September 22, 2020

Mr. George Zakhari
Water Quality Engineer
Mountain / Desert District
Golden State Water Company
13608 Hitt Road
Apple Valley, California 92308
Via e-mail to: George.Zakhari@gswater.com

Subject: Results of a Mohave Ground Squirrel Survey for the Proposed Irwin Road Reservoir and Transmission Main Project, San Bernardino County, California

Dear Mr. Zakhari:

This letter report presents the results of the focused protocol Mohave ground squirrel (MGS; *Xerospermophilus mohavensis*) survey conducted by ECORP Consulting, Inc.'s subcontractor, Elanco, for Golden State Water Company's (GSWC) proposed Irwin Road Reservoir and Transmission Main Project (Project). The methods and results of the 2020 survey are presented below. Following is an easy reference to the organization of the report:

PROJECT DESCRIPTION AND LOCATION 2
1.5 MG Water Storage Reservoir 2
Water Transmission Main Pipeline 2
PROJECT BACKGROUND 2
LITERATURE REVIEW 5
Natural History 5
Database Search Results 6
METHODS 6
RESULTS 8
IMPACTS ANALYSIS 8
CONCLUSIONS AND RECOMMENDATIONS 9
REFERENCES 10

215 North Fifth Street ● Redlands, CA 92374 ● Tel: (909) 304-0046 ● Fax: (909) 307-0056 ● www.ecorpconsulting.com

PROJECT DESCRIPTION AND LOCATION

The Project site is located north of the city of Barstow, near the intersection of Irwin Road and Gavilan Street, along the Irwin Road right of way (ROW) in San Bernardino County, California (Figure 1). The proposed Project includes an above-ground 1.5-million gallon, welded steel water reservoir on Bureau of Land Management (BLM) land (Assessor's Parcel Number 042-316-141-0000) and a 1.1-mile-long 12-inch diameter ductile iron pipe (DIP) water transmission pipeline that traverses through federal and private lands (Figure 2). Approximately 4,000 linear feet (0.75 mile) of the Project is located within land owned by the County of San Bernardino and 1,800 linear feet (0.34 mile) of the Project lies within BLM-managed lands.

The reservoir will be constructed on a 0.80-acre site that will require permanent ROW from BLM. The entire Project site and surrounding area is designated as Rural Living (RL-40) by the San Bernardino County General Plan. The Project site, as depicted on U.S. Geological Survey 7.5-minute Series Barstow SE Topographic quadrangles, lies within Sections 19 and 30 of Township 10 North and Range 1 West. Elevation on the Project site is approximately 2,335 feet above mean sea level.

1.5 MG Water Storage Reservoir

The reservoir will be approximately 102 feet in diameter and 36.5 feet in height, constructed from welded steel plates. The reservoir site will be secured by an eight-foot chain-link fence and a security gate at the point of entry. The reservoir site will require a permanent ROW grant from BLM.

Water Transmission Main Pipeline

A 12-inch diameter DIP water transmission pipeline, approximately 5,816 linear feet (1.1 miles) long will be buried between 36 and 42 inches below the surface within previously developed portions of the Irwin Road ROW, a County maintained road. The pipeline will convey water to/from the reservoir and will connect the reservoir with an existing water pipeline located at the intersection of Irwin Road and Gavilan Street. The entire pipeline alignment will be within the Irwin Road ROW. Other permanent Project facilities include air valves, blow-offs, fire hydrants, and valves for the pipeline along the pipeline alignment.

PROJECT BACKGROUND

A protocol-level MGS survey was conducted for the Project between March and June 2014, results of which were negative (RCA Associates, LLC 2014; Albert A. Webb Associates March 2020). No detections or captures of MGS were made in the 2014 protocol survey. These results were used to develop two Project documents: a draft Biological Assessment prepared by RCA Associates, LLC. (2014), and a draft Environmental Assessment prepared by Albert A. Webb Associates (2020). Given the negative results of the 2014 surveys, MGS was assumed to not be present in the Project area at the time the draft Biological Assessment was prepared for the Project (RCA Associates, LLC 2014). Both of these documents were reviewed prior to the start of the project surveys in 2020.

Location: N:\2018\2018-039.008 Irwin Road Tank & Transmission Line\MAPS\location_vicinity\IRTTL_Vicinity.mxd<ita> (TR)-trotellini 4/29/2020</ita>

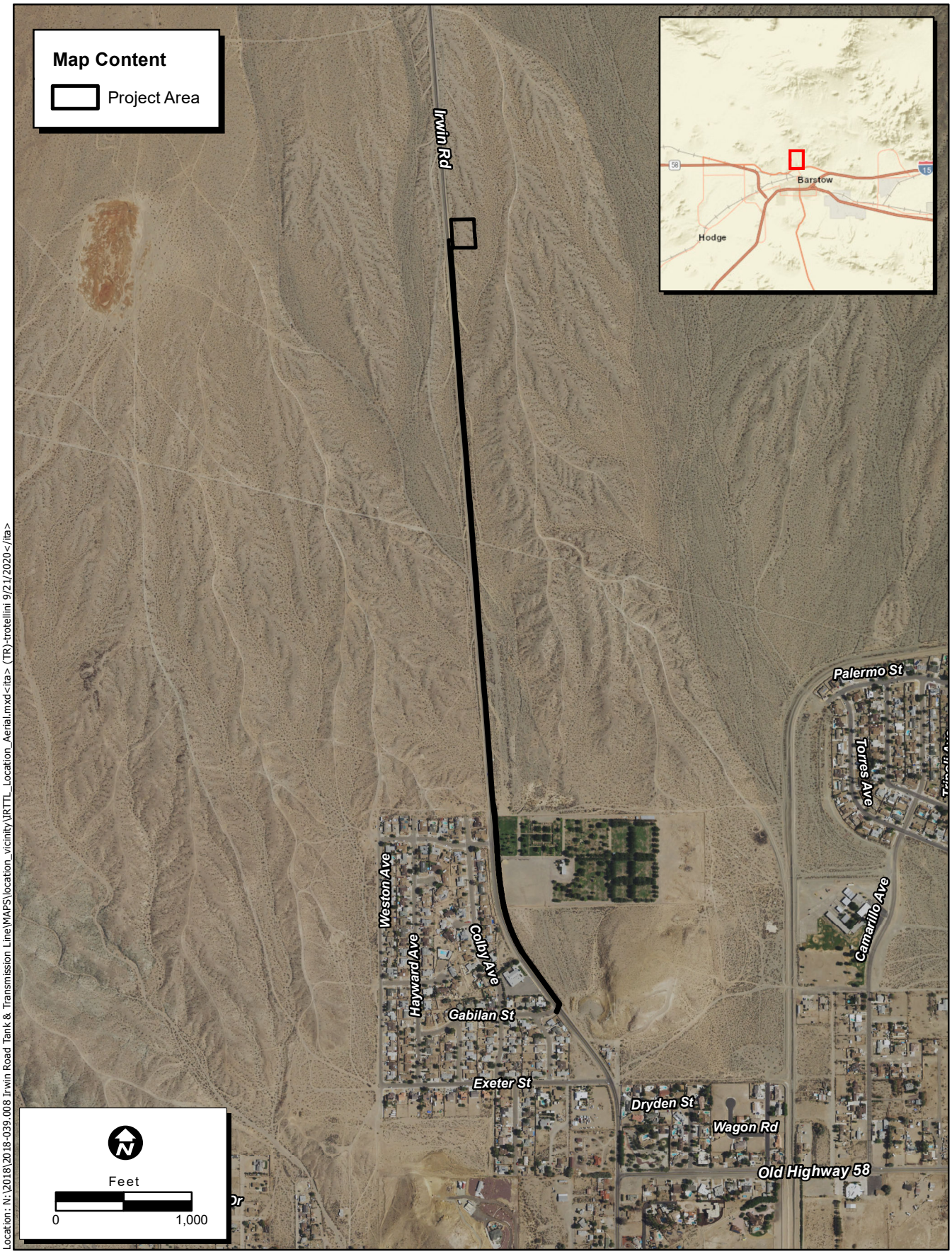
Map Date: 4/29/2020

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 1. Project Vicinity

2018-039.008 Irwin Road Tank & Transmission Line



Location: N:\2018\2018-039.008 Irwin Road Tank & Transmission Line\MAPS\location_vicinity\IRTTL_Location_Aerial.mxd<ita> (TR)-trotellini 9/21/2020</ita>

Map Date: 9/21/2020

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 2. Project Location

2018-039.008 Irwin Road Tank & Transmission Line

The project site is located on largely vacant lands, with residential land use and a cemetery at the southern end of the site. The terrain is flat to hilly on predominantly Nedona-Cuddeback Complex soils, which are sandy loams, and Cajon sands (NRCS 2020). The plant community on the site is Mojave creosote bush scrub; creosote bush (*Larrea tridentata*) is the dominant overstory plant. Common shrubs include Nevada joint fir (*Ephedra nevadensis*), white bursage (*Ambrosia dumosa*), cheesebush (*Ambrosia salsola*), four-wing saltbush (*Atriplex canescens*), and allscale saltbush (*A. polycarpa*). Common understory plants include bristly fiddleneck (*Amsinckia tessellata*) and coastal heron's bill (*Erodium cicutarium*). The grasses on the site include red brome (*Bromus madritensis rubens*), foxtail barley (*Hordeum murinum*), and common Mediterranean grass (*Schismus barbatus*). Representative site photographs are included in Attachment A.

LITERATURE REVIEW

A general assessment of the site was carried out prior to the protocol survey for MGS. Range maps for the MGS were reviewed (Gustafson 1993; CDFG 2005; Leitner 2008, 2015). The CNDDB (CNDDB 2020) was searched for Mohave ground squirrel records in the project region.

Natural History

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 (less than 2 feet in height) spaced approximately 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 percent 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.

Database Search Results

The Project site is located in the southern part of the species' historical range. The California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2020) contains several MGS records in the Project vicinity:

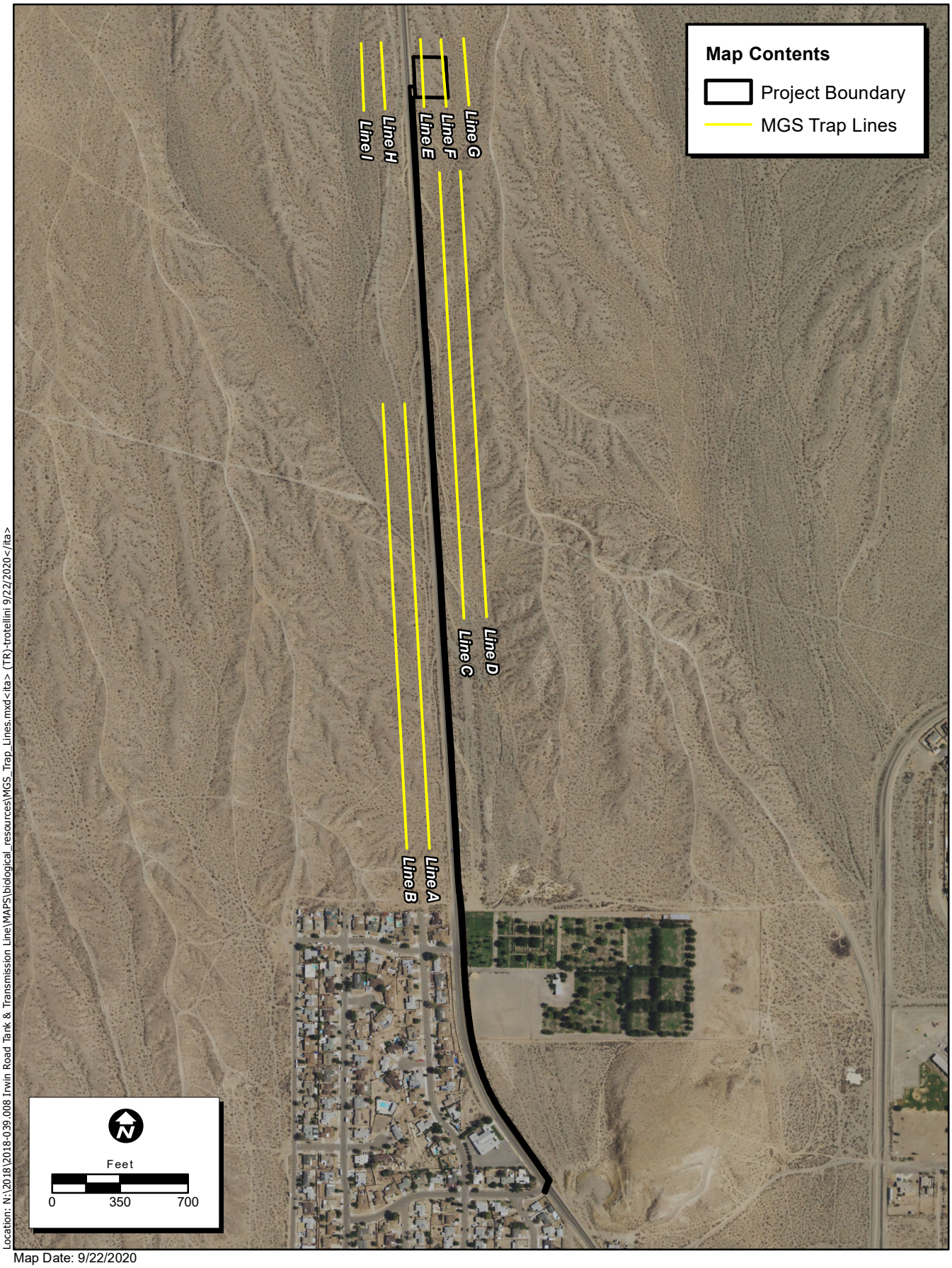
- One individual was observed in 1982 at the locality "Barstow, just northwest of Fort Irwin Rd – Hwy 58 junction" (Occurrence 282 in the CNDDB). This observation is considered historic (more than 20 years old). This locality is approximately 0.3 mile south/southwest of the southern end of the Project site;
- One individual was captured in 1977 at the locality "Ft. Irwin Rd, 6.5 mi N, 6.5 mi W of Yermo" (CNDDB Occurrence 6). This observation is considered historic (more than 20 years old). This capture location is approximately 6.6 miles northeast of the northern edge of the Project site; and
- Two individuals captured in 2013 at the locality "About 2.3 miles NW Hwy 58 at Yellowstone Rd & 3.6 miles WNW of Park Ave at Mulberry St in Hinkley" (Occurrence 491 in the CNDDB). This locality is approximately 13.3 miles west of the Project site.

Leitner (2008, 2015) reviewed MGS survey results throughout the species' range for the periods 1998-2007 and 2008-2012. For both periods, a number of surveys in the Barstow vicinity did not record any MGS. Brylski's (2017) MGS survey along the Mojave River, approximately 0.7 mile south of the southern end of the current Project site, yielded no MGS occurrences and numerous round-tailed ground squirrels (*Xerospermophilus tereticaudus*). For the 1998-2007 period, surveys in the Coolgardie Mesa-Superior Valley area north of Barstow yielded a number of MGS captures whereas the 2008-2012 period, MGS were recorded west of Hinkley (Leitner 2008). Both areas are more than 10 miles from the Project site.

METHODS

The site assessment and live-trapping survey was carried out in 2020 in accordance with CDFW's MGS survey guidelines (CDFG 2010) by Phil Brylski, Ph.D., who holds Memorandum of Understanding (MOU) with CDFW to independently conduct live-trapping surveys for MGS. Visual surveys of the project site were carried out on April 10, 2020. The live-trapping survey was carried out in three sessions consistent with the CDFG (2010) guidelines. A 100-trap grid was established using large aluminum Sherman live traps (3 x 3.75 x 12") with 35-meter between trap spacing as follows: 20 traps were located around the water tank site and 20 traps were placed along four parallel lines east and west of Irwin Rd, as shown in Figure 3. Cardboard tents were used to shield the traps from sunlight and reduce temperatures inside the traps. Traps were checked at least every four hours until they were closed at the end of each day (or until temperature reached 90 degrees Fahrenheit (°F), in accordance with the guidelines).

CDFW is currently updating the MGS survey guidelines. The draft updated guidelines (CDFW, 2019 cited in Scott Osborn, pers. comm.) states that the use of trail cameras (camera traps) as a survey technique are recommended but optional. These guidelines have not been adopted and were not in effect at the time of the current MGS survey. Trail cameras were not used in the current survey of the Project site.



Location: N:\2018\2018-039.008 Irwin Road Tank & Transmission Line\MAPS\biological_resources\MGS_Trap_Lines.mxd<ita> (TR)-trotellini 9/22/2020</ita>

Map Date: 9/22/2020
Photo Source: NAIP (2018)

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 3. Mohave Ground Squirrel Trap Lines

2018-039.008 Irwin Road Tank & Transmission Line

RESULTS

The protocol-level survey consisted of 15 days of live-trapping (100 traps each day for a total trap effort of 1,500 trap-nights) in three sessions: April 11-15, May 26-30, and July 10-14, 2020. During the course of the live-trapping surveys, temperatures ranged from 48°F in April to over 90°F in July (traps were closed when the temperature reached 90°F in accordance with the guidelines). Attachment 2 summarizes the weather data. Attachment 3 summarizes information on the grid.

No Mohave ground squirrels were captured during the survey and none were observed or heard onsite or in the adjoining area. One species of squirrel, the antelope ground squirrel (AGS; *Ammospermophilus leucurus*), was captured and is common on the site. Table 1 summarizes the AGS captures in the three sessions.

Table 1. MGS Trapping Survey Results

Session	Dates	AGS
1	April 11-15	20
2	May 26-30	38
3	July 10-14	16
	Total	**74**

AGS = antelope ground squirrel (*Ammospermophilus leucurus*)

IMPACTS ANALYSIS

The Project site is not located within any DRECP-designated Linkages or Key Population Centers for Mohave ground squirrel. Protocol-level trapping for Mohave ground squirrel was conducted on the Project site over three weeks between March and July 2020, the results of which were negative. If the Project will begin ground-breaking construction activities within one year of the survey, then the species is considered absent from the Project site and Project activities may commence without expected impacts to the species. If ground-breaking Project activities do not occur within one year of the end of the 2020 trapping survey, July 14, 2020, then another trapping survey will need to occur or the Project will need to implement mitigation measures to offset potential impacts to the species. If the species is present, direct impacts in the form of habitat loss and injury or mortality due to collision with Project vehicles and equipment could occur. If present, indirect impacts in the form of ground vibrations, noise, and increased human and vehicular presence on the Project site could also occur. The Mohave ground squirrel is a State-listed (threatened) species and also considered a BLM Sensitive species and any impacts would be considered significant. The Project would need to adhere to the following CMAs in the DRECP pertaining to Mohave ground squirrel:

- LUPA-BIO-IFS-39: perform pre-construction clearance surveys for Mohave ground squirrel during the active season (February 1 through August 31) and biological monitoring during construction activities
- LUPA-BIO-IFS-41: flag and avoid all occurrences of Mohave ground squirrel

- LUPA-BIO-IFS-42: prohibit use of rodenticides

Compliance with LUPA-BIO-IFS-39 was achieved through the protocol-level trapping survey conducted for Mohave ground squirrel in 2020, results of which were negative. Therefore, Project activities may commence within one year of the trapping survey without the requirement of additional mitigation measures for this species, per CDFW guidance. If Project activities do not commence within one year of the 2020 Mohave ground squirrel trapping survey, July 14, 2020, implementation of Mitigation Measure BIO-4 is recommended. An Incidental Take Permit (ITP) under Section 2081 of the California Endangered Species Act may be necessary to authorize incidental take to Mohave ground squirrel if the species is detected onsite during future survey efforts. If an ITP is obtained, it is expected that additional avoidance and minimization measures as well as mitigation measures will be included as permit conditions.

CONCLUSIONS AND RECOMMENDATIONS

According to the MGS 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."

No Mohave Ground Squirrels were observed or trapped during the surveys conducted at the project site, and CDFW is expected to make such a stipulation for this site. If the site is not developed prior to July 14, 2021 (one year from the completion of the current survey), it may become necessary to repeat the Mohave ground squirrel survey. Compliance with the necessary CMAs (described in the section above titled "Impacts Analysis" is recommended to maintain Project compliance with the DRECP.

Thank you for the opportunity to work on your Project. If you have any questions regarding the contents of this letter report, please contact me at (909) 307-0046.

Sincerely,

ECORP Consulting, Inc.

Kristen Wasz
Biology Manager/Senior Biologist

Field work and preparation of select report sections conducted by:

SIGNED:_____ DATE: September 22, 2020

Phillip Brylski, PhD

pbrylski@gmail.com

949-870-8878

REFERENCES

Albert A. Webb and Associates. 2020. *Environmental Assessment, Irwin Road Reservoir and Transmission Main, Screencheck No. 2*. Prepared for Bureau of Land Management, Barstow Field Office. March.

RCA Associates, LLC. 2014. *Draft Biological Assessment, Irwin Road Reservoir and Transmission Main Project*. Prepared for Golden State Water Company, U.S. Fish and Wildlife Service, and U.S. Bureau of Land Management. June 30.

Brylski, P. 2017. Mohave ground squirrel survey for the North First Avenue - Mojave River Bridge Replacement Project, Barstow, San Bernardino County, California. Prepared for ICF. 14pp.

California Department of Fish and Game (CDFG). 2003 (updated 2010). Mohave ground squirrel survey guidelines. California Department of Fish and Game, Sacramento, CA, USA.

California Department of Fish and Wildlife (CDFW). 2020. California Natural Diversity Database, Element report for the Mohave ground squirrel. California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

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.

Harris, J.H. and P. Leitner. 2004 Home-range size and use of space by adult Mohave ground squirrels, *Spermophilus mohavensis*. Journal of Mammalogy 85:517–523.

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). 2020. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)

Osborn, S. pers. comm. 2020. California Department of Fish and Wildlife Mohave ground squirrel survey guidelines (January 2003; revised July 2010, November 2019). email sent to MGS Technical Advisory Group members on October 24, 2019.

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

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

LIST OF ATTACHMENTS

Attachment A: Representative Site Photographs

Attachment B: Weather Data for Mohave Ground Squirrel Trapping Grid

Attachment C: Mohave Ground Squirrel Survey and Trapping Form

ATTACHMENT A

Representative Site Photographs

Photo 1. Proposed water tank site, looking north

Photo 2. Proposed water tank site, looking south

Photo 3. Survey area along east side of Irwin Rd, looking south.

Photo 4. Survey area along west side of Irwin Rd, looking west.

ATTACHMENT B

Weather Data for Mohave Ground Squirrel Survey

Date	Temperature (F)				Cloud Cover (%)				Wind (mph)			
	Min	Time	Max	Time	Min	Time	Max	Time	Min	Time	Max	Time
4/11	50	0700	74	1645	0	1100	1	0700	1	1100	3-7	1800
4/12	48	0650	76	1530	0	0650	0	1800	0-1	1115	7-12	1800
4/13	51	0700	76	1345	10	1115	70	0700	0-2	0700	1-3	1115
4/14	52	0645	72	1400	0	0645	0	1900	1-2	0645	3-7	1700
4/15	50	0650	83	1500	0	0650	0	1830	1-3	1500	3-6	1830
5/26	69	0630	90	1030	0	0630	0	1030	1-2	0630	1-2	1030
5/27	70	0620	90	1050	0	0620	0	1050	1-3	0620	1-4	1050
5/28	71	0615	90	0935	0	0615	0	0935	1-3	0935	2-4	0615
5/29	70	0615	09	1100	0	0615	80	1015	0	0615	2-5	1100
5/30	57	0600	86	1330	50	1330	100	1030	1-6	1330	5-9	1030
7/10	68	0545	90	0945	0	0545	0	0945	1-2	0945	1-3	0545
7/11	73	0540	90	0930	3	0540	3	0930	0-1	0540	1-3	0930
7/12	75	0550	90	0920	0	0550	0	0920	2-4	0550	2-4	0920
7/13	74	0545	90	0845	0	0545	0	0845	3-6	0545	6	0845
7/14	70	0530	90	0900	0	0530	0	0900	1-6	0530	1-6	0900

ATTACHMENT C

Mohave Ground Squirrel Survey and Trapping Form

Part I – Project Information							
Grid		Project Name:	Irwin Rd Reservoir and Transmission Main Project		Township:	10N	
		Property Owner:	BLM		Range:	1W	
		Quad/Map Series:	Barstow		Section:	19 (SW ¼) 30 (SW, NW ¼)	
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
Reservoir site							
497385	3865985	497545	3865994	497556	3865890	497392	3865882
Transmission site along Irwin Rd							
497414	3865557	497542	3865786	497590	3865090	497459	3864863
Acreage of Project Site (or linear distance):						1.03-acre reservoir, plus 1.1-mile pipeline	
Acreage of potential MGS habitat on site (or linear distance):						1.03-acre reservoir, plus 0.8-mile pipeline	
Visual Surveys of potential MGS habitat conducted on:						April 10, 2020	
Visual Surveys conducted by:						Phil Brylski	
Total # of grids:						1	

Session	Start Date	End Date	Trapping Conducted By:
1	4/11/20	4/15/20	Phil Brylski
2	5/26/20	5/30/20	Phil Brylski
3	7/10/20	7/14/20	Phil Brylski

Part II –General Habitat Description	
Vegetation	
Dominant Perennials	Creosote bush
Other Perennials	Nevada joint fir, white bursage, cheesebush, four-wing saltbush, and allscale saltbush
Dominant Annuals	bristly fiddleneck, red stem stork's bill, red brome
Other Annuals	Saharan mustard, foxtail barley, common Mediterranean grass
Land Forms (*i.e.*, bajadas, washes): bajada	
Soil Description: Sandy loams (Nedona-Cuddeback Complex), some Cajon sands	
Elevation: 2,200 to 2,340 ft.	Slope 2.5% (S)