BIOLOGICAL ASSESSMENT

APPENDIX IV

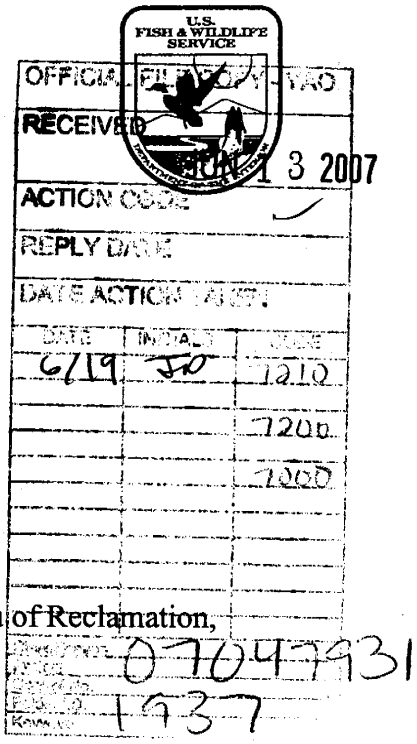
Programmatic Biological Opinion

This Page Intentionally Blank

ENV-7.00

United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:
AESO/SE
22410-2007-F-0230
22410-1996-F-0226

June 12, 2007

Memorandum

To: Director, Resource Management Office, Yuma Area Office, Bureau of Reclamation, Yuma, Arizona (Attn: Julian DeSantiago)

From: Field Supervisor

Subject: Programmatic Biological Opinion for Quarry Operations, Lower Colorado River, Arizona and California

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated May 11, 2007, and received by us on May 15, 2007. At issue are impacts that may result from the proposed development and operation of new quarries and operation of existing quarries used in the implementation of the Colorado River Front Work and Levee System (CRFWLS) located in La Paz, Mohave, and Yuma counties, Arizona and Imperial, Riverside, and San Bernardino counties, California. The proposed action may affect the Mohave population of the desert tortoise (*Gopherus agassizii*). No critical habitat would be affected.

The Mohave desert tortoise in northern Arizona, California, and Nevada, is listed under the Act as a threatened species with designated critical habitat. The Sonoran population of the desert tortoise in Arizona is not listed under the Act. However, the Sonoran population is a species of special concern by the State of Arizona. A conservation agreement for the Sonoran desert tortoise is under development by the Arizona Interagency Desert Tortoise Team (AIDTT). That agreement will provide guidance for the protection and conservation of the Sonoran population. The Bureau of Reclamation (Reclamation) has chosen to include effects to the Sonoran desert tortoise from operation of quarries in Arizona as part of the proposed action.

This draft programmatic biological opinion addresses the operations in the new and existing quarries, not the placement of materials from these quarries into stockpiles or their use along the Colorado River in accordance with the CRFWLS. Those activities were covered in the Lower Colorado River Multi-Species Conservation Program and do not require additional analysis in this consultation.

This draft programmatic biological opinion is based on information provided in the May 2007 biological assessment, the May 2007 draft environmental assessment, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, development of rock quarries and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

Reclamation first requested formal section 7 consultation on the development and operation of rock quarries for use in implementing the CRFWLS in 1996. The biological opinion was issued on April 11, 1997, and covered the operations of the quarries through December 31, 2005.

Reclamation requested an extension of the biological opinion on May 27, 2005, citing the need to complete new National Environmental Policy Act (NEPA) documentation for the continuing operation of the quarries and the addition of several new quarries as identified in a March 10, 2005, scoping request. The FWS responded on June 2, 2005, extending the biological opinion through December 31, 2006.

On December 8, 2006, Reclamation requested an additional six month extension of the biological opinion due to changes in the scope of the 2005 proposed action. Those changes resulted in a delay in completion of the new environmental assessment. The new draft environmental assessment was scheduled for completion by the end of January, 2007. The FWS responded on December 18, 2006 agreeing to an extension for the 1997 biological opinion until June 30, 2007.

Reclamation provided a draft biological assessment to the FWS on March 1, 2007, and the FWS provided comments on the draft on March 31, 2007. The draft biological assessment was revised by Reclamation and provided to the FWS with the request for formal consultation on May 11, 2007. The FWS provided a draft biological opinion to Reclamation on May 24, 2007. Comments on the draft biological opinion were received by FWS on June 7, 2007.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

A complete description of the proposed action is part of the draft environmental assessment (USBR 2007) which includes the biological assessment as an attachment. The contents of the draft environmental assessment are herein incorporated by reference.

The proposed action is programmatic in nature and reflects a broader perspective of the future use of these quarries by Reclamation. If work in any particular quarry is needed, site-specific analyses would be conducted as appropriate. Those analyses would then tier to this consultation.

The proposed action is the operation of 14 existing quarries and development and operation of two new quarries to provide rock materials for the CRFWLS program along the Colorado River for 13 years (2007-2019). The 16 sites and access routes are located on lands owned or managed by Reclamation, Bureau of Land Management (BLM), the FWS, Department of Defense (DOD), private lands and Indian Tribal lands. All permits for access and operations at the quarries will be obtained prior to initiation of work on the sites. This consultation addresses six quarries from the 1997 biological opinion, (five existing and one proposed new), and 12 quarries that were not included in that consultation, including one new quarry to be developed. Two quarries covered under the 1997 biological opinion were dropped from consideration in this consultation. The specific quarries are listed in Table 1. Because most of the quarries or needed access roads are on lands managed by the BLM, Reclamation requested they become a cooperating agency for the purposes of this consultation. BLM agreed to become a cooperator in a memorandum to Reclamation dated May 24, 2005.

Table 1:
Quarry sites included in this consultation

Name	County/State	Included in 1997	Acreage	Status
Agnes Wilson	Riverside, CA	yes	33.62	existing
Bat Cave No. 1	San Bernardino, CA	no	40.00	existing
Cibola/Hart Mine No. 1	La Paz, AZ	no	17.52	existing
Eagle Pass	San Bernardino, CA	no	17.58	existing
Ehrenburg	La Paz, AZ	yes	18.80	existing
Hart Mine No. 2	La Paz, AZ	yes	56.20	existing
Laguna Dam East	Yuma, AZ	no	15.32	existing
La Paz East	La Paz, AZ	no	15.22*	existing
La Paz West	La Paz, AZ	yes	15.22*	existing
Palo Verde	Imperial, CA	no	28.60	existing
Paymaster	Imperial, CA	no	15.00	new
Quien Sabe West	Riverside, CA	yes	35.10	new
Ripley	Riverside, CA	no	32.40	existing
Section 7	San Bernardino, CA	no	15.32	existing
Times Gulch	Mohave, AZ	yes	27.30	existing
Trigo Wash	La Paz, AZ	no	20.10	existing

*Indicates that the acreage represents both quarries combined.

The proposed action for existing quarries is to obtain rock material for use along the Colorado River. Operations at existing quarries include access road use and maintenance, blasting at the rock faces, treatment of blasted rock materials to reach the proper size for riprap or gravel for roads or other purposes. Materials not usable by Reclamation would be leveled on site. Materials for use may be stockpiled on the quarry floor until use, or trucked to existing stockpiles or specific project sites on an as-needed basis. At the close of work at a quarry, the area would be cleaned and access restricted. Reclamation estimates an annual need for 100,000 cubic yards of material from the quarries. This is an increase in 20,000 cubic yards per year over that included in the 1997 biological opinion. A total of up to 65 acres of desert tortoise habitat in each state (Arizona and California) could be lost over the 13 year life of the consultation, with a

maximum loss in any one year of 10 acres. The total acreage lost may be less than 130 acres if Reclamation does not need to quarry large amounts of rock for CRFWLS purposes. Because of transportation costs, the quarry nearest to the material use site would be the one opened when rock materials were needed. It is unlikely that more then one quarry would be open and operating at one time, however, if situations with a higher than normal need for material occur, more then one quarry may be in operation.

The proposed action also contains a suite of conservation measures that were derived from the 1997 biological opinion where they were included as Reasonable and Prudent Measures. Reclamation will include these measures in both Arizona and California to protect the listed and unlisted populations of the desert tortoise. These are now part of the proposed action and are listed below:

Conservation Measure 1: Implement personnel education programs; define quarry areas and access roads, and define and implement operational procedures.

1) Reclamation shall designate a qualified representative (biologist or quarry manager) that:

- Is responsible for compliance with the FWS biological opinion and appropriate regulations.
- Shall coordinate with FWS.
- Shall have authority and responsibility to halt all quarry activities.
- Shall be on site.

1) Reclamation shall implement a desert tortoise education program that:

- Includes, but is not limited to, Reclamation employees, inspectors, supervisors, contractors, and subcontractors.
- Shall be implemented prior to quarry construction and operational activities (quarrying, processing, and stockpiling).
- Confirms completion of the program (personnel shall sign a statement).
- Provides an overview of the FWS biological opinion and appropriate regulations, defines "take" and the penalties for violation of the laws.
- Provides discussion of the legal protection and sensitivity of the species to human activity, distribution and ecology of the species, protocols for encounters with the species, and reporting requirements.
- Reduces adverse effects to desert tortoise and their habitat, and promotes long-term survival of the species.

2) Vehicles shall be limited:

- To existing routes and areas of disturbance.
- To speeds that do not exceed 25 miles per hour, particularly from March 1 through November 1.
- Except during the establishment of new quarries and access roads, to where areas of new construction shall be identified and work limited to these designated areas.
- To turn-around sites, work areas, temporary stockpiles, and service areas located within the quarry and access road site.
- To authorized personnel only. Unauthorized vehicle use shall be prohibited; gates or other measures shall be implemented to restrict unauthorized vehicle access.
- To best management practices as described in the storm water pollution prevention plan for each quarry.

3) To the extent possible, Reclamation shall schedule:

- Construction and operation activities between November 1 and March 1 when desert tortoises are in hibernation.
- A qualified biologist to be present onsite to monitor construction and operation activities should quarry sites be operated outside of this period.

4) Reclamation shall compensate for loss of desert tortoise habitat:

- By coordinating with BLM to develop and implement appropriate compensation for residual impacts resulting from construction of new quarries and access roads, and expansion of existing quarries into desert tortoise habitat.
- In accordance with desert tortoise compensation policy.

Conservation Measure 2: Conduct full surveys for the presence or absence of desert tortoise prior to the construction and/or operation of each quarry site (including access roads).

1) Reclamation shall have an authorized, qualified biologist:

- Conduct surveys 24 hours prior to the initiation of surface-disturbing activities for construction/operation activities during the desert tortoise season (March 1 through November 1).
- Conduct 100-percent surveys one (1) week prior to any quarry activity during desert tortoise hibernation (November 1 through March 1).

Conduct surveys and flag, as required, the location of the tortoise barrier perimeter fence so that tortoise burrows are located outside the fenced quarry.

- Excavate tortoise burrows within 40 feet of proposed quarry disturbance and relocate any desert tortoise and/or eggs.

- Collapse or block desert tortoise burrows located within the quarry disturbance area to prevent reentry by tortoises.

2) The 100-percent surveys shall:

- Include areas of proposed new disturbance and expansion of existing quarries.

- Include a buffer of 40 feet.

- Be conducted a maximum of three (3) times for areas of new disturbance, or two (2) consecutive times if no desert tortoise are found.

3) Construction and operation activities may occur within the quarry site:

- Only after the tortoise-barrier fence has been constructed and completed, as specified.

- Without the presence and monitoring of a biologist after the enclosed quarry has been cleared of desert tortoises.

Conservation Measure 3: Take of desert tortoise or destruction of desert tortoise habitat shall be closely monitored.

1) An authorized, qualified biologist(s) shall:

- Be approved by FWS at least 15 days prior to initiation of quarry activities that may result in a take (Reclamation shall submit appropriate information).

- Handle desert tortoises in accordance with appropriate protocols, guidance, and regulations.

- Be present from March 1 through November 1 to monitor quarry activities that may result in take of desert tortoise. Monitoring will consist of at least: (1) inspect the quarry site a minimum of three (3) times per day for any excavations that might trap desert tortoise; (2) watch for desert tortoises wandering into construction/quarry areas and check under vehicles; and (3) conduct other activities necessary to ensure that take is minimized.

- Ensure that annual disturbances are limited to 10 acres.

- Ensure that loss of desert tortoise habitat over the 13 year operational plan is limited to 65 acres for each state (AZ and CA).

- Survey for and relocate desert tortoise/eggs within 24 hours of blasting within all areas that may be subject to falling rock and debris.

- Relocate, upon discovery, the desert tortoise the minimum distance possible within appropriate habitat to ensure its safety from death, injury, or collection associated with quarry activities. Desert tortoises shall not be relocated to lands outside the jurisdiction of the Federal government without the written permission of the landowner.

- Maintain a record of all desert tortoises encountered during the project activities that includes: (1) observance locations and dates; (2) general condition and health, injuries, healing, and voidance; (3) location moved from and location moved to; and (4) diagnostic markings (i.e. identification numbers of marked lateral scutes).

- Mark, for future reference, an identification number on the 4th costal scute using the acrylic paint/epoxy technique.

- Notching of scutes or replacement fluids with a syringe is not authorized.

Conservation Measure 4: Reduce the attraction of desert tortoise predators to the quarry vicinity to the maximum extent possible.

1) Reclamation shall be responsible for:

- Maintaining a sanitary quarry site at all times.

- Controlling and limiting litter, trash, and garbage by placing refuse in predator-proof, sealable receptacles and removing debris regularly from the quarry site.

Conservation Measure 5: Monitor the incidental take resulting from the proposed action and report findings to FWS.

1) Reclamation shall submit an annual monitoring report:

- To the appropriate FWS office by 31 December of each year.

- This report shall briefly document the effectiveness of the desert tortoise mitigation measures, actual acreage of desert tortoise habitat disturbed, the number of tortoises excavated from burrows and moved from the quarry sites, and information on individual desert tortoise encounters.

- The report shall recommend adaptive terms and conditions to enhance desert tortoise protection and reduce unnecessary hardship on Reclamation and quarry personnel.

2) The FWS will be notified within three (3) days of finding any desert tortoises dead or injured.

Reclamation shall:

- Provide notification of the date, time, circumstances, name of reporting individual, and location of the incident.

- Dispose of the dead animals in accordance with FWS recommendations.

- Ensure that an authorized biologist transports the injured animals to be treated, released, adopted, or euthanized, in accordance with FWS and veterinarian recommendations.

STATUS OF THE SPECIES

The following status of the species represents the listed entity, the Mohave desert tortoise. Life history and behavior of the Sonoran desert tortoise is similar to that of the Mohave desert tortoise; however there are differences in habitat selection and behavior. The two populations are, however, similar enough that the effects of the action would not be significantly different between the two populations.

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 FWS (1994).

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, all cited 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, all cited in Avery 1998). Additionally, their preferences can change during the course of a season (Avery 1998) and over several seasons (Esque 1994 cited 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 cited 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 FWS 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 FWS 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 FWS'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 BLM 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 transect centerline, the length of the transect, and a calculation of what percentage of the animals in the area were likely to have been above ground and visible to surveyors during the time the transect was walked, an estimation of the density can be made. Each of these methods has various strengths and weaknesses; the information we present on the density of desert tortoises across the range and in the action area is based on these methods of collecting data.

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

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

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

Upper Virgin River Recovery Unit

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

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

Northeastern Mojave Recovery Unit

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

The Beaver Dam Slope Desert Wildlife Management Area covers portions of Nevada, Utah, and Arizona; it is located to the southwest of the Red Cliffs Reserve. Based on various methods, the recovery plan estimates the density of desert tortoises in this desert wildlife management area as being from 5 to 56 animals per square mile (FWS 1994). 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 (FWS 1994).

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 (FWS 1994).

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 (FWS 1994). Kernel analysis for the Coyote Springs Desert Wildlife Management Area showed areas where the distributions of carcasses and living desert tortoises do not overlap (Tracy et al. 2004); this scenario is indicative of a higher than average rate of mortality. (The Desert Tortoise Recovery Plan Assessment Committee used a kernel analysis to examine the distribution of live desert tortoises and carcasses over large areas of the range of the species (Tracy et al. 2004). The intent of this analysis is to determine where large areas with numerous carcasses do not overlap large areas with live animals. Regions where the areas of carcasses do not overlap areas of live animals likely represent recent die-offs or declines in desert tortoise populations.) Because permanent study plots for this region were discontinued after 1996, recent declines in numbers would not be reflected in the kernel analysis if they had occurred.

The Ivanpah Desert Wildlife Management Area lies east of the Mojave National Preserve and covers approximately 36,795 acres. It is contiguous with National Park Service (NPS) lands; note that the NPS did not designate desert wildlife management areas within the Mojave National Preserve because it considers that all of its lands are managed in a manner that is conducive to the recovery of the desert tortoise. The permanent study plot in the Ivanpah Valley is located within the Mojave National Preserve and provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1986, 1990, and 1994; the densities of desert tortoises of all sizes per square mile were 386, 393, 249, and 164, respectively (Berry 1996). (Numerous data sets are collected from the study plots and various statistical analyses conducted to provide information on various aspects of trends. We cannot, in this biological opinion, provide all of this information; therefore, we have selected the density of desert tortoises of all sizes per square mile to attempt to indicate trends.) The number of juvenile and immature desert tortoises on the study plot declined, although the number of adult animals remained fairly constant. The notes accompanying this report indicated that the "ill juvenile and dead adult male (desert) tortoises salvaged for necropsy contained contaminants;" it also cited predation by common ravens and the effects of cattle grazing as causative factors in the decline in the number of juvenile and immature desert tortoises on the study plot (Berry 1996). In 2002, workers found 55 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). The average density of desert tortoises in this recovery unit was 5.1 per square mile (FWS 2006). The line-distance sampling from which this density was derived was conducted from 2001 through 2005.

Eastern Mojave Recovery Unit

The Eastern Mojave Recovery Unit extends from west of Clark Mountain, south through the Mojave National Preserve, and east into southern Nevada. Within this recovery unit, the BLM designated the Shadow Valley and Piute-Fenner desert wildlife management areas within California and the Piute-El Dorado Desert Wildlife Management Area in Nevada. The Shadow Valley Desert Wildlife Management Area, which occupies approximately 101,355 acres, lies north of Interstate 15 and west of the Clark Mountains. The Mojave National Preserve is located to the south of the interstate. Data on desert tortoises on a permanent study plot in this area were collected in 1988 and 1992; the densities of desert tortoises of all sizes per square mile were 50 and 58, respectively (Berry 1996). Although these data seem to indicate a slight increase in the number of desert tortoises, in 2002, workers found five desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). Some signs of shell disease have been observed in the population in recent years (BLM 2002).

The BLM's Piute-Fenner Desert Wildlife Management Area lies to the east of the southeast portion of the Mojave National Preserve and is contiguous with NPS lands. It occupies approximately 173,850 acres. The Goffs permanent study plot, which is located within the Mojave National Preserve, provides information on the status of desert tortoises in this general region. Data on desert tortoises on this permanent study plot were collected in 1980, 1990, and 1994; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 440, 362, and 447 individuals per square mile, respectively. As Berry (1996) noted, these data seem to indicate that this area supported "one of the more stable, high density populations" of desert tortoises within the United States. Berry (1996) also noted that "a high proportion of the animals (had) shell lesions." In 2000, only 30 live desert tortoises were found; Berry (2000) estimated the density of desert tortoises at approximately 88 animals per square mile. The shell and skeletal remains of approximately 393 desert tortoises were collected; most of these animals died between 1994 and 2000. Most of the desert tortoises exhibited signs of shell lesions; three salvaged desert tortoises showed abnormalities in the liver and other organs and signs of shell lesions. None of the three salvaged desert tortoises tested positive for upper respiratory tract disease.

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

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

Northern Colorado Recovery Unit

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

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

The Upper Ward Valley permanent study plot was surveyed in 1980, 1987, 1991, and 1995; Berry (1996) estimated the densities of desert tortoises of all sizes at approximately 437, 199, 273, and 447 individuals per square mile, respectively. In 2002, workers found 17 desert tortoises on this plot; this number does not represent a density estimate (Berry 2005). The average density of desert tortoises in this recovery unit was 19.0 per square mile (FWS 2006). The line-distance sampling from which this density was derived was conducted in 2001, 2003, 2004, and 2005.

Eastern Colorado Recovery Unit

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

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

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

Western Mojave Recovery Unit

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

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

will be translocated to newly acquired lands to the south of Fort Irwin; a plan for this translocation is currently under development.

The Navy has designated approximately 200,000 acres of the South Range at the Naval Air Weapons Station, China Lake as a management area for the desert tortoise (FWS 1995). Through a consultation with the FWS (1992), the Navy agreed to try to direct most ground-disturbing activities outside of this area, to use previously disturbed areas for these activities when possible, and to implement measures to reduce the effects of any action on desert tortoises. This area also encompasses the Superior Valley Tactical Bombing Range located in the southernmost portion of the Mojave B South land management unit of the Naval Air Weapons Station; it continues to be used as an active bombing range for military test and training operations by the Navy and Department of Defense. In the 3 years for which we had annual reports available, activities conducted by the Navy did not kill or injure any desert tortoises (Navy 1995, 2001, 2002). In general, desert tortoises occur in low densities on the North Range of the Naval Air Weapons Station; Kiva Biological Consulting and McClenahan and Hopkins Associates (in FWS 1992) reported that approximately 136 square miles of the North Range supported densities of 20 or fewer desert tortoises per square mile. The South Range supported densities of 20 or fewer desert tortoises per square mile over an area of approximately 189 square miles and densities of greater than 20 per square mile on approximately 30 square miles. The higher elevations and latitude in this area may be responsible for these generally low densities (Weinstein 1989 in BLM et al. 2005).

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

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

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

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

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

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

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

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

Recovery Plan for the Desert Tortoise

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

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

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

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

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

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

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

Assessment of the Recovery Plan

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

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

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

The recovery plan (FWS 1994) recognized six recovery units or evolutionarily significant units across the range of the listed taxon, based on differences in genetics, morphology, behavior, ecology, and habitat use of the desert tortoises found in these areas. The boundaries between

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

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

Based on the recommendations contained in the draft recovery plan for the desert tortoise (59 *Federal Register* 5820), the FWS 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. Table 2 depicts the relationship among recovery units, desert wildlife management areas, and critical habitat units through the range of the desert tortoise.

The BLM 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.

Table 2: Relationships between management units and critical habitat

Critical Habitat Unit	**Desert Wildlife Management Area**	**Recovery Unit**	**State**	**Size of Critical Habitat Unit (acres)**
Chemehuevi	Chemehuevi	Northern Colorado	CA	937,400
Chuckwalla	Chuckwalla	Eastern Colorado	CA	1,020,600
Fremont-Kramer	Fremont-Kramer	Western Mojave	CA	518,000
Ivanpah Valley	Ivanpah Valley	Eastern Mojave	CA	632,400
Pinto Mountain	Joshua Tree	Western Mojave/ Eastern Colorado	CA	171,700
Ord-Rodman	Ord-Rodman	Western Mojave	CA	253,200
Piute-Eldorado- CA	Fenner	Eastern Mojave	CA	453,800

Critical Habitat Unit	Desert Wildlife Management Area	Recovery Unit	State	Size of Critical Habitat Unit (acres)
Piute-Eldorado- NV	Piute-Eldorado	Northeastern Mojave/ Eastern Mojave	NV	516,800
Superior-Cronese	Superior-Cronese Lakes	Western Mojave	CA	766,900
Beaver Dam:		Northeastern Mojave (all)		
NV	Beaver Dam		NV	87,400
UT	Beaver Dam		UT	74,500
AZ	Beaver Dam		AZ	42,700
Gold Butte-Pakoon		Northeastern Mojave (all)		
NV	Gold Butte-Pakoon		NV	192,300
AZ	Gold Butte-Pakoon		AZ	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

In California, the BLM also classified these desert wildlife management areas as areas of critical environmental concern, which, allows the BLM to establish management goals for specific resources in defined areas. Through the land use planning process, the BLM established firm boundaries for the desert wildlife management areas.

Finally, we note that the Department of Defense installations and NPS 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 FWS 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. The NPS 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.

Recent Fires

Since December 2004, numerous wildfires have occurred in desert tortoise habitat across its range. Although we know that some desert tortoises were killed by the wildfires, mortality estimates are not available at this time. We estimate that approximately 500,000 acres of potential desert tortoise habitat burned in the Northeastern Mojave Recovery unit in 2005. This number includes areas of critical habitat that burned, which are noted in the following Table 3. All data are from Clayton (2005).

Table 3: Recent fires affecting desert tortoise habitat

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

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

Recent Consultations

Consultations for the desert tortoise in California and Nevada for a variety of land use activities have been completed, particularly for the management of the Desert Wildlife Management Areas (DWMAs). The consultation record is quite extensive and a summary is not provided here for reasons of brevity. If information on those consultations is needed, please contact the FWS Ecological Services offices in those states.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

A. STATUS OF THE SPECIES WITHIN THE ACTION AREA

The area covered by the programmatic proposed action extends over three counties in Arizona and three counties in California. The action area includes the lands proposed or in use as quarries, designated access roads, and the immediate area surrounding the quarries and the roads. It does not include all of the surrounding lands since those will not be affected by the proposed action. Generally, the surrounding land is under other management authorities that have completed consultation, and any permits or other administrative requirements needed from landowning entities would be obtained prior to work done in the quarry sites. Quarry sites in California are located within the Eastern Mohave, Northern Colorado, and Eastern Colorado

Recovery Units but are not located within any Desert Wildlife Management Areas designated by BLM for desert tortoise special management and recovery.

Quarry sites and access roads are isolated from each other; their development is based on future needs for rock along various reaches of the Colorado River. Topography at the 16 sites is varied, with washes, hills, rocky outcrops, alluvial fans and valleys dominating the landscape. The vegetation communities are representative of Mohave and Sonoran desert scrub species which includes shrubs, small trees, and cacti.

Surveys of the existing quarry sites by Reclamation contractors did not locate desert tortoises in or around the quarry sites. Similarly, the proposed two new quarries were surveyed and the habitat appeared suitable; however, no desert tortoise were found. Generally, the surveys determined, based on topography and vegetation characteristics, that the habitat value in the quarry sites and adjacent areas was low. However, Reclamation is assuming that desert tortoise may be found in the surrounding areas and could move into the action area during the period covered by this consultation. Desert tortoise are known to use fairly large (20 hectares or more) home ranges, which may become larger during periods of low forage production (FWS 1994). Thus, there is a potential for tortoises living in the surrounding area to move into the areas occupied by the quarries and access roads over the 13 year life of the project.

B. FACTORS AFFECTING SPECIES ENVIRONMENT WITHIN THE ACTION AREA

Past activities at the existing quarry sites, including the construction of access roads, has eliminated vegetation components, altered topography, and essentially eliminated desert tortoise habitats within the active quarry areas and on the roads.

Other activities take place on lands adjacent to the quarries, including recreational use (including off road vehicle [ORV] use), mining, livestock grazing, and access roads for these other purposes. Fragmentation of habitats is a serious concern as desert tortoise rely on abundant supplies of native forbs and grasses and the ability to access these areas safely. Along roads, significant mortality of tortoises does occur. Predation, particularly on young tortoises may be increased by human activities that attract predators, or provide perching sites that enable more effective location of tortoises as prey items.

Drought is also a factor affecting desert tortoises in the action area. With several years of low rainfall, production of annual plants and the robustness of perennials used for forage are reduced. This may require desert tortoises to move more widely over the landscape searching for food and thus may be more vulnerable to road mortality or predation. Diseases may also be more likely in nutrition-stressed populations. An upper respiratory tract disease (URTD) first seen in captive desert tortoises appeared in the wild populations in the 1990's and high mortality rates in some areas were documented in the intervening years (FWS 1994). This disease has spread in part through domestic tortoises released into the wild; so wild tortoise populations near roads and other access routes are particularly at risk. Another disease that causes shell lesions which may be related to a mineral or metal deficiency, toxicants, or other source has also resulted in significant mortality in the Eastern Colorado Desert Recovery Unit.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Implementation of the proposed action would result in the loss of up to 130 acres of desert tortoise habitat. No more than 10 acres per year would be affected. The actual acreage affected over the life of the project would be governed by the need for rock materials for new CRFWLS bank stabilization, flood and other maintenance repairs to existing stabilized areas, and road maintenance. Some years may see very limited work at one quarry, while others may involve use of several quarries. Vegetation would be stripped off the land and underlying rock removed. The resulting quarry area would be unsuitable for desert tortoises. Access roads would be maintained, or in the case of the two new quarries, created, to allow workers and equipment to reach the quarries and transport the rock materials out.

Implementation of the conservation measures for the proposed action would reduce the risk of death or injury of desert tortoise from the operations at the quarries and along the access roads. There would still be elimination of habitat; however tortoises in the area would be safely moved out of harms way.

Indirect effects of quarry operations relate to use of the quarries by unauthorized persons. This use can involve illegal dumping of trash, target shooting of firearms, camping, legal and illegal hunting, and ORV use.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The quarry sites in California and Arizona are on lands managed by Federal agencies (BLM, DOD or Reclamation), and cumulative effects are unlikely to occur in the action area since all Federal actions are subject to section 7 consultation. Access roads also occur on FWS land (Havasu National Wildlife Refuge), Colorado River Indian Community, and small amounts of private land. There are no known significant issues regarding the development or future use of Tribal or private lands in the action area.

CONCLUSION

After reviewing the current status of the Mohave desert tortoise, the environmental baseline for the action area, the effects of the proposed development and operation of rock quarries and access roads and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Mohave desert tortoise. Critical habitat for this species has been designated at several locations in Arizona and California; however, this action does not affect that area and no destruction or adverse modification of that critical habitat is anticipated.

We present these conclusions for the following reasons:

- The amount of total habitat that may be lost due to the implementation of the proposed action is insignificant in terms of the total habitat available for the Mohave desert tortoise.

- At the existing quarry sites, surveys indicated that the un-disturbed habitats around the quarries was of low value to desert tortoises, thus important or high-quality habitat would not be affected.

- Reclamation has included as part of the proposed action a suite of conservation measures to avoid and minimize effects to desert tortoise and its habitats at existing and new quarries and access roads.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations 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 (50 CFR 17.3) 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 (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior 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 Reclamation so that they become binding conditions as appropriate, for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Reclamation must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

This consultation addresses the potential take of desert tortoise from a programmatic perspective. Until a quarry is reopened for processing of rock products, no incidental take would occur. Reclamation has committed to preparing site-specific environmental documentation in advance of opening a quarry. Based on the proposed action as described in the BA, up to 130 acres of desert tortoise habitat will be removed by the proposed action. Of that, 65 acres is in California where the species is listed and this is the total amount of take for the species. The amount of this take per year is limited to 10 acres. We do not have an estimate of the numbers of individual tortoises that could be taken. The FWS concludes that the beneficial effects associated with the Conservation Measures being implemented as a part of this action will avoid or minimize any possible take of individual tortoises.

EFFECT OF THE TAKE

In the accompanying biological opinion, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The Conservation Measures incorporated into the proposed action were derived from Reasonable and Prudent Measures (RPMs) and Terms and Conditions (TCs) contained in the 1997 biological opinion. The FWS has not identified any additional RPMs or TCs that would reduce the amount of incidental take.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. Reclamation must immediately provide an explanation of the causes of the

taking and review with the Arizona Ecological Services Office the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, in California within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize 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.

Reclamation has included the same protective measures for the un-listed Sonoran desert tortoise as for the threatened Mohave desert tortoise. This inclusion contributes to the health of the Sonoran population. No additional conservation recommendations have been identified.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the (request/reinitiation request). As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The FWS appreciates Reclamation's efforts to identify and minimize effects to listed and unlisted populations of the desert tortoise from this project. For further information please contact Lesley Fitzpatrick at (602) 242-0210 (x236) or me at (x244).

Please refer to the consultation number, 22410-2007-F-0230 in future correspondence concerning this project.

Delka T. Bill
for Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Field Supervisor, Ventura Fish and Wildlife Office, Ventura, CA

Habitat Branch Manager, Arizona Game and Fish Department, Phoenix, AZ
District Manager, California Department of Fish and Game, Blythe, CA

W:\LESLEY FITZPATRICK\07-230 FINAL BO QUARRIES.DOC:MTR

LITERATURE CITED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

U.S. Air Force. 2004. Integrated natural resources management plan for Edwards Air Force Base, California. Edwards Air Force Base 32-7064. September update. Edwards Air Force Base, California.

U.S. Bureau of Land Management. 2002. Northern and Eastern Mojave Desert management plan, amendment to the California Desert Conservation Area Plan 1980, and final environmental impact statement. Riverside, California.

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

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

U.S. Bureau of Reclamation. 2007. Draft Programmatic Environmental Assessment and Biological Assessment for Quarry Operations. Yuma Area Office, Yuma, AZ.

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

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

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

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

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

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

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

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

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.