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Survey Report

Mojave Desert Tortoise
Kane Springs Groundwater
Development Project

March 2007

ARCADIS

Mojave Desert Tortoise Survey Report

Kane Springs Groundwater Development Project

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U.S. Fish and Wildlife Service

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1. Introduction

The Nevada State Office of the Bureau of Land Management (BLM) is preparing an Environmental Impact Statement (EIS) in response to a right-of-way application submitted by the Lincoln County Water District (LCWD or Applicant) to construct and operate a system of regional water facilities known as the Kane Springs Valley (KSV) Groundwater Development Project (Project). The project would authorize LCWD to construct infrastructure required to pump and convey groundwater resources approved for pumping by the Nevada State Engineer and located in Lincoln County to help meet anticipated future water needs in southern Lincoln County.

This desert tortoise survey report is being prepared in support of the EIS and Biological Assessment (BA) that are being prepared for the KSV Project. The U.S. Fish and Wildlife Service (USFWS) requests, but does not require, that surveys for the desert tortoise be conducted for this project (USFWS 2006).

Following the review of the BA, the USFWS will issue a Biological Opinion (BO) that will conclude whether the project would jeopardize the continued existence of any species listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA).

1.1 Background

Threatened, endangered, and proposed species are protected by the ESA of 1973, as amended. "Endangered" species are defined in the ESA as species that are in danger of extinction throughout all or a significant portion of their range. "Threatened" species are those species likely to become endangered within the foreseeable future throughout all or a significant portion of their range due to disease, predation, habitat loss, or other factors. The BLM is charged with ensuring that any action authorized, funded, or carried out by that agency is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of habitat which is determined by the Secretary of the Interior as critical to such species. Section 7 of the ESA establishes a consultation procedure to implement the substantive obligations of the Act. The BLM is required to consult with the USFWS when an action may affect a threatened or endangered species or its habitat.

The desert tortoise is a federally listed threatened species (USFWS 1990). The project area is located within desert tortoise habitat, and portions are within designated critical habitat.

1.2 Consultation History

Consultation with the USFWS was initiated for the KSV Project by the BLM in a letter dated April 10, 2006. A meeting was then held on April 17, 2006 in Reno to discuss the Project. Meeting participants included the USFWS staff, BLM staff, the Applicant, and Greystone-ARCADIS biologists. The USFWS indicated during this meeting that a desert tortoise survey would likely be needed. Greystone-ARCADIS submitted a DRAFT Desert Tortoise Survey Proposal (DRAFT Proposal) for the KSV Project on August 28, 2006. The DRAFT Proposal was reviewed by the USFWS, and a conference call with all interested parties was held on September 13, 2006 to discuss revisions. Greystone-ARCADIS then submitted a FINAL Desert Tortoise Survey Proposal (**Appendix A**) and received an email approval from the USFWS on September 26, 2006 to proceed with the surveys.

2. Project Description

Production facilities for the KSV Project would consist of up to seven production water wells located within or immediately adjacent to the utility corridor established by the Lincoln County Conservation, Recreation and Development Act of 2004 (LCCRDA; Public Act 108-424). Collectively, the wells would pump up to 5,000 acre-feet of groundwater per year. Preliminary engineering design indicates a system of lateral buried pipelines up to 12 inches in diameter to connect the production wells to the water transmission pipeline. A buried water transmission pipeline up to 24 inches in diameter located within the utility corridor established under LCCRDA would connect the well field to the Coyote Springs development (the termination point will be determined subsequent to final design and engineering studies, and final design will determine the actual pipeline diameters). A 50,000-gallon storage tank will be sited adjacent to existing wells and will serve as the termination point for the collection pipeline(s). Overall distance of the proposed project area would be approximately 16 miles.

Associated ancillary facilities would include distribution power lines and communication lines to be placed in the easement to provide power and communication for the project facilities. Access roads would be needed from the Kane Springs Road for vehicle access to each well site. A proposed water storage tank would be located on private land.

3. Project Area Description

The KSV Project would be located adjacent to Kane Springs Road in Lincoln County, Nevada on public lands managed by the BLM Ely Field Office. Kane Springs Road is a county-maintained gravel road, located east of U.S. Highway 93. Kane Springs Road connects U.S. Highway 93 with State Route (SR) 317 at Elgin, a distance of 38 miles. Generally, the proposed project facilities would be located in Township 10 and 11 South and Ranges 63 and 64 East, within the 2,640-foot-wide utility corridor established by the LCCRDA (Public Act 108-424).

3.1 Topography

The KSV Project is located in the southern part of the Great Basin, in the northernmost sub-province of the Basin and Range Physiographic Province. The Basin and Range province is characterized by north- to northwest-trending mountain ranges separated by valley basins that have been filled with sediments derived from erosion of the adjacent mountains. The mountain ranges bounding the project area include the Clover Mountains in the northeast, Delamar Mountains to the northwest, and the Meadow Valley Mountains to the southeast.

The majority of the project area is located in the Kane Springs Valley, an elongated north-northeast/south-southwest trending valley, which extends from Coyote Springs Valley at the southwestern end near U.S. Highway 93 to the northeastern end near Elgin. Covering an area of approximately 232 square miles, the Kane Springs Valley is approximately 40 miles long and an average of approximately 8 miles wide. The floor of the valley slopes south-southwest from a high of approximately 4,000 feet near the base of the Clover Mountains toward the mouth of the valley, where the elevation is approximately 2,600 feet. The Delamar Mountains reach 7,720 feet, while Meadow Valley Mountains are considerably lower with a maximum elevation of 5,676 feet.

The southwestern portion of the project area is located in the Coyote Spring Valley. Coyote Spring Valley is bounded by the Sheep Mountain Range to the west and Meadow Valley and Arrow Canyon Mountain Ranges to the east. The Coyote Spring Valley trends north-south and extends about 37.5 miles from Kane Springs Valley to Hidden Valley. The basin is roughly 8 miles wide.

Soils in the area are deep and relatively productive. They have developed in alluvium and typically have sandy and sandy loam surfaces. Slopes are level to gently sloping.

A high percentage of rock fragments is found on the surface and throughout the soil profile.

3.2 Vegetation

The project area is located in the Mojave Desert biome. Vegetation communities within this biome, and represented in the project area, can be further characterized as Mojave Creosote Bush Scrub and Desert Wash Scrub. Mojave Creosote Bush Scrub communities occur in areas less than 4,000 feet in elevation. Non-native grassland is also a component of this community type. Mojave Desert Wash Scrub occurs in elevations of less than 5,000 feet in sandy arroyos and washes.

3.2.1 Mojave Creosote Bush Scrub

This vegetation class includes Mojave mixed scrub and creosote-bursage vegetation. Dominant species associated with this vegetation community includes desert thorn (*Lycium* spp.), shadscale (*Atriplex confertifolia*), hopsage (*Grayia spinosa*), blackbrush (*Coleogyne ramosissima*), brittlebrush (*Encelia farinosa*), creosote (*Larrea tridentata*), bursage (*Ambrosia dumosa*), and desert saltbush (*Atriplex polycarpa*) that occur on lower slopes and in washes. Associate species also include Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), Mormon tea (*Ephedra nevadensis*), range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), and Indian ricegrass (*Oryzopsis hymenoides*).

Non-native grassland is also a component of this community. There are no areas mapped for this vegetation community, as it is often an understory community within shrublands. Dominant species in this community are primarily red brome (*Bromus rubens*) and Mediterranean grass (*Schismus barbatus*). These species increase fire hazards, and controlling their spread is essential to fire management. This community typically gains dominance in burned areas, perpetuating the burn cycle.

3.2.2 Mojave Desert Wash Scrub

The Mojave Desert Wash Scrub community consists of low, scrubby vegetation in sandy arroyos and along Kane Springs Wash and Pahranagat Wash. Dominant species of the community include cat claw (*Acacia greggii*), desert willow (*Chilopsis lineris ssp. Arcuata*), Mormon tea (*Ephedra nevadensis*), and indigo bush (*Psorothamnus fremontii*). Desert willow and cat claw were sparse within the project area. Other species that occur in Mojave Desert Wash Scrub include desert broom (*Baccharis sarathroides*) and big galletta (*Pleuraphis rigida*). Most of the surface area within this community was bare ground.

4. Species Description

The desert tortoise species (*Gopherus agassizii*) is divided into two distinct populations: the Sonoran and Mojave. The Sonoran population occurs south and east of the Colorado River in Arizona and Mexico, and the Mojave population occupies those portions of the Mojave and Colorado Deserts north and west of the Colorado River in southwestern Utah, northwestern Arizona, southern Nevada, and southern California.

In response to the dramatic decrease in numbers of the Mojave population of the desert tortoise throughout its entire range, the USFWS emergency-listed the species as endangered on August 4, 1989 (54 FR 32326). The Mojave population was then proposed under normal listing procedures on October 13, 1989 (54 FR 42270) and was subsequently listed as threatened on April 2, 1990 (55 FR 12178).

4.1 Distribution and Population Trend

The Mojave population of desert tortoise is divided into two subpopulations: western and eastern. The western Mojave subpopulation is distributed throughout the western Mojave Desert, west of Death Valley. The eastern Mojave subpopulation is distributed throughout the Mojave Desert in eastern California, southern Nevada, extreme northwestern Arizona (north of the Grand Canyon) and the Beaver Dam Slope and Virgin River Basin of southwestern Utah (USFWS 1990). The desert tortoise ranges from northern Sinaloa, Mexico north across Sonora, Mexico; and much of Arizona to southern Nevada; southwestern Utah; and southeastern California (Ernst et al. 1994).

Desert tortoise populations in the eastern Mojave Desert appear to be stable. Studies have indicated that tortoise populations in the eastern Mojave were stable or increased during the 1980s and are stable today. Additionally, the number of juveniles reported during surveys conducted in the eastern Mojave appeared to decline at a few study sites, but do not represent a major decline in numbers (BLM 2000).

4.2 Habitat and Behavior

The desert tortoise is most commonly found within the desert scrub vegetation type where creosote bush scrub occurs, but may also be found in association with succulent scrub, cheesebush scrub, blackbrush scrub, hopsage scrub, shadscale scrub, microphyll woodland, Mojave saltbush-allscale scrub, and scrub-steppe vegetation types of the desert and semidesert grassland complex (USFWS 1994). Desert tortoise

are completely terrestrial and typically occur in habitats that include suitable substrates for digging burrows and nest sites or that provide other coversites, such as rock crevices, for shelter. Throughout the Mojave Region, desert tortoises occur on flats and bajadas with soils ranging from sand to sandy gravel, and they occur on rocky terrain and slopes (USFWS 1994).

Activity patterns of the desert tortoise are closely related to ambient temperatures and forage availability. They spend much of their lives in burrows and emerge in late winter and early spring to feed and mate. This species remains active through the spring and may emerge again after summer storms. While aboveground, the desert tortoise feeds on herbaceous vegetation, which typically consists of grasses and annual flowers (USFWS 1994).

Approximately 6.4 million acres of critical habitat for the Mojave population of the desert tortoise was designated by the USFWS in 1994. Critical habitat is defined in Section 3 of the ESA as "those areas that have biological of physical features that are essential to the conservation of the species." In Lincoln County, there are 244,900 acres of designated critical habitat for the desert tortoise.

The proposed right-of-way for the KSV Project traverses approximately 16.5 miles of suitable desert tortoise habitat, of which approximately 13.5 miles are designated critical habitat. Of the 16.5 miles of suitable habitat, approximately 1.5 miles (8 acres) are within the area that burned in 2005. The entire corridor is directly adjacent to existing roads that support light traffic. Additionally, the alternative that follows the LCCRDA designated utility corridor to the west at the Coyote Springs Investments property traverses approximately 3 miles of suitable desert tortoise habitat, all of which are designated critical habitat.

4.3 Threats

Threats to the Mojave desert tortoise include disease, habitat destruction, and increased human access into desert tortoise habitat (USFWS 1994). Over the last decade, Upper Respiratory Tract Disease has spread across the Mojave Desert and, in part, led to the emergency listing of the desert tortoise in 1989. The loss of desert tortoise habitat from increased traffic and access, mineral development, anthropogenic fire, spread of noxious weeds, and livestock use represent significant threats to desert tortoise in the Mojave Desert. Predation, particularly from ravens, can also be implicated in population declines of the desert tortoise. Raven populations in the

Mojave Desert have increased by more than 1,000 percent between 1968 and 1992 (Boarman and Berry 1995). Ravens are known to prey on juvenile tortoises.

4.4 Existing Conditions

Suitable habitat for the desert tortoise is present in and around the KSV Project area. On June 28, 1994, the USFWS approved the Final Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (USFWS 1994). The Recovery Plan divides the range of the desert tortoise into six recovery units and recommends establishment of 14 Desert Wildlife Management Areas (DWMAs) throughout the recovery units. The BLM Ely Field Office created desert tortoise Areas of Critical Environmental Concern (ACECs; USFWS 1994) through development or modification of their land use plan.

The Coyote Springs DWMA is located approximately 16 miles south of the project area. Under the Approved Caliente Management Framework Plan Amendment and Record of Decision for the Management of Desert Tortoise Habitat (BLM 2000), the Kane Springs ACEC was established to include the Coyote Springs DWMA (TNC 2001).

In 2001, the USFWS and The Nature Conservancy (TNC) developed a Site Conservation Plan for the Coyote Springs Valley DWMA (TNC 2001) to provide management recommendations for the Coyote Springs Valley. The assessment area encompasses the original Coyote Springs DWMA and portions of the Mormon Mesa DWMA as originally identified by the Recovery Plan (USFWS 1994) and much of the Desert National Wildlife Refuge (TNC 2001).

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 (USFWS 1994). The regulation of activities within critical habitat through Section 7 Consultation is based on recommendations in the Recovery Plan (USFWS 1994).

5. Methods

Three methods of data collection have typically been used to estimate desert tortoise population densities, including strip transects, belt transects, and permanent study plots. Baseline data collection and consultation with the USFWS determined that strip transects would be most appropriate for the KSV Project.

5.1 Basline Data Collection

A variety of information sources was used to gather baseline data for the project area. Primary data sources reviewed and incorporated into this document include biological surveys and reports conducted by the following government agencies and consultants:

- Geographical Information System (GIS) data from the USFWS on federally designated critical habitat for listed species,
- Proposed and final rules for the federal listing of species from the Federal Register,
- USFWS recovery plans for listed species,
- Personal communication with local species experts
- Toquop FEIS (BLM 2003) Surveys,
- Toquop Biological Opinion (USFWS 2003)
- Karl (1980) Survey,
- Kern River Gas Pipeline Surveys, and
- Sand Hollow Permanent Study Plots.

5.2 Field Surveys

Desert tortoise surveys for the KSV Project were conducted by two Greystone-ARCADIS biologists between October 16 and October 18, 2006. Surveyor qualifications are provided in **Appendix B**.

The strip-transect method was used to sample distribution and relative abundance of tortoise sign throughout the KSV Project area. Transects were 1.5 miles long by 10 yards wide and were walked in an equilateral triangle 0.5 mile to a side. Prior to the field surveys, the project area was mapped in a GIS and uploaded to a Panasonic Toughbook (field grade laptop computer). The Toughbooks are equipped with an on-board Global Positioning System (GPS) accurate to within 10 meters. The GPS was then used in the field to navigate transects and mark observations.

Greystone-ARCADIS proposed to conduct 20 triangular strip transects on portions of the KSV proposed right-of-way and alternative. Transects were located along the entire right-of-way approximately 0.5 mile apart in alternating directions (**Figure 1**). Transects were not randomly located, and spacing resulted in an even distribution throughout the project area. On-site evaluation resulted in the elimination of one transect near the intersection of the proposed project right-of-way and the alternative right-of-way. Two transects (2 and 3) nearly coincided within the same habitat type; therefore, Transect 2 was excluded. Roads in the project area are lightly used, and tortoise likely cross them and occupy habitats immediately adjacent to disturbed areas.

Transects were surveyed for live or dead desert tortoise, and any tortoise sign including burrows, scat, tracks, and water scrapes. Observational data were collected for all tortoise presence and sign, and GPS points and photographs were taken. Observational data included a determination of its relevance (definite or possible) and its condition (good, deteriorated, fresh, fresh but not this year's, good but not active). Sex and size were noted for live and dead tortoise observations. Additionally, habitat notes, including dominant and co-dominant vegetation, percent cover, and topography, were recorded for each transect. Major communities were also photographed. Representative photos are provided in **Appendix C**.

6. Survey Results

In order to estimate tortoise densities from sign counts, the relationship between the numbers of sign observed and the estimated tortoise numbers was determined using the "total corrected sign" methodology (Berry and Nicholson 1984).

Transect data were standardized for all transects by determining the total corrected sign (CS) observed on each transect. Multiple sign produced by a single tortoise or obviously associated with a single tortoise were reduced to one sign. CS counts were regressed on total counts (TC). This resulted in the following regression equation:

$$CS = (1.2326 * TC + (-0.1162))$$

The correlation coefficient was 0.98.

The following equation was used to express tortoise density as number per square mile.

$$\text{Number per square mile} = 4\ [(CS - 1.2326)/-0.1162)]$$

Table 1 provides corrected sign counts and the correlated estimates for desert tortoise densities using the regression equation. It also provides these numbers per square mile.

6.1 Transect Data

Data from strip-transect surveys indicate that the estimated desert tortoise density in the KSV Project area range between 0 and 26 tortoise per square mile (**Table 2**). Tortoise observations were distributed relatively evenly along the right-of-way (**Figure 1**). Nearly all sign were inferred (burrows and water scrapes). One observation of scat and one observation of shell fragments were also noted. The highest densities occurred on Transect 0 (26 per square mile). Transect 0 was located on the alternative right-of-way closest to Highway 93. The habitat on Transect 0 was dominated by creosote and bursage, and the topography was generally flat with several washes dissecting the transect. Most of the sign were found in sandy washes. Transects 6, 7, and 19 had tortoise densities of 10 per square mile each. Transects 3, 4, and 5 had densities of 7 per square mile each. The remainder of transects had densities of 5 per square mile or less. No desert tortoise or sign were found in any of the burned areas along the KSV Project right-of-way (Transects 12 and 13).

6.2 Other Data Sources

No other desert tortoise data specific to the Kane Springs area are available. However, results of past strip-transect surveys in the nearby Lincoln County Land Act Groundwater Development and Right-of-Way project area show a low-density desert tortoise population. The Toquop FEIS also estimates low population densities for desert tortoise in the LCLA project area (BLM 2003). Strip transects walked by Karl (1980) in and adjacent to the project areas indicated that tortoise population densities were very low (less than 10 tortoises per square mile) (in BLM 2003). Belt transects walked in 1990 in the current right-of-way of the Kern River Gas Pipeline also recorded low sign counts with corresponding estimates of low densities of tortoises in the Toquop Wash area of the proposed LCLA project. Estimated densities along the Kern River Gas Pipeline were in the low range (10 to 45 tortoises per square mile) between mileposts 420 and 423, and in the very low range (zero to 10 tortoises per square mile) between mileposts 423 and 424 (BLM 2003).

The Sand Hollow permanent study plot is located approximately 5 to 6 miles east of the LCLA area. Two samples of this study plot indicated a low density of desert tortoise. The plot was sampled in 1989 and again in 1994 with estimates of 8 and 15 tortoises per square mile, respectively.

7. Summary

The KSV Project occurs almost entirely in desert tortoise habitat. As such, the USFWS recommended that surveys be conducted for the project. Greystone-ARCADIS biologists conducted strip-transects surveys in October, 2006. Results of the surveys showed that desert tortoise are distributed relatively evenly along the KSV project right-of-way. However, nearly all sign were inferred (burrows and water scrapes). Four observations of scat and one observation of shell fragments were also noted. No live tortoises were found. Calculated transect densities ranged from 0 per square mile to 26 per square mile. The highest densities were found in creosote bursage communities near Highway 93. No desert tortoise sign were observed in the burned areas.

Results from this survey supplement existing data. While no data were available for the Kane Springs area specifically, other survey results from nearby locations show low desert tortoise densities.

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Mojave Desert Tortoise Survey Report

Kane Springs Groundwater Development Project

TABLES

Table 1 Sign Counts and Estimates of Desert Tortoise Densities		
	Estimates of tortoise density	
Corrected Sign Count	**Regression equation**	**Number per square mile**
0	-0.12	0.38
1	1.12	3.62
2	2.35	6.87
3	3.58	10.11
4	4.81	13.36
5	6.05	16.60
6	7.28	19.85
7	8.51	23.09
8	9.74	26.34
9	10.98	29.58
10	12.21	32.83

Table 2 Desert Tortoise Survey Data for Kane Springs Project Area by Transect						
Transect Number	**Tortoise Sign Observed**	**Corrected Sign Counts**	**Number per Square Mile***	**Dominant Vegetation Species**	**Associate Vegetation Species**	**Topography**
0	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa*	Flat
	Scat					
	Burrow	1				
	Burrow	1				
	Burrow	1				
	Burrow	1				
	Burrow	1				
	Burrow	1				
	Scat	1				
	Total	**8**	**26**			
1	Burrow	1		*Larrea tridentata* *Ambrosia dumosa*		Rolling Hills
	Burrow	1				
	Scat					
	Burrow	1				
	Burrow	1				
	Total	**4**	**5**			
2	Transect Eliminated	NA**	**NA**	NA	NA	NA
3	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa*	Flat
	Burrow	1				
	Total	**2**	**7**			
4	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa*	Rolling Hills
	Burrow	1				
	Total	**2**	**7**			
5	Burrow	1		*Larrea tridentata*		Wash
	Burrow	1				
	Scat					

Table 2 Desert Tortoise Survey Data for Kane Springs Project Area by Transect						
Transect Number	**Tortoise Sign Observed**	**Corrected Sign Counts**	**Number per Square Mile***	**Dominant Vegetation Species**	**Associate Vegetation Species**	**Topography**
	Total	**2**	**7**			
6	Burrow	1		*Larrea tridentata*	*Yucca shidigera*	Wash
	Burrow	1				
	Water Scrape	1				
	Total	**3**	**10**			
7	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa* *Yucca shidigera*	Rolling Hills
	Burrow	1				
	Burrow	1				
	Total	**3**	**10**			
8	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa*	Flat
	Total	**1**	**4**			
9	Burrow	1				
	Total	1	**4**			
10	None	0	**0**	*Larrea tridentate* *Ephedra nevadensis*	*Krameria parvifolia* *Hilaria rigida*	Flat
11	None	0	**0**	*Larrea tridentata*	*Ambrosia dumosa* *Hilaria rigida*	Valley
12	None	0	**0**	*Burn*	*Burn*	Flat
13	None	0	**0**			
14	Water Scrape	1		*Larrea tridentata*	*Ephedra nevadensis* *Yucca schidigera*	Valley
	Total	**1**	**4**			
15	None	0		*Yucca shidigera* *Ambrosia dumosa*	*Larrea tridentata*	Rolling Hills

Table 2 Desert Tortoise Survey Data for Kane Springs Project Area by Transect						
Transect Number	**Tortoise Sign Observed**	**Corrected Sign Counts**	**Number per Square Mile***	**Dominant Vegetation Species**	**Associate Vegetation Species**	**Topography**
16	Burrow	1		*Larrea tridentata*	*Ephedra nevadensis*	Steep Slopes
	Total	**1**	**4**	*Ambrosia dumosa*	*Eriogonum inflatum*	
17	None	0		*Larrea tridentata*	*Ambrosia dumosa* *Ephedra nevadensis* *Yucca schidigeria*	Flat
18	None	0		*Ambrosia dumosa*		Flat
19	Burrow	1		*Larrea tridentata*	*Ambrosia dumosa* *Acacia greggii*	Flat
	Burrow					
	Scat	1				
	Burrow	1				
	Total	**3**	**10**			

FIGURES

Proposed Project ROW
Alternative ROW
Kane Springs Valley Road
Desert Tortoise Habitat
Desert Tortoise Designated Critical Habitat
Desert Tortoise Designated Critical Habitat - BLM Only
2005 Fire Boundary
LCCRD Act Utility Corridor
Desert Tortoise Survey Transect
Excluded - proximity to adjacent transect

Desert Tortoise Survey Results

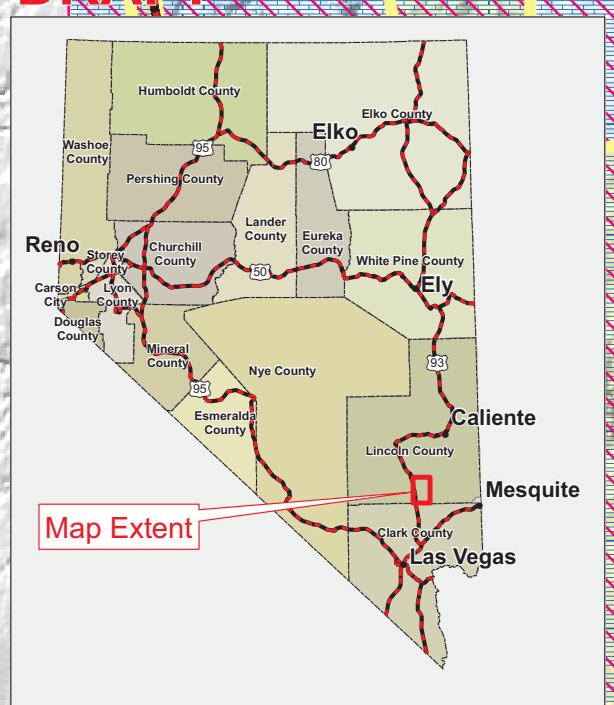
Dead
Burrow
Scat
Other

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

Kane Springs Road

93

DRAFT



0 0.5 1 1.5 2

Miles

N W E S

Kane Springs Valley Groundwater Development Project

Desert Tortoise Survey

Study Area: Lincoln County, Nevada

Date: 11.17.06	File: DesertTort_KaneSprings_11x17	Author: JAG

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ARCADIS

Appendix A

USFWS Approved Desert Tortoise Survey Proposal

DRAFT
Desert Tortoise Survey Proposal for the Kane Springs Groundwater Development and Utility Right-of-Way Project

Introduction

This memo serves as a proposal to conduct limited desert tortoise (*Gopherus agassizii*) surveys in support of the Environmental Impact Statement (EIS) and Biological Assessment (BA) that are being prepared for the Kane Springs Groundwater Development Project (KSV Project). The U.S. Fish and Wildlife Service (FWS) requested, but is not requiring, that surveys for the desert tortoise be conducted for this project (FWS 2006). This memo presents the study design proposed by Greystone-ARCADIS to conduct those surveys.

The project area is located within desert tortoise habitat and portions are within designated critical habitat (see attached maps). The project area occurs within occupied desert tortoise habitat.

Status, Habitat, and Threats

The desert tortoise is a federally listed threatened species (FWS 1990). It is completely terrestrial and typically occurs in habitats that include suitable substrates for digging burrows and nest sites or that provide other coversites, such as rock crevices for shelter. Throughout the Mojave Region, desert tortoises occur on flats and bajadas with soils ranging from sand to sandy-gravel, and they occur on rocky terrain and slopes (FWS 1994). Suitable habitats also include plant species that provide appropriate forage and cover. Vegetation is usually scattered shrubs and abundant inter-shrub space for growth of herbaceous plants. The most common plant associated with desert tortoise habitat is creosote bush. Desert tortoises are primarily herbivores, foraging on grasses, forbs, cacti, and the flowers of annual plants. Suitable habitat within the project area is shown on the attached map.

The typical life span of the desert tortoise is 30 to 100 years, with sexual maturity between 12 to 30 years (Woodbury and Hardy 1948). Females lay an average of 4.2 eggs per clutch inside the burrow and have an average of 1.9 clutches per year (Turner and Berry 1984). Desert tortoise variable reproductive success is positively correlated with environmental conditions (FWS 1994).

Activity patterns of the desert tortoise are closely tied to ambient temperatures and forage availability. Desert tortoises spend much of their lives in burrows, emerging to feed and mate during late winter and early spring. They remain active through the spring and portions of the summer through late fall. Their active season is typically defined as being from March 1 through October 31.

Threats to this species include direct and indirect human-caused mortality. Impacts such as destruction, degradation, and fragmentation of their habitat from urbanization, agricultural development, livestock grazing, mining, roads, vehicle-oriented recreational use, and losses from human take and disease have contributed to population declines (FWS 1994).

Roads can be both detrimental and beneficial to tortoise populations. Roads fragment tortoise habitats; however, tortoise will cross roads to access habitats on the other side. Tortoise are often killed while crossing roads. Large roads where high volumes of vehicles travel at high speeds pose the highest risk to tortoise. Smaller roads with less traffic and lower speeds pose a smaller risk. Tortoise are known to use roads occasionally to breed and will drink from them after large storm events (Burrows 2006).

Designated Critical Habitat

Critical habitat has been designated for the desert tortoise (FWS 1994). The designation of critical habitat is used to identify areas where federal agencies need to exercise special care to avoid damage to a species' habitat. These areas are considered to be essential to the long-term survival and recovery of a species. Critical habitat does not preclude all modification of habitat in the designated area.

On February 8, 1994, the FWS designated approximately 6.4 million acres of critical habitat for the Mojave population of the desert tortoise in portions of California, Nevada, Arizona, and Utah (59 FR 5820), which became effective on March 10, 1994. Critical habitat is designated by the FWS to identify the key biological and physical needs of the species and key areas for recovery, and focuses conservation actions on those areas.

Designated critical habitat includes 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 six recovery units (RUs), 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. Designated critical habitat within the project area is shown on the attached map.

Habitat Relating to the LCLA and KSV Projects

The project area occurs in Mojave desert scrub and is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*).

The proposed right-of-way for the KSV project traverses approximately 16.5 miles of suitable desert tortoise habitat of which approximately 13.5 miles are designated critical habitat. Of the 16.5 miles of suitable habitat, approximately 1.5 miles are within the area that burned in 2005. The entire corridor is directly adjacent to existing roads that support light traffic.

The alternative that follows the LCCRDA designated utility corridor to the west at the Coyote Springs Investments property traverses approximately 3 miles of suitable desert tortoise habitat of which 3 miles are designated critical habitat. Of the 17 miles of suitable habitat, approximately 1.5 miles are within the area that burned in 2005. The entire corridor is directly adjacent to existing roads that support light traffic.

The KSV map shows desert tortoise habitat and designated critical habitat in the project area.

Survey Methods

Three methods of data collection have typically been used to estimate tortoise population densities, including strip transects, belt transects, and permanent study plots. The strip transect method involves walking pre-determined transects that are typically 1.5 miles long and configured as an equilateral triangle. All observed tortoise sign is mapped and recorded. Sign includes scat, burrows, live tortoises, carcasses, shell fragments, eggshells, tracks, courtship rings, and drinking depressions. This sign count information is then used as a measure of relative abundance of tortoises in the study area. This method assumes that the frequency of observed tortoise sign is related to the abundance of tortoises in the surrounding area.

Another method that is commonly used to survey for desert tortoise on linear projects is the belt transect method. Rights-of-way for linear projects can be surveyed using parallel, 30-foot-wide belt transects. In areas where few or no desert tortoise surveys have been conducted, zone of influence transects can also be surveyed on both sides of the right-of-way at 100, 300, 600, 1,200, and 2,400 feet from the outer edge of the right-of-way. On belt transects, all tortoise sign (e.g., individuals, dens, burrows, scat, tracks, pellets, skeletal remains) are mapped and recorded.

Permanent study plots are sampled using a mark-recapture method and are typically sampled every 4 years and take up to 60 days to sample.

Existing Condition and Proposed Survey Methods

BLM provided data that illustrate the locations of strip transect plots near the project area (see attached map). Based on results of past strip transect surveys in the nearby Lincoln County Land Act Groundwater Development and Right-of-Way project area, the KSV project area likely supports a low-density desert tortoise population. The Toquop FEIS estimates low population densities for desert tortoise in the LCLA project area (BLM 2003). Strip transects walked by Karl (1980) in and adjacent to the project areas indicated

tortoise population densities were very low (less than 10 tortoises per square mile) (in BLM 2003). Belt transects walked in 1990 in the current right-of-way of the Kern River Gas Pipeline also recorded low sign counts with corresponding estimates of low densities of tortoises in the Toquop Wash area of the proposed LCLA project. Estimated densities along the Kern River Gas Pipeline were in the low range (10 to 45 tortoises per square mile) between mileposts 420 and 423, and in the very low range (zero to 10 tortoises per square mile) between mileposts 423 and 424 (BLM 2003).

The Sand Hollow permanent study plot is located approximately 5 to 6 miles east of the LCLA project area. Two samples of this study plot indicated a low density of desert tortoise. The plot was sampled in 1989 and again in 1994 with estimates of 8 and 15 tortoises per square mile, respectively. Based on all data collection efforts in the project area, an estimate of 11 tortoises per square mile is reasonable (BLM 2003).

Additionally, the BLM has received funding to conduct desert tortoise density surveys in the spring of 2007. This data should be available for incorporation into the EIS and BA.

The objective of this survey would be to estimate the relative abundance of tortoise because the existing density data is relatively old and FWS does not think it is current enough to use for this project. We propose to conduct triangle transect surveys to estimate tortoise density along the proposed right-of-way and alternative.

We propose to conduct 20 triangular transects on portions of the KSV proposed right-of-way and alternative (see attached map).

The project will be constructed as close to existing roads as possible and within disturbed ROW's where possible. However, the roads in the project area are lightly used and tortoise likely cross them and occupy habitats immediately adjacent to disturbed areas. Because of this, we are proposing to survey areas immediately adjacent to roads unless the FWS believes this would not provide beneficial data.

Fires in Mojave desert scrub degrade or eliminate habitat for desert tortoises. Because the 2005 fire burned a portion of desert tortoise habitat within the KSV project area, we assume that densities are severely depressed in the burned areas and there are not likely higher density pockets in these areas (FWS 2006). Conducting additional surveys in those areas may not contribute to the recovery of the species; however, we propose to conduct triangular transect surveys in these areas. If no tortoise sign is found along these transects, Greystone may determine that conducting surveys on all of the proposed transects in the burn area is not necessary.

We request that 1) FWS review the maps we have provided and provide long-term monitoring data for the plots that are near the proposed projects, and 2) FWS concur with our proposed survey method.

References

U.S. Bureau of Land Management (BLM). 2003. Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Final Environmental Impact Statement for the Toquop Energy Project. BLM Ely District, Ely, Nevada.

Burrows, M. 2006. Personal communication [*Aug 23* telephone conversation with P. Golden, Greystone-ARCADIS, Highlands Ranch, Colorado. *RE:* Impacts of roads on desert tortoise]. Tortoise Biologist, FWS, Las Vegas, Nevada.

U.S. Fish and Wildlife Service (FWS). 2006. Personal communication [*May 10* telephone conversation with P. Golden, Greystone-ARCADIS, Greenwood Village, Colorado. *RE:* Desert tortoise strategy for the LCLA and KSV Groundwater Development Projects]. Attendees included biologists Jeri Krueger and Michael Burrows with USFWS in Las Vegas, biologist Laurie Averill-Murray with USFWS in Reno, and biologist Steve Abele with the Eastern Nevada Landscape Coalition (acting BLM biologist).

FWS. 2003. Draft Biological Opinion and Request for Concurrence on Effect Determination for Listed Species Associated With the Proposed Toquop Energy Project. USFWS, Nevada Fish and Wildlife Office, Reno, Nevada. April 9, 2003.

FWS. 1994. *Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Mojave Population of the Desert Tortoise*. Federal Register 59:5820.

FWS. 1990. "Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise." Federal Register 55:12178.

Teal, K. 2006. Personal communication [*Aug 1* telephone conversation with P. Golden, Greystone-ARCADIS, Greenwood Village, Colorado. *RE:* Desert tortoise survey plots in the region of the LCLA and KSV Groundwater Development Projects]. Wildlife Biologist, BLM Caliente Field Office, Caliente, Nevada.

Turner, F. B., and K. H. Berry 1984. "Methods Used in Analyzing Desert Tortoise Populations." In: Berry, K. H. (ed.). *The Status of the Desert Tortoise in the United States*. Report to USDI Fish and Wildlife Service From the Desert Tortoise Council on Order No. 11310-0083-81.

Woodbury, A. M., and R. Hardy. 1948. "Studies of the Desert Tortoise, *Gopherus agassizii*." Ecological Monograph 18:145-200.

ARCADIS

Appendix B

Surveyor Qualifications

DESERT TORTOISE MONITOR AND BIOLOGIST RESPONSIBILITIES AND QUALIFICATIONS

DESERT TORTOISE MONITOR -- Approved by the Fish and Wildlife Service to monitor project activities within desert tortoise habitat, ensure proper implementation of protective measures, and record and report desert tortoise and sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with a biological opinion or permit, move desert tortoises from harm's way when desert tortoises enter project sites and place these animals in "safe areas" pre-selected by Authorized Biologists or maintain the desert tortoises in their immediate possession until an Authorized Biologist assumes care of the animal. Monitors assist Authorized Biologists during surveys and often serve as "apprentices" to acquire experience. Monitors are not authorized to conduct presence/absence or clearance surveys unless directly supervised by an Authorized Biologist; "directly supervised" means the Authorized Biologist is direct voice and sight contact with the Monitor.

AUTHORIZED BIOLOGIST – Approved by the Fish and Wildlife Service to conduct all activities described in the previous section for Desert Tortoise Monitors, and to locate desert tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with a biological opinion incidental take permit. Authorized Biologists must keep current with the latest information on U.S. Fish and Wildlife Service protocols and guidelines. An Authorized Biologist must have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and demonstrated substantial field experience and training to safely and successfully:

- handle and temporarily hold desert tortoises
- excavate burrows to locate desert tortoise or eggs
- relocate/translocate desert tortoises
- reconstruct desert tortoise burrows
- unearth and relocate desert tortoise eggs
- locate, identify, and record all forms of desert tortoise sign

GENERAL DESERT TORTOISE BIOLOGIST/MONITOR QUALIFICATIONS STATEMENT

This form should be used to provide your qualifications to agency officials if you intend to handle or survey desert tortoises during construction or other projects authorized under Sections 7 or 10 (HCPs) of the Endangered Species Act. If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required.

Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at http://www.fws.gov/forms/3-200-55.pdf. Supplemental information for the recovery permit application should be provided with the form, *Statement of Skills and Experience with Specialized Desert Tortoise Procedures,* which is available from a U.S. Fish and Wildlife Service Field Office.

1. Contact Information:

Name	**Patrick Golden**
Address	**630 Plaza Drive, Suite 100**
City, State, Zip Code	**Highlands Ranch, CO 81029**
Phone Number(s)	**(303) 471-3444**
Email Address	**pgolden@arcadis-us.com**

2. **Date of Statement:** 10/03/06

3. **States in which authorization is requested (check all that apply):**

☐ California ☒ Nevada ☐ Utah ☐ Arizona

4. **Please provide information on the project:**

USFWS BO or HCP Number	None (Draft EIS stage)	**Date: 10/03/06**
Project Name	Lincoln County Land Act Groundwater Development Project/Kane Springs Valley Groundwater Development Project	
Federal Agency	BLM	
Proponent or Contractor	Lincoln County Water District and Vidler (Proponents); ARCADIS (NEPA Contractor)	

5. Specify project and/or activities anticipated that require authorization (e.g. capture/release, weigh, measure, attach and remove telemetry devices and other hardware, etc.). Specifically reference the relevant document and page numbers with authorizing statements (e.g., BO, page 19, terms and conditions 6, 7, and 8):

We are conducting triangular transect surveys for both projects as proposed by ARCADIS in Desert Tortoise Survey Proposal KSV (09-25-06) and Desert Tortoise Survey Proposal LCLA (09-25-06) and approved by Laurie Averill-Murray, Jeri Krueger, and Michael Burrows on 09/26/06. We will be recording sign, tortoise, and habitat characteristics to estimate density along the proposed ROWs. I do not anticipate handling, capturing, weighing, measuring, etc. any live tortoises.

6. If you hold, or have held, any relevant state or federal wildlife permits, provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities

7. Education (provide up to three, listing most recent first):

Institution	Dates attended	Major/Minor	Degree received
1. University of Colorado	09/92 – 05/96	Environmental, Population, Organismic Biology	BA
2.			
3.			

8. Desert Tortoise Training. Include numbers of animals handled under the Experience section (No. 9 below).

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1. Chocolate Mountains/Field Survey	**05/25/00 - 06/09/00**	**Chocolate Mountains from Salton Sea (Niland) to Blythe**	**Cannot remember**
Blue Diamond/Field Survey	**07/09/01 – 07/13/01**	**Clark County, NV**	**None**
2. Blythe to Palm Springs/Field Survey I	**04/23/00 – 05/04/00**	**Blythe, CA to Palm Springs, CA**	**Alice Karl**
Blythe to Palm Springs/Field Survey II	**06/09/02 – 06/28/02**	**Blythe, CA to Palm Springs, CA**	**Alice Karl**
3. Big Sandy/Field Survey	**05/10/01 – 05/19/01**	**Wikiup, AZ Kingman, AZ**	**None**
Montezuma Power Plant Field Survey	**04/10/03 – 04/13/03**	**Maricopa County, AZ**	**None**
4. Desert Tortoise Council Field Trip	**03/18/01**	**Tucson, Arizona**	**Roy Averill-Murray**

9. Experience – Complete for each position held, attach additional sheets as necessary. Include only those positions relevant to the requested work with desert tortoises. Distinguish between Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g. if 100 tortoises were handled on a project and you handled 5 of those tortoises, include only those 5). List most recent experience first.

General Field Experience:

Project Name, Biological Opinion or Permit No. & Job Title	Dates (From/To)	Job Duties & Responsibilities/ Skills Used or Acquired
1. Montezuma Power Plant Field Survey	**04/10/03 – 04/13/03**	**Crew leader. Surveyed potential power plant site for presence/absence of Sonoran desert tortoise. (0 tortoises encountered). Surveyed low quality Sonoran desert tortoise habitat.**
2. Blythe to Palm Springs II	**06/09/02 – 06/28/02**	**Crew member under Alice Karl. Surveyed proposed transmission line ROW and Zone of Influence for Mojave desert tortoise. (4 tortoises encountered). Implemented survey techniques, DT habitats on bajadas, desert flats, mountains, and washes, ID scat, tracks, burrows, sex, and carapices.**

Blue Diamond	**07/09/01 – 07/13/01**	**Crew leader. Surveyed proposed pipeline ROW for Mojave desert tortoise, gila monster, and chuckwalla. (3 tortoises encountered). Implemented survey techniques in flat, bajada, and mountainous habitats. ID scat, tracks, burrows, and carapices.**
Big Sandy	**05/10/01 – 05/19/01**	**Crew leader. Surveyed proposed pipeline ROW for Sonoran desert tortoise. (3 tortoises encountered). Implemented survey techniques in suitable Sonoran desert habitats.**
Desert Tortoise Council Field Trip	**03/18/01**	**Conference attendee. Went to long-term study plot north of Tucson to look at burrows and Sonoran desert tortoise. (5 tortoises encountered). Learned about long-term survey design and differences between Sonoran and Mojave populations.**
3. Chocolate Mountains/Field Survey	**05/25/00 - 06/09/00**	**Crew leader. Surveyed proposed transmission ROW and ZOI for Mojave desert tortoise. (3 tortoises encountered). Implemented survey techniques in flat, bajada, and mountainous habitats. ID scat, tracks, burrows, and carapices.**
4. Blythe to Palm Springs/Field Survey I	**04/23/00 – 05/04/00**	**Crew member under Alice Karl. Surveyed proposed transmission line ROW and Zone of Influence for Mojave desert tortoise. (2 tortoises encountered). Learned survey techniques, DT habitats on bajadas, desert flats, mountains, and washes, ID scat, tracks, burrows, sex, and carapices.**

Specific Desert Tortoise Field Experience:

a. Number of hours or 8-hour days (specify) conducting desert tortoise-related activities (referenced above): 69 field days; approximately 800 hours surveyed.

b. Number of miles/kilometers walked conducting survey transects: Approximately 500 miles walked.

c. Number of wild, free-ranging desert tortoises you encountered. <100 mm carapace length: 3

≥100 mm carapace length: 17

d. Number of wild, free-ranging desert tortoises you personally handled (circle one for each size category).

<100 mm:	**Zero**	**≤10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**≤10**	**10-50**	**50-100**	**100-200**	**>200**

e. Number of captive desert tortoises you personally handled (circle one for each size category).

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

f. Number of transmitters or other devices (specify) you personally attached to or removed from wild, free-ranging desert tortoises (circle one for each size category).

Attached:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Removed:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

g. Number of transmitters or other devices (specify) you personally attached to or removed from other relevant species or captive desert tortoises (circle one for each size category).

Specify species or if captive desert tortoises:

Attached:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Removed:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

h. Number of blood samples that you personally collected from wild, free-ranging desert tortoises (circle one for each size category).

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Specific Desert Tortoise Field Experience Continued:

i. Number of blood samples that you personally collected from other relevant species or captive desert tortoises (circle one for each size category).
Specify species or if captive desert tortoises:
Specify type of procedure:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

j. Experience conducting other procedures on wild, free-ranging desert tortoises (circle one for each size category).
Specify type of procedure:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

k. Experience conducting other procedures on other relevant species or captive desert tortoises (circle one for each size category).
Specify species or if captive desert tortoises:
Specify type of procedure:

<100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm:	**Zero**	**<10**	**10-50**	**50-100**	**100-200**	**>200**

l. Prior authorizations for desert tortoise under Biological Opinions or Habitat Conservation Plans (specify number, date, project name and location). Do not reiterate "general field experience" information:
None.

10. Provide at least 3 references that can verify your field qualifications and skills:

Name	Employer/Position	Address/Location	Phone Number	Email
1. Steve Faulk	**ARCADIS/Senior Biologist**	**630 Plaza Drive, Suite 100 Highlands Ranch, CO 80129**	**303-471-3415**	**sfaulk@arcadis-us.com**
2. Paul Franks	**Self Employed/Desert Biologist**	**Moab, Utah**	**Cannot locate**	**Cannot locate**
3. Alice Karl	**Alice Karl, Ph.D. and Associates/Principal**	**P.O. Box 74006 Davis, CA 95617**	**530-666-9567**	

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch.47, Sec. 1001.

Signed: Patti F. Tolle **Date:** 10/4/06

DESERT TORTOISE MONITOR AND BIOLOGIST RESPONSIBILITIES AND QUALIFICATIONS

DESERT TORTOISE MONITOR -- Approved by the Fish and Wildlife Service to monitor project activities within desert tortoise habitat, ensure proper implementation of protective measures, and record and report desert tortoise and sign observations in accordance with approved protocol, report incidents of noncompliance in accordance with a biological opinion or permit, move desert tortoises from harm's way when desert tortoises enter project sites and place these animals in "safe areas" pre-selected by Authorized Biologists or maintain the desert tortoises in their immediate possession until an Authorized Biologist assumes care of the animal. Monitors assist Authorized Biologists during surveys and often serve as "apprentices" to acquire experience. Monitors are not authorized to conduct presence/absence or clearance surveys unless directly supervised by an Authorized Biologist; "directly supervised" means the Authorized Biologist is direct voice and sight contact with the Monitor.

AUTHORIZED BIOLOGIST – Approved by the Fish and Wildlife Service to conduct all activities described in the previous section for Desert Tortoise Monitors, and to locate desert tortoises and their sign (i.e., conduct presence/absence and clearance surveys) and ensure that the effects of the project on the desert tortoise and its habitat are minimized in accordance with a biological opinion incidental take permit. Authorized Biologists must keep current with the latest information on U.S. Fish and Wildlife Service protocols and guidelines. An Authorized Biologist must have thorough and current knowledge of desert tortoise behavior, natural history, and ecology, physiology, and demonstrated substantial field experience and training to safely and successfully:

- handle and temporarily hold desert tortoises
- excavate burrows to locate desert tortoise or eggs
- relocate/translocate desert tortoises
- reconstruct desert tortoise burrows
- unearth and relocate desert tortoise eggs
- locate, identify, and record all forms of desert tortoise sign

GENERAL DESERT TORTOISE BIOLOGIST/MONITOR QUALIFICATIONS STATEMENT

This form should be used to provide your qualifications to agency officials if you intend to handle or survey desert tortoises during construction or other projects authorized under Sections 7 or 10 (HCPs) of the Endangered Species Act. If you seek approval to attach/remove/insert any devices or equipment to/into desert tortoises, withdraw blood, or conduct other procedures on desert tortoises, a recovery permit or similar authorization may be required.

Application for a recovery permit requires completion of Form 3-200-55, which can be downloaded at http://www.fws.gov/forms/3-200-55.pdf. Supplemental information for the recovery permit application should be provided with the form, *Statement of Skills and Experience with Specialized Desert Tortoise Procedures,* which is available from a U.S. Fish and Wildlife Service Field Office.

1. Contact Information:

Name	**Selina Koler**
Address	**2960 Center Green Court, Suite 202**
City, State, Zip Code	**Boulder, CO 80301**
Phone Number(s)	**(303) 544-0043 ext. 309**
Email Address	**skoler@arcadis-us.com**

2. Date of Statement: 11/28/06

3. States in which authorization is requested (check all that apply):

☐ California ☐ Nevada ☐ Utah ☐ Arizona

4. Please provide information on the project:

USFWS BO or HCP Number	None (Draft EIS stage)	**Date: 10/03/06**
Project Name	Lincoln County Land Act Groundwater Development Project/Kane Springs Valley Groundwater Development Project	
Federal Agency	BLM	
Proponent or Contractor	Lincoln County Water District and Vidler (Proponents); ARCADIS (NEPA Contractor)	

5. Specify project and/or activities anticipated that require authorization (e.g. capture/release, weigh, measure, attach and remove telemetry devices and other hardware, etc.). Specifically reference the relevant document and page numbers with authorizing statements (e.g., BO, page 19, terms and conditions 6, 7, and 8):

We are conducting triangular transect surveys for both projects as proposed by ARCADIS in Desert Tortoise Survey Proposal KSV (09-25-06) and Desert Tortoise Survey Proposal LCLA (09-25-06) and approved by Laurie Averill-Murray, Jeri Krueger, and Michael Burrows on 09/26/06. We will be recording sign, tortoise, and habitat characteristics to estimate density along the proposed ROWs. I do not anticipate handling, capturing, weighing, measuring, etc. any live tortoises.

6. If you hold, or have held, any relevant state or federal wildlife permits, provide the following:

Species	Dates	State (specify) or Federal Permit Number	Authorized Activities

7. Education (provide up to three, listing most recent first):

Institution	Dates attended	Major/Minor	Degree received
1. Colorado State University	2001-2003	Restoration Ecology	M.S.
2. Colorado State University	1997-2001	Natural Resources Managment	B.S.
3.			

8. Desert Tortoise Training. Include numbers of animals handled under the Experience section (No. 9 below).

Name/Type of Training	Dates (From/To)	Location	Instructor/Sponsor
1 Palm Springs/Field Survey	**04/25/05 – 04/28/05**	**Palm Springs, CA**	**Art Davenport**
2. Blythe to Palm Springs/Field Survey	**05/16/05- 05/23/05**	**Blythe to Palm Springs, CA**	**Art Davenport**

9. Experience – Complete for each position held, attach additional sheets as necessary. Include only those positions relevant to the requested work with desert tortoises. Distinguish between Mojave desert tortoise and other experience. Include only your experience, not information for the project you worked on (e.g. if 100 tortoises were handled on a project and you handled 5 of those tortoises, include only those 5). List most recent experience first.

General Field Experience:

Project Name, Biological Opinion or Permit No. & Job Title	Dates (From/To)	Job Duties & Responsibilities/ Skills Used or Acquired
1. Palm Springs/Field Survey	**04/25/05 – 04/28/05**	**Crew member under Art Davenport. Surveyed proposed transmission line ROW and Zone of Influence for Mojave desert tortoise. (1 tortoise encountered). Learned survey techniques, DT habitats on bajadas, desert flats, mountains, and washes, ID scat, tracks, burrows, sex, and carapices.**
2. Blythe to Palm Springs/Field Survey	**05/16/05 – 05/23/05**	**Crew member under Art Davenport. Surveyed proposed transmission line ROW and Zone of Influence for Mojave desert tortoise. (12 tortoises encountered). Implemented survey techniques, DT habitats on bajadas, desert flats, mountains, and washes, ID scat, tracks, burrows, sex, and carapices.**

Specific Desert Tortoise Field Experience:

a. Number of hours or 8-hour days (specify) conducting desert tortoise-related activities (referenced above): 20 field days; approximately 160 hours surveyed.

b. Number of miles/kilometers walked conducting survey transects: Approximately 250 miles walked.

c. Number of wild, free-ranging desert tortoises you encountered. <100 mm carapace length: 0

≥100 mm carapace length: 13

d. Number of wild, free-ranging desert tortoises you personally handled (circle one for each size category).

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

e. Number of captive desert tortoises you personally handled (circle one for each size category).

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

f. Number of transmitters or other devices (specify) you personally attached to or removed from wild, free-ranging desert tortoises (circle one for each size category).

Attached:

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Removed:

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

g. Number of transmitters or other devices (specify) you personally attached to or removed from other relevant species or captive desert tortoises (circle one for each size category).

Specify species or if captive desert tortoises:

Attached:

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Removed:

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

h. Number of blood samples that you personally collected from wild, free-ranging desert tortoises (circle one for each size category).

<100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: Zero	**<10**	**10-50**	**50-100**	**100-200**	**>200**

Specific Desert Tortoise Field Experience Continued:

i. Number of blood samples that you personally collected from <u>other relevant species</u> or <u>captive</u> desert tortoises (circle one for each size category).

<u>Specify species or if captive desert tortoises:</u>

<u>Specify type of procedure:</u>

<100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**

j. Experience conducting other procedures on <u>wild, free-ranging</u> desert tortoises (circle one for each size category).

<u>Specify type of procedure:</u>

<100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**

k. Experience conducting other procedures on <u>other relevant species</u> or <u>captive</u> desert tortoises (circle one for each size category).

<u>Specify species or if captive desert tortoises:</u>

<u>Specify type of procedure:</u>

<100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**
≥100 mm: <u>Zero</u>	**<10**	**10-50**	**50-100**	**100-200**	**>200**

l. Prior authorizations for desert tortoise under Biological Opinions or Habitat Conservation Plans (specify number, date, project name and location). <u>Do not reiterate "general field experience" information:</u>

None.

10. Provide at least 3 references that can verify your field qualifications and skills:

Name	Employer/Position	Address/Location	Phone Number	Email
1. Pat Golden	**ARCADIS/Senior Biologist**	**630 Plaza Drive, Suite 100 Highlands Ranch, CO 80129**	**303-471-3444**	**pgolden@arcadis-us.com**
2. Matt Kizlinski	**ARCADIS/Senior Biologist**	**630 Plaza Drive, Suite 100 Highlands Ranch, CO 80129**	**303-471-3442**	**mkizlinski@arcadis-us.com**
3. Art Davenport	**Davenport Biological Services/Desert Tortoise Biologist**	**P.O. Box 1692 Barstow, CA 92312**	**619-729-4242**	**artdavenport@aol.com**

I certify that the information submitted in this form is complete and accurate to the best of my knowledge and belief. I understand that any false statement herein may subject me to the criminal penalties of 18 U.S.C. Ch.47, Sec. 1001.

Signed: _____ Date:______11/28/06_____

ARCADIS

Appendix C

Photos

Photo 1. Creosote-Bursage Community dominant in the KSV Project area.

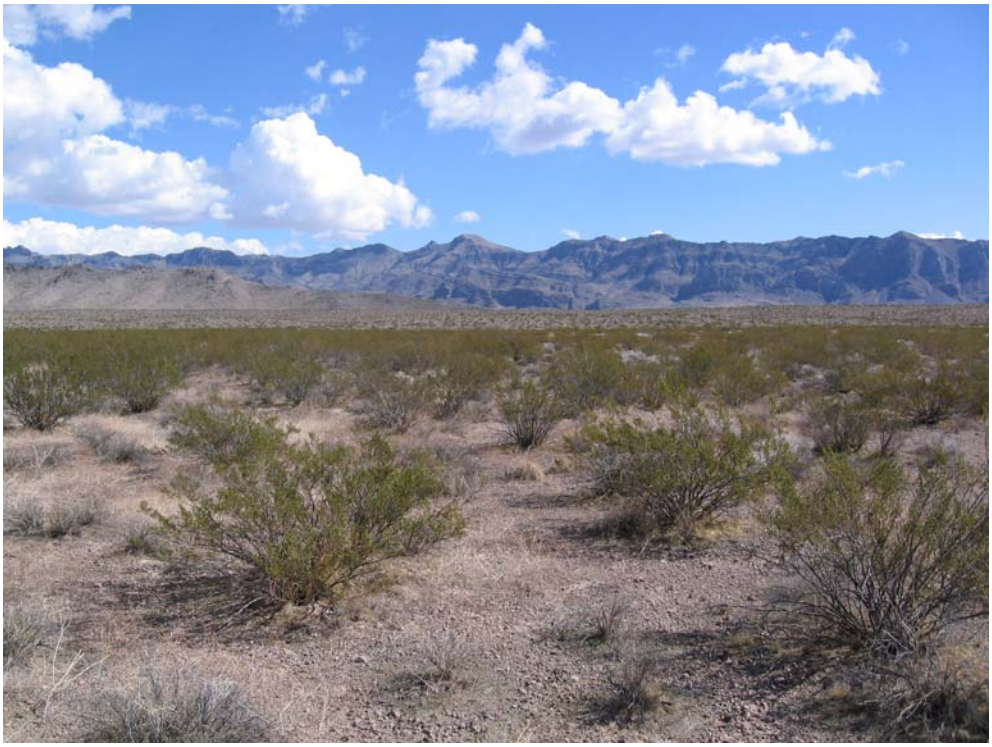

Photo 2. Creosote-Bursage Community with large Yucca component, generally found on the eastern half of the KSV Project right-of-way.

Photo 3. Burned area in the KSV Project right-of-way where no desert tortoise or their sign were found.

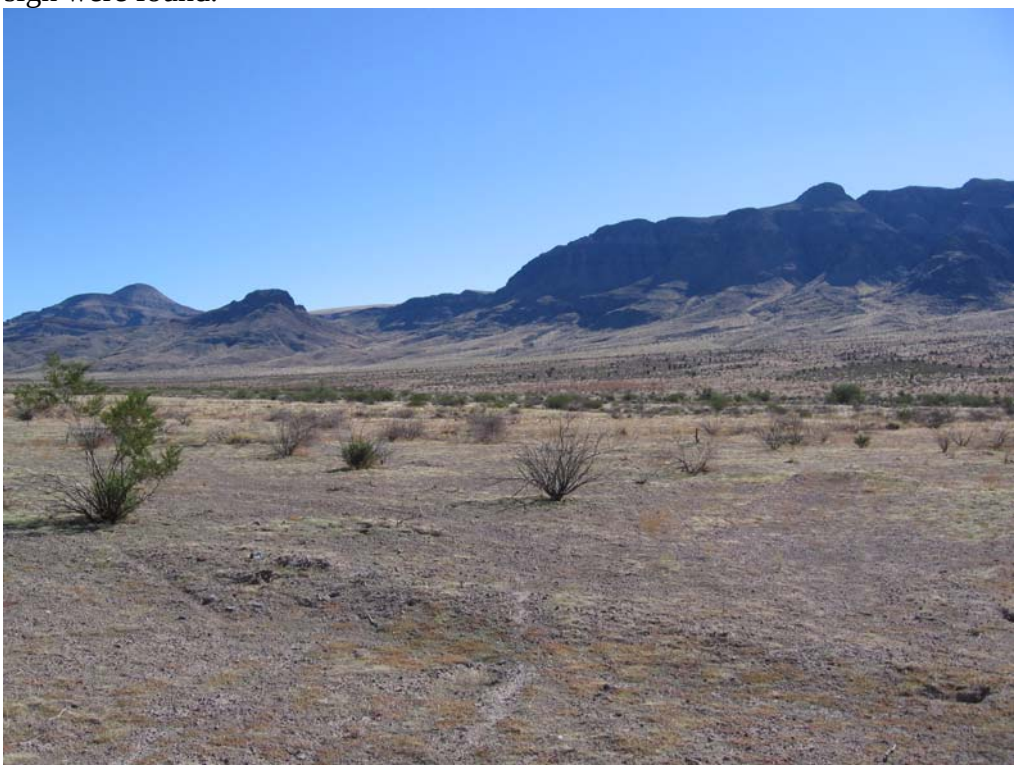

Photo 4. Kane Springs Valley Road which follows the KSV right-of-way.

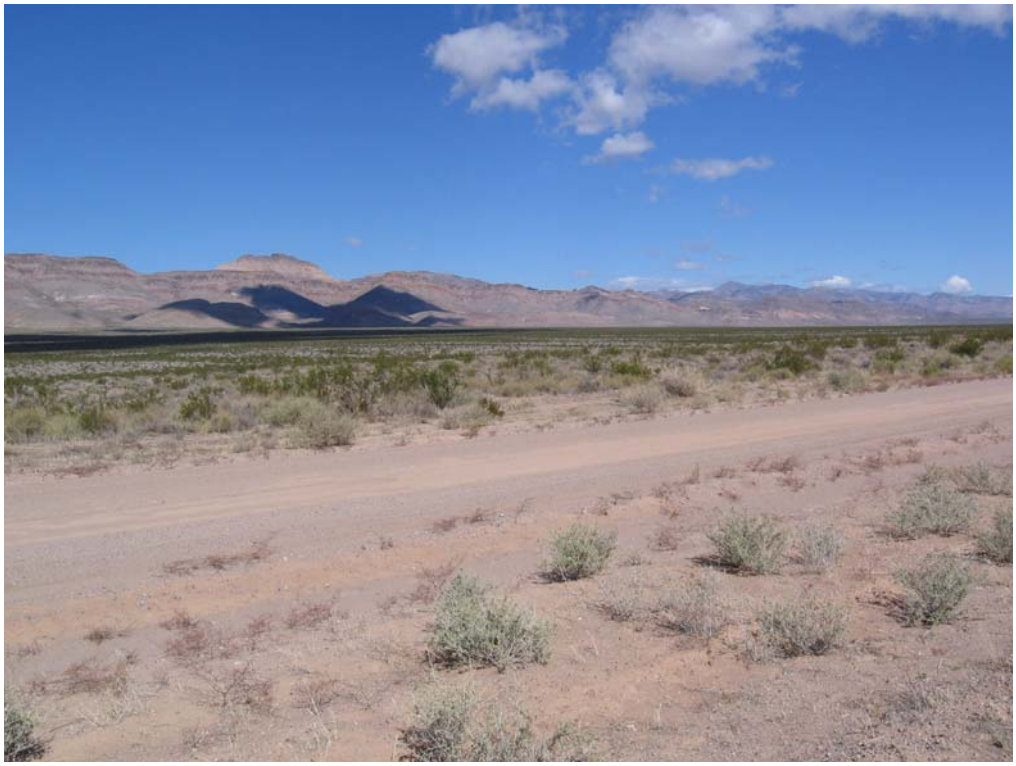

Photo 5. Representative burrow found in the KSV Project area.

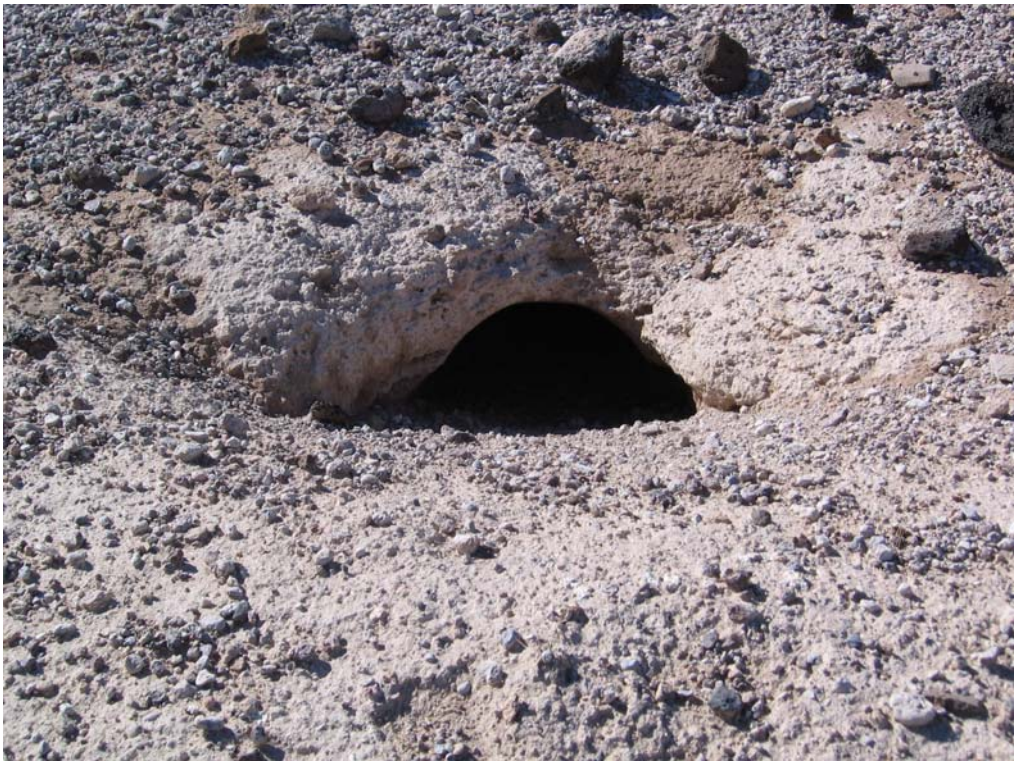

Photo 6. Desert tortoise shell fragments found in the KSV Project area.