

Mohave Ground Squirrel Survey for the
Antelope Valley Commerce Center Project, Palmdale, Los Angeles County,
California

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September 28, 2022	

Table of Contents

<u>Section</u>	<u>Page</u>
1. Introduction.....	1
2. Site Description.....	4
3. Methods	4
4. Results.....	7
5. Discussion	11
6. References.....	12

List of Figures

<u>Figures</u>	<u>Page</u>
Figure 1. Project site on topographic map.	2
Figure 2. Project site on aerial photo	3
Figure 3. Plant communities.	5
Figure 4. Locations of grids and camera stations	8
Figure 5. 1994 aerial photo of project site	9
Figure 6. 1994 aerial photo of project site with disturbed areas outlined.	10

List of Tables

<u>Table</u>	<u>Page</u>
Table 1. UTM coordinates of four grids.....	6
Table 2. Dates of MGS surveys.....	7
Table 3. Small mammal captures.....	11

Appendices

1. Site photographs
2. Weather summary
3. Fauna
4. MGS Survey and Trapping Forms

1. INTRODUCTION

The Antelope Valley Commercial Center project site is in Palmdale in Los Angeles County, located between Sierra Highway and the Palmdale Regional Airport. The proposed project is for an industrial business park. This report provides the results of focused surveys for the State-threatened Mohave ground squirrel (MGS, *Xerospermophilus mohavensis*) carried out in 2022 on the project site. Figures 1 and 2 show the study area on the USGS Lancaster East 7.5' topographic map (T6N, R12W Sections 1, 2) and on an aerial photo, respectively. The UTM coordinates of the approximate center of the project site are 11S 397521, 3833910. Site photos are found in Appendix 1.

Background on the Mojave Ground Squirrel

The MGS is a small ground squirrel (approximately 9 inches long) that inhabits the Mojave Desert, in parts of Inyo, Kern, Los Angeles and San Bernardino counties. The historical range of the MGS covered approximately 5 million acres from Palmdale in the south to Owens Lake in the north, and from the eastern edge of the Sierra Nevada to the Mojave River Valley (Gustafson 1993, Leitner 2008).

MGS occur in a range of open desert habitats, most commonly in creosote scrub but also in Joshua tree woodland, desert saltbush scrub, desert sink scrub, desert greasewood scrub, and shadscale scrub (Gustafson, 1993). MGS typically occur in areas with open vegetative cover and small bushes (< 0.6 meter [2 feet] in height) spaced approximately 6 to 9 meters (20 to 30 feet) apart. MGS consume leaves, forbs, shrubs, and grasses of several species and genera, including creosote (*Larrea tridentata*), winter fat (*Krascheninnikovia lanata*), spiny hop-sage (*Grayia spinosa*), saltbush (*Atriplex* spp.), golden linanthus (*Linanthus aureus*), Mediterranean grass (*Schismus arabicus*), box thorn (*Lycium* spp.), and several other plant species (Best 1995). Winter fat, spiny hop-sage, and saltbush are thought to make up approximately 60% of the species' shrub diet, indicating that these are important food sources when forbs are unavailable. It has been suggested that habitats where winter fat and hop-sage are absent may be suboptimal for MGS (Desert Managers MGS Working Group, no date).

MGS dig burrows in sandy and gravelly soils on flat to moderately sloping terrain. The burrows are used to avoid predators and high temperatures, and for aestivating during winter months. MGS are active only during the spring-summer months and spend most of the year (approximately seven months) below ground.

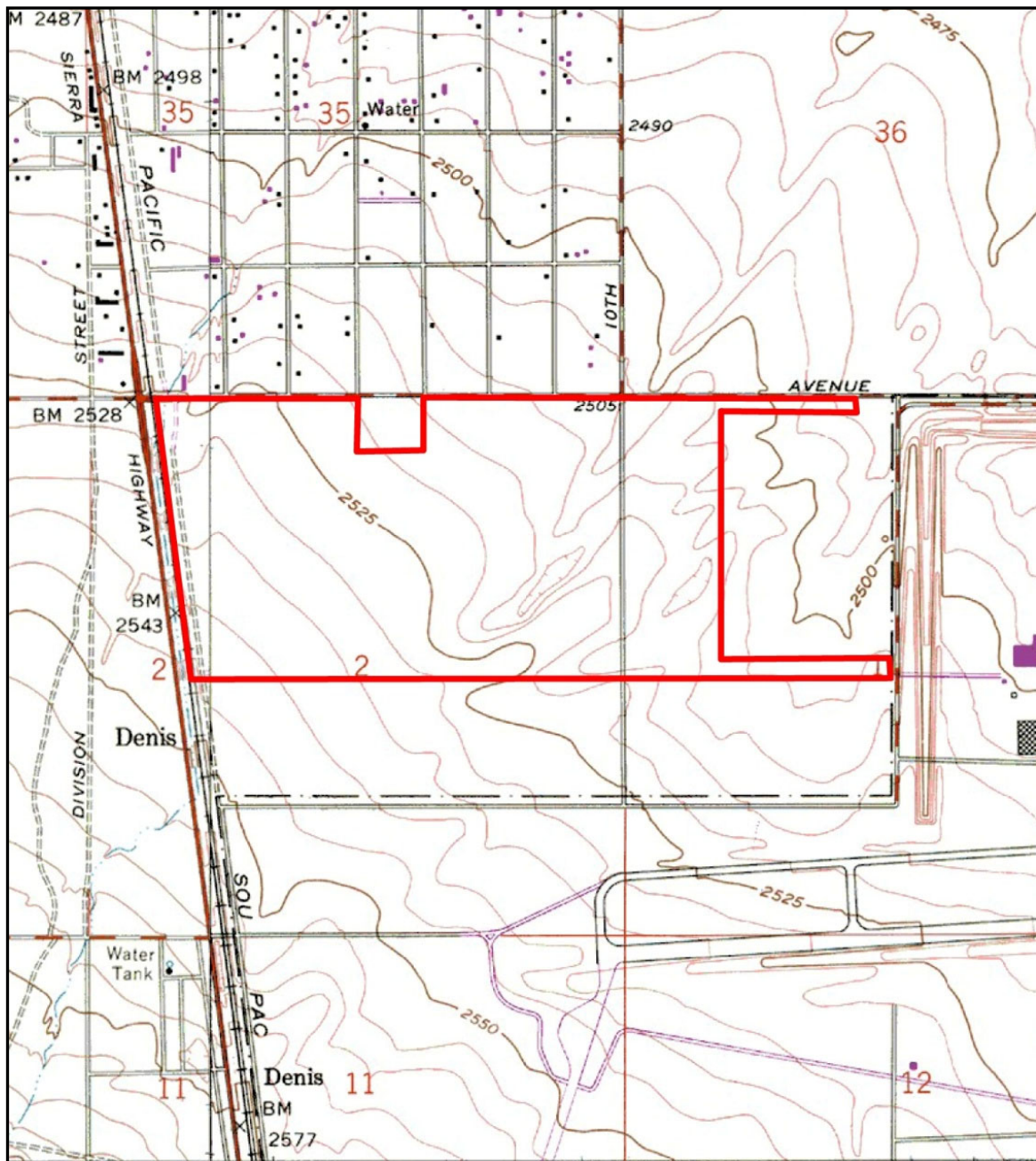


Figure 1. Project site on topographic map.

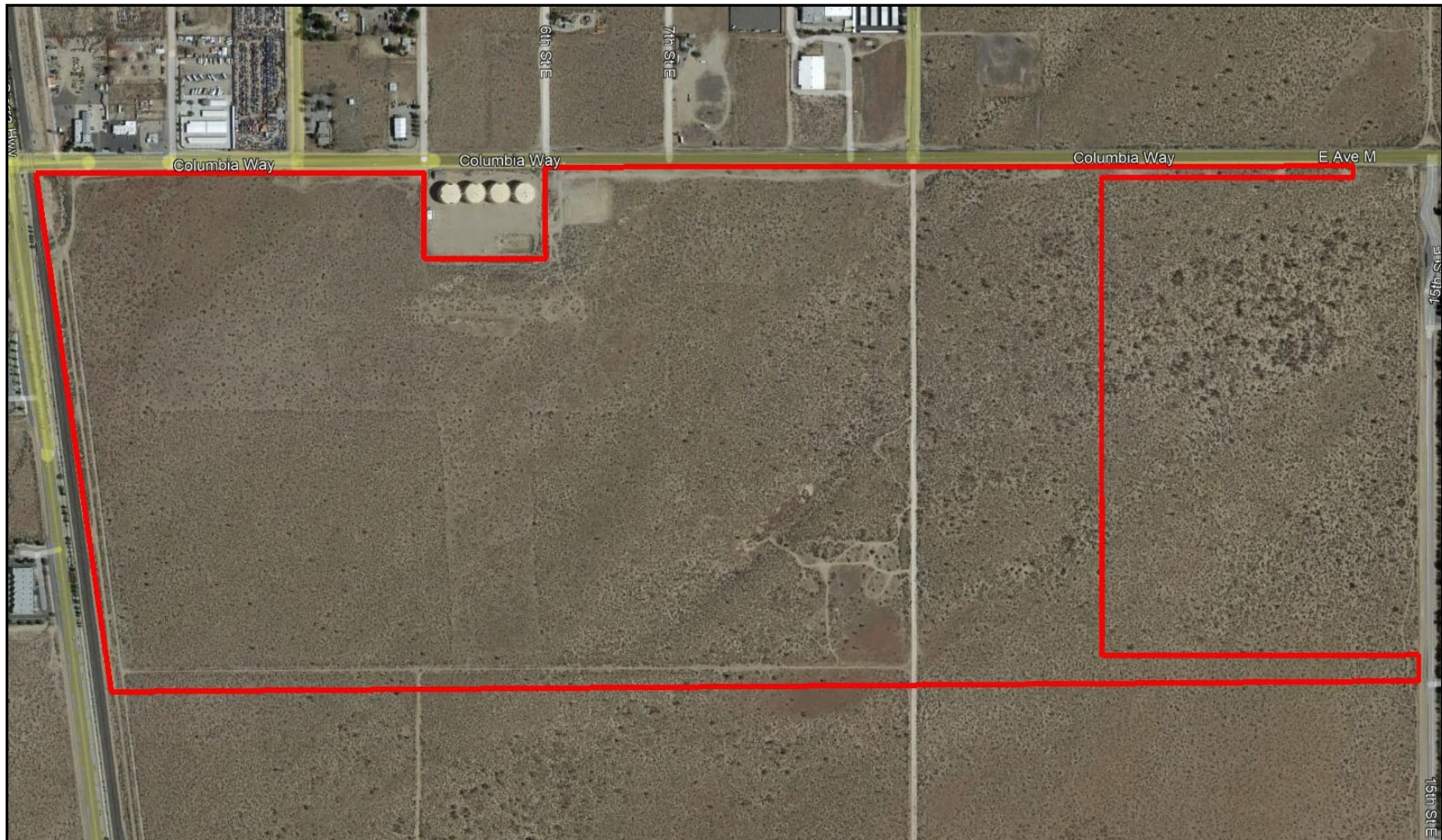


Figure 2. Project site on an aerial photo

2. SITE DESCRIPTION

The project site is located at the suburban edge of Palmdale. The project site ranges in elevation from approximately 2,445 to 2,510 feet above mean sea level and slopes slightly to the southwest (0.9 percent). The soils on the project site are predominantly Cajon loamy sands (77 percent) and Adelanto sandy loams (23 percent) (NRCS, 2022).

The plant communities on the project site are as follows:

Disturbed. There are several small areas of disturbed land cover with little to no vegetation, other than ruderal species such as rabbitbrush (*Ericameria nauseosa*).

Rabbit rubberbrush scrub (*Ericameria nauseosa* Shrubland Alliance). Common plants in this community include rubber rabbitbrush, cheesebush (*Ambrosia salsola*), Anderson's boxthorn (*Lycium andersonii*), and Mormon tea (*Ephedra nevadensis*). Common annuals include bristly fiddleneck (*Amsinckia tessellata*), redstem filaree (*Erodium cicutarium*), and dove weed (*Croton setiger*).

Joshua tree woodland (*Yucca brevifolia* Woodland Alliance). Joshua trees (*Yucca brevifolia*) occur in varying densities across the project site, but the woodland is most developed in the eastern part. Common shrubs in this community include Cooper's boxthorn (*Lycium cooperi*), rubber rabbitbrush, Mormon tea, creosote bush (*Larrea tridentata*), silver cholla (*Cylindropuntia echinocarpa*), fourwing saltbush (*Atriplex canescens*), spiny hop-sage, winter fat, and California matchweed (*Gutierrezia californica*). Common annuals include Mojave sand-verbena (*Abronia pogonantha*), bristly fiddleneck, desert dandelion (*Malacothrix glabrata*), San Bernardino suncup (*Camissoniopsis confusa*), goldfields (*Lasthenia sp.*), and white layia (*Layia platyglossa*).

Ephedra, desert mixed scrub (*Ephedra nevadensis* - *Lycium andersonii* - *Grayia spinosa* Shrubland Alliance). Common shrubs in this community include Mormon tea, fourwing saltbush, cheesebush, Mojave cottonthorn, spiny hop-sage, Anderson's boxthorn, creosote bush, rubber rabbitbrush, and winter fat. Common annuals include cheatgrass (*Bromus tectorum*), red brome (*B. rubens*), bristly fiddleneck, redstem filaree, and desert dandelion.

3. METHODS

A literature review of the MGS population and issues in the project area included the following:

- Records in the California Natural Diversity Database (CNDDDB, California Department of Fish and Wildlife [CDFW] 2022);
- Summaries of MGS surveys in the project region for the periods 2013-2020, 2008-2012, and 1998-2007 (Leitner 2021, 2015, and 2008), and
- The California Department of Fish and Wildlife 2019 Mohave ground squirrel Conservation Strategy (CDFW 2019).

The project site contains potentially suitable habitat for MGS and is within the species' historical range (CDFW 2019). Therefore, a habitat assessment, live-trapping surveys, and a camera trapping study, were conducted for MGS on the project site.

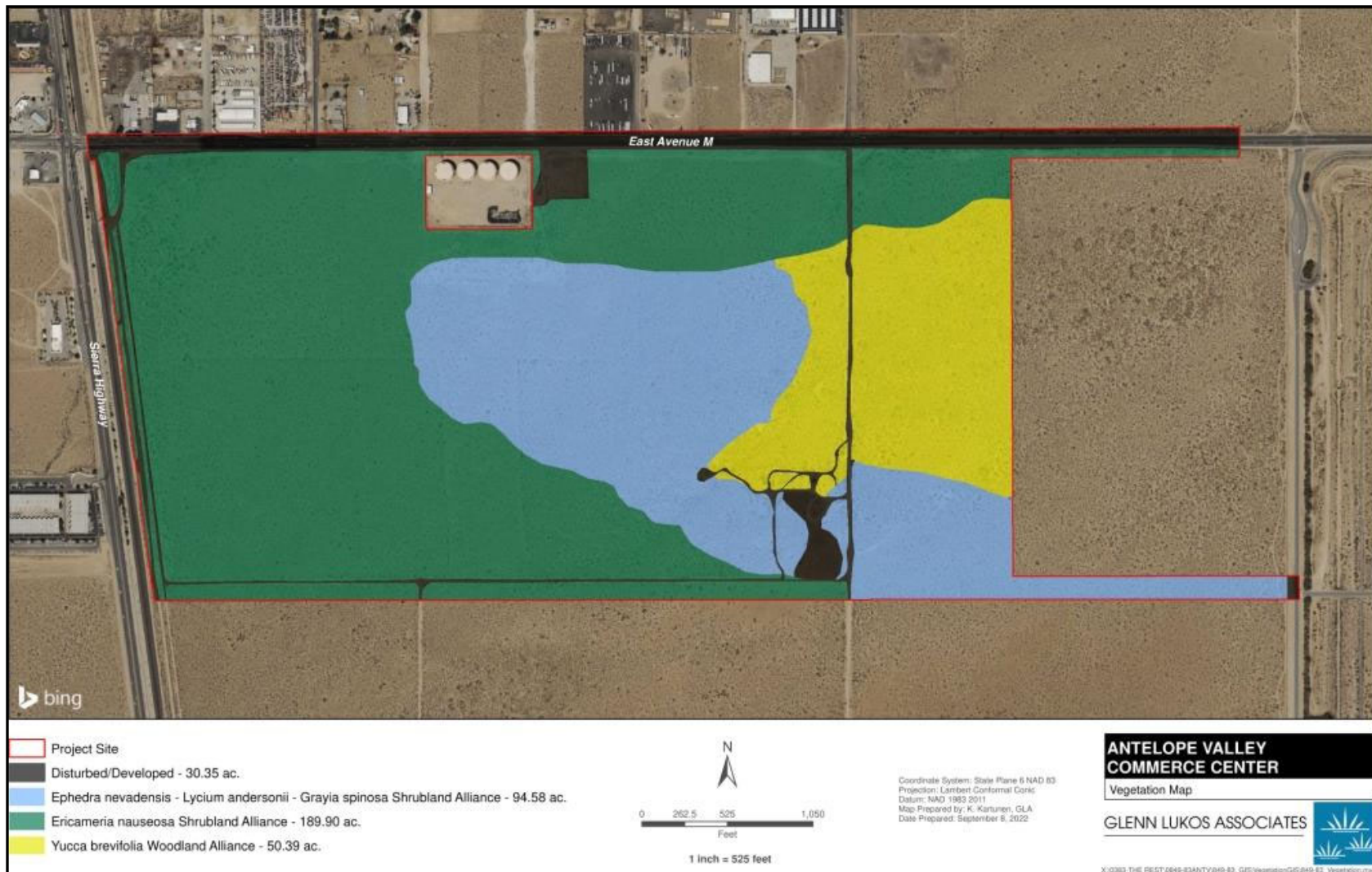


Figure 3. Plant communities.

Habitat Assessment

A habitat assessment was carried out on March 20, 2022 that examined soil, vegetation, topographic and disturbance features to assess the suitability of habitat for MGS on the project site. In addition, records were examined from the California Natural Diversity Database (CNDDDB; California Department of Fish and Wildlife [CDFW] 2022).

Live-trapping Surveys

The CDFW was contacted for a consultation on the live-trapping survey design in accordance with the MGS survey guidelines (CDFW 2010). The consultation attempts included phone messages and a letter to CDFW in March 2022 proposing a trap effort of four standard grids (100 traps, three sessions). A follow-up phone call and letter requesting consultation on the trap plan was sent to the CDFW officer assigned for MGS issues in the Palmdale area on April 10, 2022. No response was received. In the absence of CDFW's response, it was decided to utilize four survey grids and 20 camera stations for three sessions. Six of the camera stations were implemented as a replacement for a fifth grid in the center of the project site.

The survey trap effort included four grids of 100 live-traps arranged in 10 x10 squares with 35-meter spacing. Table 1 lists the UTM coordinates of the grid corners.

Table 1. UTM coordinates of four grids*				
Grids	Corners			
	NW	NE	SE	SW
1	398003, 3834224	398318, 383424	398318, 3833909	398003, 3833909
2	397998, 3833855	398313, 3833855	398313, 3833540	397998, 3833540
3	396938, 3833869	397253, 3833864	396935, 3833556	397248, 3833552
4	396010, 3834290	396325, 3834290	396325, 3833975	396010, 3833975
* NAD 83.				

The trapping survey totaled 6,000 live trap-days. Traps were opened within one hour of sunrise and checked at least every four hours. Traps were closed within one hour of sunset, or when the air temperature reached 90°F measured at 6 inches above the ground in the shade. Traps were baited with four-way commercial livestock feed mixed with bird seed. Traps were sometimes left open between dusk and dawn to inventory nocturnal small mammals. Figure 4 shows the grid locations.

Camera Study

A camera study was carried out to supplement the live-trapping surveys. Camera surveys are not required under the CDFW MGS survey guidelines (2010), but are recommended by CDFW field officers. The camera station survey used 20 wildlife cameras¹ set up and operated in accordance with recommendations in Delaney et. al (unpublished). The camera survey effort totaled 300 camera days, using six camera stations in the central part of the project site in lieu of a fifth trap grid and 14 camera stations within and outside the four trapping grids. The cameras were operated from dawn to dusk for three 5-day sessions; bait was renewed every other day. The camera station locations are shown in Figure 4.

¹ The cameras used were mainly Browning ProX trail cameras, and several K&F Concept and Meidase P60 cameras.
MGS survey, Antelope Valley Commerce Center, Palmdale

4. RESULTS

Habitat Assessment

The three main plant communities on the project site (rabbit rubberbrush, desert mixed scrub, and Joshua tree woodland) are potentially suitable habitat for MGS. However, parts of the site have disturbance histories that may affect habitat quality for MGS. Figure 5 shows the project site on a 1995 aerial (Google Earth 2022) indicating that the south and north-central parts of the project site within the rabbit rubberbrush community had been grubbed prior to 1995. Figure 6 shows the boundaries of this disturbance, which covers approximately 90 acres. This area of previous disturbance is potentially suitable for MGS, however, the habitat quality is lower than in the undisturbed plant communities on the project site. Photos 2 and 3 show two of the disturbed areas.

There are several small areas of severe disturbance (yellow polygons in Figure 6) totaling approximately 9.9 acres that would not be considered “live-in” habitat for MGS. Photo 2 shows the disturbed area around the storage tanks south of Columbia Avenue (West Ave. M).

Live-Trapping

The survey consisted of four grids (15 days of live-trapping, 100 traps each day) for a total trap effort of 6,000 trap-nights. Table 2 lists the dates of the MGS surveys. The fauna observed during the surveys is found in Appendix 2. The weather conditions during the surveys are summarized in Appendix 3. Appendix 4 contains the MGS Survey and Trapping Forms for the four grids.

Table 2. Dates of MGS surveys			
Grid, surveyor	Session 1	Session 2	Session 3
Grid 1, CJ Randel	4/15-4/19	5/10-5/14	6/15-6/19
Grid 2, CJ Randel	4/20-4/24	5/15-5/19	6/20-6/24
Grid 3, P Brylski	3/26-3/31	5/7-5/12	7/5-7/9
Grid 4, K/K Flores	4/17-4/21	5/27-5/31	6/15-6/19

No MGS were captured during the survey, and none were observed or heard on site or in the adjoining areas. Adult (Ad) and sub-adult (SA) white-tailed antelope ground squirrels (AGS, *Ammospermophilus leucurus*) were captured on all four grids. There were also some captures of the California ground squirrel (CGS, *Otospermophilus beecheyi*). Table 3 summarizes the ground squirrel captures. The night-time trapping yielded Merriam’s kangaroo rat (*Dipodomys merriami*), Panamint kangaroo rat (*D. panamintinus*), deer mouse (*Peromyscus maniculatus*), and the southern grasshopper mouse (*Onychomys torridus pulchra*).

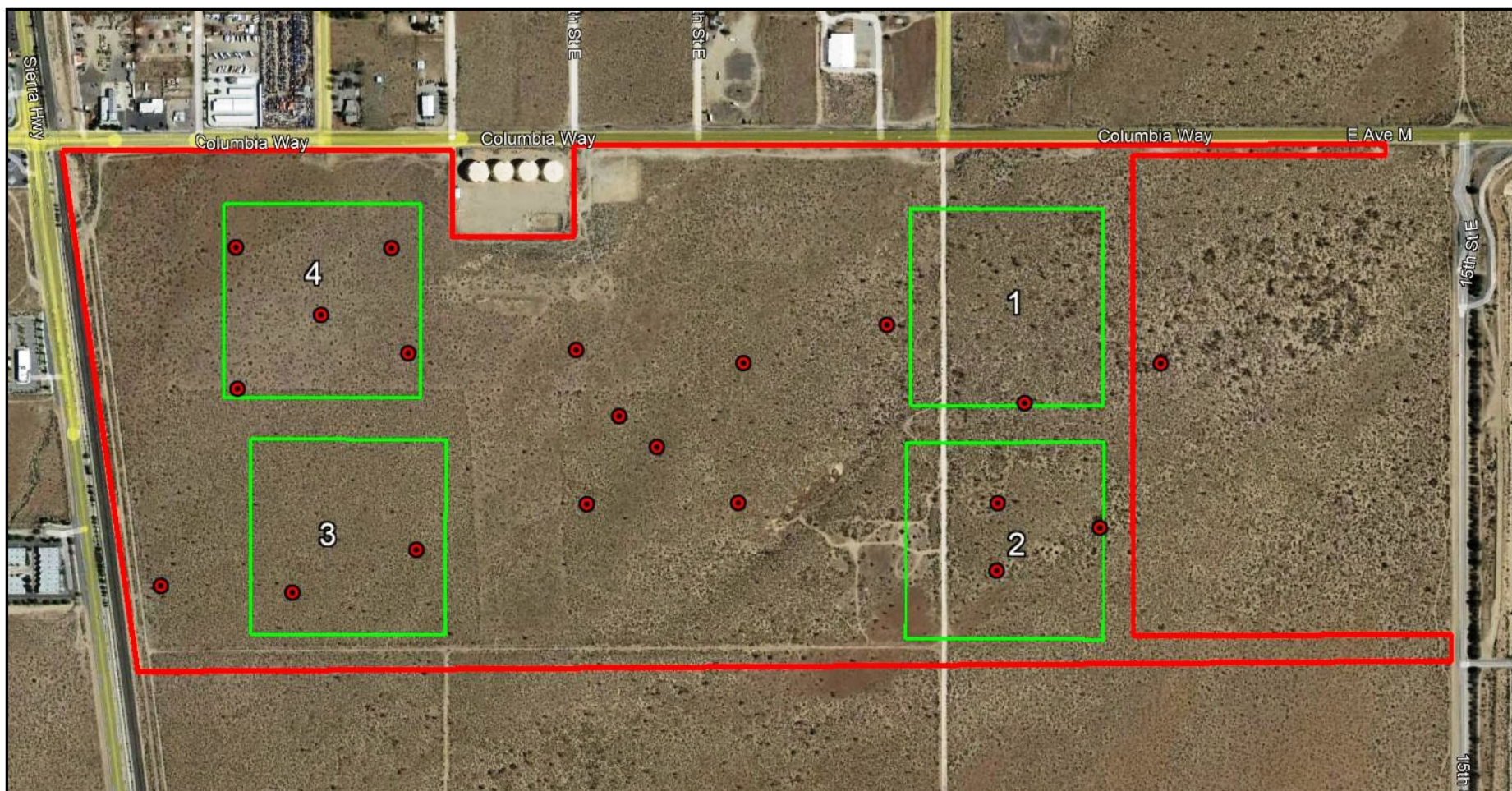


Figure 4. Locations of grids (numbered green squares) and camera stations (red circles).



Figure 5. 1994 aerial photo of project site showing vegetation disturbance in south-central and northern parts of site.

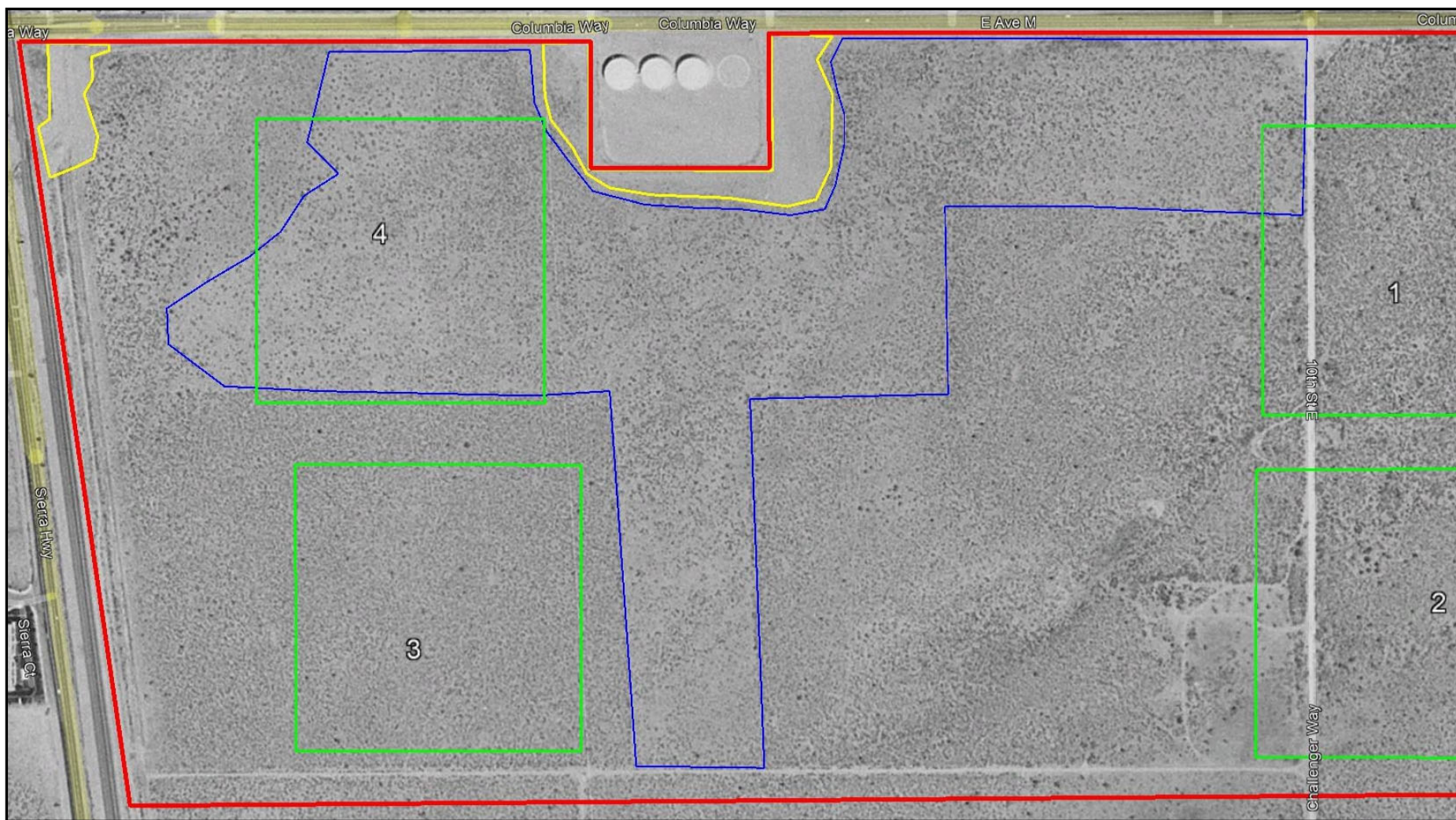


Figure 6. 1994 aerial photo of project site with disturbed areas outlined (yellow and blue polygons)..

Table 3. Small mammal captures							
Grid	Session	AGS					CGS
		Ad Male	Ad Female	SA Male	SA Female	Total AGS	
1	Session 1	1	0	0	0	1	0
	Session 2	2	0	0	0	2	0
	Session 3	0	1	1	0	2	0
	subtotals	3	1	1	0	5	0
2	Session 1	2	3	0	0	5	0
	Session 2	1	2	1	1	5	0
	Session 3	2	2	0	1	5	0
	subtotals	5	7	1	2	15	0
3	Session 1	4	3	0	0	7	
	Session 2	2	1	3	3	9	1
	Session 3	0	1	2	5	8	1
	subtotals	6	5	5	8	24	2
4	Session 1	4	5	8	8	25	
	Session 2	3	4	4	2	13	6
	Session 3	3	0	7	3	13	2
	subtotals	10	9	19	13	51	8
	Total					95	

Camera Survey

No Mohave ground squirrels were detected. AGS were recorded at most of the camera stations. Other species recorded include common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), and black-tailed jackrabbits (*Lepus californicus deserticola*).

5. DISCUSSION

Mohave ground squirrel habitat suitability

MGS typically occur in relatively undisturbed scrub habitats with a range of shrub species composition, often when food plants such as winter fat, spiny hop-sage, saltbush, and golden linanthus are present. These food plants preferred by MGS occur on the project site. The rubber rabbitbrush, desert mixed scrub, and Joshua tree woodland habitats on the project site are potentially suitable for MGS. The disturbed areas within the project site (Figure 6) cover approximately 100 acres. Based on the species composition of the rubber rabbit bush community and the presence of sandy friable soils, MGS could occupy the 90 acres of habitat disturbed by past shrub removal (the blue polygon in Figure 6). However, MGS habitat quality in this community is lower than in undisturbed habitats on the project site. The most disturbed parts of the project site (the yellow polygons in Figure 6) total 9.86 acres and would not be considered “live-in” habitat for MGS.

MGS Occurrences in Project Area

The project site is located in the southwestern corner of the species' range. The nearest MGS records are:

- 2 miles S, 0.5 miles E of Lancaster (CNDDDB occurrence 26). These include a museum record from 1920 and a visual observation from 1985. This site is approximately 2 miles north of the project site.

- 1 mile N and 2 mile N of Palmdale (occurrence 24). These are museum records from 1920 and a visual observation from 1985. This site is approximately 3 miles south of the project site.
- East of Air Force Plant 42 (occurrence 177). This is a visual observation from 1973. This site is approximately 4 miles east of the project site; and
- 4 miles E/NE of Palmdale (occurrence 134), capture record from 1977. This site is approximately 4 miles southeast of the project site.

MGS Survey Results in Project Area from 1998 to 2020

Numerous protocol or regional trapping surveys carried out in that area from 1998 to 2020 did not yield any MGS occurrences. Leitner (2008, 2015, 2021) summarized the results from all MGS surveys across the species range over three time periods. The survey results for the project region are as follows:

- In the 1998-2007 period, Leitner (2008) showed 15 or more MGS live-trapping surveys in the Palmdale-Lancaster area, which yielded no MGS captures.
- In the 2008 to 2012 period, Leitner (2015) showed eight MGS live-trapping surveys in the Palmdale-Lancaster area, which yielded no MGS captures; and
- In the 2013-2020 period, Leitner (2021) showed three MGS live-trapping surveys in the Palmdale-Lancaster area, which yielded no MGS captures.

The MGS surveys on the project site in 2022 included visual/aural surveys and live-trapping and camera station surveys and yielded no MGS occurrences. According to the Mohave Ground Squirrel Survey Guidelines (CDFG 2010), “If a survey conducted according to these guidelines results in no capture or observation of the Mohave Ground Squirrel on a project site, this is not necessarily evidence that the Mohave Ground Squirrel does not exist on the site or that the site is not actual or potential habitat of the species. However, in the circumstance of such a negative result, the Department will stipulate that the project site harbors no Mohave Ground Squirrels. This stipulation will expire one year from the ending date of the last trapping on the project site conducted according these guidelines.”

6. REFERENCES

Best, T. L. 1995. *Spermophilus mohavensis*. Mammalian Species 509: 1–7.

California Department of Fish and Wildlife. 2022. California Natural Diversity Database, Element report for the Mohave ground squirrel. California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

_____. 2019. A Conservation Strategy for the Mohave Ground Squirrel (*Xerospermophilus mohavensis*). California Department of Fish and Wildlife. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=171301&inline>

_____. 2010. Mohave Ground Squirrel Survey Guidelines. Unpublished guidelines produced by CDFG. Sacramento, California. 5 pp. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83975>.

Delaney, D.K, P. Leitner, and D. Hacker. 2017. Use of camera traps in Mohave ground squirrel studies.

Unpublished report, February 14, 2017.

Desert Managers Mohave Ground Squirrel Working Group. no date. Draft conservation strategy for the Mohave ground squirrel. 27pp.

http://www.dmg.gov/documents/DFT_MGS_Consv_Strategy_DMG_101106.pdf

Gustafson, J.R. 1993. A status review of the Mohave Ground Squirrel (*Spermophilus mohavensis*). California Department of Fish and Game. Nongame Bird and Mammals Report 93-9.

Leitner, P. 2015. Current status of the Mohave ground squirrel (*Xerospermophilus mohavensis*): A five-year update (2008–2012). Endangered Species Recovery Program, California State University, Stanislaus, One University Circle, Turlock, California 95382. Published in Western Wildlife 2: 9–22.

_____. 2008. Current status of the Mohave ground squirrel. Trans. West. Sect. Wildl. Soc. 44:11-29.

Leitner, P. and B. Leitner. 2017. Diet of the Mohave ground squirrel (*Xerospermophilus mohavensis*) in relation to season and rainfall. Western North American Naturalist 77(1): 1-13.

NRCS (Natural Resources Conservation Service). 2022. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

Recht, M.A. 1977. 1977 The Biology of the Mohave Ground Squirrel (*Spermophilus mohavensis*). Unpublished Ph.D. dissertation. University of California. Los Angeles

Sawyer, J., T. Keeler-Wolf, and J. Evens. 2009. A Manual of California Vegetation, second edition. California Native Plant Society, Sacramento, CA.

Wessman, E.V. 1977. The distribution and habitat preferences of the Mohave ground squirrel in the southeastern portion of its range. California Department of Fish and Game Wildlife Management Branch Admin. Report. 15 pp + Appendices

Appendix 1. Site photos.



Photo 1. Disturbed area colonized by rubber rabbitbrush in the area around the storage tanks, looking east.



Photo 2. Disturbed habitat in the northwestern part of the project site, looking east.



Photo 3. Disturbed area in the south-central part of the project site, looking northeast



Photo 4. Grid 1, northwestern corner, looking south.



Photo 5. Grid 1, southwestern corner, looking north.



Photo 6. Grid 2, east-central part, looking southeast.



Photo 7. Grid 2, southwest corner, looking north.



Photo 8. Grid 3, southwestern corner, looking north.



Photo 9. Grid 3, northeastern corner, looking northeast.



Photo 10. Grid 4, southern part, looking northeast.



Photo 11. Grid 4, northern part, looking southwest.

Appendix 2. Fauna

Reptiles	
Desert night lizard	<i>Xantusia vigilis</i>
Common side-blotched lizard	<i>Uta stansburiana</i>
Long-nosed leopard lizard	<i>Gambelia wislizenii</i>
Great Basin whiptail	<i>Aspidocellis tigris tigris</i>
Western fence lizard	<i>Sceloporus occidentalis</i>
Desert spiny lizard	<i>Sceloporus magister</i>
Coachwhip	<i>Masticophis flagellum</i>
Mojave green	<i>Crotalus scutulatus</i>
Birds	
Common raven	<i>Corvus corax</i>
House finch	<i>Haemorhous mexicanus</i>
Yellow- rumped warbler	<i>Setophaga coronata</i>
Horned lark	<i>Eremophila alpestris</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
LeConte's thrasher	<i>Toxostoma lecontei</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Eurasian collared-dove	<i>Streptopelia decaocto</i>
Mourning dove	<i>Zenaida macroura</i>
Cactus wren	<i>Campylorhynchus brunneicapillus</i>
Bell's sparrow	<i>Artemisiospiza belli</i>
Vaux's swift	<i>Chaetura vauxi</i>
European starling	<i>Sturnus vulgaris</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Short-eared owl	<i>Asio flammeus</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
California quail	<i>Callipepla californica</i>
Pacific brant	<i>Branta bernicla</i>
American crow	<i>Corvus brachyrhynchos</i>
Lark sparrow	<i>Chondestes grammacus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Mammals	
Black-tailed jackrabbit	<i>Lepus californicus</i>
California ground squirrel	<i>Otospermophilus beecheyi</i>
White-tailed antelope squirrel	<i>Ammospermophilus leucurus</i>
Merriam's kangaroo rat	<i>Dipodomys merriami</i>
Panamint kangaroo rat	<i>Dipodomys panamintinus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
southern grasshopper mouse	<i>Onychomys torridus pulchra</i>
Kit fox	<i>Vulpes macrotis</i>

Appendix 3. Weather Data for MGS Grids

Grid 1

Date	Temperature (F)				Cloud Cover (%)				Wind (mph)			
	Min	Time	Max	Time	Min	Time	Max	Time	Min	Time	Max	Time
4/16	46	0700	66	1700	10	0900	30	0700	8	0900	18	1230
4/17	49	0700	85	1400	5	0700	10	1600	0	0700	15	1200
4/18	57	0700	81	1215	25	0700	40	1500	0	0700	18	1830
4/19	57	0700	75	1500	15	1100	50	0700	3	1500	17	0700
4/20	52	0700	68	1500	0	1600	10	0700	0	0700	12	1500
5/10	42	0610	68	1517	25	1800	30	0610	0	0645	15	1517
5/11	39	0600	61	1500	3	0600	17	1050	0	0600	5	1800
5/12	40	0600	77	1800	0	0600	30	1910	0	0600	17	1050
5/13	51	0600	86	1500	0	0600	0	1820	0	0600	10	1700
5/14	49	0600	92	1320	*		*		0	0600	10	1215
6/15	65	0600	93	1115	0	0600	0	1115	0	0600	10	0945
6/16	64	0545	91	1040	0	0545	0	1040	0	0545	8	1040
6/17	61	0545	81	1130	50	0545	10	1400	0	0545	20	
6/18	58	0545	80	1500	0	0715	15	0545	0	0545	12	0715
6/19	52	0550	85	1515	0		0		0	0545	0	0700
* high dispersed cloud cover												

Grid 2

Date	Temperature (F)				Cloud Cover (%)				Wind (mph)			
	Min	Time	Max	Time	Min	Time	Max	Time	Min	Time	Max	Time
4/21	47	0700	1400	68	0	0700	15	1505	3	1200	18	0830
4/22	45	0700	64	1610	30	0700	30	1830	0	0700	20	1610
4/23	40	0700	70	1445	0	1445	15	0700	0	0700	13	1200
4/24	47	0700	78	1600	0	0700	0	1830	0	0700	10	1700
4/25	45	0645	85	1500	*		*		0	0645	12	1055
5/15	53	0600	91	1130	30	0600	75	1130	0	0710	10	1100
5/16	65	0545	91	1415	0	0545	0	1415	4	0545	20	1415
5/17	60	0545	90	1545	0	0545	0	1545	0	0545	20	1500
5/18	62	0545	90	1130	0	0545	0	1130	0	0545	9	1130
5/19	65	0545	90	1145	*		*		4	0705	18	0945
6/20	52	0545	92	1425	0	0545	0	1425	0	0545	18	1425
6/21	65	0545	81	1115	0	0545	0	1115	0	0545	8	1100
6/22	68	0545			90	0545			0	0545		
6/23	64	0545	91	1230	10	0545	10	1200	0	0545	10	0955
6/24	71	0545	93	1020	0	0545	0	1040	0	0545	0545	10
* high dispersed cloud cover												

Grid 3

Date	Temperature (F)				Cloud Cover (%)				Wind (mph)			
	Min	Time	Max	Time	Min	Time	Max	Time	Min	Time	Max	Time
3/26	51	0700	83	1430	15	1500	50	1030	0	1030	5-7	1430
3/27	55	0700	76	1700	15	1700	80	0700	0	0700	15	1800
3/28	55	0715	61	1400	40	0715	99	1730	3-6	1730	4-6	0715
3/29	52	0715	65	1330	0	1700	1	0715	3-6	1700	4-8	1230
3/30	51	0715	80	1530	0	0715	70	1630	0	0715	4-7	1630
5/7	55	0720	79	1300	5	0720	15	1700	1-4	0720	4-9	1700
5/8	50	0730	74	1200	1	0730	40	1800	2-6	0730	5-8	1300
5/9	50	0700	66	1800	5*	0700	15	1230	1-3	0700	4-7	1700
5/10	48	0715	63	1700	0	0715	0	1830	2-6	1100	4-8	0715
5/11	48	0730	59	1330	0	0730	0	1330	3-6	1330	3-9	0730
7/5	69	0600	90	1345	0	0600	0	1830	2-3	0600	2-7	1345
7/6	65	0600	90	1300	0	0600	0	1300	1-4	0600	3-9	1300
7/7	59	0550	90	1215	0	0550	0	1215	0-1	0550	1-3	1215
7/8	69	0545	90	1045	2	0545	1	1045	1	0545	1	1045
7/9	70	0555	90	1030	0	5555	0	1030	0	5555	0	1030
* high dispersed cloud cover												

Grid 4

Date	Temperature (F)				Cloud Cover (%)				Wind (mph)			
	Min	Time	Max	Time	Min	Time	Max	Time	Min	Time	Max	Time
4/17	59.1		85.2		0		0		4.8		3.1	
4/18	58.4		87.8		5		70		2.7		6.3	
4/19	57		77.8		5		25		10.8		16.8	
4/20	54.6		68		5		5		8.8		13.2	
4/21	54.5		64		0		30		18.7		19	
5/27	71.7		90		5		25		1.9		12.5	
5/28	67.3		84.2		10		10		8.7		19.8	
5/29	61.2		73.6		10		10		17.8		21.7	
5/30	65.1		80.4		2		0		15.9		20.5	
5/31	67		89.6		0		0		7.4		2.5	
6/15	62.4		87.2		0		0		1.8		2.5	
6/16	70		90		0		0		1.3		1.2	
6/17	63.9		80.8		5		25		3.2		15.1	
6/18	56.5		83		0		2		8.2		14.8	
6/19	58.7		87		0		0		7.1		8.2	
* high dispersed cloud cover												

Appendix 4. Mohave Ground Squirrel (MGS) Survey and Trapping Forms

Part I – Project Information							
Grid 1		Project Name: <u>Antelope Valley Commerce Center</u>				Township: <u>6N</u>	
		Property Owner: <u>Private</u>				Range: <u>12W</u>	
		Quad/Map Series: <u>Lancaster East 7.5'</u>				Section: <u>NW¼ S1, NE¼ S2</u>	
UTM Coordinates of grid corners (NAD 83, error <6m)							
NW Corner		NE Corner		SE Corner		SW Corner	
Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
398003	3834224	398318	3834224	398318	3833909	398003	3833909
Acreage of Project Site (or linear distance):						27 Acres	
Acreage of potential MGS habitat on site (or linear distance):						365 Acres	
Visual Surveys of potential MGS habitat conducted on:						March 20, 2022	
Visual Surveys conducted by:						Phil Brylski	
Total # of grids:						4 grids, 20 camera stations	
Session	Start Date	End Date	Trapping Conducted By:				
1	4/15/22	4/19/22	Charles J. Randel				
2	5/10/22	5/14/22	Charles J. Randel				
3	6/15/22	6/19/22	Charles J. Randel				
Part II –General Habitat Description							
Vegetation							
Dominant Perennials		<i>Yucca brevifolia</i> , <i>Atriplex canescens</i> , <i>Ambrosia salsola</i> , <i>A. dumosa</i> , <i>Lycium andersonii</i> , <i>Ephedra</i> sp., <i>Grayia spinosa</i> , <i>Tetradymia axillaris</i> ,					
Other Perennials		<i>Cylindropuntia echinocarpa</i> , <i>Larrea tridentata</i> , <i>Krashcheninnikovia lanata</i> , <i>Gutierrezia californica</i> , <i>Eriogonum inflatum</i>					
Dominant Annuals		<i>Abronia pogonatha</i> , <i>Amsinkia tessellata</i> , <i>Camissoniopsis confusa</i> , <i>Malacothrix glabrata</i> , <i>Cryptantha</i> sp., <i>Layia platyglossa</i> , <i>Leptosyne californica</i> , <i>Lasthenia</i> sp., <i>Layia glandulosa</i> , <i>Loeseliastrum matthewsii</i> , <i>Salvia columbariae</i> , <i>Leptosyne bigelovii</i> , <i>Phacelia tanacetifolia</i> , <i>Sisymbrium</i> sp., <i>Eriophyllum pringlei</i> , <i>E. wallacei</i>					
Other Annuals							
Land Forms (<i>i.e.</i> , bajadas, washes): desert plain							
Soil Description: Cajon loamy sand (99.9%), Cajon Loamy Fine Sand (0.1%)							
Elevation: 2,050 ft.				Slope		0-9%	

Part I – Project Information																							
Grid 2		Project Name: <u>Antelope Valley Commerce Center</u>				Township: <u>6N</u>																	
		Property Owner: <u>Private</u>				Range: <u>12W</u>																	
		Quad/Map Series: <u>Lancaster East 7.5'</u>				Section: <u>SE¼, SW¼ S1</u>																	
UTM Coordinates of grid corners (NAD 83, error <6m)																							
NW Corner		NE Corner		SE Corner		SW Corner																	
Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing																
397998	3833855	398313	3833855	398313	3833540	397998	3833540																
Acreage of Project Site (or linear distance):						27 Acres																	
Acreage of potential MGS habitat on site (or linear distance):						365 Acres																	
Visual Surveys of potential MGS habitat conducted on:						March 20, 2022																	
Visual Surveys conducted by:						Phil Brylski																	
Total # of grids:						4 grids, 20 camera stations																	
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Charles J. Randel																							
Charles J. Randel																							
Part II –General Habitat Description																							
Vegetation																							
Dominant Perennials		<i>Yucca brevifolia, Atriplex canescens, Ambrosia salsola, A. dumosa, Lycium andersonii, Ephedra sp., Grayia spinosa, Tetradymia axillaris,</i>																					
Other Perennials		<i>Cylindropuntia echinocarpa, Larrea tridentata, Krashcheninnikovia lanata, Gutierrezia californica, Eriogonum inflatum</i>																					
Dominant Annuals		<i>Abronia pogonatha, Amsinkia tessellata, Camissoniopsis confusa, Malacothrix glabrata, Cryptantha sp., Layia platyglossa, Leptosyne californica, Lasthenia sp., Layia glandulosa, Loeseliastrum matthewsii, Salvia columbariae, Leptosyne bigelovii, Phacelia tanacetifolia, Sisymbrium sp., Eriophyllum pringlei, E. wallacei</i>																					
Other Annuals																							
Land Forms (<i>i.e.</i> , bajadas, washes): desert plain																							
Soil Description: Cajon loamy sand (69.7%), Cajon Loamy Fine Sand (30.3%)																							
Elevation: 2,050 ft				Slope		0-9%																	

Part I – Project Information																							
Grid 3		Project Name: <u>Antelope Valley Commerce Center</u>				Township: <u>6N</u>																	
		Property Owner: <u>Private</u>				Range: <u>12W</u>																	
		Quad/Map Series: <u>Lancaster East 7.5'</u>				Section: <u>NW¼ S2</u>																	
UTM Coordinates of grid corners (NAD 83, error <6m)																							
NW Corner		NE Corner		SE Corner		SW Corner																	
Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing																
396938	3833869	397253	3833864	397248	3833552	396935	3833556																
Acreage of Project Site (or linear distance):						27 Acres																	
Acreage of potential MGS habitat on site (or linear distance):						365 Acres																	
Visual Surveys of potential MGS habitat conducted on:						March 20, 2022																	
Visual Surveys conducted by:						Phil Brylski																	
Total # of grids:						4 grids, 20 camera stations																	
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Session	Start Date	End Date																					
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2	5/7/22	5/11/22																					
3	7/5/22	7/9/22																					
Trapping Conducted By:																							
P. Brylski																							
P. Brylski																							
P. Brylski																							
Part II –General Habitat Description																							
Vegetation																							
Dominant Perennials		<i>Yucca brevifolia, Atriplex canescens, Larrea tridentate, Ambrosia salsola, A. dumosa, Lycium andersonii, Ephedra nevadensis., Grayia spinosa, Tetradymia axillaris, Krashcheninnikovia lanata, Ephedra nevadensis</i>																					
Other Perennials		<i>Ericameria nauseosa, Gutierrezia californica, Koeberlinia spinosa</i>																					
Dominant Annuals		<i>Bromus tectorum, B. rubens, Amsinkia tessellata, Malacothrix glabrata, Erodium cicutarium, Camissoniopsis confusa, Lasthenia sp., Sisymbrium sp., Hilaria sp</i>																					
Other Annuals		<i>Eschscholzia parishii, Euphorbia albomarginata</i>																					
<table style="width: 100%;"> <tr> <td style="width: 50%;">Land Forms (<i>i.e.</i>, bajadas, washes): desert plain</td> <td style="width: 50%;"></td> </tr> <tr> <td>Soil Description: Cajon loamy sand</td> <td></td> </tr> <tr> <td>Elevation: 2,530 ft.</td> <td style="text-align: center;">Slope 0-9% NE</td> </tr> </table>								Land Forms (<i>i.e.</i> , bajadas, washes): desert plain		Soil Description: Cajon loamy sand		Elevation: 2,530 ft.	Slope 0-9% NE										
Land Forms (<i>i.e.</i> , bajadas, washes): desert plain																							
Soil Description: Cajon loamy sand																							
Elevation: 2,530 ft.	Slope 0-9% NE																						

Part I – Project Information							
Grid 4		Project Name: <u>Antelope Valley Commerce Center</u>				Township: <u>6N</u>	
		Property Owner: <u>Private</u>				Range: <u>12W</u>	
		Quad/Map Series: <u>Lancaster East 7.5'</u>				Section: <u>NW¼ S2</u>	
UTM Coordinates of grid corners (NAD 83, error <6m)							
NW Corner		NE Corner		SE Corner		SW Corner	
Easting	Northing	Easting	Northing	Easting	Northing	Easting	Northing
396900	3834250	397215	3834250	397215	3833935	396900	3833935
Acreage of Project Site (or linear distance):						27 Acres	
Acreage of potential MGS habitat on site (or linear distance):						365 Acres	
Visual Surveys of potential MGS habitat conducted on:						04/20/2022	
Visual Surveys conducted by:						Phil Brylski	
Total # of grids:						4 grids, 20 camera stations	
Session		Start Date		End Date		Trapping Conducted By:	
1		4/17/2022		4/21/2022		Karla Flores	
2		5/27/2022		5/31/2022		Karla Flores	
3		6/15/2022		6/19/2022		Karla Flores	
Part II –General Habitat Description							
Vegetation							
Dominant Perennials		<i>Yucca brevifolia, Ambrosia salsola, Ephedra nevadensis, Lycium cooperi, Lycium andersonii, Ericameria nauseosa, Ericameria cooperi,</i>					
Other Perennials		<i>Krascheninnikovia lanata, Grayia spinosa, Scutellaria mexicana</i>					
Dominant Annuals		<i>Amsinckia tessellata, Erodium cicutarium, Eriogonum brachyanthum, Croton setiger,</i>					
Other Annuals		<i>Linanthus parryae, Camissonia campestris, Stephanomeria, Layia glandulosa, Phacelia crenulate, Malacothrix glabrata,</i>					
Land Forms (<i>i.e.</i> , bajadas, washes): desert plain							
Soil Description: Cajon Loamy Sand (85%); Arizo (4%); Rosamond (4%); Hesperia 4%; Unnamed 3%							
Elevation: 2,531 feet				Slope		0-2%	