the desert tortoise because it will assist in acquiring non-federal lands and in the implementation of management actions on public lands. Once acquired, the provisions of section 7(a)(2) would be in force. The consultation mandate requires Federal agencies to avoid adverse modification of critical habitat of listed species; section 9 of the Act does not address critical habitat. Additionally, the Bureau can close roads, regulate activities, and attempt to restore the primary constituent elements of critical habitat on acquired parcels and ultimately reduce the level of threat and disturbance to habitat of the desert tortoise. Although the compensation requirement will generally benefit the conservation role and function of critical habitat, the limit on loss or disturbance of habitat within desert wildlife management areas and the general lack of activity in the northern and eastern Mojave Desert planning area may result in the acquisition of a fairly small amount of habitat through this means; one exception to this general rule may be compensation acquired for large utility projects.

The disposal of public lands with lower resource value may result in the habitat on these parcels being lost to development or being degraded by activities occurring on adjacent non-federal lands. We anticipate that the Bureau will dispose of little, if any, critical habitat primarily because most critical habitat within this planning area is located within desert wildlife management areas. Although the approximately 12,000-acre area west of the Shadow Valley Desert Wildlife Management Area may be available for disposal, the Bureau is unlikely to dispose of this area of critical habitat because of its important recreational values. The 485-acre parcel of critical habitat near Nipton may be exchanged at some later date; the exchange of this parcel would likely allow the acquisition of lands that are important for the conservation of the desert tortoise. We discussed the benefits of such acquisitions in the previous section of this biological opinion; we also note that the Bureau generally acquires much more land through exchanges than it does through compensation. We cannot, at this time, determine the amount of land that would be disposed and acquired. This information will become available during our review of specific disposals and exchanges; consultation, pursuant to section 7(a)(2) of the Act, would occur, as appropriate, on these specific actions.

Monitoring of populations of desert tortoises to assess the effectiveness of management and

research on this species are unlikely to adversely affect critical habitat of the desert tortoise because vehicle use will be restricted to designated routes of travel; although biologists conducting the monitoring will walk through critical habitat, we expect the impacts of this activity on the primary constituent elements of critical habitat to be negligible. Information gained through monitoring about the condition of the primary constituent elements of critical habitat, if that is a goal of the monitoring, is likely to benefit the conservation of the desert tortoise because it will influence future management decisions.

Providing information to the public on the status of and conservation efforts for the desert tortoise will likely promote a better understanding of the importance of maintaining suitable habitat for its recovery. Some proposals, such as the building informational kiosks, are likely to disturb or remove primary constituent elements in a small area, but these adverse effects are likely to be negligible due to the small amount of critical habitat affected.

Management of Vehicles

Through approval of the northern and eastern Mojave Desert bioregional plan, the Bureau designated routes of travel within certain habitat of the desert tortoise, limited certain activities to within disturbed areas within 100 feet of the centerline of the road, and restricted parking and camping to within the banks of any washes that are designated as open.

Effects on the Desert Tortoise

The closure of approximately 94 miles of routes within the 350,000-acre area of desert tortoise habitat in the southern portion of the planning area is likely to reduce the number of desert tortoises that are killed or injured by vehicles; it will also remove an unquantifiable number of desert tortoises from the proximity of roads and thereby reduce the level of threat these animals are exposed to from various human activities. (This 350,000-acre area includes lands that the Bureau designated as desert wildlife management areas; the route designation process began before the desert wildlife management areas were established, so the Bureau evaluated routes over a larger area than was finally designated (Seehafer pers. comm. 2005a).) The Bureau's designation of 69 miles of routes, including 6 miles of navigable washes, as limited will also reduce the level of mortality of desert tortoises, possibly to a somewhat lesser degree because some use will remain on those routes. Conversely, desert tortoises will continue to be exposed to threats along the approximately 681 miles of routes that remain open; approximately 43 miles of navigable washes are included in this total. Given the numerous variables involved, we cannot determine how many desert tortoises are likely to be killed or injured along the routes designated as open or limited in the southern portion of the northern and eastern Mojave Desert planning area.

Desert tortoises may be killed or injured as a result of stopping, parking, and camping in disturbed areas within 100 feet of the centerline of routes within desert wildlife management areas in the northern and eastern Mojave Desert planning area. Desert tortoises that are crossing or residing in these disturbed areas would be at risk if a vehicle uses the area at the same time the

animal is present. Additionally, desert tortoises may enter disturbed areas after the vehicle is parked to take cover in its shade; the desert tortoise could then be crushed if the vehicle moves. The likelihood that desert tortoises would be killed is likely far less in disturbed areas than in undisturbed areas because the drivers of vehicles are likely more able to see animals without the full component of vegetation that is normally present; additionally, desert tortoises are likely to spend less time in these areas because of the more compact substrates and less vegetation available for shelter and forage.

As we discussed in the Effects of Human Activities on the Desert Tortoise section of this biological opinion, vehicle use in washes exposes desert tortoises to the potential of being crushed, although we cannot assess the degree this threat is different than that posed by roads. Approximately 6.3 percent of the 681 miles of routes of travel that are designated as open within the area of desert tortoise habitat are in washes; approximately 8.7 percent of the 69 miles of routes of travel that are designated as limited are in washes. Because a relatively small percentage of the open and limited routes are in washes, we anticipate that the number of desert tortoises that may be killed by vehicle use is unlikely to reduce appreciably the reproduction, numbers, or distribution of the desert tortoise in the planning area for the northern and eastern Mojave Desert.

The effects of parking and camping within the banks of open or limited navigable washes would be similar to those associated with the use of disturbed areas within 100 feet of the centerline of the road, as described previously in this biological opinion. Because desert tortoises tend to spend relatively more time in washes than in other areas, as we described in the Status of the Species and its Critical Habitat - Basic Ecology of the Desert Tortoise section of this biological opinion, they may be at somewhat greater risk of being struck by vehicles that are using washes as routes of travel. A relatively small portion of the northern and eastern Mojave Desert planning area is subject to this type of use, based on the fact that 43 miles of wash are designated as open and 6 miles as limited. For this reason, we do not anticipate that parking and camping within the banks of open or limited navigable washes is likely to reduce appreciably the reproduction, numbers, or distribution of the desert tortoise in the northern and eastern Mojave Desert planning area.

Effects on Critical Habitat

The effects of vehicles using existing routes of travel on habitat of the desert tortoise were discussed in the Effects of Human Activities on Critical Habitat section of this biological opinion. The use of vehicles on roads that are designated as open or limited will not, in general, adversely affect the primary constituent elements of critical habitat of the desert tortoise because these biological and physical attributes are not present within roadbeds. Some roads support annual plants, possibly even at greater local densities than on adjacent, undisturbed habitat, because of alterations in the hydrological regime caused by the road. Although such areas may be of value to a few desert tortoises, they are not so extensive that they substantially alter the patterns of distribution of forage plants.

Stopping, parking, and camping in disturbed areas within 100 feet of the centerline of routes is not likely to affect the primary constituent elements to a substantial degree because the value of the biological and physical attributes in such areas is likely already degraded to a substantial degree. Driving, parking, and camping within the banks of washes designated as open or limited is likely to reduce the quality and quantity of forage species and possibly vegetation that desert tortoises need for shelter from temperature extremes and predators. The quantity of affected plants that provide forage and shelter is likely to be minor, in comparison to the amount of annual plants available in habitat adjacent to washes that are open for vehicle use and in other washes. If vehicles are used in narrow washes or along the banks of a wash that is suitable for burrowing, such use is likely to destroy existing burrows and possibly caliche caves; it may also degrade substrate conditions to a degree that local areas become unavailable for burrowing. However, because only a relatively small portion of critical habitat in the northern and eastern Mojave Desert planning area is affected by this use, these activities are unlikely to compromise the conservation role and function of the affected critical habitat units.

Management of Grazing

The amount of livestock grazing has changed considerably since the issuance of the first biological opinion regarding the effects of the California Desert Conservation Area Plan on the desert tortoise and its critical habitat (Morgan pers. comm. 2005a). The Kessler Spring Allotment is currently in non-use; the Bureau has been notified by the operator that he intends to voluntarily relinquish the allotment. The Piute Valley Allotment was originally designated for ephemeral use; because the Bureau eliminated ephemeral use in the Northern and Eastern Mojave Desert Management Plan, this allotment no longer exists. The Valley View and Valley Wells allotments have been transferred to an operator who intends to voluntarily relinquish the grazing privileges. Therefore, only the Jean Lake Allotment remains within critical habitat of the desert tortoise or a desert wildlife management area. An applicant has notified the Bureau that he intends to graze cattle on the Jean Lake Allotment if his application is approved. The Bureau proposes to continue to allow grazing of cattle on three allotments that support desert tortoises but which lie outside of critical habitat.

Effects on the Desert Tortoise

The removal of livestock grazing from four allotments will eliminate any direct threats that cattle and their management pose to desert tortoises. As we noted previously in this biological opinion, quantifying the adverse effects of grazing on desert tortoises is difficult; conversely, we cannot accurately quantify the benefits. For example, although grazing will no longer occur on approximately 288,000 acres, some unquantifiable portion of this area likely does not support desert tortoises because of the elevation or other natural factors; additionally, some areas that support desert tortoises may have been lightly grazed, if at all. Nevertheless, the removal of grazing from these allotments will eliminate any source of mortality of desert tortoises that may have occurred as a result of trampling by cattle and crushing during maintenance of the livestock improvements. The absence of cattle will also likely make the area less attractive to common ravens because the subsidies upon which they partially depend will no longer be present. This

action will benefit the desert tortoise.

If the Bureau approves the use of the Jean Lake Allotment, cattle will be removed when ephemeral forage production is less than 230 pounds per acre from March 15 through November 1. This allotment covers 9,806 acres and is authorized for 300 animal unit months; it has not been grazed for many years (Bureau 2002d). The removal of cattle from the allotment between March 15 and November 1 when forage production is low will prevent direct mortality of desert tortoises during these times; this action will, therefore, assist in reducing the number of desert tortoises that are trampled by cattle. Given the small size of the allotment and the assumption that cattle do not trample larger desert tortoises on a frequent basis (see discussion in the Livestock Grazing - Effects on the Desert Tortoise section of this biological opinion), the actual reduction in mortality may be small. The presence of cattle during the winter will continue to pose some potential for mortality because desert tortoises have been crushed by cattle while in their burrows; additionally, recent observations have shown that desert tortoises can be active to some degree at almost any time of the year, particularly if rain has fallen (Jones pers. comm. 2005, Threlhoff pers. comm. 2005, Donnelly 2003a and b).

The Jean Lake Allotment is classified in the California Desert Conservation Area Plan as ephemeral/perennial; this classification means that additional livestock can be authorized to graze at times when the production of ephemeral forage is high. The Bureau's termination of ephemeral authorizations for ephemeral/perennial allotments will preclude the grazing of additional cattle at times of high production. Because additional cattle would pose a greater risk of trampling to desert tortoises, the decision to not use ephemeral authorizations will eliminate this threat; because desert tortoises will be more active during times of high production of ephemeral plants, the risk of trampling may be greater at this time. The Bureau's decision to not authorize temporary, non-renewable grazing will prevent the introduction of additional cattle at times of high production in perennial species of plants; as we noted for ephemeral authorizations, the decision to not allow additional cattle on the Jean Lake Allotment for this type of use is protective of desert tortoises.

In summary, the Jean Lake Allotment is relatively small in area and the Bureau has decided to not authorize the grazing of additional cattle at times of higher production of plants and to implement other protective measures to reduce the effects of grazing on the desert tortoise. Consequently, if the Bureau decides to authorize cattle grazing again in this allotment, we expect that this level of grazing will not reduce the reproduction, numbers, or distribution of the desert tortoise.

Cattle grazing is not likely to affect desert tortoise populations in a substantial manner in the three cattle allotments located outside of desert wildlife management areas and critical habitat units in the northern and eastern Mojave Desert bioregion. As we noted in the Environmental Baseline section of this biological opinion, desert tortoises have not been known to be abundant in historic times in the Horsethief Springs and Pahrump Valley allotments, although, prior to 1984, they were estimated to reach densities of up to 100 per square mile in portions of the Clark Mountain Allotment. The measures that the Bureau will implement to protect desert tortoises should reduce the effects of cattle grazing to some degree, although the measures outside of

critical habitat are less protective. For example, temporary, non-renewable authorization for perennial forage and authorization for ephemeral forage will allow more cattle to use the allotment in years of good plant production; therefore, desert tortoises may be more susceptible to trampling and food resources may be limited to a certain degree. The Bureau's establishment of upper limits of utilization may preclude overuse of specific areas on the allotment.

In summary, grazing of the Horsethief Springs and Pahrump Valley allotments is not likely to reduce appreciably the reproduction, numbers, or distribution of the desert tortoise because, in the first two allotments, the density of desert tortoises is likely low and continued grazing is unlikely to alter their status in those areas. Grazing in the Clark Mountain Allotment may adversely affect desert tortoises to a slightly greater degree simply because they are more common at the lower elevations of that allotment than they are elsewhere in these three areas. As we discussed previously in this biological opinion, we expect that few desert tortoises will be trampled by cattle. The measures intended to avoid alteration of habitat are less stringent within the Clark Mountain Allotment because it is not within critical habitat or a desert wildlife management area and may preclude it from supporting more desert tortoises. The management of grazing within the Clark Mountain Allotment is not likely to alter the current status of the desert tortoise in the Eastern Mojave Recovery Unit because of the low level of the grazing that it usually supports; the Bureau notes that, although the allotment can be grazed throughout the year with 132 cattle, only 25 head have been present for the past several years (Bureau 2002d).

Effects on Critical Habitat

The removal of livestock grazing from four allotments will eliminate any direct adverse effects of cattle and their management on the primary constituent elements of critical habitat of the desert tortoise. Specifically, the need to construct stock tanks and corrals will be eliminated and no additional areas will be degraded by large numbers of livestock congregating for extended periods of time; the removal of these effects on critical habitat are likely to result in at least local improvement to habitat quality. Livestock-induced changes in the species composition of plant communities, plant cover, biomass, structure of the substrate, and soil crusts will no longer occur. To the best of our knowledge, none of the livestock-induced changes to these habitat features benefit the desert tortoise (Service 1994c); therefore, the cessation of these effects will promote the conservation of the species. Burrows, caliche caves, and other shelter sites, such as shrubs, will not be crushed by cattle. Consequently, these features will be more readily available to desert tortoises; furthermore, desert tortoises will exert less energetic resources repairing damaged burrows or finding new shelter, which may allow them to devote more energy to reproductive output and to be less accessible to predators and temperature extremes. Overall, we expect that the removal of cattle will improve the quality of the primary constituent elements of critical habitat of the desert tortoise over large areas of the northern and eastern Mojave Desert bioregion in varying but unquantifiable degrees.

To provide some indication of the scale of these changes in livestock grazing, the Bureau plans to cancel its portion of the Piute Valley Allotment upon receipt of this biological opinion. This cancellation will eliminate the potential to graze on 20,145 acres of the 173,850-acre Piute-

Fenner Desert Wildlife Management Area and the 453,800-acre Piute-Eldorado Critical Habitat Unit, which also extends into Nevada. We acknowledge that this ephemeral allotment has not been grazed for years. Consequently, grazing has been completely eliminated from this desert wildlife management area and the California portion of the critical habitat unit that is managed by the Bureau. Approximately 151,700 acres of the Colton Hills Allotment and 1,200 acres of the Gold Valley Allotment are located within the National Park Service's portion of the Piute-El Dorado Critical Habitat Unit (Service 2001); we will not discuss these allotments further because they are outside of the Bureau's management responsibilities.

The Ivanpah Critical Habitat Unit covers 632,400 acres of lands administered by the Bureau and National Park Service. With the Bureau's decisions, grazing has now been eliminated from the 223,007-acre Valley Wells Allotment. This allotment overlapped the 101,355-acre Shadow Valley Desert Wildlife Management Area and portions of the surrounding area; it also overlapped the entire portion of the Ivanpah Critical Habitat Unit north of Interstate 15. The Kessler Springs and Valley View allotments were located at least partially within the 36,795-acre Ivanpah Valley Desert Wildlife Management Area and the portion of the Ivanpah Critical Habitat Unit that lies to the northeast of the Mojave National Preserve. With the relinquishment of the Kessler Springs and Valley View allotments, the Jean Lake Allotment, at 9,806 acres, is the only remaining active allotment within the Ivanpah Critical Habitat Unit. This allotment covers approximately 27 percent of the Ivanpah Desert Wildlife Management Area and approximately 1.5 percent of the 632,400-acre Ivanpah Critical Habitat Unit.

If the Bureau permits cattle grazing in the Jean Lake Allotment, desert tortoises in that area will be affected as we have described previously in this biological opinion. Additionally, in years of low production of annual plants, desert tortoises lay fewer eggs (Tracy 1996 in Boarman 2002); desert tortoises may also produce fewer eggs when they compete with cattle for food (Tracy 1996 in Boarman 2002). The Bureau intends to reduce this impact on reproduction by removing cattle from allotments within desert wildlife management areas, which, in this case, includes this portion of the Ivanpah Critical Habitat Unit, when forage production falls below 230 pounds per acre; Avery's (1998) work suggested this quantity of forage as being the level at which competition occurred in Ivanpah Valley.

The overall measurement of annual plants to determine the amount of production can result in misleading information. As Avery (1998) demonstrated, at least some plants, such as Mediterranean grass, are less nutritious than others; consequently, if the 230 pounds of available forage is composed primarily of less nutritious species, desert tortoises may still be unable to meet their nutritional needs. Consequently, although monitoring the production of annual plants may be a useful tool in assessing their overall availability, it is unable to detect, as it is currently designed, components of the forage base that are important for maintaining the primary constituent elements of critical habitat. Furthermore, Henen et al. (1998) concluded that desert tortoises have a "remarkable capacity ... to respond behaviorally and physiologically to their extremely variable environment..." specifically, their reproductive output is high following heavy rains and a strong presence of annual plants and very low following dry winters. Simply stated, years of high productivity of annual plants may sustain not only individuals, but also

populations, through more stressful years; allowing cattle grazing during the best years has the potential to, in effect, turn years of strong production of annual plants into average years.

Despite the potential that the threshold of 230 pounds of annual plants may not remove all effects of livestock grazing on the desert tortoise's food base, the effects of the remaining grazing must be considered in light of the size of the areas that are grazed and not grazed within the critical habitat unit. The recovery plan for the desert tortoise (page 58, Service 1994) recommends that grazing be prohibited within desert wildlife management areas until such time that research shows grazing is compatible with recovery. The recovery plan (page 36) also states that up to 10 percent of a desert wildlife management area "may be designated as an experimental management zone," where "intrusive research" on the desert tortoise may occur. The Bureau has, through the Northern and Eastern Mojave Desert Management Plan, allowed for research activities to occur within desert wildlife management areas; however, it has not proposed any specific research for livestock grazing in this area. Although the Jean Lake Allotment covers more than 10 percent of the area of the Ivanpah Desert Wildlife Management Area, as recommended by the recovery plan, it covers far less than this percentage of the Ivanpah Critical Habitat Unit. Because desert tortoises do not recognize the boundaries between National Park Service and Bureau lands, the extent of the critical habitat unit is the appropriate measurement to use when considering how closely the Northern and Eastern Mojave Desert Management Plan follows the guidance of the recovery plan. On this basis, the Bureau's proposals for grazing use in the northern and eastern Mojave Desert bioregion more than meet the recommendations of the recovery plan and are not likely to impair the conservation role or function of the Ivanpah Valley or Piute-Eldorado critical habitat units.

Three cattle allotments are located outside of critical habitat units in the northern and eastern Mojave Desert bioregion. These allotments will not affect critical habitat of the desert tortoise and will not be discussed in this section of the biological opinion.

Management of Burros

The Bureau will substantially remove burros from the Clark Mountain Herd Management Area, which covered 75,350 acres and was authorized to support 44 burros. This herd management area has been eliminated through approval of the Northern and Eastern Mojave Desert Management Plan.

Effect on the Desert Tortoise

This action substantially removed burros from the Shadow Valley Desert Wildlife Management Area and from Category I habitat east of Clark Mountain. Therefore, the vast majority of the adverse effects that burros have on desert tortoises will be eliminated from this area. Because removing every burro may not be possible, a small number of burros will likely remain; therefore, some residual impacts to desert tortoises will likely remain within the 75,350-acre area. The number of desert tortoises that could be trampled by burros or during round-ups will decrease. Neither burros nor desert tortoises are distributed uniformly across the herd

management area; for this reason, we cannot quantify the precise level of benefit to the desert tortoise. The removal of burros from this area constitutes an important action to promote the survival and recovery of the desert tortoise.

Effect on Critical Habitat

The removal of burros from the portion of the Ivanpah Critical Habitat Unit north of Interstate 15 will decrease the amount of disturbance of cryptogammic crusts and, over time, will likely render substrates in certain areas more suitable for burrowing, as they recover from trampling. Damage to shrubs that provide shelter for desert tortoises will decrease, probably to a substantial degree in at least some local areas; annual plants will be subjected to less grazing pressure. As we noted in the previous paragraph, burros (and the effect they have on plant communities) are not uniformly distributed across the herd management area; therefore, their effects on the primary constituent elements of critical habitat were also not uniformly distributed. For that reason, the response of the primary constituent elements to removal of burros is likely to vary within affected areas of the Ivanpah Critical Habitat Unit. Overall, the removal of burros from this area is highly likely to improve, to a substantial degree, the condition of several primary constituent elements of critical habitat of the desert tortoise in the Ivanpah Critical Habitat Unit.

Land Tenure

The Bureau proposed to acquire all private lands in desert wildlife management areas from willing sellers. The following table depicts the acreages of non-federal land in the desert wildlife management areas in the northern and eastern Mojave Desert planning area; these acreages reflect acquisitions that have occurred since the Bureau requested formal consultation (Seehafer 2005b).

Desert Wildlife Management Area	Acreage of Private and State Lands	Percentage of Private and State Lands
Piute-Fenner Valley	17,384	10
Ivanpah Valley	1,840	5
Shadow Valley	6,080	6

Effect on the Desert Tortoise

As we noted previously in this biological opinion, the Bureau's acquisition of non-federal land that supports desert tortoises provides a net benefit to the species because of the conservation mandates placed on Federal agencies and the more protective requirements of sections 7(a)(1) and 7(a)(2) of the Act, respectively. Consequently, the Bureau's goal of acquiring all non-federal land within the desert wildlife management areas in the northern and eastern Mojave Desert planning area is likely to contribute to the survival and recovery of the desert tortoise by increasing the amount of land managed to promote that conservation.

Effect on Critical Habitat

As we noted previously in this biological opinion, the Bureau's acquisition of non-federal land that supports desert tortoises provides a net benefit to the species because of the conservation mandates placed on Federal agencies and the more protective requirements of sections 7(a)(1) and 7(a)(2) of the Act, respectively. Because the protections afforded to critical habitat do not apply to non-federal lands, the acquisition of these lands provides a greater ability to conserve the primary constituent elements within the critical habitat units. Consequently, the Bureau's goal of acquiring all non-federal land within the desert wildlife management areas in the northern and eastern Mojave Desert planning area should improve the conservation role and function of the Ivanpah Critical Habitat Unit.

Effects of the Northern and Eastern Colorado Desert Coordinated Management Plan on the Desert Tortoise and its Critical Habitat**Amendment 2 - Establishment of Desert Wildlife Management Areas**

The Bureau has established two desert wildlife management areas within this planning area in accordance with the guidance provided by the recovery plan for the desert tortoise (Service 1994c). These areas have also been designated as areas of critical environmental concern. The Chemehuevi Desert Wildlife Management Area covers 874,843 acres, of which 815,843 acres are managed by the Bureau. Approximately 465,287 acres of the 818,685-acre Chuckwalla Desert Wildlife Management Area are managed by the Bureau.

Effects on the Desert Tortoise

As described in the section of this biological opinion entitled Special Management Areas, the Bureau's designation of areas of critical environmental concern provides the framework to identify clearly the management objectives of desert wildlife management areas. It also serves as an informational guide to users of the desert that future uses, activities, or management practices must be compatible with the recovery of the desert tortoise. This designation will not have

direct, on-the-ground effects on the desert tortoise; however, it appropriately sets the stage for future management of public lands and the implementation of recovery actions for the desert tortoise.

Changing all desert tortoise habitat within the desert wildlife management areas to Category I will likely have little effect on desert tortoises because of the prescriptions under which the areas of critical environmental concern will be managed; the Category I designation will not add to the level of protection. Where former Category I or II habitat lies outside of the desert wildlife management areas, the change to Category III will decrease the level of management for and protection of desert tortoises to some degree; this change is not likely to be substantially detrimental to the desert tortoise because the vast majority of suitable habitat for the desert tortoise has been included within the desert wildlife management areas. The conversion of Class M lands in a desert wildlife management area to Class L is protective of desert tortoises because the Bureau's general program guidance for Class L lands calls for a lower density of activity and carefully controlled multiple uses of resources while ensuring that sensitive values are not significantly diminished. The general effect of this change is that desert tortoises within desert wildlife management areas will receive greater consideration in the overall management of the area and during project-specific reviews; these changes are protective of desert tortoises.

Limiting the amount of cumulative surface disturbance to one percent of the public lands in each of the desert wildlife management areas will likely ensure that proposed actions do not cause injury to or mortality of a large number of desert tortoises. This cap indicates that the desert tortoises on approximately 8,158 acres of the Chemehuevi Desert Wildlife Management Area and 4,653 acres of the Chuckwalla Desert Wildlife Management Area may be subjected to project-induced threats; note that, as the Bureau acquires more land, an additional one percent of the added land may also be subject to disturbance. Conversely, desert tortoises on at least 807,685 acres of the Chemehuevi Desert Wildlife Management Area and 460,634 acres of the Chuckwalla Desert Wildlife Management Area will not be subjected to habitat disturbance or loss; such protection constitutes a substantial beneficial effect to the desert tortoise given the relationship of desert wildlife management areas to recovery units and the survival and recovery of the species.

The Bureau's requirement that project proponents compensate for loss or disturbance of habitat of the desert tortoise within desert wildlife management areas at a ratio of five acres of compensation for every acre lost or disturbed will promote the conservation of the desert tortoise. This requirement will assist the Bureau in acquiring non-federal lands. Once acquired, the provisions of section 7(a)(2) would be in force; the consultation mandate for Federal agencies provides greater protection to listed species than the prohibitions contained in section 9 of the Act. Additionally, the Bureau can close roads and regulate other activities on acquired parcels and ultimately reduce the level of threat to desert tortoises.

The Bureau's commitment to fence, sign, or patrol the peripheries of desert wildlife management areas may reduce conflicts with adjacent land uses and inform desert users that they are entering an area that is biologically important. Protecting the integrity of the desert wildlife management

areas is vitally important if they are to contribute to the survival and recovery of the desert tortoise.

The Bureau's commitment to issue permits for the harvest of live vegetation only within salvage areas where surface disturbance has been authorized should be protective of desert tortoises. First, this direction will ensure that desert tortoises in areas important to their conservation are not killed or injured solely as a result of the harvesting of vegetation. Additional protection for desert tortoises is likely because other measures to avoid mortality, such as clearance surveys and exclusion fencing, will have been conducted prior to the salvage. Consequently, this management direction should reduce the mortality of desert tortoises during the harvest of live vegetation.

Classified lands acquired through compensation or mitigation are closed to disposal and use will prevent, to a large degree, future activities on these areas that may kill or injure desert tortoises. This measure constitutes an important conservation tool for the desert tortoise because it, in conjunction with the one percent cap on new disturbance, should ensure the long-term management of most of the desert wildlife management areas for the benefit of the species.

If the Bureau authorizes new linear projects that might otherwise fragment desert tortoise populations, it will require that bridges and culverts be installed to allow animals to pass. Such provisions will ensure that the distribution of the desert tortoise is not restricted by these linear projects.

Through the approval of the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau reduced the size of the open wash zones from 577,397 to 218,711 acres in the Chemehuevi Desert Wildlife Management Area and designated 656,132 acres as "closed wash zones;" the Bureau also reduced the size of the open wash zones from 475,645 to 352,633 acres in the Chuckwalla Desert Wildlife Management Area and designated 467,444 acres as "closed wash zones." The designation of an open wash zone essentially means that any wash within such a zone that is navigable by a vehicle can be used for driving, stopping, parking, and camping; all vehicle use must be within the banks of the wash. Clearly, this reduction in the size of the areas where vehicles can travel in any navigable wash will reduce the potential for desert tortoises to be crushed by vehicles. The more difficult question is whether the level of mortality that may still occur in the smaller open wash zones is sufficient to reduce the reproduction, numbers, and distribution of the desert tortoise in these areas.

As we have noted previously in this biological opinion, determining the number of desert tortoises that may be killed by vehicles is difficult to predict because the level of mortality is affected by many factors, such as the level, type, and timing of vehicle use and the density and activity patterns of desert tortoises. To some degree, the timing of use may not play a large role in this situation. Because desert tortoises can be active at any time of the year, they are vulnerable to being struck by vehicles at any time. They may be somewhat more vulnerable in the spring and fall when they are moving farther from their burrows in search of food and mates. To evaluate the potential impact of open wash zones on desert tortoises, we will first evaluate

whether the potential for mortality is present. We will then consider the best scientific and commercial data available or which can be obtained during the consultation, as required by the implementing regulations for section 7(a)(2) of the Endangered Species Act (50 *Code of Federal Regulations* 402.14); the specific data we will consider is the level of use of the open wash zones and the distribution of desert tortoises in these areas.

As we discussed in the Effects of Human Activities on the Desert Tortoise and Effects of the Northern and Eastern Mojave Desert Management Plan on the Desert Tortoise and its Critical Habitat - Management of Vehicles sections of this biological opinion, vehicle use in washes exposes desert tortoises to the potential of being crushed, although we cannot assess the degree this threat is different than that posed by roads. The difference between the potential effects of travel in washes in the planning areas in the northern and eastern Mojave Desert and the northern and eastern Colorado Desert is that travel in washes in the former planning area is limited to a relatively short distance of specific washes; in the latter planning area, any wash that can support a vehicle within large acreages is open to use. Obviously, the potential exists that desert tortoises in an open wash zone are at a much higher degree of risk of being struck by a vehicle than those in an area where only a few specific washes are available for use. If desert tortoises are present in an area used by vehicles, they are at risk of being killed. In this case, we know desert tortoises reside in the Chemehuevi and Chuckwalla desert wildlife management areas. We will next evaluate the level of vehicle use that the open wash zones receive.

The final environmental impact statement for the Northern and Eastern Colorado Desert Coordinated Management Plan notes that washes in the open zone provide motorized vehicle access for hunting, sight-seeing, nature study, and camping (Bureau and California Department of Fish and Game 2002, page 3-56). The final environmental impact statement continues to describe the level of use of the washes as being generally low, based on information provided by members of Desert Wildlife Unlimited; the Bureau notes that “very little cross-country travel occurs due to the extensive nature of existing roads, trails, and washes.” The Bureau provides some quantification of the level of use; compared to other popular recreational areas in the California Desert Conservation Area, such as the Imperial Sand Dunes and Dumont Dunes, the numbers provided by the Bureau seem to indicate a low degree of use. Clearly, as we stated previously in this discussion, the number of desert tortoises that could be killed by vehicular use in open wash zones is a function of the level of use and type of use. A high volume of traffic would result in more desert tortoises being struck by vehicles; vehicles that are traveling faster, such as motorcycles, may also strike more desert tortoises. We conclude that the level of vehicle use in the open wash zones is generally low and that it generally consists of recreationists whose primary activity is not based on speed.

We acknowledge that the information available in the final environmental impact statement for the Northern and Eastern Colorado Desert Coordinated Management Plan (Bureau and California Department of Fish and Game 2002) is not comprehensive. It is, however, the only published documentation of the level of use that was available to us. Any attempt to gather new information on the level of vehicle use in the open wash zones will require years to gain a comprehensive view of use over such a large area; consequently, we could not obtain this

information during the course of this consultation.

Finally, we evaluated the distribution of desert tortoises in the two desert wildlife management areas using data from density maps and preliminary information from recent line distance sampling transects. To do this, we first overlaid maps of the densities of desert tortoises (Berry 1984) in the two desert wildlife management areas with the open and closed wash zones. (We are not reporting acreages for overlap of closed and open zones and densities of desert tortoises at this time; the total acreages we recorded did not match the information on the overall acreages of the desert wildlife management areas provided by the Bureau. Therefore, the following discussion views this information in relative terms.)

In the Chuckwalla Desert Wildlife Management Area, the highest density areas of 100 to 250 desert tortoises per square mile seemed to be located primarily in closed areas. Conversely, most of the area in the next highest class, 50 to 100 animals per square mile, was located in open wash zones. For the 20 to 50 animals per square mile class, approximately twice as much land was located in the open wash zones; the opposite was true for the lowest density class of 1 to 20 animals per square mile.

Although this overlay of densities may provide some indication of the distribution of desert tortoises in relation to the location of open wash zones, its value is tempered by two factors. First, the density class map is based on relatively few points and likely may not have been completely accurate; see Tracy et al. (2004) for a more detailed discussion of estimating the density of desert tortoises. Second, the data used in the development of the class are over 20 years old; additionally, we know that the density of desert tortoises in numerous areas of the desert has declined.

We also reviewed maps that were generated through data gathered from the line distance sampling efforts that were conducted from 2001 through 2004 (Everly 2005). These maps depict the locations of transects in the Chuckwalla and Chemehuevi desert wildlife management areas where live desert tortoises and carcasses were found; they also show transects where no observations were made. The data that were used to generate these maps have not been fully analyzed to date. In the Chuckwalla Desert Wildlife Management Area, the vast majority of the observations of desert tortoises or carcasses were located within the Chocolate Mountains Aerial Gunnery Range, on immediately adjacent public lands, or within the Chuckwalla Bench. The Chuckwalla Bench lies south of Interstate 10, slightly to the west of the central portion of the desert wildlife management area; Woodman (2004) describes it as “a lush region ... that still has relatively high (desert) tortoise numbers” and as a “narrow area with steep mountains or cliffs on each side.” Few, if any, transects seem to have been located within the four wilderness areas that overlap this desert wildlife management area south of Interstate 10. The areas and observations described in this paragraph are generally located within closed wash zones.

Outside of the Chocolate Mountains Aerial Gunnery Range, the immediately adjacent public lands, or the Chuckwalla Bench, either desert tortoises or carcasses were found on most of the transects. These observations were, however, much more widely scattered than those within or adjacent to the Chocolate Mountains Aerial Gunnery Range or on the Chuckwalla Bench. Most

of the transects on which no sign of desert tortoises was found had been conducted adjacent to paved roads in the northeastern portion of the Chuckwalla Desert Wildlife Management Area. The areas and observations described in this paragraph generally lie within open wash zones.

The next question to ask is whether the distribution of observations provides information that is useful in determining the effects of use of the wash open zones on desert tortoises. Based on the preliminary information provided by line distance sampling, we conclude that desert tortoises, whether alive or dead, are more likely to be encountered on the Chuckwalla Bench and on the northeastern flank of the Chocolate Mountains. The flanks of the Chocolate Mountains within the Chocolate Mountains Aerial Gunnery Range are off-limit to public use; on public lands, they seem to lie primarily within closed wash zones, as does the Chuckwalla Bench. Areas of low encounter rates seem to lie primarily in open wash zones. Although this comparison would seem to point to an effect of vehicle use in the wash open zones, Woodman (2004) notes that “much of the remainder of the Chuckwalla (Desert Wildlife Management Area) is at low elevation with sparse perennial cover, and (desert) tortoise numbers are low” in contrast to the Chuckwalla Bench’s “increased elevation, (plant) diversity, cover, and (desert) tortoise density.” The recovery plan supports the concept that desert tortoises in the Eastern Colorado Recovery Unit are not distributed evenly across the Chuckwalla (Desert Wildlife Management Area); it notes that they “occupy well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich Succulent Scrub, Creosote Bush Scrub, and Blue Palo Verde-Ironwood-Smoke Tree communities” (Service 1994c). This description seems based more on the habitat characteristics of the Chuckwalla Bench than of other areas in the desert wildlife management area, as described by Woodman. Based on this information, we conclude that the physical and biological characteristics of the open wash zones in the Chuckwalla Desert Wildlife Management Area do not naturally support desert tortoises in high densities. Consequently, although vehicle use in washes throughout the open wash zones may kill or injure some desert tortoises, we expect that this number is likely to be low. Although the potential exists that past off-road use in this area has contributed to the lower encounter rate, the qualitative descriptions of the habitat in this area provided by Woodman seem to indicate that these factors play a larger role than vehicle use in the density of desert tortoises within the Chuckwalla Desert Wildlife Management Area.

We then evaluated the same information sets for the Chemehuevi Desert Wildlife Management Area. Using the Berry (1984) maps, the closed wash areas included larger areas of habitat in every density class; in highest density areas of 100 to 250 desert tortoises per square mile, most of the land, by far, seemed to be located in closed areas. Information from line distance sampling (Everly 2005) seems to indicate that most observations of live and dead desert tortoises occurred in the central portion of the desert wildlife management area. Other potential patterns are numerous transects without any sign or only carcasses in the south-central portion of the desert

wildlife management area and similar patterns of a few live desert tortoises and several transects where no sign was found in the westernmost and southeastern corners of the region; these latter three areas correspond well with the lowest density areas reported by Berry (1984).

Regardless of whether the observations occurred in open or closed wash zones, data from line distance sampling seem to indicate that carcasses outnumber live desert tortoises by a substantial amount. In fact, Woodman (2004) notes that 81 live animals and 265 carcasses were detected in 2003. Finally, the recovery plan for the desert tortoise states that, within the Northern Colorado Recovery Unit, which includes the Chemehuevi Desert Wildlife Management Area, desert tortoises are found to a lesser extent in the broad, well-developed washes and that they rarely den in washes (Service 1994c). Consequently, the best available information seems to indicate that vehicular use of open wash zones may kill or injure some desert tortoises, but this number is likely to be low.

In summary, based on the best available data, the level of vehicle use in the open wash zones in the Chemehuevi and Chuckwalla desert wildlife management areas seems to be low and most users of the area are engaged in lower impact recreational activities. We also note that the best available data on desert tortoises in these areas implies that vehicle use in open wash zones is not affecting their distribution. Consequently, we conclude that the Bureau's designation of open wash zones in the Chemehuevi and Chuckwalla desert wildlife management areas is not likely to result in a high level of mortality of desert tortoises and therefore is not likely to reduce substantially the reproduction, numbers, or distribution of the desert tortoise in this recovery unit.

Parking and camping within the banks of navigable washes that are designated as open or limited poses some level of threat to desert tortoises. A large portion of the northern and eastern Colorado Desert planning area is subject to this type of use because this activity is authorized within the open wash zones. However, the level of overall use within the open wash zones is sufficiently low that it is not likely to result in the killing of desert tortoises at a scale that affects overall population trends. For this reason, we do not anticipate that parking and camping within the banks of navigable washes that are designated for open or limited use is likely to reduce to an appreciable degree the reproduction, numbers, or distribution of the desert tortoise in the northern and eastern Colorado Desert planning area.

The Bureau will rely on State regulations and county ordinances to prevent unauthorized use of firearms. We expect that the enforcement of State regulations and county ordinances will be minimal, simply because protecting desert tortoises is not a high priority for law enforcement agencies of the State of California (with the obvious exception of the California Department of Fish and Game) and local agencies; additionally, these agencies are generally understaffed. Berry (1986a in Boarman 2002) found 91 carcasses that showed evidence of being shot; 20.7 percent of the carcasses were from the western Mojave Desert and 1.5 and 2.0 percent of the carcasses were from the eastern Mojave and Colorado Deserts, respectively. We cannot predict how many desert tortoises may be killed by the unauthorized use of firearms, but, based on the information presented by Berry, we conclude that few desert tortoises are likely to be shot.

Effects on Critical Habitat

The recovery plan for the desert tortoise recommends that each desert wildlife management area be at least 1,000 square miles in area and that more than one desert wildlife management area be included within each recovery unit. On-the-ground circumstances, however, dictate what any single agency can accomplish.

The Chemehuevi Desert Wildlife Management Area, which lies within the Northern Colorado Recovery Unit, covers approximately 1,367 square miles. The Chemehuevi Critical Habitat Unit includes approximately 1,463 square miles (936,404 acres). Approximately 122,404 acres of the critical habitat unit occur outside of the Chemehuevi Desert Wildlife Management Area. Despite the fact that it is smaller than the critical habitat unit, we anticipate that the Chemehuevi Desert Wildlife Management Area will promote the conservation role and function of critical habitat for several reasons. First, portions of the critical habitat unit that the Bureau omitted from the desert wildlife management area occur in low, dry valleys that do not support all of the primary constituent elements of critical habitat; the preliminary results of line distance sampling seem to indicate that desert tortoises are not common in these areas. Second, even without the 122,404 acres of the critical habitat unit that are outside of the desert wildlife management area, approximately 1,272 square miles of critical habitat remain within its boundaries. Finally, substantial portions of the critical habitat unit outside of the desert wildlife management area have been captured by other land use categories that will protect the primary constituent elements of critical habitat to varying degrees; these land management designations include wilderness and wildlife habitat management areas.

Although the Bureau's portion of the Chuckwalla Desert Wildlife Management Area is smaller than the size recommended in the recovery plan, the inclusion within the desert wildlife management area of lands managed by the National Park Service within Joshua Tree National Park and by the Marine Corps in the Chocolate Mountains Aerial Gunnery Range bring the total acreage to well over 1,000 square miles. With the exception of some relatively small areas adjacent to freeway exits, the Bureau has designated virtually all available critical habitat that it manages as a desert wildlife management area. As we noted in the previous section, this designation sets the stage for future management of public lands and the implementation of recovery actions but will not have direct, on-the-ground effects on critical habitat of the desert tortoise. Consequently, the amount of critical habitat captured within the Bureau's Chuckwalla Desert Wildlife Management Area, when combined with additional critical habitat within Joshua Tree National Park and the Chocolate Mountains Aerial Gunnery Range, will promote the conservation role and function of Chuckwalla Critical Habitat Unit.

Changing all desert tortoise habitat within desert wildlife management areas to Category I will likely have little effect on the primary constituent elements of critical habitat because use of the prescriptions under which the areas of critical environmental concern will be managed; the Category I designation will not add to the level of protection. In areas where habitat that was formerly considered Category I or II lies outside of a desert wildlife management area, the change to Category III will decrease the level of management for and protection of critical

habitat to some degree; we do not consider this change to be substantially detrimental because the vast majority of suitable habitat has been included with desert wildlife management areas. The conversion of Class M lands in a desert wildlife management area to Class L is protective of the primary constituent elements of critical habitat because the Bureau's general program guidance for Class L lands calls for a lower density of activity and carefully controlled multiple uses of resources while ensuring that sensitive values are not significantly diminished. The general effect of this change is that critical habitat of the desert tortoise within desert wildlife management areas will receive greater consideration in the overall management of the area and during project-specific reviews; these changes are protective of the primary constituent elements of critical habitat of the desert tortoise.

Limiting the amount of cumulative surface disturbance to one percent of the public lands in each of the desert wildlife management areas will likely ensure that proposed actions do not appreciably compromise the function and conservation role of critical habitat units in the northern and eastern Colorado Desert planning area. This cap indicates that the primary constituent elements on approximately 8,158 acres of the Chemehuevi Desert Wildlife Management Area and 4,653 acres of the Chuckwalla Desert Wildlife Management Area may be subjected to project-induced impacts. Conversely, approximately 99 percent of the critical habitat within the desert wildlife management areas will remain undisturbed; this lack of disturbance will clearly promote the ability of the critical habitat unit to achieve its conservation role and function.

We note that the one percent limit is tied to the size of the desert wildlife management area but not to the critical habitat unit. For this reason and because we do not know where future actions may occur, we cannot, with absolute certainty, state that only one percent of the critical habitat unit will be affected. We expect, however, that project impacts within the portions of the Chemehuevi and Chuckwalla critical habitat units managed by the Bureau will also not exceed the one percent limit for several reasons. First, given the past history of this area, most actions will be relatively small in scale and will be spread across the critical habitat unit. Second, the large degree of overlap between the desert wildlife management areas and critical habitat should ensure that many actions will not be concentrated within critical habitat but outside of the desert wildlife management areas. Finally, at least some projects will likely occur within the desert wildlife management area but outside of critical habitat. Consequently, we conclude that the one percent limit on cumulative surface disturbance within desert wildlife management areas is also likely to confer a high degree of protection to critical habitat.

Although the primary constituent elements of critical habitat may be disturbed or lost within areas of disturbance, the relatively small amount of disturbance (in relation to the size of the critical habitat) that the Bureau will permit should ensure that desert tortoises will continue to have sufficient area in which to feed, breed, and find shelter. Additionally, because the disturbance and loss of habitat would likely occur through the implementation of numerous actions, separated through the desert wildlife management area by distance and over time, we do not anticipate that habitat is likely to be fragmented to the extent that the function and conservation role of the critical habitat unit as a whole is compromised.

The Bureau requirement that project proponents compensate for loss or disturbance of desert tortoise habitat within desert wildlife management areas at a ratio of five acres of compensation for every acre loss or disturbed will promote the conservation of the desert tortoise by protecting more critical habitat of the desert tortoise. Once acquired, the provisions of section 7(a)(2) would be in force. The consultation mandate requires Federal agencies to avoid adverse modification of critical habitat of listed species.

Additionally, the Bureau can use funds generated in this manner to close roads, regulate activities, and attempt to restore the primary constituent elements of critical habitat on acquired parcels and ultimately reduce the level of threat and disturbance to critical habitat of the desert tortoise. Although the compensation requirement will generally benefit the conservation role and function of critical habitat, the limit on loss or disturbance of habitat within desert wildlife management areas and the general lack of activity in the northern and eastern Colorado Desert planning area may result in the acquisition of a fairly small amount of habitat through this means; one exception to this general rule may be compensation acquired for large utility projects.

The Bureau's commitment to fence, sign, or patrol the peripheries of desert wildlife management areas may reduce conflicts with adjacent land uses. Informing visitors that they are entering lands that are being managed for specific biological resources may aid in protecting the integrity of these areas and increase their contribution to the conservation of the desert tortoise.

The Bureau's commitment to issue permits for the harvest of live vegetation only within salvage areas where surface disturbance has been authorized should be protective of the primary constituent elements of critical habitat. This direction will ensure that the primary constituent elements of critical habitat of the desert tortoise are not disturbed during the harvesting of vegetation in areas that would have remained undisturbed but for this activity. Consequently, this management direction should eliminate the loss or degradation of the primary constituent elements of critical habitat for the sole purpose of harvesting live vegetation.

Classified lands acquired through compensation or mitigation as closed to disposal and use will prevent, to a large degree, future activities on these areas that may disturb or remove the primary constituent elements of critical habitat of the desert tortoise. This measure should assist in ensuring the conservation role and function of the affected critical habitat units.

The installation of bridges and culverts as part of any new linear projects that would otherwise fragment desert tortoise populations is important in maintaining movement, dispersal, and gene flow of desert tortoises across desert wildlife management areas. This measure would ensure that the primary constituent element of critical habitat of the desert tortoise that involves the maintenance of sufficient space and the ability of desert tortoises to move freely within a desert wildlife management area is not compromised to an appreciable degree.

Through the approval of the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau reduced the size of the open wash zones from 577,397 to 218,711 acres in the

Chemehuevi Desert Wildlife Management Area and designated 656,132 acres as “closed wash zones;” the Bureau also reduced the size of the open wash zones from 475,645 to 352,633 acres in the Chuckwalla Desert Wildlife Management Area and designated 467,444 acres as “closed wash zones.” Clearly, this reduction in the size of the areas where vehicles can travel in any navigable wash will reduce the potential for vehicles to disturb the primary constituent elements of critical habitat of the desert tortoise. In the previous section of this biological opinion, we reached the conclusion that the best available data indicate that use of the open wash zone is relatively minor. We base the following analysis on that conclusion.

We are familiar, in general, with the literature on the effects of off-road vehicle use on substrates, cryptogammic crusts, and vegetation in the desert; we discussed these effects in the final listing rules for the desert tortoise and for its critical habitat. We have also reviewed at least some of the literature cited by Stewart (2004) in his declaration to the United States District Court in the Northern District of California. We agree that off-road vehicles do indeed have severe deleterious effects on stable substrates that have developed cryptogammic crusts, soil profiles, and some degree of vegetative litter; however, these conditions are found in areas that are not subjected to the rather frequent natural perturbations that desert washes experience. In fact, these perturbations, in the form of flash floods, are the reason for the existence of the washes. (We note that “frequent” is a relative term. Flash floods certainly do not occur in every desert wash every year; however, given the extremely slow development of stable substrates in the desert, floods occur frequently enough to stall this process in washes.) We acknowledge that washes support annual plants on low terraces that rise above the smaller flooding events but are still susceptible to damage by vehicles. Simply stated, the primary constituent element related to quality and quantity of forage species and the proper soil conditions to provide for the growth of these species is not extensively present in many washes. Finally, the Bureau’s criteria for allowing vehicular use of a wash speaks directly to the issue of these effects; specifically, section 3.9.5 of the final environmental impact statement (Bureau and California Department of Fish and Game 2002) states that “washes can be considered routes of travel only if ... soil stability is not adversely affected ... consequent to the passage of vehicles.”

We acknowledge that desert tortoises frequently burrow into the banks of washes. Washes support the primary constituent elements related to the provision of suitable substrates for burrowing and caliche caves. The attractiveness of washes as places to site burrows lies in the fact that digging into the side of a wash is likely easier than attempting the same task on flatter, more stable ground. Vehicular use that does not damage the banks of washes will avoid most burrows and caliche caves. Again, the same passage we quoted in the previous paragraph states that “washes can be considered routes of travel only if wash banks are not compromised.”

Desert tortoises will use larger shrubs and trees that grow in washes for shelter from temperature extremes and predators; consequently, this primary constituent element of critical habitat is present in many washes. Vehicles have the potential to damage these plants; doing so would reduce the value of this primary constituent element. The Bureau, in the final environmental impact statement also addresses this issue; specifically, if vegetation is destroyed by the use of the wash, the wash should not be considered a route of travel. In summary, we conclude that, in

one case, one primary constituent element of critical habitat of the desert tortoise is not extensively present in washes and, by the Bureau's own standards and definitions, adverse effects to other primary constituent elements would preclude the use of that wash as an open route.

As in other sections of this biological opinion, we acknowledge that authorized activities (in this case, legitimate use of a wash as a route of travel) can provide access to an area for use in an unauthorized manner (in this case, driving on banks of washes, destroying vegetation, causing an unacceptable degree of erosion). We consider habitat protected from disturbance and human-caused mortality to be an important primary constituent element; however, our conclusion regarding the level of use of washes and the effects to desert tortoises, in the previous section of this biological opinion, was predicated on a low level of use. Consequently, we will not repeat that analysis here. We also did not discuss the primary constituent element regarding sufficient space to support viable populations; that element was discussed previously in relation to the desert wildlife management areas in the northern and eastern Colorado Desert planning area as a whole. For these reasons, we did not address these primary constituent elements in this portion of the analysis.

As we mentioned previously in this biological opinion, our analysis must be based on the best available data. At this point in time, the available data indicate that the use of the open wash zone is conducted in a manner and at a level that does not compromise the function and conservation role of the Chemehuevi and Chuckwalla critical habitat units. Additionally, we note that Appendix G of the final environmental impact statement for the northern and eastern Colorado Desert planning area (Bureau 2002 and California Department of Fish and Game 2002) defines surface-disturbing activities as those that result in the elimination of perennial plant cover over an area. The Bureau recognizes that elimination of perennial plant cover "may result from blading or otherwise destroying plant roots and severely disturbing soil structure or it may be less severe in the form of crushing of above-ground plant parts." Cumulative new surface disturbance is limited to one percent of the public lands within the desert wildlife management area.

Allowing the use of firearms may result in some level of damage to the primary constituent elements of critical habitat of the desert tortoise. Persons involved in legitimate hunting and target shooting could potentially damage the quality of the primary constituent elements of critical habitat by introducing lead to substrates that desert tortoises mine for minerals. We do not have information on the effects of lead on desert tortoises, but we expect that the areas in which lead could be ingested in this manner would be fairly localized within the extensive areas available for target shooting. At least some portions of the public will likely shoot at shrubs to the extent that they are damaged and may no longer provide shelter for desert tortoises. Although we cannot predict the extent of damage to the primary constituent elements of tortoise critical habitat that may result from the use of firearms, given the size of the critical habitat units, we expect that most detectable impacts will be very localized and that only negligible adverse effects are likely to occur to the primary constituent elements and function of these two critical habitat units.

Amendment 3 - Management of Grazing

The amount, nature, and management of livestock grazing has not changed substantially since the issuance of the first biological opinion regarding the effects of the California Desert Conservation Area Plan on the desert tortoise and its critical habitat. In the northern and eastern Colorado Desert bioregion, only the Lazy Daisy Allotment remains within critical habitat of the desert tortoise or a desert wildlife management area. The portion of the allotment that supports the highest density of desert tortoises has been eliminated; the allotment has been reduced from 332,886 to 311,280 acres. The Bureau will terminate authorization of forage allocation and range improvements and eliminate the allotment designation in the California Desert Conservation Area Plan if the lessee voluntarily relinquishes all grazing use authorizations.

Effects on the Desert Tortoise

We have discussed the general effects of cattle grazing on desert tortoises previously in this biological opinion and will not review that analysis here. Unless otherwise noted, the evaluations in other sections of the biological opinion also apply to the Lazy Daisy Allotment.

The removal of cattle from a desert wildlife management area when ephemeral forage production is less than 230 pounds per acre from March 15 through June 15 will reduce opportunities for cattle to trample desert tortoises; removing cattle from an area when the utilization rate of perennial species is exceeded will also reduce the threat of trampling. The threat of trampling will remain whenever cattle are present, regardless of the season or amount of available forage.

The termination of ephemeral use in the Lazy Daisy and Chemehuevi allotments will ensure that additional cattle are not allowed to graze in the former allotment. This amendment resulted in the termination of the Chemehuevi Allotment. Additionally, temporary non-renewable authorizations are no longer allowed within the portion of the Lazy Daisy Allotment that is within the desert wildlife management area. These decisions will reduce the level of mortality associated with the trampling of desert tortoises by cattle.

The elimination of grazing from approximately 21,600 acres of the Lazy Daisy Allotment will benefit desert tortoises because all impacts of grazing would be removed from this area. We understand that this area, which supports the greatest density of desert tortoises on the allotment, does not currently sustain much use by cattle; however, its removal from the allotment would preclude the development of facilities, such as waters, that could shift cattle use into the area.

The modification of all existing cattle guards and use of “desert tortoise-friendly” designs in new cattle guards will prevent desert tortoises from being trapped; desert tortoises that are trapped

under cattle guards can die from exposure to extreme weather conditions. This measure is likely to reduce the mortality of desert tortoises, particularly smaller individuals that can fall through the bars of the cattle guards.

If the operator decides to relinquish grazing leases and related authorizations on the Lazy Daisy Allotment, the Bureau's decision to cancel the allotment would further reduce mortality associated with trampling of desert tortoises by cattle and with the management of the cattle and facilities on the allotment; the area may also be less attractive to common ravens, if watering tanks and the carcasses of cattle are no longer available. This proposal, which is not associated with any specific action at this time, would result in the removal of livestock from an area that is important for the recovery of the desert tortoise.

All of the measures proposed or enacted by the Bureau with regard to grazing are likely to reduce the number of desert tortoises that may be killed as a result of the management of livestock. As we noted previously, we cannot quantify the extent of this benefit. In conclusion, cattle grazing, as it is currently being managed on the Lazy Daisy Allotment, with approximately 110 head grazing 311,280 acres, will not reduce appreciably the reproduction, numbers, or distribution of the desert tortoise in the northern and eastern Colorado Desert bioregion.

Effects on Critical Habitat

We have discussed the general effects of cattle grazing on the primary constituent elements of critical habitat previously in this biological opinion and will not review that analysis in detail here. At the rates of utilization that the Bureau will use, most species of shrubs should retain sufficient size and structure to provide shelter for desert tortoises. However, as noted previously in this document, the effects of grazing accrue through the year; although these utilization rates will assist the Bureau in monitoring the level of grazing, impacts to primary constituent elements will continue under this regime. These impacts include trampling of burrows, compaction of substrates, and disturbance of cryptogammic crusts.

The removal of cattle from the two desert wildlife management areas in this bioregion when ephemeral forage production is less than 230 pounds per acre from March 15 through June 15 should, to some degree, protect the primary constituent elements of critical habitat related to the availability of food. Cattle should not consume annual plants to the extent that sub-adult and adult desert tortoises starve; neonate and juvenile desert tortoises may be at greater risk, because they may not be as able as larger individuals to seek out food resources over distances. Based on Henen's research, which was discussed in the Effects of the Northern and Eastern Mojave Desert Management Plan on the Desert Tortoise and its Critical Habitat - Management of Grazing section of this biological opinion, years of high rainfall and production of forage are extremely important to the desert tortoise. Continuing grazing even at these lower levels may prevent desert tortoises from acquiring enough nutrition in good years to survive through times that provide fewer resources.

The elimination of approximately 21,600 acres of the Lazy Daisy Allotment will benefit the

primary constituent elements of critical habitat of the desert tortoise because all impacts of grazing would be removed from this area. We understand that this area, which supports the greatest density of desert tortoises on the allotment, does not currently receive much use by cattle; however, its removal from the allotment would preclude the development of facilities, such as waters, that could shift cattle use into the area and degrade or remove the primary constituent elements.

The overall effect of an action on the primary constituent elements of critical habitat (or on a listed species) is a combination of the intensity and scale of the effect. As an example, cattle grazing may completely denude an area around a stock tank; however, before we conclude that this impact will compromise the conservation role and function of the critical habitat unit, we must evaluate the condition of the remainder of the allotment. In the following paragraphs of this, we evaluate the scale of the impact of cattle grazing on the primary constituent elements contained within the Chemehuevi Critical Habitat Unit.

The Bureau gathered utilization data from the Lazy Daisy Allotment in 1994 (Morgan pers. comm. 2005a). All utilization was in the 0 to 10 percent range; the Bureau characterizes this level of utilization none to slight. In 1994, 125 head of cattle grazed in this allotment; since that time, no more than 125 cattle have been present and, since 2000, approximately 100 head have grazed the Lazy Daisy Allotment each year. (This number should be considered as a rough average for the year; currently, 80 cattle are present, but the number occasionally rises above 100. The operator is authorized to graze 266 head. We anticipate that, because utilization was in the 0 to 10 percent range with 125 head of cattle, utilization levels would continue to be low even if the operator stocked at the full rate.) Because of the size of the allotment, abundant forage, topography, and the continued low level of consumption, the Bureau does not anticipate cattle utilization to increase from levels observed in 1994.

In 1999, the Bureau conducted health assessments of the allotment. Based on the results, the Field Manager of the Bureau's Needles Field Office determined that all health standards were being met (Morgan pers. comm. 2005a). The Bureau also noted that, during late spring and summer, cattle on the Lazy Daisy Allotment generally graze at higher elevations, outside of critical habitat of the desert tortoise or in areas of lower quality habitat. The southwestern portion of the allotment contains lands that exceed 4,000 feet in elevation (Bureau 2004a); desert tortoises generally occur at elevations between 1,000 and 3,000 feet.

Approximately 76 percent (235,529 acres) of the Lazy Daisy Allotment is located within the Chemehuevi Desert Wildlife Management Area; the entire allotment covers 311,322 acres. The Chemehuevi Desert Wildlife Management Area and the Chemehuevi Critical Habitat Unit cover 874,843 and 937,400 acres, respectively. Consequently, the Lazy Daisy Allotment covers approximately 27 percent of the Chemehuevi Desert Wildlife Management Area and 25 percent of the Chemehuevi Critical Habitat Unit. We acknowledge that this percent far exceeds the 10 percent level of the experimental management zone recommended by the recovery plan. As we stated at the onset of this discussion, however, both the scale and intensity of effects must be considered before a final conclusion is reached.

To that end, the Bureau has removed approximately 21,600 acres of high quality desert tortoise habitat from the Lazy Daisy Allotment, the utilization level for the past 10 years has been none to slight, this level is unlikely to increase, and some amount of grazing within the allotment occurs either outside of the boundaries of the desert wildlife management area and critical habitat or inside at elevations that generally do not support desert tortoise habitat. Finally, the Bureau's decisions that resulted from approval of the Northern and Eastern Colorado Desert Coordinated Management Plan reduced the effects of grazing from past levels. For these reasons, we conclude that the intensity of grazing on the Lazy Daisy Allotment is low and that management of grazing within the northern and eastern Colorado Desert planning area is compatible with the function and conservation role of the Chemehuevi Critical Habitat Unit.

Amendment 4 – Stopping, Parking, and Vehicle Camping

Stopping, parking, and vehicle camping would be allowed within 100 feet of the centerline of routes within areas of critical environmental concern. Outside of these areas, such activities would be allowed within 300 feet of the centerline of routes.

Effects on the Desert Tortoise

Stopping, parking, and vehicle camping within 100 feet of the centerline of routes within areas of critical environmental concern (i.e., the desert wildlife management areas) can crush desert tortoises. Through approval of the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau reduced this distance from 300 feet within the desert wildlife management areas; this reduction in the distance from the road that vehicles can travel will certainly reduce the potential for desert tortoises to be killed. As we noted previously in this biological opinion, we cannot provide any quantitative information on how frequently desert users leave routes of travel for these distances to camp, stop, and park. In at least some areas that are occupied by the desert tortoise, the density of vegetation and the terrain would prevent many desert users from leaving the routes of travel; this on-the-ground condition may substantially reduce the potential mortality of desert tortoises.

Outside of desert wildlife management areas, desert tortoises would be exposed to crushing by vehicles for up to 300 feet from the centerline of the road. However, the number of desert tortoises that are killed by this activity is likely low, because, at least in part, far fewer desert tortoises are found outside of the desert wildlife management areas.

In summary, the vast majority of desert tortoises occur more than 300 feet from the centerline of roads. Additionally, the most important areas to the survival and recovery of the desert tortoise (i.e., the desert wildlife management areas) have restrictions that limit stopping, parking, and vehicle camping within 100 feet of the centerline of routes. Finally, the terrain and vegetation in many areas will make leaving the road difficult, if not impossible, for most vehicles. Consequently, we conclude the stopping, parking, and vehicle camping within 100 feet of the centerline of routes within desert wildlife management areas and within 300 feet of the centerline

of routes outside of desert wildlife management areas are not likely to reduce substantially the reproduction, numbers, or distribution of the tortoise in the northern and eastern Colorado Desert planning area.

Effects on Critical Habitat

The California Desert Conservation Area Plan allows cars and trucks to drive and park up to 300 feet from the centerline of a route of travel in most of the California Desert Conservation Area. Such off-road travel can degrade habitat (particularly when vehicles need to be extracted from deep sand, damp areas, or rocky terrain) and cause the spread of non-native plant species. Neither we nor the Bureau can provide any quantitative information on how frequently desert users leave routes of travel for these distances to stop, park, or camp outside of existing disturbed areas. In at least some areas of desert tortoise habitat, the density of vegetation and terrain would likely prevent many desert users from leaving the routes of travel. Most of the routes where stopping, parking, or camping is available within 300 feet from the centerline of a route of travel lie outside of critical habitat; therefore, these activities will not affect the primary constituent elements of critical habitat.

Through approval of the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau reduced the distance from the centerline of routes in which vehicles can stop, park, and camp from 300 to 100 feet within desert wildlife management areas. These uses can degrade and disturb the primary constituent elements of critical habitat, as we discussed in the Effects of Human Activities on Critical Habitat section of this biological opinion; however, this reduction in the distance from the road that vehicles can travel reduces the extent to which the primary constituent elements may be disturbed. As we noted previously in this biological opinion, we cannot provide any quantitative information on how frequently desert users leave routes of travel for these distances to camp, stop, and park. In at least some areas of critical habitat, the density of vegetation and the terrain would prevent many desert users from leaving the routes of travel; this on-the-ground condition may substantially reduce the potential degradation of the primary constituent elements. Although desert tortoises killed by this activity would not be readily visible from the road, most disturbance to habitat should be visible from roads; in many years of driving through the western Mojave Desert, probably the most heavily used portion of the California Desert Conservation Area, we have not observed extensive disturbance of critical habitat within the 300-foot distance from the roads that vehicles were allowed to stop, park, and camping (Bransfield pers. obs.).

Within areas of critical habitat outside of desert wildlife management areas, the ability to travel 300 feet from the centerline of the road would remain in effect; consequently, larger areas that may support the primary constituent elements of critical habitat may be affected. We do not have specific information on the mileage of the routes that occur within the area where desert wildlife management areas do not overlap critical habitat; however, because of the relatively small areas that do not overlap and the presence of wilderness in some of those areas, we expect that a relatively few miles of designated open routes of travel occur under these circumstances. This activity is not likely to compromise the conservation role and function of the affected

critical habitat units because the vast majority of critical habitat of the desert tortoise lies outside of this zone and, in many areas, the terrain and vegetation are likely to prevent vehicles from leaving the road.

Amendment 10 – Management of Burros

The Bureau's re-alignment of herd management areas for burros essentially placed these areas outside of the desert wildlife management areas.

Effect on the Desert Tortoise

This action substantially removed burros from most of the Chemehuevi and Chuckwalla desert wildlife management areas. Therefore, the vast majority of the adverse effects, discussed previously in this biological opinion, that burros have on desert tortoises will be eliminated from these areas. Because removing every burro is likely not possible, a small number of burros will likely remain; therefore, some residual impacts will likely remain. The number of desert tortoises that could be trampled by burros or during round-ups will decrease. Note that neither burros nor desert tortoises are distributed uniformly across the herd management area; for this reason, we cannot quantify the precise level of benefit to the desert tortoise. The removal of burros from these areas constitutes an important action to promote the survival and recovery of the desert tortoise by reducing and, in most areas, eliminating a known threat to the species.

Effect on Critical Habitat

The removal of burros from most of the Chemehuevi and Chuckwalla critical habitat units will decrease the amount of disturbance most of the primary constituent elements of critical habitat. For example, the disturbance of cryptogamic crusts by burros will be substantially eliminated and, over time, will likely render substrates in certain areas more suitable for burrowing, as they recover from trampling. Damage to shrubs that provide shelter for desert tortoises will decrease, probably to a substantial degree in at least some local areas; annual plants will be subjected to less grazing pressure. As we noted in the previous paragraph, burros (and the effect they had on plant communities) were not uniformly distributed across the herd management area; therefore, we cannot quantify the precise level of benefit to the primary constituent elements of critical habitat. Burros will remain in the area of critical habitat south of Highway 178 within the Chuckwalla Critical Habitat Unit; consequently, the primary constituent elements of critical habitat will continue to be disturbed in this area. Overall, however, the removal of burros from this area will improve the condition of several primary constituent elements of critical habitat in the Chemehuevi and Chuckwalla critical habitat units to a substantial degree; the limited continued presence of burros in the area of critical habitat south of Highway 178 is not likely to impair the conservation role and function of the primary constituent elements or the critical habitat unit as a whole.

Amendment 11 - Organized Competitive Vehicle Events

Through the Northern and Eastern Colorado Desert Coordinated Management Plan, the Bureau eliminated the Parker 400 competitive recreation corridor and will prohibit competitive events using motorized vehicles in which speed is the primary competitive factor, except on approved recreation routes and within off-highway vehicle recreation areas. The Bureau will maintain a corridor for competitive events along the Johnson Valley to Parker route.

Effects on the Desert Tortoise

The Parker 400 competitive recreation corridor crossed the Chemehuevi Desert Wildlife Management Area. The elimination of this and other speed events will benefit the desert tortoise by removing a source of mortality within the desert wildlife management area that may be caused by events of this nature.

The western portion of the Johnson Valley to Parker route does not cross or border any desert wildlife management areas within the northern and eastern Colorado Desert planning area and thus avoids areas with substantial numbers of desert tortoises. Along the eastern portion of the route, where it crosses Highway 95, the corridor is located along the southern border of the Chemehuevi Desert Wildlife Management Area. Riders may travel up to 100 feet from the centerline of the established road on the side away from the desert wildlife management area; this off-road travel is likely to kill or injure desert tortoises, if they are present in the area. The proximity of an off-road event to the desert wildlife management area poses, at a minimum, an indirect threat to the stability of the area. Desert tortoises travel beyond the boundaries of reserve areas. Maps generated from the preliminary results of line distance sampling conducted in 2001, 2003, and 2004 do not provide conclusive information on the status of the desert tortoise in this area; specifically, no sampling was conducted in the area of the corridor to the west of Highway 95 and only carcasses were found to the east of the road (Everly 2005). As we mentioned in the Environmental Baseline section of this biological opinion, this area includes Route 62, an aqueduct, and a rail line; activities associated with these facilities may have suppressed the number of desert tortoises in this area. The situation regarding desert tortoises in this area needs to be further studied; this evaluation should occur if the Bureau contemplates authorizing an event in this area, as such an event would be subject to the requirements of section 7(a)(2) of the Act.

In summary, the impacts described in the previous paragraph have the potential to kill and injure desert tortoise within a limited area of the Chemehuevi Desert Wildlife Management Area; however, preliminary data from line distance sampling seem to indicate that desert tortoises may be scarce in that area. For that reason, the function of that unit is not likely to be substantially impaired, but further section 7(a)(2) analysis is warranted prior to any event in this corridor.

Effects on Critical Habitat

The Parker 400 competitive recreation corridor crossed critical habitat of the desert tortoise. The elimination of this and other speed events is likely to benefit the critical habitat of the desert tortoise by removing the adverse effects to the primary constituent elements within the Chemehuevi Critical Habitat Unit that may be caused by events of this nature.

The western portion of the Johnson Valley to Parker route within the northern and eastern Colorado Desert planning area does not cross or border any critical habitat units. Along the eastern portion of the route, where it crosses Highway 95, the corridor crosses through the southern portion of the Chemehuevi Critical Habitat Unit. Riders may travel up to 100 feet from the centerline of the established road on the side away from the desert wildlife management area; this off-road travel would be through critical habitat. Traveling off of an established route through critical habitat is likely to disturb and degrade vegetation and substrates that constitute a portion of the primary constituent elements of critical habitat in this area; it could also accelerate the spread of invasive species in and beyond the affected areas. Some potential also exists that recreationists would cause degradation of habitat in the area surrounding the end of the race, which is also within critical habitat. Conversely, as we mentioned in the Environmental Baseline section of this biological opinion, the area within the portion of the Chemehuevi Critical Habitat Unit that is crossed by the corridor includes Route 62, an aqueduct, and a rail line; activities associated with these facilities may have already disturbed and degraded the primary constituent elements in this area. As we noted in the previous section, the situation regarding the desert tortoise and its critical habitat in this area warrants further analysis, pursuant to section 7(a)(2) of the Act, should an event be proposed for authorization by the Bureau.

In summary, although the impacts described in the previous paragraph will adversely affect the primary constituent elements of critical habitat of the desert tortoise to some degree, they are restricted to a very narrow corridor that constitutes an extremely small percentage of the Chemehuevi Critical Habitat Unit. For that reason, the function of that unit is not likely to be substantially impaired.

Amendment 12 – Routes of Travel

The Bureau's route designation process and existing routes on private lands result in a network of approximately 734 miles of routes within the Chemehuevi Desert Wildlife Management Area; the Bureau also proposed 3 miles of new routes for recreation and closed 31 miles of routes in this area. Within the Chuckwalla Desert Wildlife Management Area, the Bureau's designation of open routes and routes on private lands totals 960 miles; the Bureau also closed 53 miles of routes. Within the planning area in its entirety but outside of desert wildlife management areas, approximately 3,049 miles of routes were designated as open or are located on private lands; the Bureau designated 155 miles of routes as closed outside of desert wildlife management areas.

Effects on the Desert Tortoise

The closure of approximately 84 miles of routes within the 1,507,105 acres of the desert wildlife management areas in the northern and eastern Colorado Desert planning area is likely to reduce, by a very small increment, the number of desert tortoises that are killed or injured by vehicles. (This acreage is the total size of both desert wildlife management areas, minus the Chocolate Mountains Gunnery Range, because travel is prohibited inside this area. We included non-federal lands in this total, despite the fact that the Bureau cannot designate routes of travel on these areas because the final environmental impact statement presents these data to provide a more clear view of the on-the-ground picture.) Desert tortoises will continue to be exposed to threats along the approximately 1,694 miles of routes that remain open. Given the numerous variables involved, we cannot determine how many desert tortoises are likely to be killed or injured along the routes designated as open in the northern and eastern Colorado Desert planning area.

Outside of the desert wildlife management areas, approximately 3,049 miles of routes are designated as open or are located on private lands; the Bureau designated 155 miles of routes as closed outside of desert wildlife management areas. The closure of these routes will likely have little effect on the desert tortoise because their densities outside of desert wildlife management areas are generally low; for the same reason, vehicular use of the routes of travel are unlikely to result in the mortality of many desert tortoises.

In summary, the vast majority of desert tortoises occur more than 300 feet from the centerline of roads. Additionally, stopping, parking, and camping are limited to within 100 feet of the centerline of routes within the most important areas to the survival and recovery of the desert tortoise (i.e., the desert wildlife management areas). Therefore, we anticipate that this amendment is not likely to reduce substantially the reproduction, numbers, or distribution of the desert tortoise in the planning area for the northern and eastern Colorado Desert.

Effects on Critical Habitat

The effects of vehicles using existing routes of travel on habitat of the desert tortoise were discussed in the Effects of Human Activities on Critical Habitat section of this biological opinion. The use of vehicles on roads that are designated as open or limited will not, in general, adversely affect the primary constituent elements of critical habitat because these biological and physical attributes are not present within roadbeds. Some roads support annual plants, possibly even at greater local densities than on adjacent, undisturbed habitat, because of alterations in the hydrological regime caused by the road. Although such areas may be of value to a few desert tortoises, they are not so extensive that they substantially alter the patterns of distribution of forage plants.

Summary of the Effects of the California Desert Conservation Area Plan, as Amended, on the Desert Tortoise and its Critical Habitat

Effects on the Desert Tortoise

The amended California Desert Conservation Area Plan provides general guidance to the Bureau for its management of activities within the California Desert Conservation Area. Some guidelines for the multiple-use classes and elements clearly promote the conservation of the desert tortoise; for example, prohibiting development of nuclear and fossil fuel plants within Class C and L lands is highly protective in relation to this specific activity. Other guidelines for multiple-use classes and elements allow activities to occur that could have substantial adverse effects on desert tortoises; for example, the guidelines allow the development of wind and solar plants within Class L lands. However, except for casual uses (e.g., casual mining exploration, use of open wash zones, ongoing grazing, vehicle use on existing roads, hiking, and vehicle camping along existing roads), activities and projects will receive site-specific environmental review and consultation with the Service, pursuant to section 7(a)(2) of the Act. Therefore, all activities and projects, except casual uses, may be denied, modified, or mitigated to reduce adverse effects to the desert tortoise if, as proposed for some future specific activity, they would violate section 7(a)(2) of the Act. As we have noted previously in this biological opinion, section 6840 of the Bureau of Land Management Manual states that the Bureau's policy is to "ensure that (its) actions will not reduce the likelihood of survival and recovery of any listed species or destroy or adversely modify their critical habitat."

The interim measures being implemented in the Western Mojave Recovery Unit provide some additional protection to desert tortoises in the period prior to the adoption of the West Mojave Plan. Although evidence of declines in the number of desert tortoises is present in many areas of the California Desert Conservation Area, nowhere do these declines approach those documented in portions of the Western Mojave Recovery Unit. The ongoing decline of desert tortoises in this region presents a substantial challenge to management, particularly in an area where numerous threats are present and we continue to be uncertain of the primary cause of declines.

The Bureau intended actions that were adopted as part of the bioregional plans for the northern and eastern Mojave and northern and eastern Colorado deserts to implement various aspects of the recovery plan for the desert tortoise. The following discussion summarizes important components of the bioregional plans and their effects on the desert tortoise.

The Bureau's proposal to designate all lands within desert wildlife management areas as Class L should provide increased protection to the desert tortoise over that currently provided by Class M guidance; however, the Bureau can authorize actions within Class L areas that could kill desert tortoises. The proposal to limit the cumulative amount of surface disturbance to one percent should ensure that the vast majority of desert tortoises residing on public lands within the desert wildlife management areas are conserved in a manner that provides for their survival and recovery.

The designation of routes in desert wildlife management areas, with an overall reduction in the

amount of the road network, should reduce the level of mortality of desert tortoises on roads; it should also reduce the area in which they are threatened by other human activities related to access (e.g., poaching, vandalism). Neither the Bureau nor the Service has definitive information on how differing route networks affect the desert tortoise. Roadless areas would have the least adverse effect on desert tortoises; an access network that provides for large expanses of undisturbed habitat for the desert tortoise would seem to provide the opportunity for recovery. As the Bureau notes in northern and eastern Mojave Desert and northern and eastern Colorado Desert bioregional plans, the goal of the route networks is to allow access to most regions within the planning area to an extent that does not compromise the conservation of threatened and endangered species. The extent that the changes in the access network affect the desert tortoise will be difficult to measure because of the slow reproductive rate of the species and other factors, such as disease, drought, and predation, that may be affecting the number of individuals in a region.

The closure of most navigable washes within desert wildlife management areas in the northern and eastern Mojave Desert planning area is likely to benefit the desert tortoise because a source of potential mortality will be reduced. The Bureau also closed washes on 1,213,061 acres in the northern and eastern Colorado Desert planning area; however, washes on 480,467 acres will remain open, posing a level of threat to desert tortoises. The Bureau's amendment clearly reduced the size of the open wash zones from historic levels; that action is also beneficial to the desert tortoise.

In the northern and eastern Mojave Desert planning area, the desert tortoise will benefit from the Bureau's proposal to allow the voluntary relinquishment of grazing leases and related authorizations. As a result of this action, only one small allotment remains within a desert wildlife management area in this bioregion; desert tortoises will be threatened with trampling and crushing by cattle and operators on a far smaller area.

In the northern and eastern Colorado Desert planning area, the Lazy Daisy Allotment has been reduced by approximately 21,000 acres; this portion of the allotment does not contain any water for cattle and is subsequently grazed infrequently. The remainder of the allotment can be voluntarily relinquished if the lessee so desires. All of these actions will result in decreased impacts to the desert tortoise from trampling by cattle.

The elimination of burros from the Clark Mountain Herd Management Area, which includes the Shadow Valley Desert Wildlife Management Area, will provide substantial benefits to the desert tortoise. In the northern and eastern Colorado Desert planning area, reductions in the size of the herd management areas for burros will essentially remove them from desert wildlife management areas.

Reducing the distance that cars and trucks can drive and park from up to 300 feet from a route of travel to 100 feet in the desert wildlife management areas in the northern and eastern Colorado Desert and northern and eastern Mojave Desert planning areas provides a greater degree of protection to the desert tortoise. The additional requirement, in the Northern and Eastern

Mojave Desert Management Plan, that this use be limited to existing disturbed areas provides an even higher level of protection.

In the northern and eastern Colorado Desert planning area, maintaining a corridor for competitive events along the Johnson Valley to Parker route is likely to kill or injure desert tortoises. We do not have sufficient information to assess the likely level of mortality at this time. The Bureau's review of a specific proposed race in the future will provide an opportunity to review the potential level of mortality in adequate detail.

The acquisition of private lands within desert wildlife management areas will remove at least some threats that desert tortoises may face on non-federal lands; this acquisition will also facilitate the Bureau's management. Programs to educate visitors about the desert tortoise and how they can assist in conserving the species will also promote recovery of the species.

The California Desert Conservation Area Plan, as amended by the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, other amendments, and modified by interim measures currently applicable only in the western Mojave Desert planning area, provides guidance, including the requirement to consider the needs of listed species, sufficient to ensure the survival and recovery of the desert tortoise in the Eastern Colorado, Northern Colorado, and Eastern Mojave Recovery Units. Recent declines in these regions prompt concern, because the number of desert tortoises had remained relatively high and stable during the 1980s and early 1990s when the number of desert tortoises in the western Mojave Desert was decreasing. Full and swift implementation of the amended California Desert Conservation Area Plan may reduce the severity and duration of the decline, if it is tied to anthropogenic causes.

In summary, the actions in the northern and eastern Colorado Desert and northern and eastern Mojave Desert bioregional plans were adopted with consideration of the Bureau's mandates to manage public lands and after careful evaluation of the current situation in these areas and input from the public and numerous agencies. With a few exceptions, such as the open wash zones and the Johnson Valley-to-Parker race corridor in the northern and eastern Colorado Desert planning area, the actions that were adopted by the Bureau are highly protective of desert tortoises. Even the exceptions as noted provide greater protection to the desert tortoise than the California Desert Conservation Area Plan of 1980. In addition, as we discussed previously in this biological opinion, the best data available seem to indicate that none of these actions have severe adverse effects on the desert tortoise. However, the cause of the recent declines in the number of desert tortoises across California has not been identified. Consequently, the mechanisms needed to reverse these declines are also unknown. The potential exists that reversal of the decline of the desert tortoise may require substantial additional management; another scenario is that we may not be able to identify or manage the agent or agents responsible for the decline.

Any consideration of the effects of an action on a species must consider the scale of those effects; that is, how much of the species' range would be destroyed, degraded, or enhanced by the proposed action. The range of the desert tortoise is vast; the recovery units themselves cover

extensive areas. However, the scale of the California Desert Conservation Area Plan is also vast. Its goal is to provide for the use of public lands and resources in a manner that enhances, where possible, and does not diminish, on balance, the environmental, cultural, and aesthetic values of the desert and its productivity (Bureau 1999).

The immensity of the range of the desert tortoise assists in achieving this balance; although the Bureau has authorized many projects under the guidance of the California Desert Conservation Area Plan, large expanses of undisturbed habitat remain. As we noted in the Status of the Species and Critical Habitat section of this biological opinion, however, the number of desert tortoises has declined over large portions of the range. We cannot, at this time, determine the exact cause of this decline although upper respiratory tract disease is likely a factor; drought and human-induced perturbations are likely additional factors that contribute to the species' decline.

Effects on Critical Habitat

The amended California Desert Conservation Area Plan provides general guidance to the Bureau for its management of activities within the California Desert Conservation Area. Some guidelines for the multiple-use classes and elements clearly promote the conservation role and function of the critical habitat of the desert tortoise; for example, prohibiting development of nuclear and fossil fuel plants within Class C and L lands is highly protective in relation to this specific activity. Other guidelines for multiple-use classes and elements allow activities to occur that could have substantial adverse effects on desert tortoise critical habitat; for example, the guidelines allow the development of wind and solar plants within Class L lands. However, except for casual uses (e.g., casual mining exploration, use of open wash zones, vehicle use on existing roads, ongoing grazing, hiking, and vehicle camping along existing roads), activities and projects will receive site-specific environmental review and consultation with the Service, pursuant to section 7(a)(2) of the Act. Therefore, all activities and projects, except casual uses, may be denied, modified, or mitigated to reduce adverse effects to the primary constituent elements of critical habitat if, as proposed for some future specific activity, they would violate section 7(a)(2) of the Act. As we have noted previously in this biological opinion, section 6840 of the Bureau of Land Management Manual states that the Bureau's policy is to "ensure that (its) actions will not reduce the likelihood of survival and recovery of any listed species or destroy or adversely modify their critical habitat."

This biological opinion also addresses specific actions that were adopted as part of the bioregional plans for the northern and eastern Mojave and northern and eastern Colorado deserts to implement various aspects of the recovery plan for the desert tortoise. The following discussion summarizes important components of the bioregional plans and their effects on critical habitat of the desert tortoise.

The Bureau's proposal to designate all lands within desert wildlife management areas as Class L should provide increased protection to critical habitat over that currently provided by Class M guidance. Not all critical habitat was included within desert wildlife management areas. Portions of the relatively small amounts of critical habitat that were not included within desert wildlife management areas have been included in wildlife habitat management areas or wilderness, which will provide varying degrees of protection. Other portions will be available for disposal. Even without the portions of critical habitat that have been omitted from desert wildlife management areas, the Bureau has included sufficient areas of critical habitat, either solely with public lands or through the proximity of public lands to National Park Service lands and areas managed by the Marine Corps, to ensure the conservation role and function of the critical habitat units in the northern and eastern Mojave Desert and northern and eastern Colorado Desert planning areas.

The Bureau can authorize actions within Class L areas that could degrade or remove primary constituent elements of critical habitat. The proposal to limit the cumulative amount of surface disturbance to one percent should ensure that the vast majority of public lands within the critical habitat units are managed for the conservation of the desert tortoise.

The designation of routes within the boundaries of the critical habitat units, with an overall reduction in the amount of the road network, should reduce adverse effects to the primary constituent elements of critical habitat. The closure of all navigable washes within desert wildlife management areas in the northern and eastern Mojave Desert planning area will reduce the adverse effects to the greatest degree. The Bureau also closed washes on 1,213,061 acres in the planning area for the northern and eastern Colorado Desert; however, washes on 480,467 acres will remain open. Washes do not always support all primary constituent elements or are physically more resistant to the potential effects of vehicles than other areas. The Bureau's amendment clearly reduced the size of the open wash zones from historic levels; to the extent that the use of these areas by vehicles degrades the primary constituent elements of critical habitat, that action will reduce the effects on critical habitat.

In the planning area for the northern and eastern Colorado Desert, maintaining a corridor for competitive events along the Johnson Valley-to-Parker route is likely to disturb the primary constituent elements of critical habitat where the route crosses the Chemehuevi Critical Habitat Unit. It could also accelerate the spread of invasive species.

The elimination of burros from the Clark Mountain Herd Management Area, which includes the proposed Shadow Valley Desert Wildlife Management Area, will eliminate adverse effects to the primary constituent elements of critical habitat. In the northern and eastern Colorado Desert planning area, reductions in the size of the herd management areas for burros will substantially remove them from most of the critical habitat in this area.

The designation as wilderness of the portions of the Chemehuevi and Ivanpah critical habitat units removed most threats to the primary constituent elements of critical habitat from these areas. Although occupied and suitable critical habitat within wilderness areas is not extensive, the management of these areas for the conservation of the desert tortoise is beneficial.

Reducing the distance that cars and trucks can drive and park from up to 300 feet from a route of travel to 100 feet within large portions of the critical habitat units in the northern and eastern Colorado Desert planning area provides a greater degree of protection to the primary constituent elements of critical habitat of the desert tortoise. The additional requirement in the Northern and Eastern Mojave Desert Management Plan that this use be limited to existing disturbed areas provides even a higher degree of protection because it restricts this activity to areas that usually lack one or more of the primary constituent elements of critical habitat of the desert tortoise.

In the northern and eastern Mojave Desert planning area, the voluntary relinquishment of grazing leases and related authorizations will remove most areas of critical habitat from the effects of cattle grazing; as a result of this action, only one small allotment remains within a desert wildlife management area in this bioregion. In the northern and eastern Colorado Desert planning area, the Lazy Daisy Allotment has been reduced by approximately 21,000 acres; this portion of the allotment did not contain any water for cattle and was consequently grazed infrequently. The remainder of the allotment can be voluntarily relinquished if the lessee so desires. All of these actions will result in decreased impacts to the desert tortoise from trampling by cattle. The removal of burros from substantial areas of critical habitat will eliminate adverse effects to the primary constituent elements of critical habitat in much the same manner.

The acquisition of private lands within desert wildlife management areas will remove at least some sources of degradation of the primary constituent elements of critical habitat of the desert tortoise that occur on non-federal lands; this acquisition will also facilitate the Bureau's management. Programs to educate visitors about how to behave responsibly while visiting areas of critical habitat will also promote conservation of the desert tortoise.

In summary, the California Desert Conservation Area Plan, as amended by the Northern and Eastern Mojave Desert Management Plan and Northern and Eastern Colorado Desert Coordinated Management Plan and other amendments, provides guidance, including the requirement to consider the needs of listed species, sufficient to ensure the conservation role and function of critical habitat of the desert tortoise in the Eastern Colorado, Northern Colorado, and Eastern Mojave Recovery Units. Additionally, the specific actions that were adopted by the Bureau are highly protective of critical habitat. The best data available seem to indicate that the few exceptions to this statement, such as the open wash zones and Johnson Valley-to-Parker race corridor in the northern and eastern Colorado Desert planning area, are not likely to have severe adverse effects on the overall function of affected critical habitat units because the primary constituent elements in these areas are likely to have been previously disturbed or naturally absent or of lower quality; in some cases, such as the Johnson Valley-to-Parker race corridor, the scale of the impact is truly minor in comparison with the area of critical habitat. Interim measures provide sufficient guidance to protect critical habitat in the western Mojave Desert

planning area until the Bureau can complete its planning effort. Although recent declines in the numbers of desert tortoises in several regions of the desert prompt concern, we have not been able to attribute those declines in a definitive manner to changes in the condition of desert tortoise habitat.

Any consideration of the effects of an action on a species must consider the scale of those effects; that is, how much of the species' range would be degraded or enhanced by the proposed action. The range, recovery units, and critical habitat units of the desert tortoise encompass vast areas. The scale of the California Desert Conservation Area Plan is also vast. Its goal is to provide for the use of public lands and resources in a manner that enhances, where possible, and does not diminish, on balance, the environmental, cultural, and aesthetic values of the desert and its productivity (Bureau 1999). The immensity of the range of the desert tortoise and the large amount of critical habitat assist in achieving this balance. Although the Bureau has authorized many projects under the guidance of the California Desert Conservation Area Plan, large expanses of habitat, including most critical habitat of the desert tortoise, remain undisturbed by the Bureau's management actions. In our analysis, we place particular emphasis on the Bureau's commitment to ensure that no more than one percent of land within the desert wildlife management areas under its management will be disturbed by future actions; this measure should ensure that the conservation role and function of critical habitat of the desert tortoise are maintained.

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 (50 *Code of Federal Regulations* 402.02). 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.

To conduct this analysis, we contacted planning staff in the counties of Imperial, Riverside, San Bernardino, Kern, and Inyo counties and with the State Lands Commission and asked them to provide us with information on any projects that met the criteria for cumulative effects established by the implementing regulations at 50 *Code of Federal Regulations* 402.02. For the purposes of this analysis, we asked them to consider the action area to be non-federal lands that were either surrounded by Bureau lands or within one mile of the edge of large expanses of public lands. Planning staff from Imperial and Inyo counties and from the State Lands Commission responded that they were not aware of any actions within their jurisdictions that met these criteria. Planning staff from Kern and Riverside counties did not respond and we are not otherwise aware of any projects planned within these counties that would occur within the action area. Planning staff from the County of San Bernardino reported that a few small projects, primarily located along the sides of interstate highways were nearing approval; given their location adjacent to freeways, these cumulative effects are not likely to change, in a substantial manner, the current status of the desert tortoise or its critical habitat in the action area. We are unaware of any other non-federal actions that are reasonably certain to affect the desert tortoise

within the action area.

CONCLUSION

Desert Tortoise

After reviewing its current status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that continued implementation of the California Desert Conservation Area Plan, as modified by previous amendments, the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, and the interim measures in place in the western Mojave Desert planning area, is not likely to jeopardize the continued existence of the desert tortoise.

We reached this conclusion for several reasons. First, although we have detected declines in the number of the desert tortoise in various portions of its range, including within the action area of this consultation, the general guidance provided by the California Desert Conservation Area Plan and the specific actions contained in the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, and the interim measures in place in the western Mojave Desert planning area will ensure that actions the Bureau takes, funds, and authorizes are not likely to reduce appreciably, either directly or indirectly, the likelihood of both the survival and recovery of the desert tortoise in the wild by reducing its reproduction, numbers, or distribution. Secondly, during the course of this consultation, we did not detect any cumulative effects that we would expect to reduce appreciably, either directly or indirectly, the likelihood of both the survival and recovery of the desert tortoise in the wild by reducing its reproduction, numbers, or distribution. Finally, the Bureau has proposed and, in some cases, already implemented, measures to avoid or reduce adverse effects to the desert tortoise and to further its conservation. These measures include, but are not limited to, the following actions and proposals within the planning areas for northern and eastern Mojave Desert and the northern and eastern Colorado Desert:

- The establishment of large, well-distributed desert wildlife management areas that will be administered in a manner consistent with most of the recommendations of the recovery plan for the desert tortoise and will promote the survival and recovery of the species within this portion of its range;
- Substantial reductions in the amount of livestock grazing to the degree that most desert tortoises and their habitat in these planning areas will not be exposed to cattle grazing;

- Removal of burros from desert wildlife management areas, which will benefit the survival and recovery of the desert tortoise and is consistent with recommendations in the recovery plan;
- Acquisition of private lands, which will result in a higher level of protection of desert tortoises under the guidance of the California Desert Conservation Area Plan;
- A limit of one percent of new disturbance within desert wildlife management areas to reduce the loss of desert tortoises, which will ensure that most individuals and their habitat in areas that are essential to their conservation will not be exposed to the adverse effects of human activities;
- Reducing the distance, in the desert wildlife management areas within the northern and eastern Colorado Desert planning area, that vehicles can stop, park, and camp from 300 feet to 100 feet;
- Reducing the places, in the desert wildlife management areas within the northern and eastern Mojave Desert planning area, that vehicles can stop, park, and camp to disturbed areas within 100 feet of the road;
- Closure of routes, which will reduce the exposure of desert tortoises to human-related threats; and
- A reduction in the size of the open wash zones in the northern and eastern Colorado Desert planning area, which will reduce the level of adverse effects of vehicular-related activities on desert tortoises and their habitat in these areas.

In the western Mojave Desert planning area, the Bureau has implemented interim measures that include reductions in the amount and extent of cattle grazing and closure of areas to vehicular access that will avoid and minimize adverse effects to the desert tortoise and its habitat. To date, less than 1.3 percent of Bureau-administered lands within proposed desert wildlife management areas in this planning area have been disturbed by human activities. The continued implementation of the California Desert Conservation Area Plan, as modified by the interim measures, will likely maintain that situation until the adoption of the West Mojave Plan. We are currently consulting, pursuant to section 7(a)(2) of the Act, on the California Desert Conservation Area Plan amendments for the western Mojave Desert.

Critical Habitat

After reviewing the current status of critical habitat, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that continued implementation of the California Desert Conservation Area Plan, as modified by previous amendments, the Northern and Eastern Mojave Desert Management Plan,

the Northern and Eastern Colorado Desert Coordinated Management Plan, and the interim measures in place in the western Mojave Desert planning area, is not likely to destroy or adversely modify the critical habitat of the desert tortoise.

We reached this conclusion for several reasons. First, although we are aware of some areas, including within the action area of this consultation, where the condition of critical habitat has been degraded to some degree because one or more of the primary constituent elements have been disturbed by human activities, the general guidance provided by the California Desert Conservation Area Plan and the specific actions contained in the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, and the interim measures in place in the western Mojave Desert planning area will ensure that the critical habitat of the desert tortoise remains functional and continues to serve its conservation role. Secondly, during the course of this consultation, we did not detect any cumulative effects that we would expect to compromise the conservation role or function of critical habitat of the desert tortoise. Finally, the Bureau has proposed and, in some cases, already implemented, measures to avoid or reduce adverse effects to the critical habitat of the desert tortoise further its conservation. These measures include, but are not limited to, the following actions and proposals within the planning areas for the northern and eastern Mojave Desert and northern and eastern Colorado Desert:

- The establishment of large, well-distributed desert wildlife management areas encompassing most of the critical habitat in these planning areas that will be administered in a manner consistent with most of the recommendations of the recovery plan for the desert tortoise within this portion of its range;
- Substantial reductions in the amount of livestock grazing to the degree that most critical habitat in these planning areas will not be exposed to grazing activities;
- Substantial removal of burros from desert wildlife management areas, which will benefit the recovery of the primary constituent elements of critical habitat in areas previously used by burros;
- Acquisition of private lands, which will result in a higher level of protection for critical habitat under the guidance of the California Desert Conservation Area Plan;
- A limit of one percent of new disturbance within desert wildlife management areas, which will ensure that most critical habitat in these areas will not be exposed to adverse effects of human activities;
- Reducing the distance from road centerline, in the desert wildlife management areas within the northern and eastern Colorado Desert planning area, that vehicles can stop, park, and camp from 300 feet to 100 feet, which will ensure that most critical habitat will not be exposed to the adverse effects of off-road vehicle use;

- Reducing the places, in the desert wildlife management areas within the northern and eastern Mojave Desert planning area, that vehicles can stop, park, and camp to disturbed areas within 100 feet of the road, which will reduce the area that may be subject to off-road vehicle use;
- A reduction in the size of the open wash zones in the northern and eastern Colorado Desert planning area, which will ensure that critical habitat in these areas will not be exposed to the adverse effects of off-road vehicle use.

In the western Mojave Desert planning area, the Bureau has implemented interim measures that include reductions in the amount and extent of cattle grazing and closure of areas to vehicular access that will avoid or reduce the adverse effects to the primary constituent elements of critical habitat. To date, less than 1.3 percent of Bureau-administered lands within proposed desert wildlife management areas in this planning area have been disturbed by human activities. The continued implementation of the California Desert Conservation Area Plan, as modified by the interim measures, will likely maintain that situation until the adoption of the West Mojave Plan. We are currently consulting, pursuant to section 7(a)(2) of the Act, on the California Desert Conservation Area Plan amendments for the western Mojave Desert.

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 below are non-discretionary and must be undertaken by the Bureau or made binding conditions of any authorization provided to permittees. The Bureau has a continuing duty to regulate the activities covered by this incidental take statement. If the Bureau fails to assume and implement the terms and conditions of the incidental take statement or to

make them enforceable terms of permit or grant documents, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Bureau must report the progress of its action and their impact on the species to the Service as specified in the incidental take statement (50 *Code of Federal Regulations* 402.14(i)(3)).

The California Desert Conservation Area Plan, Northern and Eastern Mojave Desert Management Plan, and Northern and Eastern Colorado Desert Coordinated Management Plan describe numerous programs under which the Bureau will need to make specific decisions with regard to future actions. Although we have evaluated the general nature of the effects of these actions, both negative and positive, on listed species, we cannot fully assess the potential effects of specific future actions under these programs because information on the location, timing, nature, and other aspects of the actions is not available at this time. Consequently, we cannot provide an exemption from the prohibitions against take, as described in section 9 of the Act, for the incidental take that may result from these future actions that require separate review and authorization by the Bureau. We will review the effects of those actions and, through the section 7(a)(2) consultation process, issue incidental take statements in the future, if appropriate, when the Bureau requests formal consultation on specific discretionary actions.

Given this limitation, this biological opinion provides an exemption from the prohibitions against take only for the incidental take of desert tortoises that is likely to result from actions that are inherently authorized by the approval of the California Desert Conservation Area Plan or its amendments, such as the Northern and Eastern Mojave Desert Management Plan and Northern and Eastern Colorado Desert Coordinated Management Plan, or from actions for which the records of decision for these bioregional plans constitute the Bureau's final authorization. These activities include casual use associated with recreation and mining within the California Desert Conservation Area and ongoing grazing within the planning areas for northern and eastern Mojave Desert and the northern and eastern Colorado Desert. This biological opinion also provides an exemption for the incidental take of desert tortoises associated with the management of burros because, although the Bureau will prepare subsequent environmental assessments on a periodic basis for the removal of burros, these documents are general in nature and are unlikely to provide any additional information that would alter the analysis contained in this document.

We cannot quantify the precise numbers of desert tortoises that may be killed or injured as a result of the actions that the Bureau authorizes through approval of the California Desert Conservation Area Plan, as amended, because of the large size of the action area, the patchy distribution of desert tortoises within the California Desert Conservation Area, and the unpredictability of when these activities are likely to cause injury or mortality to desert tortoises. Additionally, finding carcasses and assigning a cause of death is problematic over such large areas and in the presence of numerous scavengers that are likely to find dead desert tortoises soon after they die.

To attempt to quantify the extent of the incidental take that is exempted by this biological opinion, we will quantify the extent of the areas where such incidental take is likely to occur as a result of authorized activities that occurred as direct result of the signing of the records of

decision for the Northern and Eastern Mojave Desert Management Plan, the Northern and Eastern Colorado Desert Coordinated Management Plan, and the adoption of the interim measures for the western Mojave Desert planning area.

Casual Use

Incidental take of desert tortoises is likely to occur through casual use, through walking, equestrian use, or mining conducted at this level, anywhere where such activities are authorized within the approximately 9,788,000 acres within the action area.

Within the boundaries established for the Northern and Eastern Mojave Desert Management Plan, incidental take of desert tortoises is likely to occur through casual use, in the form of operating vehicles in an authorized manner:

1. along approximately 650 miles of routes designated as open;
2. along 69 miles of routes designated as limited; and
3. within 100 feet of the centerline of such open and limited routes in previously disturbed areas or within the banks of washes where the open and limited route is a navigable wash when stopping, parking, and camping.

Within the boundaries established for the Northern and Eastern Colorado Desert Coordinated Management Plan, incidental take of desert tortoises is likely to occur through casual use, in the form of operating vehicles in an authorized manner:

1. along approximately 1,694 miles of routes designated as open or are located on private lands within the Chuckwalla and Chemehuevi desert wildlife management areas and within 100 feet of the centerline of such open routes when stopping, parking, and camping;
2. along approximately 3,049 miles of routes designated as open or located on private lands within this planning area but outside of the Chuckwalla and Chemehuevi desert wildlife management areas and within 300 feet of the centerline of such open routes;
3. within the 218,711 acres of open wash zones in the Chemehuevi Desert Wildlife Management Area; and
4. within the 352,633 acres of open wash zones in the Chuckwalla Desert Wildlife Management Area.

Note that we have included an exemption for the use of routes of travel on private lands because the Bureau has noted that access to these lands was a consideration in the route designation process. Additionally, we (and most users of the desert) do not have the ability to determine all of the boundaries between public and private land in areas where they are substantially intermingled.

We also consider this exemption to apply to causal use activities that may occur on any lands that the Bureau may acquire, provided that the activities causing the take are in compliance with the Bureau's management direction provided by the California Desert Conservation Area Plan, as amended, and analyzed herein. Note that this exemption may not apply to any desert tortoises that may reside on public lands that are transferred from the management of the Bureau. In such instances, the Service would have to determine whether the exemption would remain in place on a case-by-case basis; the factors we would consider in such cases would include, but not be limited to, any changes in the nature and intensity of use that would result from the transfer.

Livestock Grazing

Incidental take of desert tortoises is likely to occur during activities associated with livestock grazing, (but not including new range developments or harm, as defined in the first paragraph of this section) within the boundaries of the following allotments:

Within the boundaries of the Northern and Eastern Mojave Desert Management Plan:

Clark Mountain Allotment – 97,560 acres
Horse Thief Springs Allotment – 150,140 acres
Jean Lake Allotment – 9,806 acres
Pahrump Valley Allotment – 26,952 acres

Within the boundaries of the Northern and Eastern Colorado Desert Coordinated Management Plan:

Lazy Daisy Allotment - 311,280 acres
Rice Valley Allotment - 76,301 acres

Through memoranda dated May 17, 1999, and August 3, 2000, the Service (1999, 2000) extended the incidental take statements that were contained in previous biological opinions for sheep and cattle grazing in the California Desert Conservation Area until such time as the bioregional plans were completed. With the issuance of this biological opinion, this incidental take statement replaces those contained in previous biological opinions regarding livestock grazing for the northern and eastern Mojave Desert and northern and eastern Colorado Desert bioregions. The incidental take statements from previous biological opinions for the western Mojave Desert planning area remain in effect.

Management of Burros

Incidental take of desert tortoises is likely to occur during activities associated with the management of burros, including various methods of removing them from public lands, in the following areas:

Within the boundaries of the Northern and Eastern Mojave Desert Management Plan:

Clark Mountain Herd Management Area - 75,350 acres
Shadow Valley Desert Wildlife Management Area - 101,355 acres

Within the boundaries of the Northern and Eastern Colorado Desert Coordinated Management Plan:

Chemehuevi Herd Management Area - 147,630 acres
Chocolate/Mule Mountains Herd Management Area - 223,542 acres
Chemehuevi Desert Wildlife Management Area - 815,843 acres
Chuckwalla Desert Wildlife Management Area - 465,287 acres

We have extended the exemption for incidental take throughout public lands within appropriate desert wildlife management areas for the management of burros, in the event that such activities may be needed in these areas.

Relationship to Incidental Take Statements in Previous Biological Opinions

In our previous biological opinion on the California Desert Conservation Area Plan, we extended the exemption from the prohibitions against take to entrapment of desert tortoises in managed waters and guzzlers. Upon further consideration, we are not extending that exemption in this incidental take statement because these facilities are specifically authorized by the Bureau and can be designed to avoid take of desert tortoises. We note that this incidental take statement does not alter any previous incidental take statement that the Service provided to the Bureau within biological opinions regarding specific managed waters and guzzlers.

The incidental take statements contained in the biological opinions for the bioregional plans for the Coachella Valley (Service 2002b) and Algodones Dunes (Service 2005b), and for route designation in the western Mojave Desert (Service 2003b) planning area and for the portion of the northern and eastern Mojave Desert planning area that is outside of the desert wildlife management areas (Service 2004d) remain in effect and are not altered by this incidental take statement.

Effects of the Incidental Take on the Desert Tortoise

All of the activities for which we exempted incidental take have some potential for killing or injuring desert tortoises. Activities such as casual use involving walking, equestrian use, and mining will likely kill or injure very few desert tortoises because these activities are generally low in intensity and scattered over large areas; additionally, because these activities generally involve low speeds, desert tortoises can be seen and avoided.

The removal of burros, for the most part, will kill or injure very few desert tortoises because this activity is restricted to relatively small and discrete areas in the California Desert Conservation Area within herd management areas. During these removal activities, some desert tortoises may be captured and moved from harm's way; although this form of take may induce some level of physiological stress, moving desert tortoises out of direct danger likely reduces the level of mortality that would otherwise result.

Stopping, parking, and camping in disturbed areas within 100 feet of open or limited routes within the northern and eastern Mojave Desert planning area will likely kill very few desert tortoises because they are less likely to be in these areas and would be more easily observed in areas that have reduced levels of vegetation.

We anticipate that grazing activities will directly kill or injure few desert tortoises because livestock attempt to avoid stepping on larger animals; also, this use is dispersed to a large degree, in relation to the distribution of desert tortoises. We acknowledge smaller desert tortoises are at greater risk. This exemption with regard to livestock grazing does not extend to specific range improvements because the Bureau will need to authorize those on a case-by-case basis, or to mortality that may be caused by degradation of habitat. The Bureau's grazing prescriptions and standards and guidelines are specifically designed to maintain or improve the condition of habitat; therefore, any degradation of habitat that would likely lead to mortality in desert tortoises would be outside the bounds of the proposed action.

Other forms of activities, such as casual use involving vehicles on routes designated as open or limited, stopping, parking, and camping within either 100 or 300 feet of such routes, and use of open wash zones pose the greatest risk to desert tortoises and are likely to kill or injure more animals because these activities can be conducted at greater speeds and involve large areas of the desert. In spite of these facts, we anticipate that relatively few desert tortoises will be killed or injured for several reasons. Many users of the desert will attempt to avoid killing animals with their vehicles. A large portion of the use will occur when desert tortoises are less active; we acknowledge that the periods of heaviest use – the spring and fall – are also when desert tortoises are most likely to be moving longer distances, which puts them at greater risk. Finally, some areas of use, such as the open wash zones, are generally located in areas of lower density of desert tortoises.

Finally, this incidental take statement also extends to the management of burros; specifically, we understand that the removal of burros occurs opportunistically. That is, the Bureau conducts round ups when burros congregate in specific areas; the normal statutory timeframes provided for the consultation process under 50 *Code of Federal Regulations* 402 are not amenable to this type of action. Furthermore, reducing the effectiveness of the Bureau's ability to gather burros would be counterproductive to implementing a recovery program for this species.

Many of the actions for which we have exempted incidental take are likely to occur in disturbed areas (e.g., at least some camping off roads, existing corrals for burro gathers) or will not, by their nature, cause removal of habitat (e.g., herding of burros, hiking) to the extent that it would result in harm to desert tortoises. We anticipate that grazing, management of burros, and casual use associated with recreation and mining are likely to result in relatively few mortalities of or injuries to desert tortoises.

In conclusion, despite the numerous actions that will occur and have the potential to kill or injure desert tortoises, we anticipate that relatively few desert tortoises will be killed or injured by these activities.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoises during activities related to grazing, management of burros, and casual use associated with recreation and mining:

1. The Bureau must ensure that only qualified personnel are allowed to handle desert tortoises, conduct clearance surveys, and monitor for compliance with the protective measures proposed by the Bureau and the terms and conditions of this biological opinion.
2. The Bureau must reduce the take of desert tortoises during removal of burros.
3. The Bureau must provide information on the desert tortoise and its conservation to anyone requesting information on casual use associated with recreation and mining.
4. The Bureau must ensure that the use of the open wash zones in the northern and eastern Colorado Desert planning area does not result in the take of substantial numbers of desert tortoises.
5. The Bureau must monitor its activities to track, in a comprehensive manner, the take of desert tortoises to ensure that its assumptions about the effects of its activities are valid.

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Bureau and repeated in the Description of the Proposed Action portion of this biological opinion to reduce the adverse effects of grazing, management of burros,

and casual use associated with recreation and mining on the desert tortoise. We also considered the management of grazing that occurs under the Service's previous biological opinions, as modified by Bureau proposals described in this biological opinion. Any subsequent changes in the minimization measures proposed by the Bureau or in the conditions under which cattle grazing or the use of open wash zones currently occurs may constitute a modification of the proposed action and may warrant re-initiation of formal consultation, as specified at 50 *Code of Federal Regulations* 402.16. These reasonable and prudent measures are intended to clarify or supplement the protective measures that were proposed by the Bureau as part of the proposed action.

TERMS AND CONDITIONS

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

1. The following terms and conditions implement reasonable and prudent measure 1:
 - a. The Bureau must ensure that only biologists authorized by the Service under the auspices of this biological opinion are allowed to handle desert tortoises to assist in implementing the actions for which take was exempted in this incidental take statement.
 - b. All handling of desert tortoises and their eggs, relocation of desert tortoises, and excavation of burrows must be conducted by an authorized biologist in accordance with recommended protocol (Desert Tortoise Council 1999).
 - c. The Bureau must ensure that only biologists approved or authorized by the Service under the auspices of this biological opinion conduct pre-project clearance surveys for desert tortoises or engage in moving desert tortoises out of harm's way.
 - d. The Bureau must submit the names(s) and credentials of the proposed biologist(s) to the Service for review and approval at least 30 days prior to the onset of activities. The Bureau must ensure that no activities begin until a biologist is approved by the Service.
2. The following term and condition implements reasonable and prudent measure 2:

When burros are being removed from areas where desert tortoises are likely to be present and are likely to be killed or injured by the removal of burros, the Bureau must have biologists authorized by the Service present to ensure desert tortoises are moved from harm's way or avoided, if necessary. The Bureau must use its best professional judgment in determining when a Service-authorized biologist needs to be present; we expect such circumstances to occur when the removal of burros is likely to result in concentrated

activity by horses, burros, or workers or ground disturbance in areas where desert tortoises are likely to be present and are likely to be killed or injured by the removal activities.

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

The Bureau must provide information on the desert tortoise, its status, the protection it receives under the Endangered Species Act, and the actions that can be taken to avoid killing or injuring desert tortoises when working or recreating in the desert to anyone requesting information on casual use associated with recreation and mining.

4. The following term and condition implements reasonable and prudent measure 4:

The Bureau must develop a monitoring program, within 2 years of the issuance of this biological opinion, that tracks the types and levels of use in, and the effects of that use, within the open wash zones in the northern and eastern Colorado Desert planning area.

5. The following terms and conditions implement reasonable and prudent measure 5:

- a. To ensure that the measures proposed by the Bureau are effective and are being properly implemented, the Bureau must contact the Service immediately if a desert tortoise is killed or injured by human activities. At that time, the Service and the Bureau must review the circumstances surrounding the incident to determine whether additional protective measures are required. Grazing, the removal of burros, and casual use associated with recreation and mining may continue pending the outcome of the review, provided that the Bureau's proposed protective measures and any appropriate terms and conditions of this biological opinion have been and continue to be fully implemented.
- b. If more than five desert tortoises are found dead or injured in any 12-month period as a result of any specific activity or circumstance, the Bureau must contact the Service to determine whether formal consultation should be re-initiated on that aspect of the California Desert Conservation Area Plan. This threshold is intended to determine whether certain activities or circumstances (e.g., desert tortoises being trapped in cattle guards or killed along one portion of a road) may be affecting desert tortoises more substantially than we anticipated. The threshold would not be used in situations that we would reasonably expect to occur and that have been considered by the Bureau and Service during this consultation (e.g., desert tortoises being consumed by common ravens).

REPORTING REQUIREMENTS

By January 31 of each year this biological opinion is in effect, the Bureau must provide a report to the Service that provides details on each desert tortoise that is found dead or injured. The information must include the location of each mortality, the circumstances of the incident, and

any actions undertaken to prevent similar instances from occurring in the future. We request that the annual report also describe activities that the Bureau implemented (e.g., the amount of road maintained, habitat restored, etc.) within habitat of the desert tortoise to promote its recovery.

DISPOSITION OF DEAD OR INJURED DESERT TORTOISES

Upon locating a dead or injured desert tortoise, the Bureau must notify the Service's Division of Law Enforcement (370 Amapola Avenue, Suite 114, Torrance, California 90501) in writing within 3 working days of its finding; the Bureau must also notify the Ventura Fish and Wildlife Office (805-644-1766) by telephone and in writing. The report must include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

The Bureau must ensure that injured animals are handled with care and provided effective treatment. Injured animals must be transported to a qualified veterinarian. Should any treated desert tortoise survive, the Service must be contacted regarding the final disposition of the animal.

The Bureau must ensure that dead animals are preserved in the best possible state. The Bureau must endeavor to place the remains of the intact desert tortoises with educational or research institutions holding the appropriate State and Federal permits per their instructions. If such institutions are not available or the shell has been damaged, the information noted above must be obtained and the carcass left in place. The Bureau must make arrangements regarding proper disposition of potential museum specimens with the institutions as soon as possible.

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.

1. We recommend that the Bureau establish baseline data regarding desert tortoises, plant communities, and substrates within the Jean Lake Allotment prior to the return of livestock grazing. We also recommend that the Bureau encourage qualified researchers to study potential effects of cattle grazing, if it is resumed on this allotment. Because the Jean Lake Allotment has not been grazed for several years, the resumption of grazing in this location may provide a valuable opportunity to gather information on its effects.
2. The Bureau should work with the California Department of Fish and Game and other agencies within the Desert Managers Group to disseminate information to hunters and target shooters that explains the status of the desert tortoise and how to protect it while hunting and shooting within the California Desert Conservation Area. This information should also provide general guidelines for shooting and hunting in a responsible manner

so that damage to other resources, such as migratory birds and native plants, could be reduced.

3. We recommend that the Bureau work with non-governmental organizations, possibly with the coordination of the Desert Managers Group, to assist in gathering data on the use levels of the open wash zones in the northern and eastern Colorado Desert bioregion.
4. We recommend that the Bureau work with non-governmental organizations, possibly with the coordination of the Desert Managers Group, to conduct surveys of guzzlers, adits, and cattle guards to determine whether these facilities are entrapping desert tortoises and to retrofit them, if necessary, to eliminate this threat.
5. Prior to the authorization of any vehicular events in the Johnson Valley-to-Parker race corridor, the Bureau should conduct an in-depth analysis of this area within the Chemehuevi Critical Habitat Unit to determine the relative density of desert tortoises and the condition of the primary constituent elements of critical habitat within and adjacent to the corridor. If desert tortoises or the primary constituent elements of critical habitat are present in the area, riders participating in any race in the Johnson Valley-to-Parker corridor should be required to stay on the existing road within the Chemehuevi Critical Habitat Unit. By eliminating off-road travel in this area, the likelihood that desert tortoises would be killed or injured would be reduced. Additionally, restricting riders to the established road would reduce disturbance of the primary constituent elements within the Chemehuevi Critical Habitat Unit and possibly reduce the likelihood of invasion by exotic species.
6. We recommend that the Bureau evaluate the status of the desert tortoise in former category I habitat east of Clark Mountain to determine whether cattle grazing is degrading habitat in this area or compromising the conservation of desert tortoises in this area. If conflicts are observed, we recommend that the Bureau extend the voluntary relinquishment provisions to this operator. Given the widespread declines of desert tortoises in California, desert tortoises outside of desert wildlife management areas may be important in future recovery efforts.
7. As Tracy et al. (2004) discussed, the relationship between disease, physiological health, and declines in desert tortoises has not been thoroughly examined. We recommend that the Bureau assist in facilitating this work so that we can more effectively conserve this species.
8. Figures 4.a and 4.b in the final environmental impact statement for the Northern and Eastern Mojave Desert Management Plan lead us to conclude that a portion of the routes designated as open seem to be redundant (Bureau 2002d). We do not have the ability, during this consultation, to be aware of all of the factors that were considered in making determinations regarding specific routes, such as terrain and the nature of a route. Consequently, we recommend that the Bureau seek additional opportunities to reduce

further the threat of mortalities resulting from vehicle strikes within the desert wildlife management areas by eliminating redundant routes in areas that are important for recovery.

9. Finally, we recommend that the Bureau conduct thorough inventories of all natural water sources before they are modified or enhanced for game species or for any other purpose. Many springs in the desert support unique assemblages of invertebrates that could be extirpated if the water source is altered. If such assemblages are found, modifications of the spring should be avoided or conducted in a manner that protects these assemblages.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the California Desert Conservation Area Plan, as amended. 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 our Ventura Fish and Wildlife Office at (805) 644-1766 or Pete Sorensen of our Carlsbad Fish and Wildlife Office at (760) 431-9440.

Attachments:

Tables 2 through 5 from the recovery plan for the desert tortoise regarding the characteristics of recovery units

Figure 3 from the recovery plan for the desert tortoise depicting the recovery units

Table 2. Vegetation communities and typical foods used by the desert tortoise (*Gopherus agassizii*) within recovery units.

Recovery Units	Vegetation Communities ¹	Plant Foods
Northern Colorado	(1) Succulent Scrub (<i>Fouquieria</i> , <i>Opuntia</i> , <i>Yucca</i>), (2) Blue Palo Verde-Smoke Tree Woodland, (3) Creosote Bush Scrub (lava flows)	Summer and winter annuals
Eastern Colorado	(1) Succulent Scrub (<i>Fouquieria</i> , <i>Opuntia</i> , <i>Yucca</i>), (2) Blue Palo Verde-Ironwood-Smoke Tree Woodland, (3) Creosote Bush Scrub (rocky slopes)	Summer and winter annuals, cacti
Upper Virgin River	Transitional Vegetation: (1) Sagebrush Scrub, (2) Psammophytes, Great Basin (sand sage), (3) Blackbush Scrub	Summer and winter annuals, perennial grasses, cacti (< 5%)
Northeastern Mojave	(1) Creosote Bush Scrub, (2) Big Galleta Scrub-Steppe, (3) Desert Needlegrass Scrub-Steppe, (4) Blackbush Scrub	Summer and winter annuals, cacti, perennial grasses
Eastern Mojave	(1) Big Galleta-Scrub Steppe, (2) Succulent Scrub (<i>Yucca</i> , <i>Opuntia</i> species), (3) Creosote Bush Scrub, (4) Cheesebush Scrub (east Mojave type), (5) Indian Rice Grass Scrub-Steppe	Summer and winter annuals, cacti, perennial grasses, herbaceous perennials
Western Mojave	(1) Creosote Bush Scrub, (2) Mojave Saltbush- Allscale Scrub (endemic), (3) Indian Rice Grass Scrub-Steppe, (4) Hopsage Scrub, (5) Big Galleta Scrub Steppe, (6) Cheesebush Scrub (west Mojave type), (7) Desert Psammophytes, (8) Blackbush Scrub	Winter annuals, few herbaceous perennials, cacti

¹From Appendix E

Table 3. Topography, substrate, winter burrow site preference, and denning behavior of the desert tortoise (*Gopherus agassizii*) in each recovery unit.

Recovery Unit	Physical Attributes of Habitat	Burrow Sites	Denning Behavior
Northern Colorado	Flats, valleys, bajadas, rocky slopes, small washes	Under shrubs, in intershrub spaces, few in washes	Single
Eastern Colorado	Flats, valleys, fans, small washes, deeply dissected washes, rocky slopes	Shallow burrows, bajadas, more use of shrubs	Single
Upper Virgin River	Rock caves, sandstone crevices	Burrows in sand, and in sandstone crevices; (Do not use habitat like NE Mojave, even if available)	Multiple
Eastern Mojave	Flats, valleys, fans, bajadas, rocky slopes	Some caliche caves, bajadas, washes	Single
Northeastern Mojave	Flats, valleys, fans, bajadas, rocky slopes	Caliche caves, bajadas, washes	Multiple
Western Mojave	Flats, valleys, fans, rolling hills, mountainous slopes, rock outcrops, badlands, sand dunes, lava flows	Under shrubs, in bajadas, few in washes	Single

Desert Tortoise (Mojave Population) Recovery Plan

Table 4. Distribution of recovery units of the desert tortoise by genetic unit (mtDNA) and phenotype.

Recovery Unit	Genetic	Phenotype
Northern Colorado	California	California
Eastern Colorado	California	California
Upper Virgin River	Eastern Nevada/Utah	Unknown
Eastern Mojave	California, Southern Nevada	California
Northeastern Mojave	Western Nevada, Central Nevada, Eastern Nevada/Utah	Beaver Dam Slope, Unknown
Western Mojave	California	California

Table 5. Numbers of freezing days and amounts and timing of precipitation within desert tortoise recovery units.

Recovery Unit	Mean number of freezing days annually	Precipitation	
		Mean annual precip. (mm)	%precip. July-Sept.
Northern Colorado	2-12	112-129	33-34
Eastern Colorado	12-16	96-100	32-37
Upper Virgin River	96	210	24-29
Eastern Mojave	24-46	112-208	28-38
Northeastern Mojave	46-127	100-210	24-31
Western Mojave (totals)	33-104	90-150	6-27
Fremont-Kramer DWMA	33-84	90-150	6-10
Ord-Rodman DWMA	57-104	108	18-27
Superior-Crones DWMA	57+	109	27

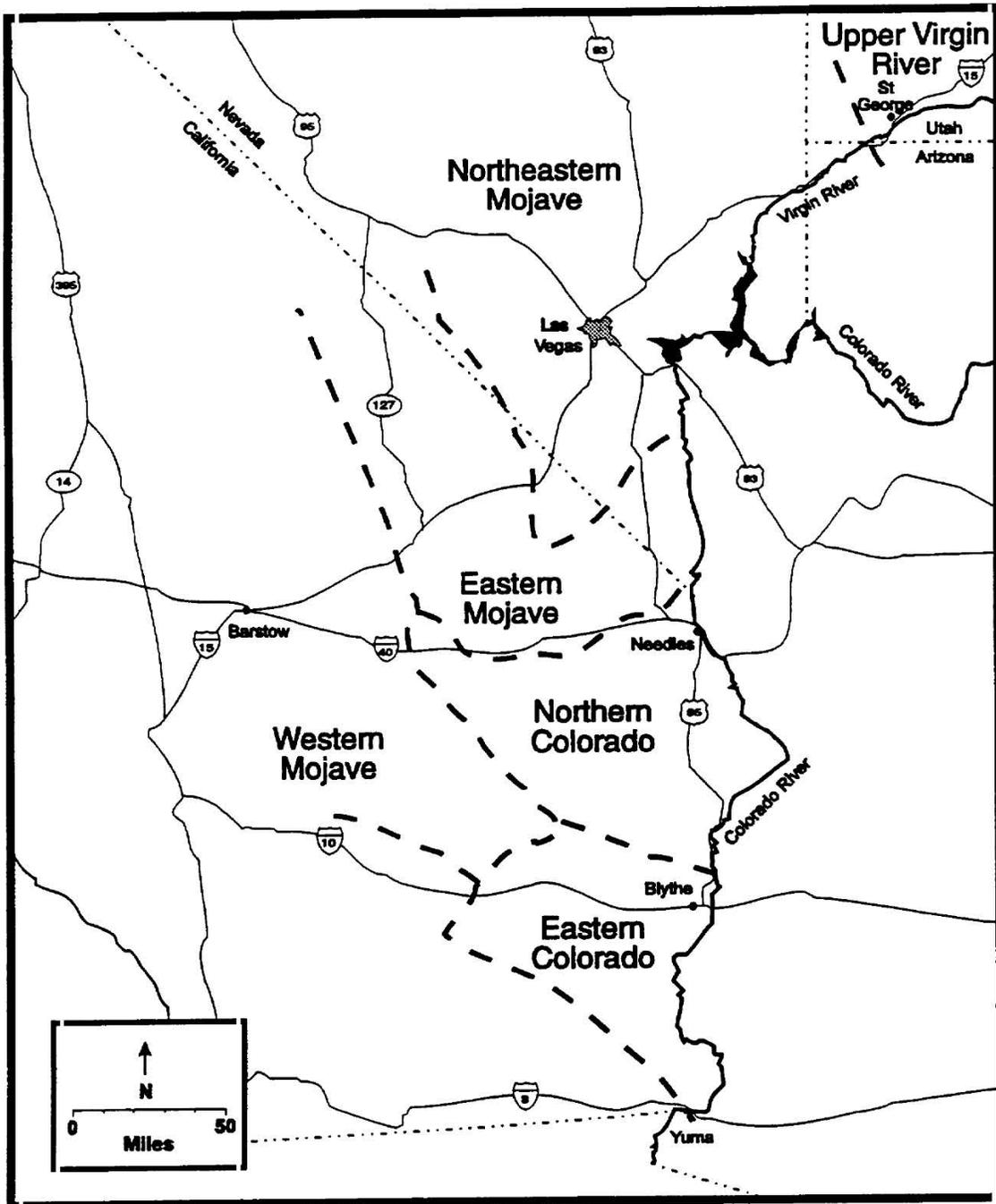


Figure 3. Approximate boundaries of recovery units of the desert tortoise in the Mojave region

REFERENCES CITED

- Aardahl, J. 2005. Personal communication regarding desert tortoises in mine shafts in the El Paso Mountains. Wildlife biologist, Ridgecrest Field Office, Bureau of Land Management. Ridgecrest, California.
- 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.
- Avery, H.W., and A.G. Neibergs. 1997. Effects of cattle grazing in the desert tortoise, *Gopherus agassizii*: nutritional and behavioral interactions. In: *Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles - An International Conference*, pp. 13-20. New York Turtle and Tortoise Society.
- Berry, K.H. 1984. Human activities in desert tortoise critical habitats in California. In: K.H. Berry (ed.). *The Status of the desert tortoise (Gopherus agassizii) in the United States*. Report to the U.S. Fish and Wildlife Service from the desert tortoise Council. Order Number 11310-0083-81. Available at the Ventura Fish and Wildlife Office, Ventura, 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. Riverside Field Station, 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. Dated February 28. Research Wildlife Biologist, U.S. Geological Survey. Moreno Valley, California.
- Berry, K.H., T. Goodlett, and K. Anderson. 2001. Recent declines in desert tortoise populations in eastern California: the Fenner and Chemehuevi Valleys. Abstract of paper presented at the Twenty-sixth Annual Meeting and Symposium of the Desert Tortoise Council. [Http://www.deserttortoise.org/abstracts2001/2001abs6.html](http://www.deserttortoise.org/abstracts2001/2001abs6.html)
- Boarman, W.I. 2002. Threats to desert tortoise populations: a critical review of the literature. Western Ecological Research Center, U.S. Geological Survey. Riverside, California.

- Boarman, W.I., and K.H. Berry. 1995. Common ravens in the southwestern United States 1968-92. In: E.T. LaRoe (ed.), *Our Living Resources: A report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems*. National Biological Service, Department of the Interior. Washington, D.C.
- Boarman, W.I., and M. Sazaki. 1996. Highway mortality in desert tortoises and small vertebrates: success of barrier fences and culverts. In: G. J. Evink, P. Garrett, D. Zeigler, and J. Berry (eds.), *Trends in addressing transportation related wildlife mortality. Proceedings of the transportation related wildlife mortality seminar*. Environmental Management Office, Department of Transportation, Tallahassee, Florida.
- Boarman, W.I., M.L. Beigel, G.C. Goodlett, and M. Sazaki. 1998. A passive integrated transponder system for tracking animal movements. *Wildlife Society Bulletin* 26:886-891.
- 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.
- Chaffee, M.A., and K.H. Berry. 1999. The search for sources of potential toxicants in desert tortoises: results of a pilot project incorporating surficial materials and plants from three areas in southeastern California. Abstract of paper presented at the Twenty-fourth Annual Meeting and Symposium of the Desert Tortoise Council.
[Http://www.deserttortoise.org/abstracts1999/sgabs6.html](http://www.deserttortoise.org/abstracts1999/sgabs6.html)
- 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.
- Collis, S. 2005. Personal communication regarding activities and acreages of disturbed areas within critical habitat of the desert tortoise at Edwards Air Force Base. Biologist, Air Force Flight test Center. Edwards Air Force Base, 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.
- Connor, M.J. 2003. Desert tortoise conservation project #2001-0123-000. Final report. Desert Tortoise Preserve Committee. Riverside, California.

- Crowe, R. 2005a. General characterization of critical habitat in the Northern Colorado Desert Recovery Unit (Ward-Chemehuevi). Summary of information from the Proposed Northern and Eastern Colorado Desert Coordinated Management Plan and Final Environmental Impact Statement. California Desert District, Bureau of Land Management. Moreno Valley, California.
- Crowe, R. 2005b. General characterization of critical habitat in the Eastern Colorado Desert Recovery Unit (Chuckwalla Bench) and Pinto. Summary of information from the Proposed Northern and Eastern Colorado Desert Coordinated Management Plan and Final Environmental Impact Statement. California Desert District, Bureau of Land Management. Moreno Valley, California.
- Crowe, R. 2005c. Personal communication. Electronic mail describing critical habitat in the northern and eastern Colorado Desert planning area, outside of desert wildlife management areas. Dated February 2. Northern and Eastern Colorado Desert Plan Manager, California Desert District, Bureau of Land Management. Moreno Valley, California.
- Crowe, R.E., and L.D. Foreman. 1997. Current desert tortoise management situation in the northern and eastern Colorado Desert planning area. California Desert District, Bureau of Land Management. Riverside, California.
- DeFalco, L.A., J.K. Detling, C.R. Tracy, and S.D. Warren. 2001. Physiological variation among native and exotic winter annual plants associated with microbiotic crusts in the Mojave Desert. *Plant and Soil* 234:1-14.
- Desert Tortoise Council. 1999. Guidelines for handling desert tortoises during construction projects. Wrightwood, California.
- Donnelly, M. 2003a. Tortoise monitoring report – week ending 01/25/03 Kern River Gas Transmission 2003 Expansion Project. Ecology and Environment, Inc. Lancaster, New York.
- Donnelly, M. 2003b. Tortoise monitoring report – week ending 02/22/03 Kern River Gas Transmission 2003 Expansion Project. Ecology and Environment, Inc. Lancaster, New York.
- Everly, C. 2005. Draft GIS maps produced from unpublished data gathered during line distance sampling in 2001, 2002, 2003, and 2004. Mojave Desert Ecosystem Program, Department of the Army. Barstow, California.
- Foreman, L.D. 1998. Current desert tortoise management situation in the BLM-administered lands portion of the northern and eastern Mojave planning area. California Desert District, Bureau of Land Management. Riverside, California.

- Foreman, L.D. 2002. Personal communication. Wildlife biologist, California Desert District, Bureau of Land Management. Riverside, California.
- Heaton, J.S., A. Karl, K. Nussear, R. Inman, and C. Everly. 2004. Estimation of numbers of desert tortoises in the additional training lands at Fort Irwin and the Western Mojave Recovery Unit. Unpublished calculations.
- Henen, B.T., C.C. Peterson, I.R. Wallis, K.H. Berry, and K.A. Nagy. 1998. Effects of climatic variation on field metabolism and water relations of desert tortoises. *Oecologia* 117:365-373.
- 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.
- Jones, R. 2005. Personal communication regarding winter activity of desert tortoises. Biologist, California Department of Fish and Game. Palmdale, California.
- Kerneck, P. 2004. Personal communication. Status of cattle allotments in the western Mojave Desert. Planner, Charis Corporation. Barstow, California.
- Kerneck, P. 2005. Personal communication. Status of land acquisitions for the Fort Irwin project in the western Mojave Desert. Planner, Charis Corporation. Barstow, California.
- Knight, R.L., R.J. Camp, and H.A.L. Knight. 1998. Ravens, cowbirds, and starlings at springs and stock tanks, Mojave National Preserve, California. *Great Basin Naturalist* 58:393-395.
- Knight, R.L., R.J. Camp, W.I. Boarman, and H.A.L. Knight. 1999. Predatory bird populations in the East Mojave Desert, California. *Great Basin Naturalist* 59:331-338.
- LaPre, L. 2005a. Electronic mail. General characterization of critical habitat in the Ord-Rodman Critical Habitat Unit. Summary of information from the West Mojave Plan. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.

- LaPre, L. 2005b. Electronic mail. General characterization of critical habitat in the Fremont-Kramer Critical Habitat Unit. Summary of information from the West Mojave Plan. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.
- LaPre, L. 2005c. Electronic mail. General characterization of critical habitat in the Superior-Cronese Critical Habitat Unit. Summary of information from the West Mojave Plan. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.
- LaPre, L. 2005d. Electronic mail. General characterization of critical habitat in the Pinto Mountain Critical Habitat Unit. Summary of information from the West Mojave Plan. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.
- LaPre, L. 2005e. Electronic mail and facsimile. Explanation of the calculations of disturbance in proposed desert wildlife management areas within the West Mojave Plan area. Dated February 23. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.
- LaPre, L. 2005f. Electronic mail. Information regarding the land acquisitions within the California Desert Conservation Area in the last 10 years. Dated March 2. District Wildlife Biologist, California Desert District, Bureau of Land Management. Moreno Valley, California.
- Lorentzen, E. 2005a. Personal communication. Adverse modification and the unnecessary and undue degradation standard. Endangered Species Biologist, Bureau of Land Management. Sacramento, California.
- Lorentzen, E. 2005b. Personal communication. Extension of moratorium on patent applications. Endangered Species Biologist, Bureau of Land Management. Sacramento, California.
- Lovich, J.E., and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. *Environmental Management* 24:309-326.
- 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.
- Morgan, L. 2004. Personal communication regarding management of burros in Shadow Valley Desert Wildlife Management Area. Field Manager, Needles Field Office, Bureau of Land Management. Needles, California.

- Morgan, L. 2005a. Personal communication regarding status of allotments. Field Office Manager, Needles Field Office, Bureau of Land Management. Needles, California.
- Morgan, L. 2005b. Personal communication regarding future National Environmental Policy Act procedures for removal of burros. Field Office Manager, Needles Field Office, Bureau of Land Management. Needles, California.
- O'Gara, J. 2005. Personal communication regarding Navy activities and acreages of disturbed areas within critical habitat of the desert tortoise at the Naval Air Weapons Station, China Lake. Environmental Project Office, Naval Air Weapons Station. China Lake, 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](http://www.deserttortoise.org/abstracts2001/2001abs29.html)
- Oftedal, O.T. 2005. Fast plants, slow tortoises: How nutrition could constrain the recovery of the desert tortoise. Abstract of paper presented at the Thirtieth Annual Meeting and Symposium of the Desert Tortoise Council.
<http://www.deserttortoise.org/abstract/abstracts2005/dtc2005abstracts.pdf>
- Pearce, R.L. 2005. Personal communication regarding Marine Corps activities and acreages of disturbed areas within critical habitat of the desert tortoise at the Chocolate Mountains Aerial Gunnery Range. Range Manager, Marine Corps Air Station Yuma. Yuma, California.
- Pratini, N. 2005. Critical habitat and BLM management zones. GIS analysis. Dated February 2. California Desert District, Bureau of Land Management. Moreno Valley, California.
- Schamberger, M., and F.B. Turner. 1986. The application of habitat modeling to the desert tortoise (*Gopherus agassizii*). *Herpetologica* 42(1):134-138.
- Seehafer, E. 2005a. Personal communication regarding route designation process within the northern and eastern Mojave Desert planning area. Project lead, Northern and Eastern Mojave Desert Management Plan. Barstow Field Office, Bureau of Land Management. Barstow, California.

- Seehafer, E. 2005b. Personal communication regarding changes in land ownership within the northern and eastern Mojave Desert planning area. Project lead, Northern and Eastern Mojave Desert Management Plan. Barstow Field Office, Bureau of Land Management. Barstow, California.
- Stewart, G.R. 2004. Declaration of Glenn R. Stewart. Case No: C 03-2509-SI; San Francisco Division, Northern District of California, United States District Court. San Francisco, California.
- Threlhoff, D. 2005. Personal communication regarding winter activity of desert tortoises. Fish and Wildlife Biologist, Fish and Wildlife Service. Ventura, California.
- 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 desert scrub. In: D.E. Brown (editor). Biotic communities of the American Southwest - United States and Mexico. *Desert Plants* 4(1-4):181-222.
- U.S. Bureau of Land Management. 1999. The California Desert Conservation Area Plan 1980, as amended. California Desert District. Riverside, California.
- U.S. Bureau of Land Management. 2001. Biological evaluation on effects of CDCA Plan, as amended, and proposed to be amended by the NEMO and NECO preferred alternatives and with other interim measures on desert tortoise. California Desert District. Riverside, California.
- U.S. Bureau of Land Management. 2002a. Comments on draft biological opinion for the California Desert Conservation Area Plan [Lane Mountain milk-vetch, Ash Meadows gumplant, and Amargosa niterwort] (1-8-01-F-18) (6840(P) CA-930). Memorandum to Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service, Ventura, California. Dated February 15. From State Director. Sacramento, California.
- U.S. Bureau of Land Management. 2002b. Draft biological opinion for the California Desert Conservation Area Plan [desert tortoise] (1-8-01-F-16) (6840(P) CA-930). Memorandum to Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service, Ventura, California. Dated May 24. From State Director. Sacramento, California.
- U.S. Bureau of Land Management. 2002c. Revision to interim measure 7 on cattle grazing in our consultation on the California Desert Conservation Area Plan and boundary adjustment to the proposed Ivanpah Desert Wildlife Management Area (1-8-01-F-16) (640(P) CA-930). Memorandum to Manager, California-Nevada Operations Office, U.S. Fish and Wildlife Service, Sacramento, California. Dated April 29. From State Director. Sacramento, California.

U.S. Bureau of Land Management. 2002d. Final Environmental Impact Statement. Proposed Northern and Eastern Mojave Desert Management Plan. Amendment to the California Desert Conservation Area Plan. California Desert District. Riverside, California.

U.S. Bureau of Land Management. 2004a. Map. Lazy Daisy Grazing Allotment: Elevation above 4,000 feet. Dated October 28. Produced by California Desert District. Moreno Valley, California.

U.S. Bureau of Land Management. 2004b. Map. Ord Mountain Grazing Allotment: Elevation above 4,000 feet. Dated October 28. Produced by California Desert District. Moreno Valley, California.

U.S. Bureau of Land Management. 2004c. Electronic mail. Actual use and utilization for the Ord Mountain Allotment. Produced by California Desert District. Moreno Valley, California.

U.S. Bureau of Land Management and California Department of Fish and Game. 2002. Proposed Northern and Eastern Colorado Desert Coordinated Management Plan and Final Environmental Impact Statement. California Desert District, Riverside, California and Inland, Deserts, and Eastern Sierra Region, Bishop, California.

U.S. Bureau of Land Management, County of San Bernardino, and City of Barstow. 2003. Draft 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. Bureau of Land Management. 2005. Revisions to term and condition number 1 of biological opinion on effects of the California Desert Conservation Area Plan on the desert tortoise (1-8-01-F-16) (CA610 1510(P)). Memorandum to Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service, Ventura, California. Dated March 17. From District Manager, California Desert District. Moreno Valley, 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. 1994a. Biological opinion for the Bureau of Land Management's interim livestock grazing program in Mojave Desert tortoise critical habitat (1-5-94-F-107). Memorandum from Regional Director, Region 1 to State Director, Bureau of Land Management, Sacramento, California. Dated April 20. Portland, Oregon

- U.S. Fish and Wildlife Service. 1994b. Biological opinion for cattle grazing on 25 allotments in the Mojave Desert, Riverside and San Bernardino Counties, California (1-8-94-F-17). Memorandum from Field Supervisor, Ventura Field Office to State Director, Bureau of Land Management, Sacramento, California. Dated March 14. Ventura, California.
- U.S. Fish and Wildlife Service. 1994c. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.
- U.S. Fish and Wildlife Service. 1999. Livestock grazing activities in the California desert involving the desert tortoise (6840(P)(CA 610)). Memorandum to District Manager, California Desert District, Bureau of Land Management, Riverside, California. Dated May 17. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2000. Extension of biological opinions 1-6-92-F-55, 1-8-94-F-17, and 1-5-96-F-296R for livestock grazing in the California desert, Riverside and San Bernardino Counties, California. Memorandum to District Manager, California Desert District, Bureau of Land Management, Riverside, California. Dated August 3. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2001. Biological opinion for the general management plan for the Mojave National Preserve, San Bernardino County, California (1-8-00-F-36). Memorandum to Superintendent, Mojave National Preserve, National Park Service, Barstow, California. Dated July 6. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2002a. Biological opinion for the California Desert Conservation Area Plan [desert tortoise] (1-8-01-F-16). Memorandum to State Director, Bureau of Land Management, Sacramento, California. Dated June 17. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2002b. Endangered species consultation/conference on the effects of the proposed California Desert Conservation Area Plan amendment for the Coachella Valley on 10 listed plants and animals and one proposed species. Riverside County, California. FWS-ERIV-3066.2. Memorandum to Field Manager, Palm Springs-South Coast Field Office, Bureau of Land Management, Palm Springs, California. Dated December 24. From Assistant Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- U.S. Fish and Wildlife Service. 2003a. Endangered species consultation of the proposed Western Colorado Desert Route Designation, Imperial County, California. (FWS-IMP-3327.1). Memorandum to District Manager, California Desert District, Bureau of Land Management, Riverside, California. Dated January 31. From Assistant Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.

- U.S. Fish and Wildlife Service. 2003b. Biological opinion for the designation of routes of travel in the western Mojave Desert, California (6842 CA-063.50) (1-8-03-F-21). Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Dated June 30. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2004a. Application of the “destruction or adverse modification” standard under section 7(a)(2) of the Endangered Species Act. Dated December 9. From Acting Director. Washington, D.C.
- U.S. Fish and Wildlife Service. 2004b. Biological opinion for the DARPA Grand Challenge Event, San Bernardino County, California, and Clark County, Nevada (1-8-04-F-7). Letter to Colonel Jose A. Negron, Defense Advanced Research Projects Agency, Arlington, Virginia. Dated February 11. From Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2004c. 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. 2004d. Biological opinion for the designation of routes of travel in the northern and eastern Mojave Desert, California (CA 610 1510 (P)) (1-8-04-F-11). Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Dated June 7. From Assistant Field Supervisor, Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2005a. GIS calculation of acreages of critical habitat units within the action area of the biological opinion for the California Desert Conservation Area Plan. Ventura Fish and Wildlife Office. Ventura, California.
- U.S. Fish and Wildlife Service. 2005b. Endangered species consultation on management of Imperial Sand Dunes recreation based on the California Desert Conservation Area Plan, as amended by proposed 2002 Recreation Area Management Plan (Bureau of Land Management Reference Number 6840(P) CA-063.50). FWS-IMP-3419.2. Memorandum to District Manager, California Desert District, Bureau of Land Management, Moreno Valley, California. Dated January 25. From Assistant Field Supervisor, Carlsbad Fish and Wildlife Office. Carlsbad, California.
- 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.

Woodman, P. 2004. Summary report for line distance transects conducted in spring, 2003 in the Mojave Desert, California. Prepared for U.S. Fish and Wildlife Service, Las Vegas, Nevada. Inyokern, California.

Woodman, P. 2005. Summary report for line distance transects conducted in spring, 2004 in the Mojave Desert, California. Prepared for U.S. Fish and Wildlife Service, Reno, Nevada. Inyokern, California.