Terrestrial Wildlife Survey
Spring 2011

Searchlight Wind Project
Clark County, NV

Prepared for

Duke Energy

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TETRA TECH EC, INC.

SNEI

Biological and Botanical Services

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1.0 INTRODUCTION

Duke Energy is proposing to develop the Searchlight Wind Energy Facility (Project) that includes the erection of 87 to 96 wind turbines with supporting infrastructure, transmission lines, distribution lines, and collection lines within the proposed Project area in southern Clark County, Nevada. The proposed Project area includes locales within the rural outskirts to the north, east, and south of the town of Searchlight. The overall Project boundary encompasses approximately 9,500 acres of Bureau of Land Management (BLM) managed lands. Approximately 3,612 acres of this area was surveyed based on the potential for ground disturbance and development. Most of the site and the surrounding vicinity is currently undeveloped, and/or is managed by the BLM, with some of the site containing off-road vehicle trails.

Tetra Tech EC, Inc. contracted Southern Nevada Environmental, Inc. (SNEI) to perform baseline presence/absence surveys for Gila monster (*Heloderma suspectum*), common chuckwalla (*Sauromalus ater*) and desert bighorn sheep (*Ovis canadensis nelsoni)* within the Project site. The survey objectives were to determine the presence or absence of the aforementioned species within Project area and to assess the distribution of species present, when possible, within the site.

1.1 SITE DESCRIPTION

The Project site is located in the Mojave Desert along a bajada, or alluvial fan, which extends north, south, and east from the town of Searchlight, Nevada. Topographic dimensions of the survey area vary greatly with flats, washes, valleys, and steep mountains/hills. Soil largely consists of sandy, stony loam with abundant rock/boulder deposition.

Vegetation communities observed within the survey area were categorized into three main groups: creosote scrub, black brush scrub, and Joshua tree woodland. The most abundant vegetative communities in the survey area are creosote scrub and black brush scrub. Additionally, areas of Joshua tree woodland are present in the northern portion of the project.

1.2 SPECIES PROFILES

1.2.1 Banded Gila Monster (*Heloderma suspectum cinctum*)

The Gila monster is the largest native lizard in North America with a length of up to 61 cm and weight of up to 1.4 kg. The banded Gila monster *(Heloderma suspectum cinctum*), one of two subspecies, is found primarily in the Mojave Desert. Habitat preferences include washes, sandy areas, rocky crevices, and creosote scrub brush lands.

Activity patterns of the Gila monster tend to be temperature dependent. The Gila monster is largely crepuscular, although it may become active after dark or following a rainfall. Adapted to the arid desert biotope, the Gila monster minimizes water and caloric loss through inactivity and a semi-fossorial lifestyle. *Heloderma suspectum cinctum* spends up to 95 percent of its life underground or in crevices. Although pre-constructed animal

burrows or rocky crevices are preferred, Gila monsters will excavate their own burrows. The most active period for Gila monsters is from April to June. Gila monsters will actively pursue mates during this time with animals sometimes roaming up to 1 kilometer per day (Cooper and Arnett 1995). During this period, males may become territorial and wrestle for the right to procreate. Female Gila monsters will lay between 4 and 12 eggs in moist substrate such as sandy arroyos during July or August. The eggs will then overwinter and hatch out in May of the following year (Jennings and Hayes 1994). Gila monsters become inactive at 9-15 degrees Celsius, usually go into hibernacula during October and awaken in March or April.

The Gila monster forages mostly in the prime activity period of April through June. Energy storage in Gila monsters is efficient, and only three to four feedings are needed in a year. The food items most often consumed are bird eggs with bird hatchlings, small reptiles, and mammals also being taken. Live prey is subdued by powerful jaws but often not envenomated (Beck et al. 1990). The drinking of water is not needed due to efficient stores of water in the tail.

1.2.2 Common Chuckwalla (*Sauromalus ater*)

The common chuckwalla inhabits the southwestern United States, occurring in the Mojave and Sonoran deserts with distribution in the southern areas of Utah and Nevada, western Arizona, northern Mexico, and eastern and Baja regions of California. Habitat preferences include lava flows, rocky outcrops, rocky washes, and large rocky slopes with an elevation up to 1,800 meters (6,000 feet). The vegetative communities associated with common chuckwalla habitat tend to be the cat's claw (*Acacia greggi*), scrublands of creosote bush (*Larrea tridentata*), black brush (*Coleogyne ramosissima*), and saltbush (*Atriplex canescens*).

The common chuckwalla generally basks until its body temperature reaches 38-40 degrees Celsius before becoming active. If the basking temperature exceeds tolerance, common chuckwallas will utilize rock crevices or, in extreme heat, estivation (Johnson et al. 1965). The common chuckwalla brumates during the coldest months of the year and emerges during February. Mating occurs from May to June with 5-16 eggs being laid from July to August in sandy, well-drained soils. The common chuckwalla exhibits a low fecundity with females laying only one clutch of eggs every two to three years depending on environmental conditions (Johnson et al. 1965).

Common chuckwallas feed on a range of plant material and occasionally insects. The most common types of vegetation consumed are flowers and leaves of perennial vegetation (creosote flowers). Annual plants/flowers representing a lesser portion of the diet (Shaw 1939, Stebbins 1954, Berry 1974). Common chuckwallas obtain necessary water through plant material consumed with no free-water drinking needed.

1.2.3 Desert Bighorn Sheep (*Ovis canadensis Nelsoni*):

The desert bighorn sheep is a distinct subspecies of *Ovis canadensis* with a home range encompassing portions of Nevada, Arizona, California, and west Texas into Northern Mexico. *Ovis canadensis nelsoni* is generally found on steep, mountainous rocky slopes, although the habitat suitability and preference changes with the season depending on

available forage. Escape terrain, terrain that encompasses slopes steeper than 60 percent, is an essential component of desert bighorn sheep habitat and used for escape from predators as well as for raising lambs. Females have a high fidelity to habitat with escape terrain while males may travel in unsuitable habitat inclusive of inter-mountain movements. During the summer months desert bighorn sheep are found in montane environments but are restricted to areas near water due to extreme heat. In winter, an altitudinal migration may occur to lower canyon or valley areas to escape weather conditions. These environmental conditions may keep desert bighorn sheep's home range within a 32-kilometer radius (Welles and Welles 1961). Vegetative communities associated with desert bighorn sheep vary greatly and include but are not limited to desert riparian, brittlebrush, and desert scrub (Deforge 1980, Monson and Sumner 1980, Wehausen 1980).

The breeding season for desert bighorn sheep may extend all year but usually peaks in August-September. After a 5.5- to 6-month gestation period, a ewe will give birth to one lamb or, on occasion, twins. Lambing season for this species usually happens between January and April although lambs may be born any time of year depending on environmental conditions. The lambs will grow to reach sexual maturity at around 2.5 years of age. The bodyweight of adult desert bighorn sheep ranges from 52-91 kg for ewes, and 119-127 kg for rams.

The diet of desert bighorn sheep varies with the season. Ruminant digesters, desert bighorn sheep may subsist on nutrient-poor browse (e.g., dried grass) but prefer green succulent forbs and grasses. Green succulent vegetation provides the desert bighorn with enough water to avoid drinking in winter months. The heat of summer makes it necessary for desert bighorn sheep to drink water approximately every three days (Wilson 1968).

2.0 METHODS

To determine the presence of the target species, we conducted pre-construction presence/absence surveys between April 3 and May 16, 2011. The surveys included belt transect-oriented searches for all sign indicating presence of Gila monster, chuckwalla, and desert bighorn sheep.

To account for ground disturbing activities, a four hundred foot-wide survey corridor was created around the proposed center line of turbine strings, roads, collector lines, and transmission lines and utilized for the both a pre-construction desert tortoise presence/absence survey and a terrestrial wildlife survey. Other project features such as the O&M building, substation, and lay-down area were buffered by 200 feet from the outer edge and added to the survey corridor. Interior of islands created by turbine strings and road layouts were also included in the surveyor corridor (Figure 1). The survey corridor is found exclusively within the Project boundary and represents the areas of potential development at the time of this report. Two teams of 3 biologists each conducted searches along transects spaced 10-meters apart within the interior of the survey corridor. Biologists walked transects, visually covering 5 meters per biologist to either side of the transect, looking for Gila monsters, chuckwallas, and desert bighorn sheep and/or any other sign of presence (e.g., scat or carcasses). Additional belt transects

were surveyed at 200, 400, and 600 feet around the perimeter of the survey corridor (exterior transects) for signs of the same target species. Each belt transect was completed with one SNEI biologist walking the center line of the transect, visually searching 5 meters to each side of the center line. Biologists used Garmin GPS units while walking the transect to insure accuracy of coverage. All data were recorded with a Trimble Geo XH 2008 Global Positioning System; signs of target species were documented using a digital camera (Appendix B).

Biologists recorded observations of target species or sign noting the specific habitat for each observation. When a species' preferred habitat was encountered, it was thoroughly searched. For example, tortoise burrows, mammal holes and caliche dens were checked for Gila monsters while checking for desert tortoise. Similarly, rocky outcrops and lava flows were inspected for chuckwalla and sign. Large rocky hills and mountains were observed for desert bighorn sheep. Game trails were also observed for bighorn sheep sign. Observations of target species made outside of the survey corridor and external belt transects were recorded by approximating distance and direction from the surveyor's position. Observations made outside of the survey time were recorded as incidental.
We calculated density for each species based on the number of sign observed (live and other) and the total acres covered by the survey corridor and exterior belt transects (survey acres). Because bighorn sheep could be detected outside of the survey corridor and, the acres observed for bighorn sheep could not be calculated. Thus, we calucated calculated the number of sheep observed divided by the total survey hours to determine the number of sheep /hour to provide a standardized metric.

Additionally, because desert bighorn sheep have a larger home range than either of the other two species involved in the study and are more likely to move through the project area, we delineated suitable habitat for this species within the Project area. Using desktop analysis, suitable habitat was identified utilizing GAP land cover data and topographic relief within the project area and vicinity. GAP data selected for included areas of North American Warm Desert Bedrock Cliff and Outcrop. Polygons of suitable habitat were further refined by identifying locations with slopes greater than a 60 percent grade suitable for escape terrain.

3.0 RESULTS

For each target species, with the exception of the banded Gila monster, both live individuals and signs were observed within the survey corridor and/or within the exterior belt transects. Twenty live chuckwallas and 54 pieces of chuckwalla scat were documented during the survey (Figure 2). Biologists documented one observation of 4 desert bighorn sheep, split between two groups, and one piece of unidentified ungulate scat (presumably desert bighorn sheep) was observed during the survey (Figure 3). No banded Gila monsters were observed directly or indirectly during this survey. Location data for all observations can be found in Appendix A.

The surveyor corridor and exterior belt transects covered a total of 4,370.8 acres. The total field effort for the concurrent desert tortoise and terrestrial wildlife surveys to cover the acreage occurred over a total of 1,564 survey hours. The density of live

common chuckwalla within the surveyed area was 0.005 chuckwalla per acre and the density of chuckwalla sign was 0.012 chuckwalla sign per acre. The density of desert bighorn sheep sign was 0.0002 (Table 1). Four live individuals of desert bighorn sheep were observed outside the survey corridor and exterior belt transects. To contextualize relative abundance for this species, we divided the number sheep by the number of survey hours. Live desert bighorn sheep were detected at a frequency of 0.003 individuals per survey hour.

Table 1. Species Density within the Searchlight Survey Corridor And Exterior Belt Transects.

Detection type	Number of sign	Density (sign/acre)
Live common chuckwalla	20	0.005
Common chuckwalla scat	54	0.012
Desert bighorn sheep scat	1	<0.001

Six non-contiguous polygons of desert bighorn sheep were identified within and extending out of the Project area. Polygons of suitable habitat ranged in size from 233 to 3382 acres, with 6041 acres of suitable habitat acreage occurring within and extending outside of the Project boundary (Figure 3). Of the 6041 acres of suitable habitat, 416 acres fell within the survey corridor with 112 miles (135.75 acres) of belt transects surveyed within suitable habitat.

4.0 DISCUSSION

Two of the three target species were observed during the terrestrial wildlife survey with low density. The common chuckwalla was the most frequently detected target species within the survey corridor and exterior belt transects. A high proportion of live chuckwallas and chuckwalla scat were concentrated in the northwest section of the project area. This area includes lava flows, rocky outcrops, rocky washes, and large rocky slopes – the preferred habitat of the chuckwalla. Additionally, a smaller proportion of chuckwalla were documented on rocky outcrops in the middle and southern end of the project area (Figure 2). Little current published data exists on chuckwalla abundance throughout its range. Older studies, however, suggest that the chuckwalla has achieved densities as high as 3-6 individuals per acre within preferred habitat (Johnson 1965, Barry 1974). The Project falls within the core of the chuckwalla range, suggesting that calculated densities for this area are low.

Desert bighorn sheep was the second target species observed during the survey. A group of desert bighorn sheep were observed in the south-central portion of the project area towards the western edge. This area was delineated as suitable bighorn sheep habitat and is characterized by steep, rocky slopes with slope grades of greater than 60%. Six polygons of suitable habitat exist within and on the periphery of the Project area with each polygon separated by areas of low topographical relief. Given that the habitat requirement of desert bighorn sheep are patchy on the landscape, desert bighorn sheep demonstrate a patchy distribution within their range (Leslie and Douglas 1979). Such distribution is likely to be mirrored within the Searchlight project area and be further limited by the amount of escape terrain available. Additionally, desert bighorn sheep scat is very hard to distinguish from mule deer scat (Steve Holl, pers com). Based on mule

deer range and a lack of mule deer sightings, however; the scat detected, although not confirmed, is presumed to be that of desert bighorn sheep. Both the in the Newberry and south Eldorado mountain ranges support low-density herds of desert bighorn sheep (NDOW 2010), suggestive of a low density for this species within the area surrounding the Project.

Finally, although the preferred habitat of the banded Gila monster exists within the survey corridor and the exterior belt transects, no sign of Gila monster was observed. The Gila monster is rarely observed relative to other species, and given the difficulty of detection (NDOW 2007), though likely rare, absence cannot be concluded. Overall, few detections of targeted species occurred despite a focused survey.

5.0 REFERENCES

Beck, D.D. 1990. Ecology and behavior of Gila monster in southwestern Utah. Journal of Herpetology 24: 54-68.

Berry, K.H. 1974. The ecology and social behavior of the chuckwalla, *Sauromalus obesus Baird*. Univ. Calif. Pub. Zool. 101:1-60.

Biotics Database. 2005. Utah Division of Wildlife Resources, NatureServe, and the Network of Natural Heritage Programs and Conservation Data Centers.

Cooper, W.E., Jr., and I. Arnett. 1995. Strike-induced chemosensory searching in the Gila monster. Copeia 1995 (I): 89-96.

DeForge, J. R. 1980. Population biology of desert bighorn sheep in the San Gabriel Mountains of California. Desert Bighorn Counc. Trans. 24:29-32.

Jennings, M.R., and M.P. Hayes. 1994. Amphibian and reptiles species of special concern in California. Final report submitted to the Dept. Fish and Game Inland Fisheries Division under contract 8023. 255pp.

Johnson, C.R. 1965. An ecological study of the chuckwalla, *Sauromalus obesus Baird*, in the western Mojave Desert. Am. Midl. Nat. 73: 1-29.

Leslie, D.M. and C.L. Douglas. 1979. Desert bighorn sheep of the River Mountains, Nevada.

Monson, G., and L. Sumner, eds. 1980. The desert bighorn: its life history, ecology, and management. Univ. Arizona Press, Tucson. 370pp.

Nevada Department of Wildlife (NDOW). 2010. 2009-2010 Big Game Status Report. Accessed at http://www.ndow.org/about/pubs/reports/10_bg_status.pdf, June 29, 2011.

Nevada Department of Wildlife (NDOW). 2007. Gila Monster Status, Identification and Reporting Protocol for Observation. 3pp.

Shaw, C.E. 1939. Food habits of the chuckwalla, *Sauromalus obesus*. Herpetologica 1:153.

Southern Nevada Environmental, Inc (SNEI). 2011. Desert Tortoise Inventory Survey of the Proposed Duke Energy Searchlight Wind Farm. Report prepared for Tetra Tech, EC.

Stebbens, R.C. 1954. Amphibians and reptiles of western North America. McGraw-Hill New York. 536pp.

Welles, R. E., and F. B. Welles. 1961. The bighorn of Death Valley. USDI, Natl. Park Serv., Fauna Ser. No. 6. 242pp.

Wehausen, J. D. 1980. Sierra Nevada bighorn sheep: history and population ecology. Ph.D. Diss. Univ. Michigan, Ann Arbor. 240pp.

Wilson, L.O. 1968. The distribution, ecology and management of the desert bighorn of southeastern Utah. Utah Division of Wildlife, Salt Lake City, Utah, 68(5):220 pp.

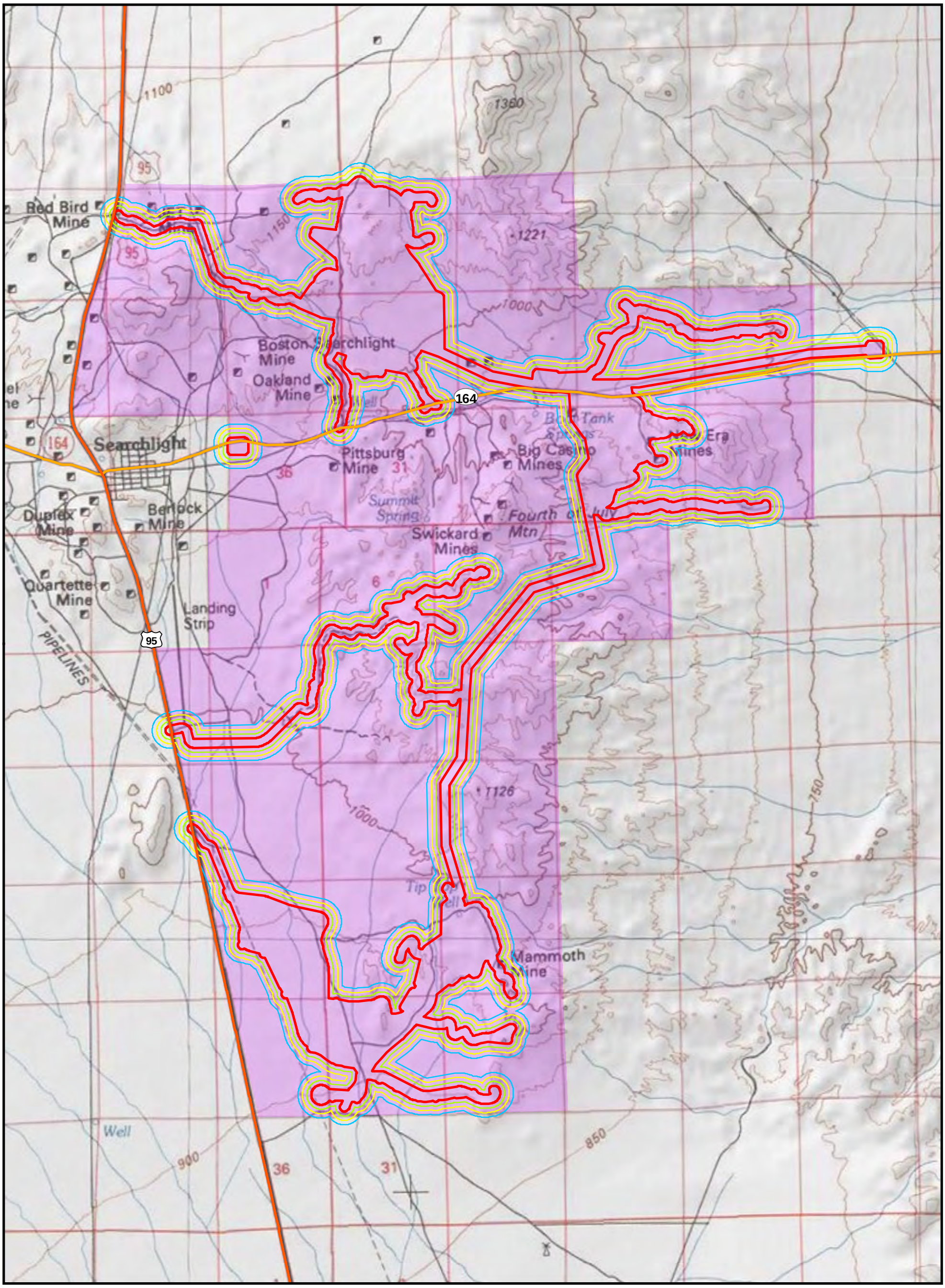

Figure 1

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Searchlight

Terrestrial Wildlife Survey Corridor

Clark County, Nevada
June 24, 2011

Project boundary (3-29-2011)
Federal highway
State highway
Survey Boundary
Exterior Belt Transects
200 feet
400 feet
600 feet

1:50,000
NAD 1983 UTM 11

Kilometers
0 1 2

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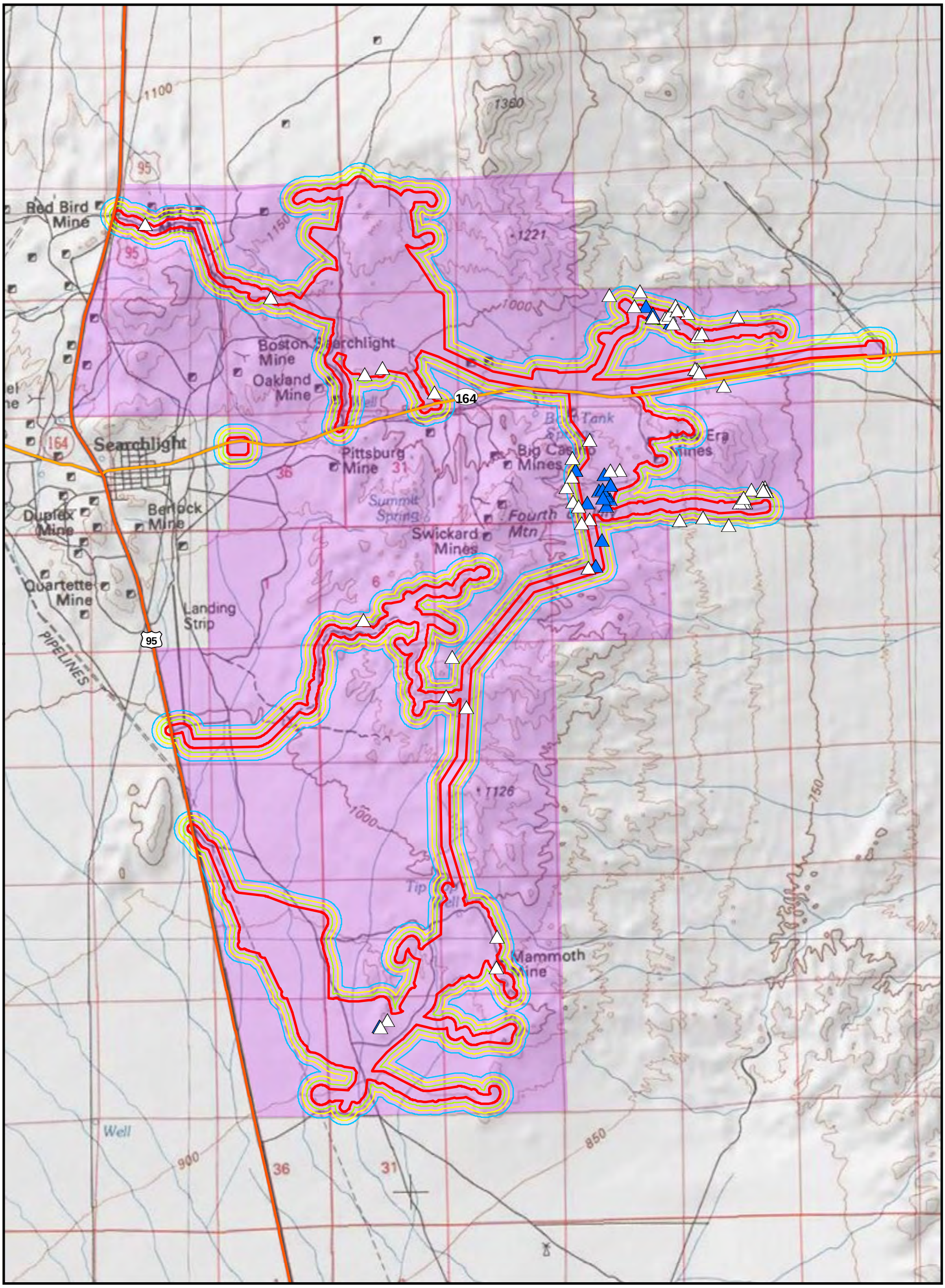

Figure 2

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Searchlight

Chuckwalla Observations (Live and Sign)

Clark County, Nevada
June 24, 2011

Live Chuckwalla
Chuckwalla scat
Project boundary (3-29-2011)
Federal highway
State highway

Survey Boundary
Exterior Belt Transects
200 feet
400 feet
600 feet

1:50,000
NAD 1983 UTM 11

Kilometers
0 1 2

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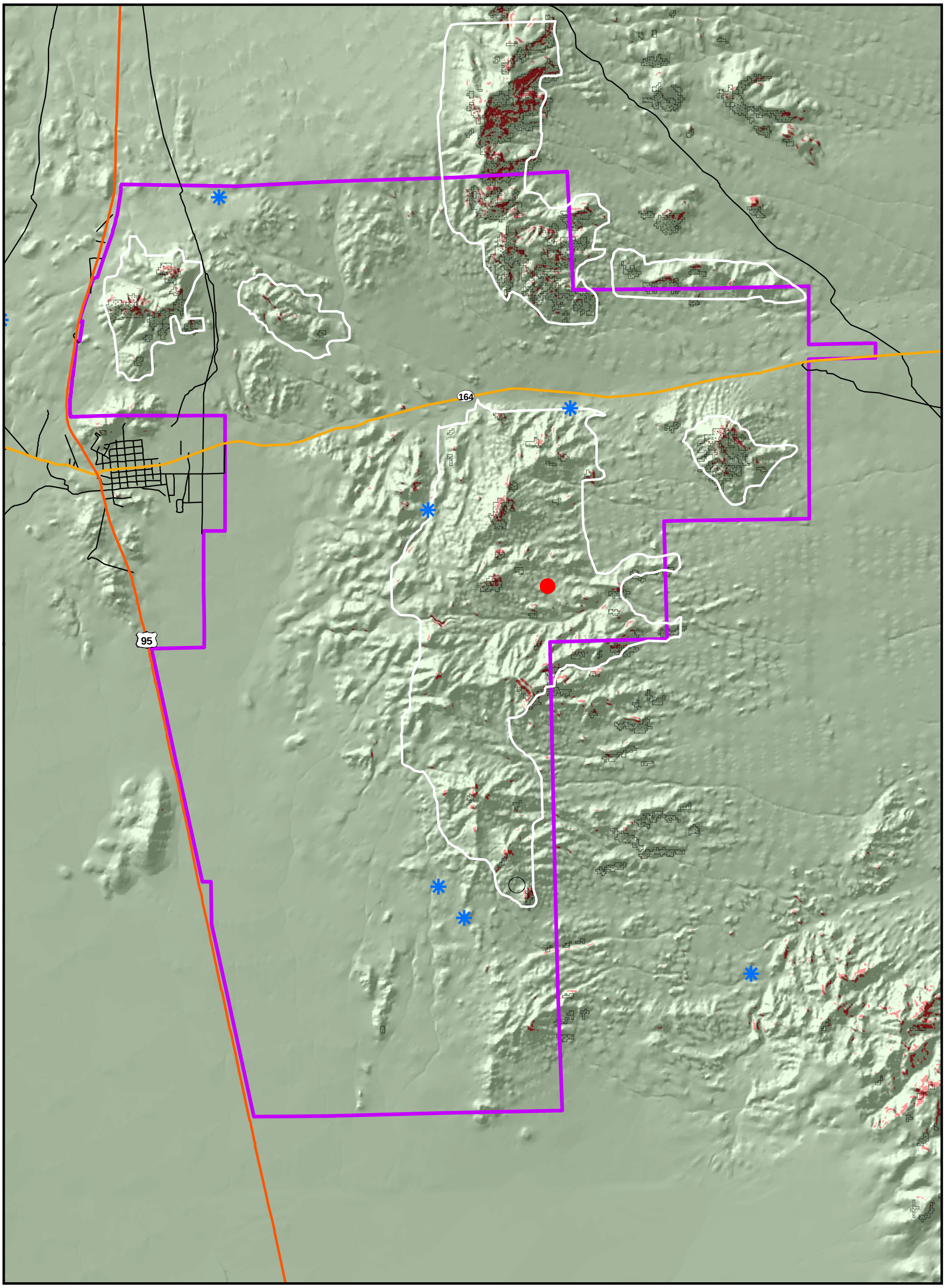

Figure 3

Searchlight

Bighorn Sheep Habitat and Sightings

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Clark County, NV
July 19, 2011

Bighorn Sheep Observation
Potential Bighorn Sheep Scat
Spring
Desert Bighorn Sheep Habitat
Project Boundary

Percent Slope
0 - 60
> 60
North American Warm Desert Bedrock Cliff and Outcrop

Federal Highway
State Highway
Local Road

0 1 2 3 4
Miles

N
1:50,000 NAD 1983 UTM 11

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Appendix A: Species Sign Tables

Live Desert Bighorn Sheep		
Waypoint	**Easting**	**Northing**
	694916	3925097

Potential Desert Bighorn Sheep Scat		
Waypoint	**Easting**	**Northing**
BHSS01	694954	3925123

Live Chuckwalla			
Waypoint	**Easting**	**Northing**	**Comment**
C01	692544	3918975	N/A
C02	695531	3925333	N/A
C03	695679	3926163	N/A
C04	695571	3926372	N/A
C05	695414	3926206	N/A
C06	695732	3926447	N/A
C07	695732	3926451	N/A
C08	695723	3926259	N/A
C09	695652	3926592	N/A
C10	695674	3926307	N/A
C11	695624	3926378	N/A
C12	695634	3926275	N/A
C13	696323	3928761	Wedged in rock
C14	696563	3928694	Wedged in rock
C15	696229	3928910	Wedged in rock
C16	695732	3926447	N/A
C17	696323	3928816	N/A
C18Z	695250	3926650	N/A
C19Z	695249	3926650	N/A
C20Z	695613	3925692	N/A

Chuckwalla Scat			
Waypoint	**Easting**	**Northing**	**Comment**
CS01	695448	3925974	N/A
CS02	695429	3925303	N/A
CS03	696486	3928750	N/A
CS04	696939	3928504	N/A
CS05	696993	3928538	N/A
CS06	696547	3928792	N/A
CS07	696061	3928915	N/A
CS08	692649	3919062	N/A
CS09	694157	3919788	N/A
CS10	693467	3923525	N/A
CS11	693743	3923376	N/A
CS12	694168	3920206	N/A
CS13	692338	3927978	N/A
CS14	692582	3928055	N/A
CS15	695865	3926656	N/A
CS16	695732	3926641	N/A
CS17	689312	3930051	N/A
CS18	691044	3929032	N/A
CS19	696926	3928044	N/A
CS20	696899	3928049	N/A
CS21	696965	3927996	3 pieces
CS22	696320	3928759	Fresh
CS23	696595	3928676	N/A
CS24	697596	3926201	N/A
CS25	697574	3926207	N/A
CS26	697524	3926206	N/A
CS27	695444	3927065	N/A
CS28	692557	3918955	N/A
CS29Z	697370	3925888	N/A
CS30Z	697870	3926415	Numerous scat
CS31Z	697834	3926407	Numerous scat
CS32Z	697680	3926386	Numerous scat
CS33Z	695214	3926817	Numerous scat

Waypoint	Easting	Northing	Comment
CS34Z	695123	3926413	Numerous scat
CS35Z	693549	3924073	Numerous scat
CS36Z	697301	3927812	30 pieces
CS37Z	695722	3929070	10 pieces
CS38Z	696142	3929116	1 piece
CS39Z	696692	3925962	N/A
CS40Z	697010	3925989	N/A
CS41Z	697889	3926357	N/A
CS42Z	697851	3926360	N/A
CS43Z	697842	3926362	N/A
CS44Z	695221	3926213	N/A
CS45Z	696629	3928918	N/A
CS46Z	697484	3928774	N/A
CS47Z	696799	3928822	N/A
CS48Z	693303	3927720	N/A
CS49Z	692321	3924577	N/A
CS50Z	697569	3926264	N/A
CS51Z	695205	3926558	Fresh
CS52Z	695293	3926141	Fresh
CS53Z	695339	3925915	N/A
CS54Z	696660	3928852	N/A

Appendix B: Photographs

Photo 1. High elevation rocky area.

Photo 2. Low elevation flat area.

Photo 3. Bighorn sheep spotted outside of survey area.

Photo 4. Second group of bighorn sheep spotted outside of survey area.

Photo 5. Potential desert bighorn sheep scat documented within survey area.

Photo 6. Chuckwalla habitat.

Photo 7. Chuckwalla encountered during survey.

Photo 8. Chuckwalla in a rocky crevice.

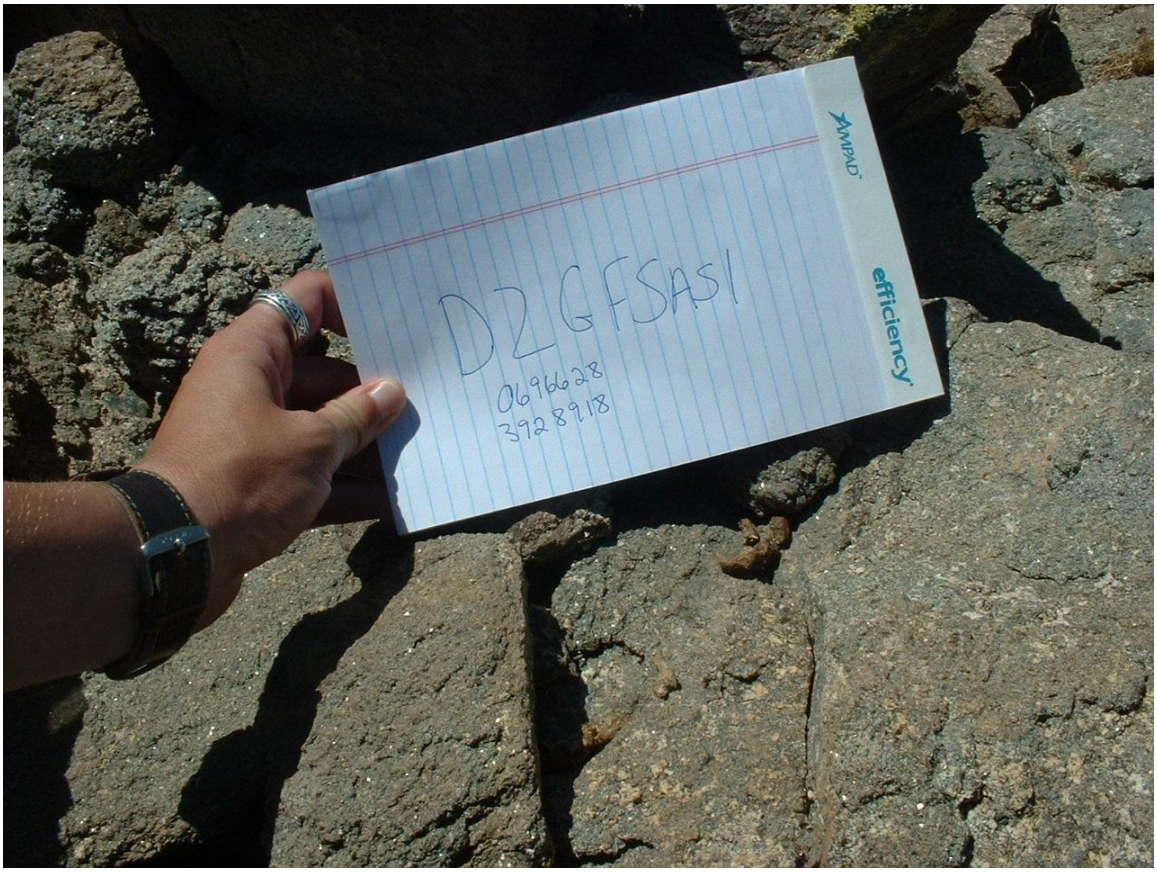

Photo 9. Chuckwalla scat.