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In Reply Refer To:
AESO/SE
22410-2007-F-0223

May 22, 2008

Memorandum

To: Field Office Manager, Arizona Strip Field Office, Bureau of Land Management, St. George, UT

From: Field Supervisor

Subject: Biological Opinion for the Proposed Arvada Land Sale

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 February 8, 2008, and received by us on February 19, 2008. At issue are impacts that may result from the proposed disposal of two parcels of land administered by the Bureau of Land Management (BLM) in the unincorporated area of Arvada in Mohave County, Arizona. The proposed action may affect the threatened Mojave desert tortoise (*Gopherus agassizii*) and its critical habitat.

In your memorandum, you requested our concurrence that the proposed action is not likely to adversely affect critical habitat for the Mojave desert tortoise. We concur with this determination. Our rationale for concurrence is detailed in Appendix A.

This biological opinion (BO) is based on information provided in your February 8, 2008, memorandum and biological assessment (BA); telephone conversations with Tom Denniston and Katie Brauer of your staff; and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

The following details the history of the consultation pertaining to this project:

- November 3, 2006: We were first contacted by BLM regarding the proposed Arvada Land Sale.
- March 7, 2007: We had a conference call with BLM and FWS Desert Tortoise Recovery Office to discuss the desert tortoise relocation associated with the Arvada Land Sale project.
- May 3, 2007: We conducted a site visit with BLM to the Arvada parcels and the proposed relocation site.
- September 12, 2007: We had a second conference call with BLM and FWS Desert Tortoise Recovery Office to discuss the desert tortoise relocation associated with the Arvada Land Sale project.
- November 16, 2007: We conducted a second site visit with BLM to the Arvada parcels and the proposed relocation site.
- February 19, 2008: We received BLM's request for initiation of formal consultation.
- April 14, 2008: We provided a draft biological opinion to the BLM.
- May 21, 2008: We received your comments on the draft biological opinion.

BIOLOGICAL OPINION

Description of the Proposed Action

The Proposed Action involves the sale of two parcels of BLM-administered lands located in the unincorporated Arvada area of Mohave County, Arizona. The larger parcel is 78.85 acres and is made up of lots 2 and 3 of section 5, T. 39 N., R. 16 W. The smaller parcel is 39.97 acres and is made up of lot 2 of section 4, T. 39 N., R. 16 W. The 78.85 acre parcel (Arvada parcel) borders the Arizona/Nevada state line. The perimeter of this parcel is surrounded by Virgin Valley High School on the west, the Palms Golf Course on the east and south, and residential development to the north. A power line right-of-way granted to Dixie-Escalante Electric to provide electricity to the communities crosses both parcels. The 39.97 acre parcel is approximately 1.5 miles east of the Arizona/Nevada state line and borders a motor cross arena and Oasis Gun Club to the south and east, and non-Federal land to the north and west. Both parcels are accessed via Peppermill Palms Boulevard, a paved road which has been dedicated to Mohave County (see Figure 1 of the BA).

The proposed action is to translocate all of the threatened Mojave desert tortoises from the Arvada parcel prior to the initiation of the sale proposed for June 2008. The smaller 39.97 acre parcel is not inhabited by tortoises, and is therefore not included in the translocation aspect of this project. The translocation project will be divided into four main phases: Preparation, Construction, Capture/Disease Testing, and Relocation.

Phase I – Preparation

The preparation phase was initiated in March 2007 when most of the likely desert tortoise burrows on the Arvada parcel were marked with a pin flag, given a unique identification number, and GPS coordinates collected and mapped. Between July and September 2007, additional site visits have been conducted to identify any previously undetected tortoise burrows, eliminate non-tortoise burrows from the data set, and re-record GPS coordinates of all suspected sites using a more accurate GPS unit than was used initially. Sixty-eight potentially active burrows were located as of October 29th, 2007.

The intended release area, approximately three miles southeast of the Beaver Dam Slope Study Plot (Section 34 of Township 42 North, Range 15 West), will be initially surveyed for soil characteristics and plant life in order to establish an exact future release area.

Phase II – Construction

Highway 91, a two lane road that runs north/south, is located approximately one mile west of the proposed relocation site. Recent traffic counts from Mohave County indicate an average of between 300 and 800 vehicles per day during the summer along the more remote stretch of Highway 91, north of Beaver Dam and south of the Arizona/Utah state line (Mohave County Public Works, 2005, 2007). A large-gauge mesh fence currently runs the length of the road on both sides. BLM has determined that there is no need for additional tortoise fencing at the relocation site because traffic counts are relatively low for this particular stretch of highway. Furthermore, fencing could contribute to greater genetic isolation of the tortoise population; therefore the relocation site will be left unfenced.

Construction of an approved holding facility at the Beaver Dam High School and any other schools that will hold adopted ELISA+ tortoises should also be completed during the construction phase to minimize temporary holding time. Development of an appropriate artificial habitat will involve a small fencing project as well as den construction and planting of appropriate vegetation. A solid construction and monitoring plan for this facility is important in preventing any sick tortoises from coming in contact with healthy wild populations. Volunteers from the community could be utilized for this construction effort.

Phase III - Capture and Disease Testing

Phase III will begin in early to mid-spring, but the local weather conditions will dictate the end of tortoise hibernation and the beginning of their emergence from winter dens. The parcel will be closely monitored at the beginning of spring to track the days of initial emergence. At this time, tortoises will likely show limited movement and remain close to the burrows that they

entered at the end of the fall. The capture will be coordinated so as to optimize the timing of blood collection (discussed below) and minimize the amount of time tortoises are held in captivity.

Approximately four trained tortoise biologists will each lead a team of four other biologists or volunteers to relocate all occupied burrows at the Arvada site and capture tortoises by hand. If tortoises cannot be found in burrows with the aid of a mirror or scope, burrows will be carefully excavated. Once captured, each burrow will be collapsed to prevent other tortoises from re-using the site, and all remaining unoccupied burrows will be collapsed as well. Each captured individual will be given a small numbered tag with a unique identification number that will be affixed to the fourth costal scute using epoxy. File numbers may be utilized as well. Data collected for each individual will include sex, carapace length, mass, age class, and cursory health assessments. All calipers, scales, and other tools will be sterilized appropriately with a 50 percent bleach solution.

Any tortoise nests encountered at this time will have the location GPS coordinates recorded, as well as the number of eggs found. Special care will be taken during each burrow excavation so that each burrow is thoroughly inspected by hand for tortoise eggs prior to initiating burrow collapse. If any eggs are found, the nest will be left as is, and any living tortoises found in the burrow will be removed without harming the integrity of the burrow structure. In order for this to occur, a short length of large-gauge polyvinyl chloride (PVC) piping cut lengthwise will be placed at the entrance of the burrow and the burrow itself will be dug out by hand, if necessary, to remove the tortoise. Footprints and any other human sign will be carefully swept away to prevent predation, and the eggs will be relocated at the same time as the tortoises.

All tortoises captured will be placed in an appropriate temporary holding facility until blood samples can be collected in early May. A licensed and permitted veterinarian or technician experienced with desert tortoises will collect blood samples from each captured tortoise. All samples will be sent to the University of Florida for ELISA testing to determine whether the individual tortoise is positive for Upper Respiratory Tract Disease (URTD) or other infectious diseases.

ELISA testing results should be completed within approximately three to five business days from the date the samples are sent. Once results are received, captured tortoises will be classified as either healthy (negative ELISA results and no clinical signs) or sick (positive ELISA results and/or clinical signs). Healthy tortoises will be considered releasable and will be counted in order to make provisions for their release into the wild. Artificial burrows will be implemented at the relocation site for each healthy tortoise accounted for. Each burrow will consist of a large-diameter PVC pipe cut in half length-wise, partially buried at an angle in the dirt. Sick tortoises will be considered non-releasable and further provisions will be made for adoption.

Phase IV – Relocation

Phase IV will be completed by mid-May, as soon as ELISA test results are received and when local temperatures are still relatively mild. Two to three days prior to release, a radio transmitter weighing 19-30 grams with an expected battery life of two to three years will be attached with

epoxy gel to the anterior portion of the carapace of each healthy tortoise. Tortoises will be given ample opportunity to “soak” and drink water prior to transport and subsequent release.

Following confirmation of secure radio transmitter attachment, tortoises will be released into an artificial burrow at the relocation site.

Sick tortoises will be introduced to and closely monitored at their new holding facilities at adopting schools or other locations. Each sick tortoise will have an Avid Chip implanted in the left rear leg, in order to track the animal in the event that it becomes lost. An alternative method includes attaching a small telemetry receiver, in the same fashion as healthy tortoises, in order to track this tortoise and prevent reintroduction into healthy populations.

Any eggs that were found during the Arvada tortoise capture will also be translocated at this time. Burrow nests will be excavated by hand using sterile techniques, and all viable eggs will be relocated to a natural burrow. A nest chamber will be excavated and eggs will be buried at the same depth and position in which they were found (eggs will be marked to prevent torsion). If necessary, artificial burrows will be constructed using an auger in order to provide appropriate nest sites. Ground disturbance will be minimized by working on a tarp at the nest site. Nest positions will be flagged and have their GPS coordinates recorded in order to allow for close monitoring.

Activity and behavior patterns of telemetered tortoises will be monitored periodically over the life of the transmitter battery. Most observations will be made from March through May, and again in the following fall, when desert tortoises are most active.

The action area includes the larger 78.85 acre Arvada parcel, private lands adjacent to this parcel with desert tortoise habitat, and the relocation site.

Conservation Measures

The following conservation measures will be incorporated into the proposed action in order to enhance beneficial effects of the proposed action and minimize adverse effects to Mojave desert tortoises.

- All desert tortoises on Arvada land will be captured and relocated in the spring, prior to initiation of the land sale. Tortoise nests will be excavated and relocated.
- Authorized biologists will maintain a record of all special status species encountered during biological surveys and monitoring. Incidences of observations of listed species and their sign during construction activities will be conveyed to the Field Contact Representative (FCR) and/or authorized biologist.
- Construction of a desert tortoise fence around the Arvada capture site will ensure that all animals are accounted for during removal. A second sweep of the land will take place just prior to the sale to confirm that all tortoises have been removed.
- All activities will be restricted to the approved access roads and staging areas.

- Tortoises removed from occupied burrows and relocated to newly constructed burrows will be handled using disposable surgical gloves. The gloves will be disposed of after handling each tortoise. Disposable shoe covers will also be worn. Other equipment will be sterilized or changed between uses.
- Tortoises will be handled and transported in such a way as to minimize stress experienced by each animal.
- Desert tortoises and their eggs will only be moved by an authorized biologist and solely for the purpose of moving the tortoises out of harm's way. A ground tarp will be used to minimize ground disturbance and discourage predation.
- All tortoises will have blood drawn and sent to be analyzed for URTD through ELISA testing to ensure the health of all animals being released onto the relocation site.
- All tortoises will be given the opportunity to "soak" in water prior to their release onto the relocation site to prevent dehydration. Each animal will be placed inside an artificially constructed burrow in order to provide a definitive source of shade and shelter.
- Any time a vehicle or construction equipment is parked longer than two minutes in desert tortoise habitat, the ground around and under the vehicle or equipment will be inspected for desert tortoises before the vehicle or equipment is moved. If a desert tortoise is observed, it will be left to move on its own. If this does not occur within 15 minutes, an authorized biologist will remove and relocate the tortoise.
- All tortoises released onto the relocation site will have a radio transmitter securely attached to its carapace in order to monitor its movements for approximately 17 months after release. Behavioral monitoring will take place to determine foraging movement, drinking habits, predation, and home range size in relation to translocation as a management tool.

STATUS OF THE SPECIES

Desert Tortoise (Mojave Population)

The desert tortoise populations north and west of the Colorado River in Arizona and Utah (excluding the Beaver Dam slope population) were listed as endangered under an emergency rule on August 4, 1989 (54 FR 42270). Subsequently, the entire Mojave population of the desert tortoise west of the Colorado River in California and Nevada, and north of the river in Arizona and Utah, including the Beaver Dam slope, was listed as a threatened species on April 2, 1990 (55 FR 12178). Critical habitat was designated in 1994 (59 FR 5820-5846, also see corrections at 59 FR 9032-9036). The Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (USFWS 1994) was signed on June 28, 1994; however, it is currently being revised and is expected to be finalized in 2008.

The desert tortoise is an arid land reptile associated with desert scrub vegetation types, primarily creosote bush (*Larrea tridentata*) flats, washes, and hillside slopes or bajadas. A robust herbaceous component to the shrubs and cacti of the creosote bush vegetation type is an important component of suitable habitat. Within these vegetation types, desert tortoises potentially can survive and reproduce where their basic habitat requirements are met: a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and over-wintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow. Further information on the range, biology, and ecology of the desert tortoise can be found in the Recovery Plan (USFWS 1994).

Desert tortoises are most active 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. In Arizona, tortoises are considered to be active from approximately March 15 through October 15. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert.

Desert tortoise home range sizes vary with respect to location and year. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than seven miles at a time (Berry 1986). During droughts, tortoises forage over larger areas, increasing the likelihood of injury or mortality through encounters with humans and predators. Direct loss of tortoises has occurred from illegal collection by humans for pets or consumption, URTD, predation on juvenile desert tortoises by common ravens (*Corvus corax*) and kit foxes (*Vulpes macrotis*), and collisions with vehicles on paved and unpaved roads. Other threats affecting the desert tortoise include loss of habitat from construction projects such as roads, housing and energy developments, and conversion of native habitat to agriculture.

Grazing and off-highway vehicle (OHV) activities have degraded additional habitat. Fire is an increasingly important threat because it degrades or eliminates habitat (Appendix D of USFWS 1994). Following wildfire, native plant species are often replaced by invasive, non-native species such as red brome (*Bromus rubens*) and cheat grass (*Bromus tectorum*), resulting in long-term habitat degradation or loss. Over 500,000 acres of desert lands burned in the Mojave Desert in the 1980s and approximately 500,000 acres burned in the northeastern Mojave Desert in 2005. Over 20,000 acres of Mojave desert burned on the Arizona Strip in 2006.

The Recovery Plan divides the range of the desert tortoise into six recovery units (RUs) and recommends establishment of 14 Desert Wildlife Management Areas (DWMAs) throughout the RUs. Twelve DWMAs have been designated as “desert tortoise areas of critical environmental concern (ACECs) by the BLM through development or modification of their land use plans in Arizona, Nevada, Utah, and parts of California; designation is still underway in the West Mohave planning area in California. Recovery of the desert tortoise may occur at the RU level, which allows populations within each of the six RUs to be recovered and delisted individually. Similarly, the jeopardy and adverse modification standards may be applied within or across RUs. Thus, proposals to implement the Desert Tortoise Recovery Plan in portions of a RU cannot be evaluated with regard to jeopardy or adverse modification in a section 7 consultation without an understanding of proposed or existing management prescriptions occurring elsewhere in the RU.

Permanent plots were established in the 1970s to monitor tortoise populations, and some of these plots were surveyed through 2002. However, surveys in the Northeastern Mojave RU (Nevada, Utah, and Arizona) and some other RUs detected too few live tortoises to determine a population trend. Line distance sampling was used to monitor populations across the range of the desert tortoise from 2001 through 2005. Tortoise populations have declined significantly in the Western Mojave and appear to be declining in the Eastern Mojave RUs in California (Tracy *et al.* 2004).

In 2003, the U.S. Fish and Wildlife Service convened the Desert Tortoise Recovery Plan Assessment Committee (DTRPAC) to scientifically assess the Desert Tortoise Recovery Plan. The DTRPAC Report (Tracy *et al.* 2004) produced a number of findings and recommendations that will serve as the basis for revision of the 1994 Recovery Plan. In particular, this report recognizes that threats to the desert tortoise have cumulative, synergistic, and interactive effects, and that tortoise recovery depends on managing multiple threats. Threats facing desert tortoises have been increasing since the 1994 Recovery Plan, including in the Northeastern Mojave RU, and recovery actions have not been fully implemented. The DTRPAC Report also recognizes that tortoise populations may be distributed in metapopulations rather than single, large populations in RUs. In addition to reducing multiple threats within management areas, it is important to protect the corridors among habitat patches. For recovery, tortoise metapopulations require areas of suitable habitat, but these areas may be periodically vacant of tortoises. As previously mentioned, the 1994 Recovery Plan is being revised and is expected to be completed in 2008.

Section 7 consultations since 1994 on various human actions have addressed the effects of those actions on the desert tortoise and the conservation value of the critical habitat units. The most recent major consultation on the Mojave desert tortoise in California was on the California Desert Conservation Area Plan (USFWS 2002), which contained a summary of the status of the species and its critical habitat in California. In Nevada, consultations with three BLM offices (Las Vegas, Ely, and Battle Mountain) addressed most impacts to tortoises and designated critical habitat from land management practices. Grazing continues to occur on BLM lands across the Arizona Strip. Several of these grazing allotments are also in DWMAs/ACECs and continue to affect desert tortoises and their critical habitat.

Mojave desert tortoise management in Arizona is covered primarily by the 2008 Arizona Strip Resource Management Plan for BLM lands in northern Arizona (file numbers 22410-2002-F-0277-R1 and 22410-2007-F-0463). The Mojave desert tortoise is the primary species covered by the Clark County Multiple Species Habitat Conservation Plan (HCP) in Clark County, Nevada (Regional Environmental Consultants 2000). Additionally, the Washington County HCP in Utah established the Red Cliffs Desert Reserve to protect desert tortoises and their habitat. Conservation actions for the species in these HCPs include protection for individuals and habitat.

The year 2005 was a particularly bad fire year for desert tortoises. That year, much of the Southwest received nearly twice the average annual winter-spring precipitation. This resulted in lush vegetative growth during spring and summer. Large wildfires occurred across southwestern Utah, southern Nevada, and northwestern Arizona during summer 2005 and again in 2006. In

the Northeastern Mojave RU, wildfires burned 124,782 acres of critical habitat, approximately 11 percent of the critical habitat in this unit. Most vegetation was burned off during these fires, with a loss of forage available for Mojave desert tortoise and loss of shrubs to provide shelter from temperature extremes and predators.

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 that 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 Mojave Desert Tortoise in the Action Area

The tortoises that inhabit the larger Arvada parcel, as well as the relocation site, are members of the Northeastern Mojave RU. This large unit ranges from south of Las Vegas, Nevada, to the slopes of the Beaver Dam Mountains; therefore behavioral and phenotypic differences exist within the unit. Beaver Dam Slope tortoises and the Upper Virgin River tortoises of southern Utah are characterized as colonial, a unique characteristic setting them apart from their southern solitary counterparts. These tortoises can dig complex dens up to 20-30 feet in depth, which can possess many rooms and chambers. The 78.85 acre capture site is not designated as critical habitat.

The Virgin Slope Study plot is located approximately 4.5 miles northeast of this site. In a spring 2003 study, nine live tortoises were encountered within the 1 square mile study area. Seven of the nine animals encountered were noted to have signs of cutaneous dyskeratosis (CD) (Goodlett and Woodman, 2003). CD is a shell disease that often results in the flaking and loss of scute laminae and thinning in bones, which could be a sign of toxic material taken up by the animal (Goodlett and Woodman, 2003) The Littlefield Study Plot is located approximately 14.5 miles northeast of the capture site. In spring of 2002, 37 live tortoises and 44 carcasses were found within this one-square mile plot. None of the tortoises found had definitive signs of URTD, but 62.3 percent had CD. Fifteen tortoises encountered during this study had gnaw marks on their shells, and 29.5 percent of the carcasses were possible canid predation (Young *et al.* 2002).

In September 2006, an initial biological clearance survey was conducted on both parcels. The smaller parcel was searched for 1.5 hours, during which three deteriorated burrows were found that could have possibly been tortoise burrows. The soil on this parcel is much sandier and with fewer washes, making burrow construction more difficult. No tortoises or tortoise sign were found. One burrowing owl was found inside an old burrow, and the remains of another burrowing owl were found.

The larger parcel was searched for three hours, and several active burrows were located. Approximately 20 deteriorated burrows were also found. One living adult tortoise was found at

the entrance to its burrow, and one dead juvenile tortoise was found approximately 175 yards from the on-site power line with its carapace still intact and some remaining flesh on the limbs. The deceased juvenile had a mean carapace length (MCL) of approximately four inches and had a one inch hole in the left abdominal scute. According to descriptions and a photograph, the juvenile had been dead less than one year and was most likely killed by a raven or other predatory bird.

In March 2007, volunteers identified likely desert tortoise burrows on the Arvada parcel. Burrows were marked with a pin flag, given a unique identification number, and GPS coordinates were collected and mapped. Between July and September 2007, additional site visits were conducted by a technician to identify any previously undetected tortoise burrows, eliminate non-tortoise burrows from the data set, and re-record GPS coordinates of all suspected sites using a more accurate GPS unit than was used initially. Sixty-eight potentially active burrows were located as of October 29, 2007. Although 68 burrows are located on the Arvada parcel, several of these burrows lack all of the characteristics of desert tortoise burrows and are likely rodent burrows. Seven individual tortoises were encountered during the initial data collection, two of which were encountered more than once. Six of the individuals were medium to small adults, and one was a juvenile under four inches long. cursory health assessments indicated that all individuals encountered had clean/dry nares, clear eyes with no swelling, and no presence of shell lesions or scute damage; however, a more thorough assessment will be completed during the relocation process. Based on preliminary burrow inspections, scat and track counts, and actual tortoise encounters, between 10 and 30 tortoises are estimated to occur within the larger Arvada parcel.

Five of the 68 burrows occur on private land that is directly connected to the southwestern corner of the parcel (See Figure 3 of BA). This narrow wash located between the high school and Oasis golf course provides the only habitable landscape for desert tortoises in the surrounding zone of influence. This area is accessed by tortoises through large gaps in the present fencing, through which clear tortoise trails can be seen. Tortoises found here will be translocated in the same manner as Arvada tortoises, in cooperation with the private land owner.

The release site is located on the western slopes of the Beaver Dam Mountains, northeast of the town of Beaver Dam, Arizona within the Beaver Dam Slope ACEC (BLM 1999:2.68 and BLM 1991:II-40) and is designated critical habitat (Figure 2 of the BA). This area is characterized by sandy sloping hills and deep washes. Several potentially active burrows have been found in this area, but the actual densities of active burrows and extant tortoises are yet to be determined. Diverse native plant life also characterizes this area, including Joshua trees, barrel cacti, cholla, and various annual forbs and grasses. The site is approximately three miles southeast of the Beaver Dam Slope Desert Tortoise Study Plot. A 2001 study of this plot determined the presence of many favored forbs of the desert tortoise, including desert mallow (*Sphaeralcea ambigua*) and desert marigold (*Baileya multiradiata*). In the spring of 2001, six tortoises were encountered within this 494-acre plot and the population was concluded to be functionally extinct due to die-offs associated with disease (Walker and Woodman 2002).

B. Factors Affecting Mojave Desert Tortoise Environment Within the Action Area

The release site is located within the Beaver Dam Slope grazing allotment, which is currently on a winter-only grazing rotation. Most impacts from grazing are confined to a small radius around a corral and water tank, located approximately one mile north of the intended release area. Off highway vehicle (OHV) use occurs at the relocation site; vehicles are restricted to designated roads and trails. Several campsites occur along the main road through the relocation site. BLM allows dispersed camping in the area, but vehicles must stay near or along roadways. In early 2008, the BLM initiated planning for a proposed fiber-optic line along Highway 91 outside of the Beaver Dam Slope ACEC. This fiber-optic line will be placed within the Highway 91 Right-of-Way and should not result in the loss of any desert tortoise habitat.

The release site was not part of the large area burned by wildfires during 2005 and 2006.

Development occurs along all sides of the Arvada parcel. Housing developments occur on two sides and a golf course surrounds the remaining two sides. The Arvada parcel is currently heavily used by local residents to walk, including with dogs, dump trash, and to ride bicycles and OHVs. All of these activities are known threats to desert tortoises, especially in small, isolated parcels like the Arvada parcel.

EFFECTS OF THE PROPOSED ACTION

Effects of the Relocation

Transfer of ownership of the 78.85 acre parcel of land in unincorporated Arvada and its subsequent development will result in an irreversible loss of habitat for 10 to 30 tortoises; however, we anticipate that if the parcel were retained in Federal ownership, the Arvada tortoise population would eventually die out as a result of adjacent development and anthropogenic threats. Although adverse effects to the desert tortoise will occur as a result of relocating them, these effects are anticipated to be short-term and relatively minor. It is anticipated that several beneficial effects will likely result from translocating this isolated population. Individual tortoises will be relocated to higher quality, contiguous habitat, allowed a larger home range, the opportunity to increase genetic diversity of the overall population, and reduced threats from human activities, such as garbage dumping and domestic dogs.

Tortoises will likely be temporarily disturbed when their burrows are excavated and they are brought into captivity; however, we anticipate they will be held in captivity for less than one month. While in captivity, tortoises will be kept in sterile conditions and provided food and water. All tortoises captured will be tested for the mycoplasma associated with URTD. Testing for URTD mycoplasma requires a blood sample drawn from the subcarapacial sinus, located where the top of the neck meets the carapace. Research has shown this is the best place to draw blood from turtles and tortoises. Large volumes of whole blood can be collected from small or uncooperative individuals without the need for chemical restraint (Hernandez-Divers *et al.* 2002). Although there will be short-term stress associated with this procedure, this is the most widely used technique to collect blood from tortoises and there are no long-term effects known from it (Cristina Jones, AGFD, personal communication). Tortoises that test positive for URTD

will not be relocated to the new relocation site to avoid spreading the disease to the tortoises currently occupying the relocation site. Instead, the URTD positive tortoises will be adopted by a local school to augment their environmental education program. Constructing the holding facility with native habitat and to FWS and Arizona Game and Fish Department guidelines will ensure that these tortoises will be able to live as long as possible and continue to provide educational benefits to the local community.

Handling tortoises during burrow excavation, blood sample collection, data collection, and placement of telemetry equipment will also likely cause some level of stress. The conservation measures previously described will help minimize the stress associated with these activities as well as decrease the chances of causing stress, infections, or mortality associated with non-sterile techniques. Additionally, desert tortoise eggs discovered during burrow excavations will be recorded and eventually collected and moved to the relocation site. Due to the sensitive nature of reptile eggs, they will be left on the Arvada site and protected from predation until the relocation phase of the project begins. Burrow nests will be fully excavated by hand using sterile techniques, and all viable eggs will be relocated to a natural burrow where a new nest chamber will be excavated and created at the entrance of that burrow. All eggs will be re-buried at the same depth and in the same position in which they were originally found. Eggs will be marked to prevent torsion. If necessary, artificial burrows will be created using an auger in order to provide appropriate nest sites.

Nest orientation, physical location, and timing are important factors to consider when relocating tortoise nests. Numerous aspects of embryonic development and hatchling phenotype, in addition to survival, are influenced by the abiotic conditions experienced in the nest. These thermal and hydric conditions, in turn, can be affected substantially by nest slope, aspect, and depth (Spotila *et al.* 1994, Kolbe and Janzen 2002, Weisrock and Janzen 1999). Both temperature and substrate moisture content affect hatching success of desert tortoise eggs. High moisture content (4.0 percent soil moisture) is lethal at low temperature (78.8 degrees Fahrenheit) and is probably lethal at 91.4 degrees Fahrenheit (Spotila *et al.* 1994). Additionally, desert tortoises have temperature-dependant sex determination, in which the incubation temperature of the eggs determines their sex (Spotila *et al.* 1994). Therefore, re-burying the eggs at the same depth, same orientation, and same aspect will decrease the likelihood of altering the sex of the embryos and, possibly, diminishing the viability of the eggs.

Although the BLM intends to relocate eggs discovered at the same time tortoises are translocated to the release site, research also suggests that the timing at which eggs are moved has an overall impact on their viability (Limpus *et al.* 1979). Embryos attach to the egg approximately 12 hours after laying. Data gathered by Limpus *et al.* (1979) indicates that moving eggs immediately after completion of laying had a higher success rate than moving eggs more than 12 hours after laying, although embryos did survive when moved after 12 hours post-laying. Survival of embryos moved after attaching to the egg decreases with the more time the embryo has to develop (Limpus *et al.* 1979). Desert tortoises have an incubation period of 90 to 120 days in the wild (Ernst *et al.* 1994). Without knowing the timeline of when disturbance associated with development of the parcel will occur, we believe that moving eggs and risking the loss of an increased number of them will likely result in greater overall survival when compared to not relocating them from the site and, potentially having development occur at the site before they hatch.

Ground disturbance will be minimized by working on a tarp at the nest site. Nest positions will be flagged and have their coordinates marked with GPS in order to allow for close monitoring. Although sterile techniques will be used at all times, and all care will be taken to minimize the effects to eggs, it is possible that eggs will be damaged beyond viability in the relocation process. With a small estimated population of tortoises (10 to 30) and the potential that many are young tortoises (less than four inches MCL), we do not anticipate that there are more than five nests associated with the 78.85 acre parcel, thus the number of eggs damaged would be minimal.

Transfer and release of the tortoises to the relocation site could temporarily disrupt normal behaviors of those tortoises; however the effects would be minimal compared to not relocating them. Field *et al.* (2007) suggest that relocation of tortoises is a viable conservation tool, including tortoises that have been held in captivity for long periods of time. Tortoises relocated in that study were able to utilize local resources (food, water, shelter) and establish home ranges by the season after release. The study also indicates that distance from original habitat to a relocation site does not have any correlation to survival. They also suggest that mortality (rate or cause) of released tortoises was not different than resident tortoises within the release site. Translocated tortoises fared well during their initial adjustment period; however, long-term survival and productivity of those animals will be subject to the same factors that continue to decrease populations of the desert tortoise across its range. Translocations may be acceptable during drought years because drought conditions likely affect mortality of resident and translocated tortoises similarly (Field *et al.* 2007). Field *et al.* (2007) further suggest that, to increase the chances of long-term survival, releases should be done in non-drought years. The relocation site experienced significant rainfall during the winter of 2007-2008, thus increasing the chances of long-term survival of tortoises translocated from Arvada to the release site. Without relocating the tortoises located on the Arvada parcel, it is highly likely that population will die out as a result of adjacent development and other anthropogenic threats.

Effects of the Management at the Relocation Site

Relocating the tortoises from the Arvada parcel is not anticipated to have significant effects on the resident tortoises at the relocation site within the Beaver Dam Slope ACEC. As previously mentioned, the resident population within this area suffered a sharp decline within recent years. Six tortoises were encountered within the 494-acre plot and the population has been described as functionally extinct (Walker and Woodman 2002). Resource competition between introduced and resident tortoises is a possibility; however, this competition is expected to be minimal, given the current density of resident tortoises at the release site.

The release site is also located within the Beaver Dam Slope grazing allotment. Cattle have been known to trample desert tortoises and their burrows, but the frequency of trampling, or how this affects tortoise populations is unclear. Direct mortality or injury may occur if cattle step on tortoises, their eggs, tortoise burrows, or sheltersites (Burge 1977; Berry 1989; Avery and Neibergs 1993; USFWS 1994). These direct effects can occur when grazing is authorized during the desert tortoise inactive period. Several cases of trampling have been reported on the Arizona Strip; however, the frequency with which trampling occurs is unknown. Trampling has been documented twice on the Beaver Dam Slope, in 1988 (Coffeen 1990) and in 1991 (BLM 1991); however, this grazing allotment is currently utilized on a winter-only grazing rotation. In

addition to grazing occurring during the non-active period for desert tortoises, most of the impacts from grazing are confined to a small radius around a corral and water tank, located approximately one mile north of the intended release area. Because of the concentration of cattle one mile from the release site, grazing is not anticipated to have a significant effect on translocated desert tortoises.

In addition to grazing, off highway vehicle (OHV) use is a potential threat to tortoises at the relocation site. Several campsites occur along the main road through the relocation site and are used by people with OHVs. OHVs can crush tortoises and nests as well as collapse burrows; however, much of the area where tortoises will be relocated is very rocky and not conducive for OHV travel. The relocation site is approximately one mile north of the campsites and, because it occurs in an ACEC, off road travel by OHVs is not allowed. During a site visit to the relocation site in November 2007, no OHV tracks were observed in the washes within the relocation site.

Implementing conservation measures will decrease the likelihood of spreading URTD among tortoises and ensure they are all healthy prior to release. Additionally, the conservation measures will help decrease the likelihood of anthropogenic threats as well as predation by ravens or other local natural predators. The released tortoises will be closely monitored for at least two active seasons to determine the success of the relocation and collect more data regarding foraging, movement, drinking habits, predation, habitat use, and home range size in relation to translocation as a conservation and management tool.

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. Upon transfer of ownership of the two parcels near Arvada, the proposed parcels will likely be slated for development. Once developed, the parcels will no longer be available as desert tortoise habitat. Non-federal actions likely to occur within the proposed release site of the action area include hiking, camping, horse-back riding, and OHV use.

CONCLUSION

After reviewing the anticipated effects of the proposed action, including conservation measures incorporated into the proposed Arvada Land Sale and associated desert tortoise relocation, the environmental baseline for the action area, the current status of the Mojave desert tortoise, and the cumulative effects, we conclude that the proposed action is not likely to jeopardize the continued existence of the Mojave desert tortoise. We base this determination on the following:

- 1) Relocating the Mojave desert tortoises within the Arvada parcel will allow many of these tortoises to survive and contribute to the recovery of the species.
- 2) Tortoises testing positive for the mycoplasma that causes URTD will not be euthanized. Although they will no longer contribute to the population in this RU, they will be permanently relocated to holding facilities, including a nearby school, where they will serve to enhance education and public awareness of desert tortoises and their habitat.

- 3) Resource competition between translocated and resident tortoises at the relocation site is expected to be minimal given the low anticipated population density of resident tortoises.
- 4) Grazing within the release site is currently scheduled as winter-only and most of the impacts associated with grazing are concentrated approximately one mile north of the release site. Specific grazing management activities will be subject to future section 7 consultation as part of the renewal of the grazing permit and revision of the allotment management plan.
- 5) Proposed conservation measures are sufficient to minimize the effects to Mojave desert tortoises within the occupied Arvada parcel during collection and relocation as well as any tortoises found within the relocation site.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, 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 defined 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 (50 CFR 17.3). “Harass” is defined 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 (50 CFR 17.3). “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 ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

We anticipate that the following incidental take of desert tortoises could occur as a result of the proposed action. Activities that may result in incidental take include the disposal of the 78.85 acre parcel of land near Arvada and associated activities during the relocation of desert tortoises from that parcel (blood collection, handling, nest relocation, short- and long-term holding, etc.). The incidental take is expected to be in the form of harm (injury or mortality related to relocation activities) and/or harassment (resulting from habitat degradation or loss, loss of forage, disturbance of individuals during the breeding season, or moving animals out of harm’s way). A tortoise refers to one desert tortoise or one clutch of desert tortoise eggs.

Based on preliminary population estimates for the larger Arvada parcel (78.85 acres), we anticipate that harm or harassment of up to 35 tortoises (including nests) may occur. This estimate is based upon the estimated number of desert tortoises and associated nests likely to occur in the project area; the need to move adult and juvenile tortoises, collect blood samples for

ELISA testing, and relocate nests; and the likelihood that biologists will not detect all tortoises and nests in the project area.

EFFECT OF THE TAKE

In this biological opinion, we have determined that this level of anticipated take is not likely to result in jeopardy to this species.

REASONABLE AND PRUDENT MEASURES WITH TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, BLM must comply with the following terms and conditions (lettered and Roman numeral items), which implement the reasonable and prudent measures (numbered items) and outline reporting/monitoring requirements. The terms and conditions are non-discretionary.

The following reasonable and prudent measures are necessary and appropriate to minimize take of desert tortoise:

1. BLM shall implement programs and procedures to minimize injury or mortality of tortoises during project activities.
 - A. BLM will include the following stipulations in carrying out relocation activities.
 - i. All individuals handling tortoises must meet the FWS desert tortoise monitor or biologist qualifications requirements. Permitting of these individuals may be done through application for a section 10(a)(1)(a) research and recovery permit.
 - ii. Designate a field contact representative (FCR) who will have the authority to halt all project activity should any danger to a listed species arise. Work will only resume after hazards to the listed species are removed.
 - iii. Authorized biologists will act as biological monitors and be present during all relocation activities for the protection of desert tortoises and other listed species. These biological monitors will be responsible for determining compliance with measures as defined in the biological opinion or other agreements between the project proponent and agencies.
 - iv. Authorized activities will require monitoring of the desert tortoise population throughout the duration of the project. The appropriate level of monitoring will be developed in coordination with BLM and FWS. To ensure desired results are being achieved, minimization measures will be evaluated and, if necessary, section 7 consultation reinitiated.
2. The BLM shall submit annual relocation monitoring reports to the Arizona Ecological Services Field Office by February 1 beginning in year 2009 until the completion of all proposed monitoring (two active seasons). Specifically for this project, the report shall

briefly document for the previous active season the actual number of tortoises translocated, survival rate, predation, and overall health of tortoises translocated, as well as actions taken to implement these terms and conditions, the effectiveness of these terms and conditions at reducing take of desert tortoise, the number of desert tortoises and nests excavated from burrows, and information on individual desert tortoise encounters. The report shall make recommendations for modifying or refining these terms and conditions to enhance desert tortoise protection and reduce needless hardship on the BLM and users of public lands.

Additionally, the following reasonable and prudent measure with terms and conditions are carried forward from the November 7, 2007 opinion (22410-2002-F-0277-R1/ 22410-2007-F-0463) for the Mojave desert tortoise only.

1. BLM shall take measures to eliminate or minimize take of desert tortoises resulting from livestock grazing.
 - A. The BLM shall monitor compliance with livestock removal from those allotments with seasonal restrictions (October 15 to March 15) and/or compliance on required pasture moves in the allotments managed with deferred grazing and take prompt action to resolve unauthorized grazing uses.
 - B. The BLM shall monitor compliance with the established key forage use threshold of 45 percent current annual growth on allotments with desert tortoise habitat to ensure that over-utilization of forage does not occur.
 - C. The BLM shall complete proposed fencing to implement proposed management changes and to exclude livestock from areas identified for closure in a timely manner.
2. BLM shall take measures to minimize incidental take from recreational activities and travel.
 - A. Upon implementation of the route designation/closure plan, make available to the public a route designation map that displays all open routes and clearly explains vehicle, camping, recreational, and other public use regulations and opportunities in the DWMAs/ACECs, and explains the purpose of the DWMAs/ACECs.
 - B. Use various mechanisms of public outreach to inform the public about the DWMAs/ACECs and recovery of the desert tortoise. These mechanisms may include interpretive displays, news releases, and open houses to answer questions about DWMAs/ACEC designation and management, and/or other actions.
 - C. Within DWMAs/ACECs during the tortoise active season (March 15-October 15), set a 20 mph speed limit on BLM roads.

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.

1. Since tortoises can lay eggs as early as May (Rostal et al. 1994), with constant monitoring of the Arvada population, it would be possible to locate eggs and move them quickly. Moving them within 12 hours of laying would increase the hatching success rate. If possible, eggs should be allowed to hatch in their original nests on the Arvada parcel and hatchlings moved to the relocation site as soon as possible. However, if this is not possible, to minimize handling and decrease the likelihood of eggs becoming non-viable, eggs should remain in their original nests and be relocated directly to new nest chambers rather than temporarily holding them along with tortoises.
2. We recommend that BLM coordinate with us to develop specific management actions within ACECs to further protect special status species.
3. We recommend that BLM fully implement the Desert Tortoise Recovery Plan and subsequent revisions of the plan.
4. We recommend that BLM continue to assist Lake Mead National Recreation Area; other BLM offices in Utah, Nevada, and California; and other land managers in the northeastern Mojave recovery unit in the development of regional planning efforts to implement the recovery plan, and in the integration of those plans with the Arizona Strip RMP.
5. We recommend that BLM manage activities so that they do not contribute to the proliferation of predators within desert tortoise habitat.
6. We recommend that BLM construct new wildlife guzzlers in desert tortoise habitat only if they are designed so as to exclude desert tortoises, and if sufficient forage is available.
7. We recommend that the BLM coordinate and partner with other local, State, and Federal agencies as well as private groups to sponsor and/or assist with public education regarding desert tortoise conservation to enhance public support for conservation activities. Target groups for education and outreach may include OHV groups, hunting groups, Homeowner Associations, scout troops, public schools, libraries, and other audiences and venues associated with regional land use and/or educational programming.
8. We recommend working with Mohave County officials to establish a speed limit on county roads in desert tortoise habitat. Additionally, we recommend instituting a speed limit for grazing permittees during the desert tortoise active season (March 15-October 15) in DWMAs/ACECs.

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.

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 West Broadway Road #113, Mesa, Arizona [telephone: (480) 967-7900] 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 injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of Chiricahua leopard frogs shall be submitted to the FWS Ecological Services Office in Tucson. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the FWS should be contacted regarding the final disposition of the animal.

REINITIATION NOTICE

This concludes formal consultation on BLM's proposed Arvada Land Sale within the Arizona BLM Arizona Strip Field Office management area. 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 a 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. If conservation measures or other aspects of the proposed action are not implemented as anticipated herein, including schedules for implementation, reinitiation may be warranted pursuant to 50 CFR 402.16(b).

Thank you and your staff for helping us complete this formal consultation. Any questions or comments should be directed to Brian Wooldridge (928) 226-0614 (x105) or Brenda Smith (x101) of our Flagstaff suboffice.

/s/Brenda Smith for

Steven L. Spangle

cc: Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
State Director, Bureau of Land Management, Phoenix, AZ
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Las Vegas, NV
Desert Tortoise Recovery Office, Fish and Wildlife Service, Reno, NV

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References Cited

- Avery, H.W., and A.G. Neibergs. 1993. Interactions of range cattle and desert tortoises at Ivanpah Valley, California: 1993 observations. Page 2 in B. Bartholomew (ed), Proc. Desert Tortoise Council. Symp. 1993 (abstract).
- Berry, K.H. 1986. Incidence of gunshot death in desert tortoises in California. *Wildlife Society Bulletin* 14 (2):127-132
- Berry, K.H. 1989. The status of the desert tortoise in California in 1989. Report to the US Fish and Wildlife Service. 94 pp.
- Bureau of Land Management 1991. Final Environmental Impact Statement: Vegetation treatment on BLM Lands in Thirteen Western States. Wyoming State Office.
- Burge, B.L. 1977. A survey of the present distribution of the desert tortoise (*Gopherus agassizii*) in Arizona. Contract No. YA-512-CT8-108. Bureau of Land Management.
- Coffeen, M.P. 1990. Letter to Sid Slone, Bureau of Land Management, Las Vegas, NV, dated 31 January 1990.
- Field, K. J., C. R. Tracy, P. A. Medica, R. W. Marlow, and P. S. Corn. 2007. Return to the wild: Translocation as a tool in conservation of the Desert Tortoise (*Gopherus agassizii*). *Biological Conservation* 136(2): 232-245.
- Goodlett, G.. and A.P. Woodman. 2003. Desert tortoise population survey at Virgin Slope desert tortoise study plot and line distance transects on the Virgin and Beaver Dam Slopes, Spring, 2003. Report prepared for the Arizona Game and Fish Dept, Nongame, Contract G90040-K, Phoenix, Arizona.
- Hernandez-Divers, S.M., S. J. Hernandez-Divers, and J. Wynken. 2002. Angiographic, anatomic and clinical technique descriptions of a subcarapacial venipuncture site for chelonian. *Journal of Herpetological Medicine and Surgery* 12:32-37.
- Kolbe, J.J. and F.J. Janzen. 2002. Impact of nest-site selection on nest success and nest temperature in natural and disturbed habitats. *Ecology* 83(1):269-281.
- Limpus, C.J., V. Baker, and J.D. Miller. 1979. Movement induced mortality of loggerhead eggs. *Herpetologica* 35(4): 335-338.
- Rostal, D.C., V.A. Lance, J.S. Grumbles, and A.C. Alberts. 1994. Seasonal reproductive cycle of the desert tortoise (*Gopherus agassizii*) in the eastern mojave desert. *Herpetological Monographs* 8: 72-82

- Spotila, J.R., L.C. Zimmerman, C.A. Binckley, J.S. Grumbles, D.C. Rostal, A. List, Jr., E.C. Beyer, K.M. Phillips, and S.J. Kemp 1994. Effects of incubation conditions on sex determination, hatching success, and growth of hatchling desert tortoises, *Gopherus agassizii*. *Herpetological Monograph* 8:103-116.
- 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. University of Nevada, Reno. <http://www.brrc.unr.edu/>
- U.S. Fish and Wildlife Service. 1993. Draft recovery plan for the desert tortoise (Mojave population). Portland, Oregon. 170 pp. plus appendices.
- U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon. 73 pp. plus appendices.
- U.S. Fish and Wildlife Service. 2002. Biological opinion for the California Desert Conservation Plan (Desert Tortoise). [6840 (P) CA 063.50] (1-8-01-F-16). Ventura Fish and Wildlife Service Office, Ventura, CA.
- Walker, M. and A.P. Woodman. 2002. Desert tortoise population survey at the Beaver Dam Slope Exclosure desert tortoise study plot, spring 2001. Report prepared for the Arizona Game and Fish Dept, Nongame, Contract G90040-K, Phoenix, Arizona
- Weisrock, D.W. and F.J. Janzen. 1999. Thermal and fitness-related consequences of nest location in painted turtles (*Chrysemys picta*). *Functional Ecology* 13:94-101.
- Young, R., Christine Halley, and A.P. Woodman. 2002. Desert tortoise population survey at Littlefield Desert Tortoise Study Plot, spring 2002. Report prepared for the Arizona Game and Fish Dept, Nongame, Contract G40088-001, Phoenix, Arizona.

Appendix A

CONCURRENCE

After reviewing the effects of the proposed action, we concur with the BLM's determination that the proposed action may affect, but is not likely to adversely affect, Mojave desert tortoise critical habitat. Our concurrence is based on the following:

- Critical habitat does not exist within the 78.85 acre Arvada parcel
- No primary constituent elements of critical habitat for the Mojave desert tortoise will be affected within the relocation area.