FWS/R6
ES/UT
6-UT-07-F-004

December 4, 2007

To: Otto Jose, U.S. Fish and Wildlife Service, Division of Federal Assistance, Regional Office for Region 6, Denver, Colorado

From: Larry Crist, Field Supervisor, U.S. Fish and Wildlife Service, Ecological Services, Utah Field Office, West Valley City, Utah

Subject: Biological Opinion for the Amendment to the Section 6 Grant Agreement Between U.S. Fish and Wildlife Service and the State of Utah, Natural Resources Department and Subsequent Construction of Ivins Detention Basin, Ivins City, Utah

Dear Mr. Otto Jose:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) for the proposed Section 6 grant agreement amendment and subsequent construction of Ivins detention dam project in Ivins, Utah, and its effects on Mojave desert tortoise (*Gopherus agassizii*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). The biological assessment was received October 19, 2007 from JBR Environmental Consultants representing the Utah USFWS.

The biological opinion is based on information provided in the October 19, 2007 biological assessment; phone conversations with the Service, JBR Environmental Consultants, Ivins City, and Snow Canyon State Park; meetings with Ivins City, Washington County Habitat Conservation Plan (WCHCP) biologist and Snow Canyon State Park ; and email correspondence with Ivins City, Washington County HCP staff, JBR Environmental Consultants, Snow Canyon State Parks, and U.S. Fish and Wildlife Service Regional Office Federal Grant Coordinator.

Consultation History

The City of Ivins identified the need for the detention dam and has been in the process of planning the detention dam since 2002. JBR Environmental Consultants has been contracted to conduct surveys, write the Environmental Assessment, and write the Biological Assessment. The USFWS has participated in early discussions regarding the detention dam through participation in the Washington County Habitat Conservation Plan Advisory Committee (HCAC) meetings and the Technical Advisory Committee (TAC) meetings. There were also City Council meetings that occurred on the proposed project.

- HCAC meeting on September 16, 1997;
- HCAC meeting on December 16, 1997;

- HCAC meeting on January 20, 1998;
- HCAC meeting on February 18, 1998;
- HCAC meeting on April 21, 1998;
- HCAC meeting on May 26, 1998;
- HCAC meeting on June 30, 1998;
- HCAC meeting on July 21, 1998;
- HCAC meeting on December 15, 1998;
- TAC meeting on March 20, 2002;
- HCAC meeting on March 26, 2002;
- TAC meeting on April 17, 2002;
- TAC meeting on September 17, 2002;
- TAC meeting on October 18, 2002.
- HCAC meeting in December 2002;
- Ivins City Council meetings on January 16, 2003;
- HCAC meeting in October 26, 2004;
- HCAC meeting in December 13, 2004
- HCAC meeting in February 22, 2005;
- TAC meeting on April 27, 2005;
- TAC meeting May 17, 2005;
- TAC meeting and site visit June 9, 2005.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed action is to amend a Federal Funding Section 6 grant agreement between the State of Utah (Parks and Recreation) and the U.S. Fish and Wildlife Service. The amendment will allow for a right-of-way (ROW) across property acquired by Snow Canyon State Park (Park) with Federal Section 6 funding and intended for the conservation and recovery of desert tortoise. The amendment is necessary to provide the City of Ivins access to their land where they are proposing the construction of a detention dam.

Background

When the Washington County HCP was signed in 1996 and the Red Cliffs Desert Reserve (Reserve) established, specific private parcels of land were identified and considered key to the conservation of tortoise in the Reserve. One such parcel was a privately-owned parcel in Zone 2, at the mouth of Padre Canyon, encompassing a portion of the Tuacahn Wash. In June 1999, The Conservation Fund, a not-for-profit organization purchased 143 acres of this land. That same year, Utah State Parks (Snow Canyon State Park) used Federal Section 6 HCP land acquisition grant money to purchase 52.42 acres from The Conservation Fund and incorporated these acres into Snow Canyon park boundaries. Under this grant agreement, the lands are to be managed in keeping with desert tortoise conservation and recovery goals. If the land is proposed to be

managed otherwise, a grant agreement amendment must be proposed by the state and approved by the Service. When approved, the state can then incorporate the new management proposals, in this case, a ROW easement across a portion of their lands, into their grant agreement.

Ivins City Project

In 2002, Ivins City purchased seven acres in the Reserve and surrounded by Park lands. The purchased property encompasses a portion of Tuacahn Wash. Ivins City is proposing to construct a detention dam on their property in Tuacahn Wash to control high water flows generated during storms that may cause flood damage to new property developments adjacent to and downstream from the wash. The parcel is located 300 feet east of Tuacahn Drive, 2,500 feet south of the Tuacahn High School/Center for the Arts (400 feet south of Tuacahn property), and 3,000 feet north of the subdivisions, in the SW¼ of Section 28, T41S R16W. Tuacahn Wash is located at the mouth of Padre Canyon east of Ivins City, Washington County, Utah (see EA Diagram 2). The detention dam construction project will require two phases, to be completed over two consecutive desert tortoise "inactive windows" (desert tortoise inactive/hibernation period). The first phase is geotechnical studies required to complete the dam design. The first phase will include soil drilling on-site at the dam location to determine the depth of the bedrock and the soil characteristics. The second project phase will be the dam construction. Access to the basin for both segments of the project will require ROW easements. Easements will be required from Snow Canyon State Park and the Heritage Arts Foundation (private property). If approved, the on-site drilling would be completed in less than a week (phase I) and the dam construction activities would be completed within 90 days (phase II). Phase I will occur between the dates of December 1, 2007 to February 15, 2008. Phase II will occur between the dates of December 1, 2008 to February 15, 2009.

Access:

Both phases of this project require access to Ivins City property through Snow Canyon State Parks property. The same access route will be utilized by both phases of the project. Access to the project site would run across private (Heritage Arts Foundation, Inc.) property, west of State Parks land, then south along the wash (owned by Snow Canyon State Park) to the project site (see EA Diagram 2.). To minimize impacts to the vegetation and desert tortoises and habitat, access will go directly east to the Tuacahn Wash and then follow the wash south to the detention dam location on Ivins City property. A gravel base will be laid because the sandy soil characteristics do not currently support heavy equipment. The access road is estimated to be 1,654 feet long and 12 feet wide (approximately 0.46 acres). The access road may cross up to three types of landscapes: upland vegetation, islands of vegetation in the wash, and the barren/sandy wash without vegetation. Currently, the access road is planned to cross Heritage Arts Foundation lands first (158 feet), then head south across the Snow Canyon Park boundary (249 feet) and east to the wash. Once in the wash, the road will head south for approximately 587 feet on Snow Canyon State park lands and then crossing onto Ivins City property for the remaining 660 feet. The width of the wash as of November 27, 2007 was wide enough to accommodate the access road without disturbing any of the islands of vegetation. Although, we recognize that the wash is a dynamic system which is anticipated continue moving over time.

The access road will require an estimated total easement of 0.23 acres from Snow Canyon State Park (0.07 acre upland state park property and 0.16 acre wash state park property). The sandy wash area without vegetation would not be appreciably altered by the access road. Therefore, only the upland and vegetation islands in the wash will be considered permanent loss of habitat. The upland habitat and vegetation islands are relatively undisturbed desert tortoise habitat with intact vegetation communities of annual and perennial herbaceous understory and shrub structure. As a result, permanent road access impacts (on Arts Heritage, Snow Canyon State Park, and Ivins City lands) would impact 0.17 acres of tortoise habitat for burrowing, shelter vegetation, and forage. The access road impacts to the sandy areas without vegetation will be considered temporary impacts and are estimated to equal 0.33 acres.

Phase I: Pre-construction/Drilling Activities

Geotechnical studies are required prior to finalizing dam design details. To obtain this geotechnical data, four holes would be drilled at depths between 30 and 50 feet in the proposed dam location. The drilling would be conducted using a wash-rotary drilling method at the proposed site of the detention dam. The holes would be drilled with a drill rig mounted on a 2-5 ton Ford truck. At each 3.5 inch-diameter hole location, drilling activities would disturb an area approximately 100 square feet in size. Water used for the wash-rotary method would recirculate water from a water trailer (needing to be refilled each day) or a 5,000 gallon water truck. The water trailer or truck may require a D-8 dozer or track-mounted Excavator to pull the rig onto the site if the access road is not suitable. There would be no residual water pooling or running down the wash. Due to the wash-rotary method, minimal underground vibration would result from the drilling activities. Estimated duration of the drilling activities is three working days. The geotechnical data would be obtained from the lab approximately 30-45 days after on-site drilling activities have been completed.

Phase II: Dam construction

Construction activities would occur during the inactive tortoise window (November 1, 2008 through February 15, 2009) and the estimated duration of project construction is 90 days. The dam will require 16,400 cubic feet of soil material, the majority coming from a location downstream (outside of the Reserve) and 700 cubic feet coming is another local, weed-free source (outside the Reserve).

The dam would be approximately 600 feet in length with a maximum height of 19 feet from the flow line of the existing wash to the top of the dam. The anticipated footprint area of the dam is 1.36 acres (Table 1). The inundated area for the 100-year event (1,714 cfs) is 7.0 acres (Table 1). The basin area would have a capacity of approximately 44 acre-feet, most of which would be contained within the capacity of the existing wash. The wash would not be excavated and would remain in a natural state.

Construction would occur on weekdays during normal working hours. The sequence of construction activities for the detention dam would begin with vegetation grubbing and debris removal. Next, the foundation for the dam would be completed and materials for the dam would

then be installed. At least four trucks, two excavators, two bulldozers, one blade, two scrapers, and a water truck would be required. After each day's construction activities are completed, project vehicles would be left on-site within permanent and temporary disturbance areas.

Table 1. Acreage of permanent and temporary disturbance from the proposed project.

DISTURBANCE	PROPOSED ACTION LOWER PADRE BASIN WITH WASH ACCESS
Permanent (dam)	1.36 acres
Permanent (access road)	0.17 acre (State Park = 0.07 acre)
Temporary (access road – wash)	0.33 acre
Temporary (basin – inundated area)	7.0 acres
Temporary (construction)	1.0 acre

Maintenance

Maintenance of the detention facility would consist of monthly inspections of the outlet structure on foot, and excavation and removal of debris after major flood events. Large equipment would only be needed to remove sediment that builds up and reduces the detention basin capacity, which is anticipated to occur once every 2-3 years. Sediment removed from the basin would be transported off-site. Access to the site for this purpose would occur as for construction activities, following the guidelines in the Utility Development Protocol (UDP), which include desert tortoise training for all maintenance personnel.

Applicant Committed Conservation Measures

The project activities will only occur during the desert tortoise inactive window (December 1 – February 15). Therefore, the first segment of the project (drilling) will occur starting no earlier than December 1, 2007 and the second segment of the project (construction) will occur starting December 1, 2008.

A Restoration and Rehabilitation Plan will be developed in cooperation with the Service and the City of Ivins to finalize the restoration of temporary habitat impacts and develop a strategy to offset the permanent loss of desert tortoise habitat. The Restoration and Rehabilitation Plan *will* be approved by the USFWS before June 2008. Total temporary habitat impacts are1.33 acre for the portion of the access road in the wash without vegetation (0.33 ac) and disturbance for construction of the dam (1.0 ac). The temporary impacts will be compensated by restoration of critical habitat at a ratio of 3:1 resulting in approximately 4.0 acres. The total acres permanently impacted are 1.53 acres from the dam footprint (1.36 ac) and the portions of the gravel access road in the upland and the islands of vegetation in the wash (0.17 ac). Permanent impacts will be offset by a 4:1 ratio resulting in 6.12 acres. Temporary and permanent impact acres will be restored within Zone 2 of the Reserve. The exact location(s) of the restoration will be outlined in a Restoration and Rehabilitation Plan developed in coordination with the WCHCP biologist and the Service and approved by the Service. The restoration activities will be initiated and completed before the end of 2009 by Ivins City or its contractors.

Control of Noxious/Invasive Weeds

To minimize the potential for the spread of noxious/invasive weeds, all construction related equipment would be cleaned of soils, seeds, vegetation matter, and other debris or matter that could contain or hold noxious/invasive species' seeds. The cleaning of equipment would also be done any time thereafter if the equipment leaves the Project Area, is used on another Project, and reenters the Project Area. Any material brought in for the dam construction will be "weed-free". Ivins City would be responsible for any future weed control work, if needed as a result of the implementation of this Project and identified in the Restoration and Rehabilitation Plan (as approved by Service). A certified weed-free seed mix, approved by Service would be used during restoration activities.

Design Features

To minimize the potential impacts from the Project related to loss of habitat, the area behind the dam (the basin) will be left undisturbed. Only in flood events will the basin temporarily fill with water. This measure greatly reduces the impact of the dam and allows for the future utilization of the habitat by desert tortoises.

Desert Tortoise Surveys

Desert tortoise surveys will be conducted by a qualified desert tortoise biologist[1]. Surveys will be conducted on the project site to ensure tortoises are kept out of harm's way and occupied burrows in the planned access route are cleared before heavy equipment enters the project area to the dam construction site.

Monitoring

The project construction site will be monitored once a week during dam construction and post-construction to monitor the success of the restoration and rehabilitation efforts. Monitoring would be the responsibility of Ivins City. Further, a Restoration and Monitoring Plan will be prepared that outlines all future monitoring requirements and responsibilities. This is to ensure that all Terms and Conditions of the Biological Opinion and the Washington County Habitat Conservation Plan and associated Utility Development Protocols are met.

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[1] Qualified tortoise biologists will have a bachelors degree or graduate degree in biology, ecology, wildlife biology, herpetology, or related fields. He/she must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises. Field experience means a minimum of 60 days field experience searching for desert tortoises and tortoise sign. In addition, the surveyor should have the following qualifications for the survey results to be accepted by the Service: 1) ability to recognize and accurately identify all types of desert tortoise sign and 2) ability to carefully, legibly, and completely record all sign including scat, size of shelter sites, shells, and estimated size of live tortoises.

STATUS OF THE SPECIES/CRITICAL HABITAT

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered (54 FR 42270). On April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (55 FR 12178). Reasons for the determination included significant population declines, 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) activity have degraded additional habitat. Also cited as threatening the desert tortoise's continuing existence were illegal collection by humans for pets or consumption, upper respiratory tract disease (URTD), predation on juvenile desert tortoises by common ravens, coyotes (*Canis latrans*), and kit foxes (*Vulpes macrotis*), fire, and collisions with vehicles on paved and unpaved roads.

On February 8, 1994, the Service designated approximately 6.45 million acres of critical habitat for the Mojave population of the desert tortoise in portions of California (4.75 million acres), Nevada (1.22 million acres), Arizona (339 thousand acres), and Utah (129 thousand acres) (59 FR 5820-5846, also see corrections in 59 FR 9032-9036), which became effective on March 10, 1994. Desert tortoise critical habitat was designated by the Service to identify the key biological and physical needs of the desert tortoise and key areas for recovery, and focuses conservation actions on those areas. Desert tortoise critical habitat is composed of specific geographic areas that contain the primary constituent elements of critical habitat, consisting of the biological and physical attributes essential to the species' conservation within those areas, such as space, food, water, nutrition, cover, shelter, reproductive sites, and special habitats. The specific primary constituent elements of desert tortoise critical habitat are: sufficient space to support viable populations within each of the six recovery units, and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

Critical habitat units were based on recommendations for DWMAs outlined in the *Draft Recovery Plan for the Desert Tortoise (Mojave Population)* (Service 1993). These DWMAs are also identified as "desert tortoise ACECs" by BLM. Because the critical habitat boundaries were drawn to optimize reserve design, the critical habitat unit may contain both "suitable" and "unsuitable" habitat. Suitable habitat can be generally defined as areas that provide the primary constituent elements.

Desert Tortoise Recovery Plan Assessment and Recommendations

On June 28, 1994, the Service approved the final Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (Service 1994). The Recovery Plan divides the range of the desert tortoise into 6 recovery units and recommends establishment of 14 Desert Wildlife Management Areas

(DWMAs) throughout the recovery units. Within each DWMA, 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 design of DWMAs should follow accepted concepts of reserve design. As part of the actions needed to accomplish recovery, the Recovery Plan recommends that land management within all DWMAs should restrict human activities that negatively impact desert tortoises (Service 1994). The DWMAs/Areas of Critical Environmental Concern (ACECs) have been designated by BLM through development or modification of their land-use plans in Arizona, Nevada, Utah, and parts of California.

The General Accounting Office (GAO) Report, *Endangered Species: Research Strategy and Long-Term Monitoring Needed for the Mojave Desert Tortoise Recovery Program* (U.S. General Accounting Office 2002), directed the Service to periodically reassess the Recovery Plan to determine whether scientific information developed since its publication could alter implementation actions or allay some of the uncertainties about its recommendations. In response to the GAO report, the Service initiated a review of the existing Recovery Plan in 2003. In March 2003, the Service impaneled the Desert Tortoise Recovery Plan Assessment Committee (Committee) to assess the Recovery Plan. The Committee was selected to represent several important characteristics with particular emphasis on commitment to solid science. The charge to the Committee was to review the entire Recovery Plan in relation to contemporary knowledge to determine which parts of the recovery plan will need updating. The recommendations of the Committee were presented to the Service and Desert Tortoise Management Oversight Group on March 24, 2004. The recommendations will be used as a guide by a recovery team of scientists and stakeholders to modify the 1994 Recovery Plan. A revised recovery plan is anticipated by the end of 2006.

The Committee recognized that the distribution and abundance data indicate trends leading away from recovery goals in some parts of the species' range. These results indicate a need for more aggressive efforts to facilitate recovery. Many of the original prescriptions of the Recovery Plan were never implemented although these prescriptions continue to be appropriate. New prescriptions should be prioritized to assess redundancies and synergies within individual threats.

Recovery Units

The Northeastern Mojave Recovery Unit occurs primarily in Nevada, but it also extends into California along the Ivanpah Valley and into extreme southwestern Utah (Beaver Dam Slope population) and northwestern Arizona. Vegetation within this unit is characterized by creosote bush scrub, big galleta-scrub steppe, desert needlegrass scrub-steppe, and blackbrush scrub (in higher elevations). Topography is varied, with flats, valleys, alluvial fans, washes, and rocky slopes. Much of the northern portion of the Northeastern Mojave Recovery Unit is characterized as basin and range, with elevations from 2,500 to 12,000 feet. Desert tortoises typically eat summer and winter annuals, cacti, and perennial grasses. They den in caves, bajadas, and washes (Woodbury and Hardy 1948). Desert tortoises in this recovery unit, the northern portion of which represents the northernmost distribution of the species, are typically found in low densities (about 10 to 20 adults per square mile).

The Eastern Mojave Recovery Unit is situated primarily in California, but also extends into Nevada in the Amargosa, Pahrump, and Piute valleys. In the Eastern Mojave Recovery Unit, desert tortoises are often active in late summer and early autumn in addition to spring because this region receives both winter and summer rains and supports two distinct annual floras on which they can feed. Desert tortoises in the Eastern Mojave Recovery Unit occupy a variety of vegetation types and feed on summer and winter annuals, cacti, perennial grasses, and herbaceous perennials. They den singly in caliche caves, bajadas, and washes. This recovery unit is isolated from the Western Mojave Recovery Unit by the Baker Sink, a low-elevation, extremely hot and arid strip that extends from Death Valley to Bristol Dry Lake. The Baker Sink area is generally not considered suitable for desert tortoises. Desert tortoise densities in the Eastern Mojave Recovery Unit can vary dramatically, ranging from 5 to as much as 350 adults per square mile (Service 1994).

The Northern Colorado Recovery Unit is located completely in California. Here desert tortoises are found in the valleys, on bajadas and desert pavements, and to a lesser extent in the broad, well-developed washes. They feed on both summer and winter annuals. Denning occurs singly in burrows under shrubs, in intershrub spaces, and rarely in washes. The climate is somewhat warmer than in other recovery units, with only 2 to 12 freezing days per year.

The Western Mojave Recovery Unit occurs completely in California and is exceptionally heterogeneous and large. It is composed of the Western Mojave, Southern Mojave, and Central Mojave regions, each of which has distinct climatic and vegetation characteristics. The most pronounced difference between the Western Mojave and other recovery units is in timing of rainfall and the resulting vegetation. Most rainfall occurs in fall and winter and produces winter annuals, which are the primary food source of tortoises. Above ground activity occurs primarily in spring, associated with winter annual production. Thus, tortoises are adapted to a regime of winter rains and rare summer storms. Here, desert tortoises occur primarily in valleys, on alluvial fans, bajadas, and rolling hills in saltbrush, creosote bush, and scrub steppe communities. Tortoises dig deep burrows (usually located under shrubs on bajadas) for winter hibernation and summer aestivation. These desert tortoises generally den singly.

The Upper Virgin River Recovery Unit encompasses all desert tortoise habitat in Washington County, Utah, except the Beaver Dam Slope, Utah population. The desert tortoise population in the area of St. George, Utah is at the extreme northeastern edge of the species' range and experiences long, cold winters (about 100 freezing days) and mild summers, during which the tortoises are continually active. Here the animals live in a complex topography consisting of canyons, mesas, sand dunes, and sandstone outcrops where the vegetation is a transitional mixture of sagebrush scrub, creosote bush scrub, blackbush scrub, and a psammophytic community. Desert tortoises use sandstone and lava caves instead of burrows, travel to sand dunes for egg-laying, and use still other habitats for foraging. Two or more desert tortoises often use the same burrow.

Species Description

The desert tortoise is a large, herbivorous reptile that is generally active when annual plants are most common (spring, early summer, autumn). Desert tortoises reach 200 to 380 mm (8 to 15 inches) in carapace length. Adults have a domed carapace and relatively flat, unhinged plastron. Shell color is brownish, with yellow to tan scute centers. The forelimbs are flattened and adapted for digging and burrowing. Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 50 to 200 mm (2 to 8 inches), where a diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982; Turner 1982; Turner and Brown 1982). Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse. Desert tortoises occur from below sea level to an elevation of 2225 meters (7,300 feet), but the most favorable habitat occurs at elevations of approximately 305 to 915 meters (1,000 to 3,000 feet) (Luckenbach 1982). Maximum longevity in the wild is likely to be about 50 to 70 years, the norm being 25 to 35 years (Germano 1992, 1994 in Boarman 2002).

Life History

The desert tortoise is most commonly found within the desert scrub vegetation type, primarily in creosote bush scrub vegetation, but also in succulent scrub, cheesebush scrub, blackbush scrub, hopsage scrub, shadscale scrub, microphyll woodland, and Mojave saltbush-allscale scrub (Service 1994). Within these vegetation types, desert tortoises can survive and reproduce where their basic habitat requirements are met. These requirements include a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and overwintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow. Throughout most of the Mojave region, tortoises occur most commonly on gently sloping terrain with soils ranging from sand to sandy-gravel and with scattered shrubs, and where there is abundant inter-shrub space for growth of herbaceous plants. Throughout their range, however, tortoises can be found in steeper, rockier areas.

Sheltering habits of desert tortoises vary greatly in different geographic locations. Shelter sites may be located under bushes, in the banks or beds of washes, in rock outcrops, or in caliche caves. Burrows function primarily as thermoregulatory aids and may also provide water conservation and protection from predators. Burrow sites may be located under bushes, in the banks or beds of washes, in rock outcrops, or in caliche caves. The size of desert tortoise home range varies with respect to location and year. Females have long-term home ranges that are approximately half that of the average male, which range from 25 to 200 acres (Berry 1986).

Spending much of their lives in burrows, tortoises emerge to feed and mate during late winter and early spring. They typically remain active through the spring, and sometimes emerge again after summer storms. During these activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry 1974, Luckenbach 1982). Desert tortoises are essentially "K-strategists" (MacArthur and Wilson 1967), with delayed maturity and long life. Eggs and hatchlings are quite vulnerable, and pre-reproductive mortality averages 98% (Wilber and Morin 1988, Turner et al. 1987, Morafka et al. 1997). Their longevity helps compensate for their variable annual reproductive success, which is

correlated with environmental conditions (Service 1994).

The desert tortoise species is long-lived. This species grows slowly, requiring 15 to 20 years to reach sexual maturity, and has low reproductive rates (Turner et al. 1984; Bury 1987; Tracy et al. 2004). Tortoise populations are probably dependent on relatively rare years of sufficient and timely precipitation to produce sufficient forage for reproduction and survival. This life history makes a species susceptible to environmental perturbations that may affect recruitment of young animals into the population, or survival of breeding adults before replacement.

Choice of mates is mediated by aggressive male-male interactions and possibly by female choice (Niblick et al. 1994). Tortoises in the West Mojave Desert may exhibit pre-breeding dispersal movements, typical of other vertebrates, ranging from 1 to 10 miles in a single season (Sazaki et al. 1995). The advantage of pre-breeding dispersal may be to find a more favorable environment in which to reproduce. However, the risk is increased mortality from predation, exposure, starvation, or anthropogenic factors (e.g., motor vehicle mortality).

The average clutch size is 4.5 eggs (range 1 to 8), with 0-3 clutches deposited per year (Turner et al. 1986). Clutch size and number probably depend on female size, water, and annual productivity of forage plants in the current and previous year (Turner et al. 1984, 1986; Henen 1997). The ability to alter reproductive output in response to resource availability may allow individuals more options to ensure higher lifetime reproductive success. The interaction of longevity, late maturation, and relatively low annual reproductive output causes tortoise populations to recover slowly from natural or anthropogenic decreases in density. To ensure population stability or increase, these factors also require relatively high juvenile survivorship (75 to 98 percent per year), particularly when adult mortality is elevated (Congdon et al. 1993). Most eggs are laid in spring (April through June) and occasionally in fall (September to October). Eggs are laid in sandy or friable soil, often at the entrance to burrows. Hatching occurs 90 to120 days later, mostly in late summer and fall (mid-August to October). Eggs and young are untended by the parents.

Tortoise sex determination is environmentally controlled during incubation (Spotila et al. 1994). Hatchlings develop into females when the incubation (i.e., soil) temperature is greater than 89.3° F (31.8° C) and males when the temperature is below that (Spotila et al. 1994). Mortality is higher when incubation temperatures are greater than 95.5° F (35.3° C) or less than 78.8° F (26.0° C). The sensitivity of embryonic tortoises to incubation temperature may make populations vulnerable to unusual changes in soil temperature (e.g., from changes in vegetation cover).

At Yucca Mountain, Nye County Nevada (Northeastern Mojave Recovery Unit), Mueller et al. (1998) estimated that the mean age of first reproduction was 19 to 20 years; clutch size (1 to 10 eggs) and annual fecundity (0 to 16 eggs) were related to female size but annual clutch frequency (0 to 2) was not. Further, Mueller suggested that body condition during July to October may determine the number of eggs a tortoise can produce the following spring. McLuckie and Fridell (2002) determined that the Beaver Dam Slope desert tortoise population, within the Northeastern Mojave Recovery Unit, had a lower clutch frequency (1.33 ± 0.14) per

reproductive female and fewer reproductive females (14 out of 21) when compared with other Mojave desert tortoise populations. The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Henen 1997; McLuckie and Fridell 2002).

Further information on the range, biology, and ecology of the desert tortoise can be found in Berry and Burge (1984), Brooks et al. 2003, Burge (1978), Burge and Bradley (1976), Bury et al. (1994), Germano et al. (1994), Hovik and Hardenbrook (1989), Jennings (1997), Karl (1981, 1983a, 1983b), Luckenbach (1982), Service (1994), and Weinstein et al. (1987).

Population Dynamics

The prescriptions for recovery in the 1994 Recovery Plan were focused on individual populations and assumed that preserving large blocks of habitat and managing threats in that habitat would be principally all that would be necessary to recover the species. However, that original paradigm, and the prescriptions made within that paradigm, may be wrong. Existing data have revealed population crashes that have occurred asynchronously across the range. There are reports that some populations, which have crashed previously, have subsequently increased in population density. Additionally, all known dense populations of desert tortoises have crashed. This suggests that density-dependent mortality occurs in desert tortoise populations, and that population dynamics may be asynchronous.

These characteristics indicate that tortoises may exist in a classic metapopulation structure (Hanski 1999; Levins and Culver 1971; Levins et al. 1984), and this should portend profoundly different prescriptions for recovery. In particular, if desert tortoises have historically existed in metapopulations, then connections among habitat patches are a necessary part of conservation prescriptions. Additionally, habitat suitable for tortoises, but without tortoises, should be regarded as equally necessary for recovery. Long-term persistence cannot be determined from tortoise density or tortoise numbers alone, but assessment must include the complexities of metapopulation dynamics and the habitat characteristics that promote metapopulation dynamics including habitat connectivity through inefficient corridors (i.e., partial connectivity), asynchrony of subpopulation dynamics, and several separate habitat patches. Some of the characteristics of proper metapopulation function may already have been obviated by proliferation of highways, and habitat fragmentation due to satellite urbanization. Thus, management may require artificially facilitating metapopulation processes such as movement among patches.

Distribution and Status

The range of the Mojave population of the desert tortoise includes a portion of the Mojave Desert and the Colorado Desert subdivision of the Sonoran Desert and spans portions of four States. The Mojave Desert is located in southern California, southern Nevada, northwestern Arizona, and southwestern Utah. It is bordered on the north by the Great Basin Desert, on the west by the Sierra Nevada and Tehachapi Ranges, on the south by the San Gabriel and San Bernardino Mountains and the Colorado Desert, and on the east by the Grand Wash Cliffs and Hualapai

Mountains of Arizona. In Utah, the native range of this species is generally restricted to Washington County below approximately 1,330 meters elevation (4,000 feet).

Long-term monitoring of desert tortoise populations is a high priority recovery task as identified in the Recovery Plan. From 1995 to 1998, pilot field studies and workshops were conducted to develop a monitoring program for desert tortoise. In 1998, the Desert Tortoise Management Oversight Group identified line distance sampling as the appropriate method to determine rangewide desert tortoise population densities and trends. Monitoring of populations using this method is underway across the range of the desert tortoise. Successful rangewide monitoring will enable managers to evaluate the overall effectiveness of recovery actions and population responses to these actions, thus guiding recovery of the Mojave desert tortoise. Rangewide tortoise population monitoring began in 2001 and is conducted annually.

Data collected on 1-square-mile permanent study plots indicate that tortoise populations have declined both in numbers of tortoises found during surveys and in densities of live tortoises at most sites since the plots were first established 20-30 years ago (Berry et al. 2002). Declines of 50 to 96 percent have occurred regardless of initial tortoise densities. Increases in the occurrence of shell-skeletal remains have been found to correspond with declines in numbers and densities of live tortoises with the exception of certain plots where poaching has been documented (Berry 2003).

Results of desert tortoise surveys at three survey plots in Arizona indicate that all three sites have experienced significant die-offs. Six live tortoises were located in a 2001 survey of the Beaver Dam Slope Exclosure Plot (Walker and Woodman 2002). Three had definitive signs of URTD, and two of those also had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 31 live tortoises in 1996, 20 live tortoises in 1989, and 19 live tortoises in 1980. The 2001 survey report indicated that it is likely that there is no longer a reproductively viable population of tortoises on this study plot. Thirty-seven live tortoises were located in a 2002 survey of the Littlefield Plot (Young et al. 2002). None had definitive signs of URTD. Twenty-three tortoises had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 80 live tortoises in 1998 and 46 live tortoises in 1993. The survey report indicated that the site might be in the middle of a die-off due to the high number of carcasses found since the site was last surveyed in 1998. Nine live tortoises were located during the mark phase of a 2003 survey of the Virgin Slope Plot (Goodlett and Woodman 2003). The surveyors determined that the confidence intervals of the population estimate would be excessively wide and not lead to an accurate population estimate, so the recapture phase was not conducted. One tortoise had definitive signs of URTD. Seven tortoises had lesions indicative of cutaneous dyskeratosis. Previous surveys of this plot detected 41 live tortoises in 1997 and 15 live tortoises in 1992. The survey report indicated that the site may be at the end of a die-off that began around 1996-1997.

The Western Mojave has experienced marked population declines as indicated in the Recovery Plan and continues today. Spatial analyses of the Western Mojave show areas with increased probabilities of encountering dead rather than live animals, areas where kernel estimates for carcasses exist in the absence of live animals, and extensive regions where there are clusters of carcasses where there are no clusters of live animals. Data are not currently available with

sufficient detail for most of the range of the desert tortoise with the exception of the Western Mojave (Tracy et al. 2004).

Declines in tortoise abundance appear to correspond with increased incidence of disease in tortoise populations. The Goffs permanent study plot in Ivanpah Valley, California, suffered 92 to 96 percent decreases in tortoise density between 1994 and 2000 (Berry 2003). The high prevalence of disease in Goffs tortoises likely contributed to this decline (Christopher et al. 2003). Upper respiratory tract disease has not yet been detected at permanent study plots in the Sonoran Desert of California, but is prevalent at study plots across the rest of the species' range (Berry 2003) and has been shown to be a contributing factor in population declines in the western Mojave Desert (Brown et al. 1999; Christopher et al. 2003). High mortality rates at permanent study plots in the northeastern and eastern Mojave and Sonoran Deserts appear to be associated with incidence of shell diseases in tortoises (Jacobson et al. 1994). Low levels of shell diseases were detected in many populations when the plots were first established, but were found to increase during the 1980s and 1990s (Jacobson et al. 1994; Christopher et al. 2003). A herpesvirus has recently been discovered in desert tortoises, but little is known about its effects on tortoise populations at this time (Berry et al. 2002; Origgi et al. 2002).

Site-specific analysis of the Eastern Colorado Recovery Unit shows that the distributions of the living tortoises and carcasses overlap for most of the region. The Chuckwalla Bench study plot occurs outside the study area, which creates a problem in evaluating what may be occurring in that area of the recovery unit. However, the few transects walked in that portion of the DWMA yielded no observations of live or dead tortoises. This illustrates our concern for drawing conclusions from areas represented by too few study plots and leaves us with guarded concern for this region. The percentage of transects with live animals was relatively high for most DWMAs within the Eastern Colorado Recovery Unit. In addition, the ratio of carcasses to live animals was low within this recovery unit relative to others.

There are many natural causes of mortality, but their extents are difficult to evaluate and vary from location to location. Native predators known to prey on tortoise eggs, hatchlings, juveniles, and adults include: coyote, kit fox, badger (*Taxidea taxus*), skunks (*Spilogale putorius*), common ravens, golden eagles (*Aquila chrysaetos*), and Gila monsters (*Heloderma suspectum*). Additional natural sources of mortality to eggs, juvenile, and adults may include desiccation, starvation, being crushed (including in burrows), internal parasites, disease, and being turned over onto their backs during fights or courtship (Luckenbach 1982, Turner et al. 1987). Free-roaming dogs cause mortality, injury, and harassment of desert tortoises (Evans 2001). Population models indicate that for a stable population to maintain its stability, on average, no more than 25 percent of the juveniles and 2 percent of the adults can die each year (Congdon et al. 1993, Service 1994). However, adult mortality at one site in the West Mojave was 90 percent over a 13-year period (Berry 1997). Morafka et al. (1997) reported 32 percent mortality over 5 years among free-ranging and semi-captive hatchling and juvenile tortoises (up to 5 years old) in the West Mojave. When the 26 that were known to have been preyed on by ravens were removed from the analysis, mortality dropped to 24 percent. Turner et al. (1987) reported an average annual mortality rate of 19 to 22 percent among juveniles over a 9-year period in the East Mojave.

The status and trends of desert tortoise populations are difficult to determine based only upon assessment of tortoise density due largely to their overall low abundance, subterranean sheltering behavior, and cryptic nature of the species. Thus, monitoring and recovery should include a comprehensive assessment of the status and trends of threats and habitats as well as population distribution and abundance.

For more information on desert tortoise or expanded discussions on recovery units and recommended DPSs, please refer to the Recovery Plan (Service 1994) and report prepared by the Committee (Tracy et al. 2004).

ENVIRONMENTAL BASELINE

Land managers and field scientists identified 116 species of alien plants in the Mojave and Colorado Deserts (Brooks and Esque 2002). The proliferation of non-native plant species has contributed to an increase in fire frequency in tortoise habitat by providing sufficient fuel to carry fires, especially in the intershrub spaces that are mostly devoid of native vegetation (Service 1994; Brooks 1998; Brown and Minnich 1986). Changes in plant communities caused by alien plants and recurrent fire can negatively affect the desert tortoise by altering habitat structure and species composition of their food plants (Brooks and Esque 2002).

Numerous wildfires occurred in desert tortoise habitat across the range of the desert tortoise in 2005 due to abundant fuel from the proliferation of non-native plant species after a very wet winter. These wildfires heavily impacted two of the six desert tortoise recovery units, burning less than 19 percent of desert tortoise habitat in the Upper Virgin River and 10 percent in the Northeastern Mojave (Table 1). In the Upper Virgin River Recovery Unit, 19 percent of the Upper Virgin River critical habitat unit (CHU) burned. In the Northeastern Mojave Recovery Unit, three CHUs were impacted: about 23 percent of the Beaver Dam Slope CHU burned, 13 percent of the Gold Butte-Pakoon CHU, and 4 percent of the Mormon Mesa CHU. Although it is known that tortoises were burned and killed by the wildfires, tortoise mortality estimates are not available at this time.

Table 1. Acres of desert tortoise habitat burned in each recovery unit during 2005. Note all data is preliminary and needs further analysis.

Recovery Unit	Habitat Burned (acres)	Percent Habitat Burned	CH* Burned (acres)	Percent CH Burned
Upper Virgin River**	10,446	< 19	10,446	19
Northeastern Mojave***	500,000	10	124,782	11
Eastern Mojave	6,000	< 1	1,219	<1
Western Mojave	0	0	0	0
Northern Colorado	0	0	0	0
Eastern Colorado	0	0	0	0

Total	**516,446**	-	**136,447**	-

* CH – critical habitat

** Estimates only for Upper Virgin River; needs GIS analysis.

*** Potential habitat was mapped and calculated as Mojave Desert less than 4,200 feet in elevation minus playas, open water, and developed and agricultural lands.

Disease was identified in the 1994 Recovery Plan as an important threat to the desert tortoise. Disease is a natural phenomenon in wild populations of animals and can contribute to population declines by increasing mortality and reducing reproduction. However, upper respiratory tract disease (URTD) appears to be a complex, multi-factorial disease interacting with other stressors to affect desert tortoises (Brown et al. 2002; Tracy et al. 2004). The disease occurs mostly in relatively dense desert tortoise populations, as mycoplasmal infections are dependent upon higher densities of the host (Tracy et al. 2004).

The Upper Virgin River Recovery Unit boasts the highest density desert tortoise populations anywhere in the species' range. This population exists in close proximity to St. George and other rapidly-growing cities in Washington County. Much of the habitat within the Recovery Unit is in good condition, and provides adequate food, shelter, and breeding opportunities for tortoises.

Significant portions of tortoise habitat in this Unit are non-federally owned land. Washington County applied for an ESA section 10(a)(1)(B) incidental take permit on behalf of its residents. On March 15, 1996, the Service issued Washington County such a permit (PRT-811471), which authorizes the incremental take of up to 1,169 tortoises on privately-owned desert tortoise habitat within Washington County. Take is only authorized as the County undertakes mitigation measures to benefit the desert tortoise in the 61,000-acre Red Cliffs Desert Reserve, the establishment and maintenance of which is the primary mitigation measure contained in the Washington County Habitat Conservation Plan (HCP) associated with the aforementioned permit.

The Service issued a biological opinion on its issuance of permit PRT-811471 on February 22, 1996, in which it determined that issuance of the permit was not likely to jeopardize the continued existence of the species nor was it likely to destroy or adversely modify designated or proposed critical habitat. This finding was based on strict adherence to many guidelines, one of which is the Utility Development Protocol (UDP) for utilities constructed or maintained within the Reserve.

Within this recovery unit, the most imminent threat is habitat loss through private development; thousands of acres of occupied tortoise habitat are slated for development. Analysis of this eventual habitat loss was completed in the aforementioned February 22, 1996 biological opinion. Even within the Reserve, new threats are emerging as proposals for development of roads and utilities continue to proliferate. Today, the most imminent threats to tortoises within the Reserve are invasive weed infestations and their tendency to lead to fire cycles. In 2005, 10,446 acres of critical habitat burned within the Reserve. It is estimated that > 100 adult tortoise mortalities occurred as a direct result of the fires (McLuckie pers. communication 2006). Additional threats include disease, specifically URTD, recreation, poaching, and impacts from illegal ORV riding.

In 2003, the Utah Division of Wildlife Resources documented a tortoise decline of 47% in Zone 3 and attributed this decline to disease further exacerbated by drought conditions (McLuckie 2004).

The proposed action will impact Zone 2 of the Reserve. Zone 2 hosts a high density of tortoises estimated to be an average of 250 per square mile (Washington County HCP 1996). In particular, the Tuacahn Wash area provides nesting habitat and hatchlings are frequently observed in the area. A survey of the project area by JBR Environmental Consultants on March 14, 2005 identified one adult male tortoise and five burrows within the project area. Although the proposed project occurs within very sensitive habitat in the Reserve, in designated critical habitat for desert tortoise, the project design has been altered significantly to minimize impacts to desert tortoises and their habitat.

EFFECTS OF THE ACTION

At least 1 adult male tortoise and 5 burrows occur within the project area. Tortoises are vulnerable to impacts from large vehicles and surface-disturbing activities. Heavy equipment use of the access road and construction activities have the potential to disturb, harm, or kill tortoises, especially in dense tortoise habitat such as the habitat to be impacted by the proposed project. In particular, small tortoises ($\leq$ 50 mm MCL) may be harmed or killed as a result of being crushed by construction equipment or vehicles along access routes into work areas; or entombed in their burrows or dens. However, the likelihood of a tortoise (larger than 50 mm MCL) mortality is considered low for this project, given that the site will be thoroughly surveyed and cleared of detectable tortoises and the construction will occur during the inactive season per the UDP.

In the final rule designating desert tortoise critical habitat, the Service determined that desert tortoise habitat consists of the following primary constituent elements: (1) sufficient space to support viable populations within each of the six RUs and provide for movement, dispersal, and gene flow; (2) sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species; (3) suitable substrates for burrowing, nesting, and overwintering; (4) burrows, caliche caves, and other Shelter sites; (5) sufficient vegetation for shelter from temperature extremes and predators; and (6) habitat protected from disturbance and human-caused mortality (Service 1994).

Although critical habitat will be affected, temporary impacts to habitat will be restored and permanent loss of tortoise habitat will be minimal and will be offset by rehabilitation work in other areas. Habitat will be disturbed, regardless of whether or not direct impacts to animals occur, but restoration will take place soon after construction under the guidance of the Service-approved Restoration and Rehabilitation Plan.

Indirect effects such as the impacts of construction projects to the soils and vegetation of desert ecosystems that support the desert tortoise, are well-documented and may affect tortoise populations and habitat quality over a long period of time. Mechanical disturbance of desert

soils can cause: (1) changes in annual and perennial plant production and species composition; (2) soil loss due to increased rates of water and wind erosion; (3) reduced soil moisture; (4) reduced infiltration rates; (5) changes in soil thermal regime; and (6) compaction or an increase in surface strength (Adams et al. 1982; Burge 1983; Bury 1978; Bury and Luckenbach 1983 and 1986; Davidson and Fox 1974; Hinkley et al. 1983; Nakata 1983; Vollmer et al. 1976; Webb 1983; Wilshire 1977; Wilshire and Nakata 1976; Woodman 1983).

Desert soils are protected by fragile organic or inorganic crusts. The organic crust can be the result of various microflora (algae, lichen, and fungi which form cryptogams) or macroflora (remnants of fibrous root material from dead annual plants) (Went and Stark 1968). The inorganic crust can be comprised of desert pavement, silt/clay, or chemicals. All of these crusts help prevent erosion, and may increase infiltration and retard evaporation (Epstein et al. 1966). Modification of soils by surface disturbing activities can result in a decrease in organic material and nutrient value (Webb et al. 1978). When the soil surface is exposed the thermal insulation provided by the vegetative cover is decreased, which results in increased soil temperatures. Higher temperatures decrease the soil moisture, which causes soil temperature to increase further because less heat is required to vaporize the water present. Revegetation is inhibited as a result of these processes (Webb et al. 1978).

Movement of construction equipment can result in soil compaction. Disturbance in an area can be detrimental to the vegetation because the soil compaction can decrease the amount of water entering the soil and available to plants (Davidson and Fox 1974). Soil compaction, or increased soil strength, substantially increases run-off of rain by decreasing infiltration rates, resulting in increased potential for water erosion. Soil compaction inhibits seed germination and subsequent regeneration of plant cover (Wilshire and Nakata 1976). Even minimal vehicle use can significantly reduce the establishment and growth of desert annuals in succeeding years (Adams et al. 1982). Bury et al. (1977) rejected the notion that light use has little or no effect on the biota of desert lands, stating that even partial damage to plants may subject them to stress in dry years or droughts. Greater soil surface disturbance can be expected under vehicles moving at higher speeds (Webb 1983).

Design features to lessen environmental impacts associated with this project include restoring habitat at a 3:1 and 4:1 ratios for temporary disturbance of undisturbed habitat and permanent loss of habitat, respectively. This proposed restoration and rehabilitation will be initiated upon completion of the Project (consistent with the Restoration and Rehabilitation Plan (approved by the Service). The restoration efforts will offset the impacts from temporary disturbances to desert tortoise habitat (3:1) and habitat replacement or other agreed upon measures will occur to offset permanent habitat losses (4:1 ratio) associated with the Project. Successful restoration and rehabilitation in desert habitats can be difficult to achieve. A thorough restoration and rehabilitation plan and monitoring (refer to the Terms and Conditions) will be essential to meet success.

Education programs will provide workers and supervisors with the information needed to prevent incidental take. Well-defined work areas will reduce the area of disturbance. Rehabilitation and restoration of the sites, including re-contouring and seeding, will reduce residual impacts.

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.

Unrelated State, tribal, local or private actions that may occur in the future within the project area can be broken into two categories, 1) within the Reserve and 2) outside the Reserve. Any unrelated activity outside the Reserve is covered by the Washington County HCP and underwent analysis through the section 7 process associated with the issuance of that permit. Unrelated activities within the Reserve that are State, tribal, local or private are only authorized if they comply with the Utility Development Protocols associated with the Washington County HCP. These Protocols were designed minimize residual impacts to habitat from all authorized "utility development" within the Reserve.

CONCLUSION

After reviewing the current status of the Mojave desert tortoise, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the proposed amendment to the Section 6 grant agreement and associated detention dam construction and maintenance is not likely to jeopardize the continued existence of the Mojave desert tortoise in the Upper Virgin River Recovery Unit and does not adversely modify or destroy critical habitat.

Section 7(a)(2) of the ESA requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to destroy or adversely modify critical habitat. This Federal responsibility accompanies, and is in addition to, the requirement in section 7(a)(2) of the ESA that Federal agencies ensure their actions do not jeopardize the continued existence of any listed species. This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

The Service reached this conclusion based on the following reasons:

(1) Permanent loss of critical habitat is estimated to be 0.17 acres for the access road and 1.36 acres for the dam, only a small portion (less than 0.001 %) of the Recovery Unit. The permanent loss of critical habitat will be replaced at a 4:1 ratio with land that provides the constituent elements of critical habitat and will be protected in perpetuity and managed for the desert tortoise as part of the Red Cliffs Desert Reserve or rehabilitation of land to restore constituent elements of critical habitat or other desert tortoise needs identified by the Washington County HCP administration, Utah Division of Wildlife Resources, and the U.S. Fish and

Wildlife Service.

(2) Total temporary disturbance is estimated to be 1.33 acres. Temporary disturbance from the access road is estimated to be 0.33 acre and will occur in the sandy portions of the wash with no vegetation. Temporary disturbance from the dam construction is estimated to be 1.0 acre. Temporary habitat degradation will be restored at a 3:5 ratio to improve the constituent elements of critical habitat. Once disturbance is completed, City of Ivins will actively restore any disturbed areas according to the Restoration and Rehabilitation Plan developed under the guidance of *Restoration/ Reclamation Standards for the Red Cliffs Desert Reserve*. **The Restoration and Rehabilitation Plan must be approved by the Service prior to the initiation of the second segment of construction (dam construction).** The additional proposed "off-site" habitat restoration will be identified by the Service in coordination with the Washington County HCP Technical Advisory Committee (TAC).

(3) All construction activity will occur during the tortoise inactive season and will comply with the Utility Development Protocol associated with the Washington County HCP.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by the U.S. Fish and Wildlife Service, Federal Assistance Branch of the Regional Office, so that they become binding conditions of any grant or permit issued to City of Ivins and its contractors, as appropriate, for the exemption in section 7(o)(2) to apply. The USFWS Federal Assistance Branch of the Regional Office has a continuing duty to regulate the activity covered by this incidental take statement. If the USFWS Federal Assistance Branch of the Regional Office (1) fails to assume and implement the terms and conditions or (2) fails to require the State to require

the City of Ivins or its contractors 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, City of Ivins and its contractors must report the progress of the action and its impact on the species to the Service (Utah Field Office) as specified in the incidental take statement [50 CFR §402.14(i)(3)]. Due to the unique nature of the manner in which the Reserve and Upper Virgin River Recovery Unit are managed under the HCP, Washington County HCP staff (Bill Mader, Lori Rose, or Justin Neighbor) or DWR desert tortoise biologists may fulfill the Service obligations outlined herein to the extent that both the Service, the County, and the State of Utah Division of Wildlife Resources agree that is appropriate.

Amount or Extent of Take Anticipated

The Service anticipates the following level of take associated with implementation of the proposed action:

1. Based on the estimated density of tortoises in the area, at least one tortoise can be expected to be found in the area. Therefore, 2 desert tortoises ($\geq$ 50 mm MCL) may be directly taken during the proposed action (e.g., mortality from stress-related impacts, moved out of harm's way, removal from their winter dens or burrows).

2. An unknown number of juvenile or neonate desert tortoises may be taken directly with the operation of heavy equipment during this construction.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take of desert tortoises authorized by this biological opinion.

1. Measures shall be implemented to prevent injury or death of desert tortoise by any project-related activity.

2. Measures shall be implemented to minimize destruction, loss, degradation, and fragmentation of desert tortoise habitat by any project-related activity.

3. Measures shall be taken to ensure the success of the restoration associated with the project.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Service (and Ivins City) must comply with the following terms and conditions, which implement the reasonable and

prudent measures described above. These terms and conditions are non-discretionary.

To implement reasonable and prudent measure number 1, the following terms and conditions shall be implemented:

Construction-related Activities:

a) Ivins City will designate, with approval by the Service, an individual as a field contact representative who will be responsible for overseeing compliance with the project description and terms and conditions contained in this biological opinion, and providing coordination with the Service and the Reserve. This representative will be an authorized tortoise biologist (approved by the Service) and have the authority to halt activities associated with the project which may be in violation of the project description or the terms and conditions. This individual must monitor all construction activity on a weekly basis in accordance with this opinion. He/she is responsible to ensure that the project description and the terms and conditions of this opinion are being met. This representative shall monitor all actions taken in relation to Mojave desert tortoise and Mojave desert tortoise habitat.

b) Prior to heavy equipment going into desert tortoise habitat, all tortoise burrows within the access routes, turn around areas, and the dam construction site will be scoped, cleared and collapsed by a qualified tortoise biologist. If tortoises are located in dens, the Service and the HCP biologist will be notified and receive approval *before* the animal will be excavated by hand and held until conditions warrant release (as guided by the Service and HCP biologist).

c) To ensure adjacent burrows are not adversely affected by construction equipment, silt fencing will line the boundary of the access routes, turn around areas, and the dam construction site. Any travel outside of the designated access route is prohibited and will be immediately reported to the Service by the field contact representative.

d) Surveys and tortoise relocation activities will be conducted in the field by qualified desert tortoise biologists as approved by the Service and the HCP biologist. All surveys, required handling, and burrow excavation and construction shall be conducted following the protocol described in *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council, 1994 revised 1999).

e) A qualified tortoise biologist must be present on the construction site during those times when the ambient temperature reaches 65 degrees *F* or greater for three or more consecutive days.

f) All project employees working within the range of the desert tortoise shall be informed, through an educational program conducted by a qualified desert tortoise biologist, of the occurrence of Mojave desert tortoise in the project area, and of the species' threatened status. Information will be included on the life history of the desert tortoise, general tortoise activity patterns, reporting requirements, and specific detailed instructions on the

proper techniques to capture and move tortoises that are in *imminent*[2] danger (ideally, without the tortoises voiding their bladders). Tortoises not in *imminent* danger shall only be moved by the qualified, on-site tortoise biologist. Project employees shall also be advised as to the definition of "take" under the Act and the potential penalties (up to $25,000 in fines and six months in prison per violation) for taking a Federally threatened species in a manner not authorized in this biological opinion. Finally, they shall be informed as to the terms and conditions included in this biological opinion.

g) Project-related staff shall not bring any pets on the project sites at any time.

h) A litter-control program shall be implemented, by Ivins City and its contractors, to minimize predation on tortoises by ravens drawn to the project site. All trash and food items shall be contained immediately when discarded. Containers must preclude the entrance of both birds and mammals which might be attracted to the garbage. This trash (especially food-related trash) must be properly contained and removed daily from the project site to reduce the attractiveness of the area to coyotes, common ravens, and other desert tortoise predators. On-site workers must not feed any animals, wild or domestic, on the site.

i) Construction and maintenance vehicles shall not exceed a speed of 10 miles per hour in Mojave desert tortoise habitat except on Federal, state and County roads, where the posted speed limit must be obeyed.

j) Given the possibility that not all impacts and opportunities for minimizing them may be foreseen prior to preconstruction and/or construction activity, the HCP biologist or Division of Wildlife Resources biologist may suggest, in writing, additional minimization measures to reduce adverse impacts from the project on Mojave desert tortoise. Such suggests must be approved and added to the project file with the Service. If Ivins City or its contractor chooses not to follow these measures, the designated representative must explain, in writing, to the Service why such measures cannot be followed prior to carrying out the portion of the project commented upon by the HCP biologist or Division of Wildlife Resources wildlife biologist.

k) All access points will be signed indicating that the area is a construction zone and that there is no public access (except during weekends). If conditions warrant, construction areas and access should be watered to suppress dust.

l) Once each segment is completed, the silt fencing will be removed to allow movement of

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[2]'Imminent' shall mean immediate and unavoidable. For example, if a tortoise may be killed or injured in the immediate future, and the cause of imminent death or injury cannot be stopped, the tortoise must be moved immediately by whoever is on-site. However, if a tortoise is found in the project path, and no immediate and/or unavoidable impacts are pending, project employees must alleviate the threat and await the qualified tortoise biologist so that he/she can move the animal prior to project continuation.

tortoises through the area. All activities must be contained within these areas.

m) These Terms and Conditions will be incorporated into the terms and conditions on which the State of Utah issues the Right-of-Way (ROW) to Ivins City.

Maintenance Activities:

a) The individuals responsible for performing routine maintenance on the detention dam are to be trained in basic desert tortoise biology. This training will be performed annually by a qualified tortoise biologist. The training will include at a minimum the following: identification of tortoises, burrows, dens, scat, and other sign. Employees who have not received such training shall not perform maintenance operations within tortoise habitat.

b) Prior to access to the detention dam within the Reserve, the HCP Administration will be notified a week in advance.

c) Within the Reserve, UDP protocol will be implemented.

d) Prior to any silt/sediment removing maintenance to the detention basin, the maintenance activities will be coordinated and planned with the Service to ensure that desert tortoises will not be adversely impacted. To do so, a desert tortoise clearance may need to be performed by a qualified tortoise biologist as per the WCHCP (during the active tortoise windows). Active tortoises found above ground will be moved out of harms way and the HCP biologist and the Service will be notified immediately. Any burrows that are located in an area impacted by heavy equipment will be scoped to determine the presence of tortoise(s). If tortoises are located in dens, the HCP biologist and the Service will be notified and receive approval *before* the animal will be excavated by hand and held until conditions warrant release (as guided by the HCP biologist). If the silt/sediment removal maintenance is required outside of the active clearance windows, coordination and approval will be required by the Service before any maintenance is performed.

To implement reasonable and prudent measure number 2, the following terms and conditions shall be implemented:

Construction-related Activities:

a) The qualified biologist will determine access points (across undeveloped areas), and identify the construction areas to ensure avoidance of tortoise burrows, dens, and native vegetation whenever possible. All access points and construction areas will be delineated with silt fencing (with no public access) during both segments of the project. Access roads will not exceed 15 feet in width. Road access will be minimized to the maximum extent practicable.

b) Impacts to vegetation will be minimized to the maximum extent possible.

c) Prior to excavation or surface disturbance, access roads, turn around areas, and dam

construction sites will be clearly marked with silt fencing. If locations to stockpile topsoil are needed, the Service will be notified and the area will be completely cleared of tortoises by a qualified tortoise biologist. The area will be marked with silt fence on three sides to minimize spread of excavation materials.

d) Prior to accessing the site, all vehicles and equipment will be cleaned of soils, seeds, vegetation matter and other debris or matter that could contain or hold noxious/invasive species' seeds. The cleaning of vehicles and equipment will be cleaned again any time thereafter if the equipment leaves the project area, is used on another project, and reenters the project area.

e) Other then an emergency, all vehicle maintenance activities shall be conducted in maintenance facilities *outside of the reserve*. Vehicle maintenance shall not be conducted in areas of undisturbed habitat. Precautions shall be taken to ensure that contamination of maintenance sites by fuels, motor oils, grease, etc. does not occur and such materials are contained and properly disposed of off-site. The applicant shall notify the Service immediately upon spills of petroleum-based or other toxic materials. As further directed by the Service, the site shall be immediately cleaned up and the materials shall be disposed of as directed by the Service.

f) Once each segment is completed, the silt fencing will be removed to allow movement of tortoises through the area. All activities must be contained within these areas.

g) Prior to rehabilitation of the tortoise habitat, a Restoration and Rehabilitation Plan *must* be approved by the Service (in coordination with the HCP Technical Advisory Committee [TAC]). Areas in need of restoration will be delineated and suggested by the HCP TAC. Final approval of the Restoration and Rehabilitation Plan is the responsibility of the Service. Final implementation of the Restoration and Rehabilitation Plan is the responsibility of Ivins City.

h) A standard for success will be identified and subsequent monitoring will be conducted on rehabilitation sites on an annual basis for 3 years, to determine status of meeting the success standard

i) A report shall be written and submitted to the Service to detail the status of the restoration and rehabilitation sites at the end of the 3 years. Re-initiation of rehabilitation (with monitoring) efforts will be required if previous rehabilitation does not meet success standards.

j) These Terms and Conditions will be incorporated into the terms and conditions on which the State of Utah issues the Right-of-Way (ROW) to Ivins City.

To implement reasonable and prudent measure number 3, the following terms and conditions shall be implemented:

Construction-related Activities:

a) Prior to the initiation of Segment two, the dam construction, in desert tortoise habitat, a Restoration and Rehabilitation Plan must be approved by the Service's Utah Field Office. This restoration plan should comply with the document *Restoration/Reclamation Standards for the Red Cliffs Desert Reserve*. The Restoration and Rehabilitation Plan will describe objectives, methods, specie of plants and seed mixture to be used, time of planting, success standards, and type of subsequent monitoring. This plan will describe in specific detail how surface-disturbance sites will be rehabilitated using reasonable state-of-the-art techniques. The rehabilitation plan shall also describe in detail how the evaluation will be made for determining the success of the restoration/rehabilitation efforts. The objective should be to reach a minimum 50 percent of the range site potential within 3 years. Should the objective not be achieved, Ivins City will be responsible for further restoration activities or shall provide monetary compensation to Washington County or Division of Wildlife Resources to complete restoration efforts and monitoring.

b) The Restoration and Rehabilitation Plan will identify all off-site habitat restoration within the Reserve as recommended by the Washington County HCP biologist, in coordination with the HCP TAC, the approval of the Service. The Restoration and Rehabilitation Plan will be agreed to by Ivins City and the Service.

c) Ivins City will be responsible for all initial and additional monitoring activities to ensure successful restoration. Monitoring will be defined in the Restoration and Rehabilitation Plan.

d) All seed will be certified free of noxious weeds and seed mix rates shall be based on pure live seed. The seed source, mix and rates will be submitted to the Service for approval.

e) Ivins City shall coordinate the date for implementing the approved Restoration and Rehabilitation Plan with the Washington County HCP biologist and the Service. Fifteen working days prior to initiating the restoration and rehabilitation activities, the Service and the Washington County HCP biologist will be notified.

REPORTING REQUIREMENTS

Upon locating a dead or injured desert tortoise, initial notification must be made within one business day to the Service's Division of Law Enforcement in Cedar City, Utah at telephone (435) 865-0861, the Service's Ecological Services Office at telephone (801) 975-3330, the Bureau in St. George at telephone (435) 688-3204, and the St. George Office of the Utah Division of Wildlife Resources at telephone (435) 688-1426.

Instructions for proper handling and disposition of such specimens will be issued by the Service's Division of Law Enforcement consistent with the provisions of the Incidental Take Statement. Care must be taken in handling sick or injured animals to ensure effective treatment

and care, and in handling dead specimens to preserve biological material in the best possible state.

REINITIATION STATEMENT

This concludes formal consultation with the Service on the Snow Canyon State Park Section 6 grant agreement amendment for the Ivins City Detention Dam project in Ivins City, Washington County, Utah. 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 impact 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.

Bcc:

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