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ECOLOGICAL CONSULTING, LLC

November 14, 2022

Scott Crawford
WSP USA Environment and Infrastructure, inc.
1845 Chicago Street
Riverside, CA 92507
Via email: scott.crawford@wsp.com

Subject: Results of a Mohave Ground Squirrel Habitat Assessment for the 4,460-acre Hydrostor Project near Rosamond, Kern County, California

Dear Scott:

The purpose of this report is to document the results of a Mohave ground squirrel (*Xerospermophilus mohavensis*; MGS) Habitat Assessment conducted by Dipodomys Ecological Consulting LLC (DEC) for the Hydrostor Project (project). Presented in this report are a description of the project, project location, MGS natural history, survey methodology, results of the MGS Habitat Assessment, and conclusions/recommendations.

Project Description and Location

Hydrostor Inc., proposes to develop a 500-megawatt energy storage facility, along with an associated 10.9-mile transmission line alignment to tie into the Southern California Edison (SCE) Whirlwind substation. The 4,460-acre project is located west of the City of Rosamond, in Kern County, California. The project footprint is bordered by Hamilton Road on the north, Rosamond Boulevard on the south, Tehachapi-Willow Springs Road on the east, and 172nd Street on the west (**Figures 1 and 2**). The parcel is surrounded by undeveloped land, abandoned agricultural areas, solar farms, and scattered residential dwellings. The primary sources of disturbance on the site are past and current off-highway vehicle (OHV) activity and illegal dumping. The project site is found within the Willow Springs, Little Buttes, Fairmont Butte, and Tylerhorse Canyon U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps, and it extends from Section 23 Township 9 Range 15W on the west to Section 8 Township 9North and Range 13 West on the east, as shown in **Figure 1**, Project Location.

Mohave Ground Squirrel Natural History

Mohave ground squirrels (*Xerospermophilus mohavensis*) are medium-sized (210-230mm, 85-130g), diurnal squirrels. Their dorsal pelage is light gray to cinnamon-brown, while their ventral side is creamy. Unlike round-tailed ground squirrels, which occur sympatrically in the southeast portion of their range, MGS have a short, flat tail that is light-colored on its underside, and have brown cheeks instead of white.

MGS inhabit a small geographic area in the western Mojave Desert. This species ranges from Palmdale in the southwest, the Lucerne Valley in the southeast, Olancha in the northwest, and the Avawatz Mountains in the northeast (Gustafson 1993). Although occurrences in the southern portion of their range are rare, occurrences have been documented on the California Natural Diversity Database (CNDDB) as recently as

2011 (Figure 3). Vegetation communities (as classified by the California Native Plant Society) typically associated with MGS include Mojave Creosote Scrub, Shadscale Scrub, Desert Saltbush Scrub, Desert Sink Scrub, and Joshua Tree Woodland. MGS feed primarily on the leaves and seeds of forbs and shrubs. In the northern portion of their range, MGS have been found to feed on spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*) and saltbush (*Atriplex* sp.), especially in early spring when forbs are unavailable, during summer when forbs have dried out, and during drought conditions (Leitner and Leitner 1998). Recent studies have also indicated that MGS feed on the following forbs and shrubs: freckled milkvetch (*Astragalus lentiginosus*), Mojave lupine (*Lupinus odoratus*), buckwheat (*Eriogonum* sp.), white mallow (*Eremalche exilis*), fiddleneck (*Amsinckia tessellata*), Russian thistle (*Salsola tragus*), desert pincushion (*Chaenactis* sp.), Cryptantha (*Cryptantha pterocarya*), Coreopsis (*Leptosyne bigelovii*), Valley lessingia (*Lessingia glandulifera*), desert dandelion (*Malacothrix glabrata*), Phacelia (*Phacelia* sp.), wire lettuce (*Stephanomeria* sp.) Anderson's desert thorn (*Lycium andersonii*), spiny horsebrush (*Tetradimya spinosa*), and Joshua tree *(Yucca brevifolia*) (Leitner and Leitner 2017).

MGS have adapted to live in hot desert environments by limiting their activity aboveground through estivation and hibernation. The timing of emergence from hibernation varies by location: in the northern portion of their range male MGS emerge mid-March (Leitner and Leitner 1998); however, in the southern portion of their range, MGS may emerge as early as mid-January (Recht 1977). Throughout their active period, MGS store fat in preparation for estivation, which typically occurs between July and September, but may occur as early as April or May during drought conditions (Leitner et al. 1995). MGS reproduction is dependent on fall and winter rains and individuals may forgo breeding entirely if low rainfall (<80mm) results in reduced herbaceous plants (Leitner and Leitner 2017).

Throughout the range of MGS, they may co-occur with antelope ground squirrels, round-tailed ground squirrels, and California ground squirrels. MGS may be misidentified with round-tailed ground squirrels, but this is unlikely to occur with antelope grounds squirrels, because the latter species has white dorsal stripes that makes them resemble a chipmunk more than an MGS. California ground squirrels are notably larger and are not typically confused with MGS.

MGS are classified as threatened and are protected under the California Endangered Species Act. Primary threats to MGS include limited distribution, low abundance, and habitat loss from by converting suitable habitat to urban, suburban, agricultural, and military land uses (Gustafson 1993, Leitner and Leitner 2017).

Methods

Prior to carrying out the habitat assessment in the field, a 16-quad query of the California Natural Diversity Database (CNDDB) was conducted (including the four quadrangles encompassed by the project footprint: Willow Springs, Little Buttes, Fairmont Butte and Tylerhorse Canyon, plus the adjacent quadrangles).

The MGS habitat assessment was conducted on November 7, 2022, by permitted biologists Karla Flores (MOU Principal Investigator, Scientific Collection Permit SC-10572) and Karl Fairchild (Authorized Individual, SCP S-182820007-18333-001). The habitat assessment consisted of walking meandering transects and driving throughout the project footprint while recording vegetation communities and individual plants that provide suitable habitat for MGS. Biologists recorded areas where known MGS

food plants were present in moderate abundance such as winterfat, spiny hopsage, creosote bush (*Larrea tridentata*), Cooper's boxthorn (*Lycium cooperi*) and Joshua tree. Given the timing of the survey, locations of annuals/forbs associated with MGS were not recorded, because the survey took place outside the flowering season.

Results

The 16-quad CNDDB query yielded four MGS occurrences within the 16-quad search, the most recent of which was recorded in 1998 and the closest of which was 9 miles east of the project (**Figure 2**). All occurrences were separated from the project location by either Highway 14 or Highway 58.

Six different vegetation communities/land uses were recorded within the project footprint during the habitat assessment, including: abandoned agricultural field, allscale saltbush scrub, creosote bush scrub, disturbed Nevada-joint fir scrub, disturbed/developed, Nevada-jointfir-winterfat scrub, and California Juniper wash (**Figure 4**). Each vegetation community was evaluated for its potential to support MGS based on the presence of MGS food plants, suitable substrates for burrowing, and levels of disturbance. Based on these criteria, MGS habitat suitability was characterized as low, or medium, or not present (**Figure 3**). Tables 1 and 2 summarize the acreages of each vegetation community onsite as well as the acreages of habitat quality level present.

Weather conditions during the habitat assessment were generally overcast with temperatures that ranged from 55°-61°F, wind speed ranged between 7-13 mph, and cloud cover ranged from 75-95%. Wildlife species observed during the habitat assessment included common raven (*Corvus corax*), white-crowned sparrow (*Zonotrichia leucophrys*), western meadowlark (*Sturnella neglecta*), Bell's sparrow (*Artemisiospiza belli*), horned lark (*Eremophila alpestris*), European starling (*Sturnus vulgaris*), Cactus wren (*Campylorhynchus brunneicapillus*), house finch (*Haemorhous mexicanus*), rock pigeon (*Columba livia*), American pipit (*Anthus rubescens*), and rock wren (*Salpinctes obsoletus*).

TABLE 1
VEGETATION COMMUNITIES PRESENT ONSITE

Vegetation Type	Acres
Abandoned Agricultural Field	91.78
Allscale Saltbush Scrub	1157.69
Creosote Bush Scrub	2012.35
Disturbed Ephedra Scrub	88.79
Disturbed/Developed	783.69
Nevada joint-fir-Winterfat Scrub	232.10
Juniper Wash	93.94
Total	4,460.34

TABLE 2
MGS HABITAT PRESENT ONSITE

Habitat Quality	Acres
Low	3,287.97
Medium	296.90
Not Present	875.47
Total	4,460.34

Conclusions and Recommendations

The 4,460-acre Hydrostor project footprint encompasses areas with some suitable MGS habitat. Areas with suitable MGS habitat are defined as those with suitable substates for burrowing as well as the presence of plant communities known to provide forage material for MGS (e.g., creosote bush scrub/Nevada joint-fir-winterfat scrub). Known MGS food plants such as winterfat, spiny hopsage (*Grayia spinosa*), Cooper's boxthorn, Joshua tree, creosote bush, and saltbush are present onsite and were used to identify areas of suitable MGS habitat (Leitner 2022).

Despite the presence of some isolated patches of suitable MGS habitat, the project is located approximately seven miles west of the mapped MGS range and is nine miles west of the closest MGS occurrence documented in CNDDB (**Figure 2**). The closest MGS core population area is the Edwards Air Force Base core population area and is separated from the project by Hwy14, a significant barrier to dispersing individuals. In addition, portions of the site that support MGS habitat are small and highly fragmented, existing as isolated patches of suitable habitat surrounded by disturbed areas and intensive development, including large-scale solar farms, wind farms, and agricultural areas. Therefore, there is little potential connectivity to established core populations, and it is unlikely that any dispersing individuals would be encountered in the project area.

It is unlikely that MGS are present within the project based on the range of MGS, lack of connectivity to core population areas and generally low population densities in the southern portion of the MGS range.

I hereby certify that the information in this report is true, and that it conforms to accepted biological standards. Please feel free to contact Karla Flores by phone at (619) 972-4319 or by email at kflores@dipodomysecological.com with any questions regarding this report.

Sincerely,

Karla L. Flores
Principal Biologist, CEO

Figures and Attachments
Figure 1-Project Location
Figure 2-MGS and Historical MGS Occurrences
Figure 3- MGS Habitat Quality
Figure 4- Vegetation Community

Attachment A- Representative Photographs

References

California Department of Fish and Wildlife. California Natural Diversity Database Rarefind. November 6, 2022.

Gustafson, J.R. 1993. A Status Review of the Mohave Ground Squirrel (*Spermophilus mohavensis*). Department of Fish and Game. Nongame Bird and Mammal Report 93-9.

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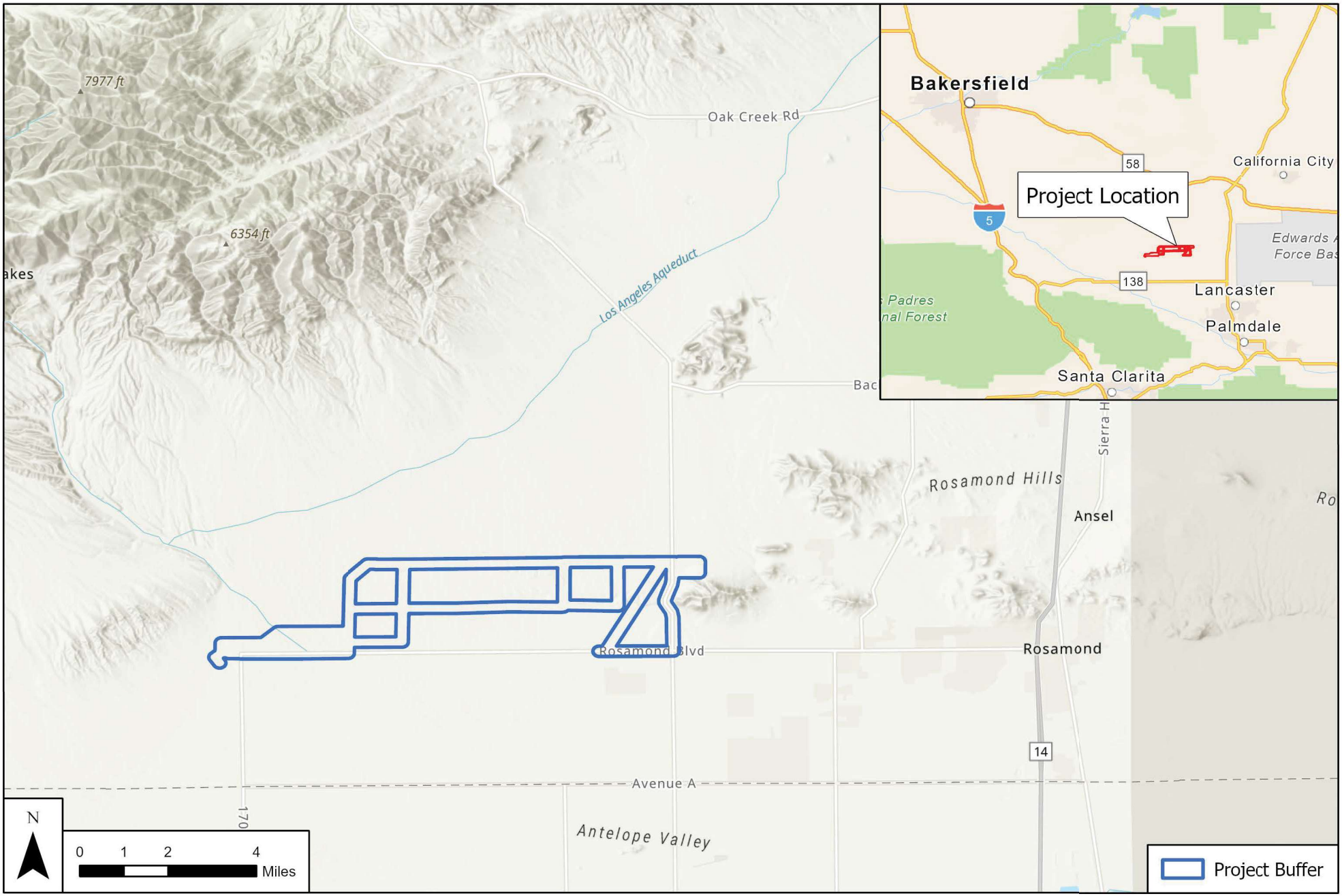
Recht, M.A. 1977. The biology of the Mohave ground squirrel, *Spermophilus mohavensis*. Ph.D. Dissertation, University of California, Los Angeles. 117 pp.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: http://websoilsurvey.sc.egov.usda.gov/. Accessed [11/6/2022].



SOURCE: ESRI

Hydrostor Project

Figure 1

Project Location

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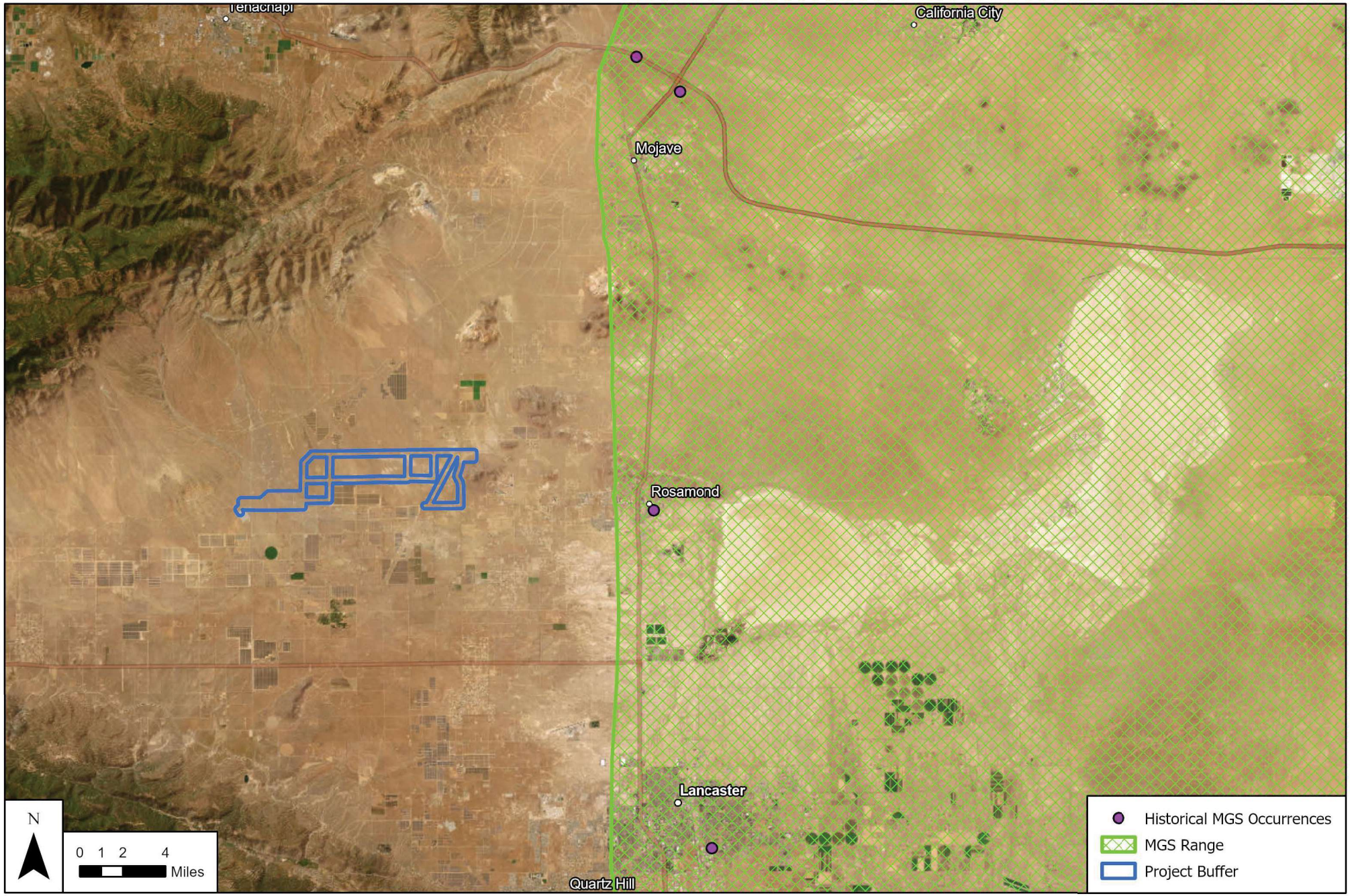

SOURCE: ESRI

Hydrostor Project

Figure 2

MGS Range and Historical Occurrences

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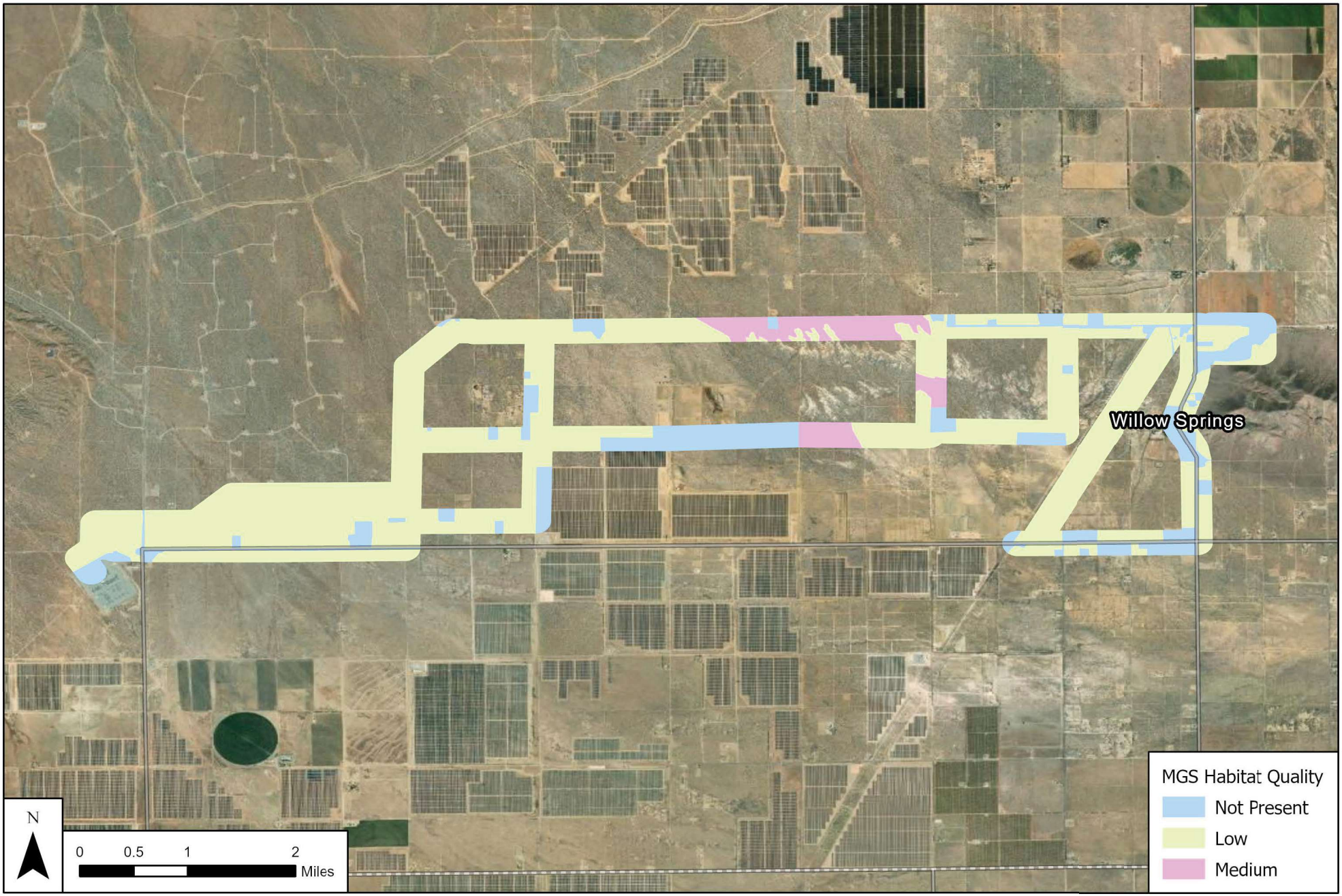

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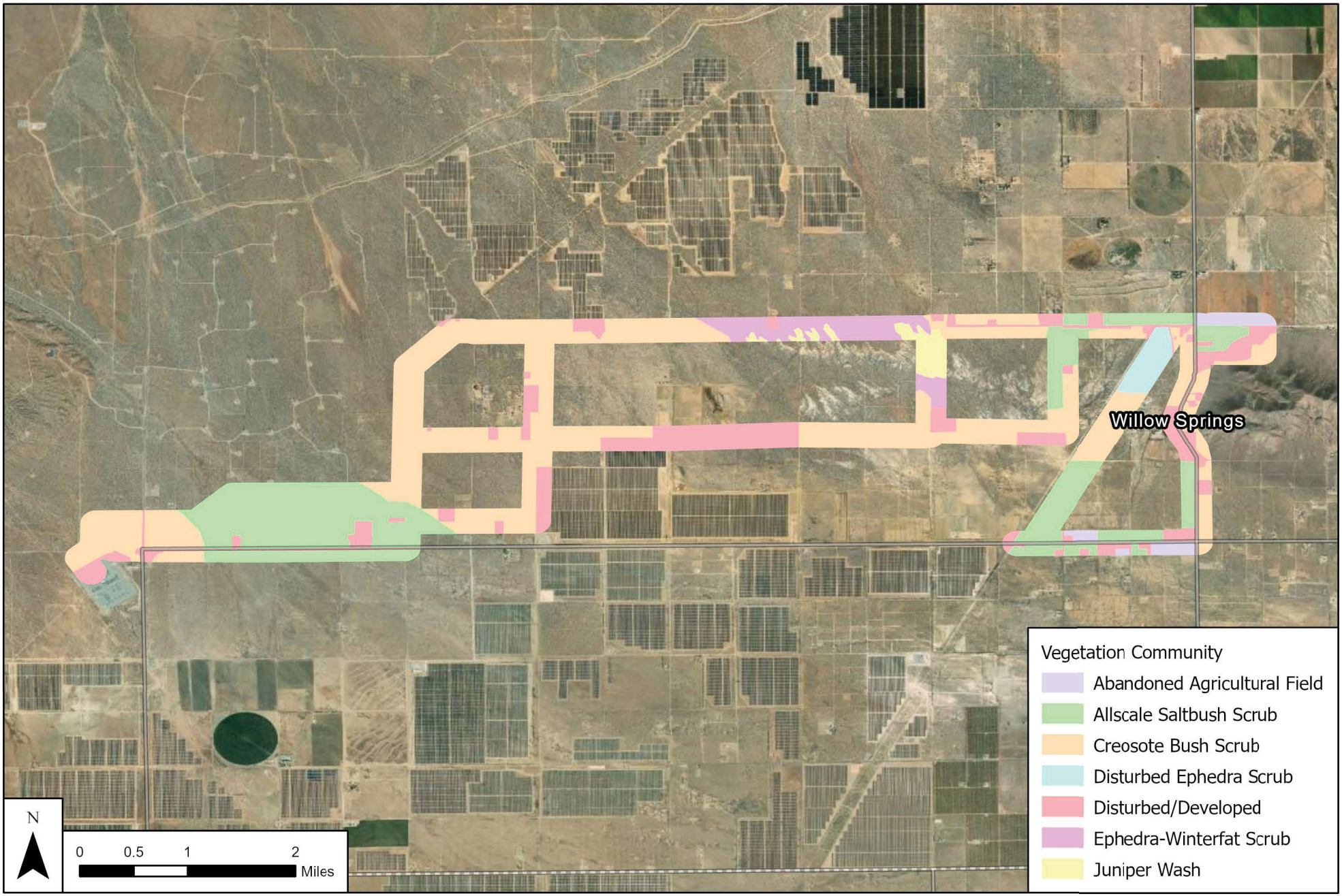
Hydrostor Project

Figure 3

MGS Habitat Quality



SOURCE: ESRI

Hydrostor Project

Figure 4

Vegetation Community

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Attachment A

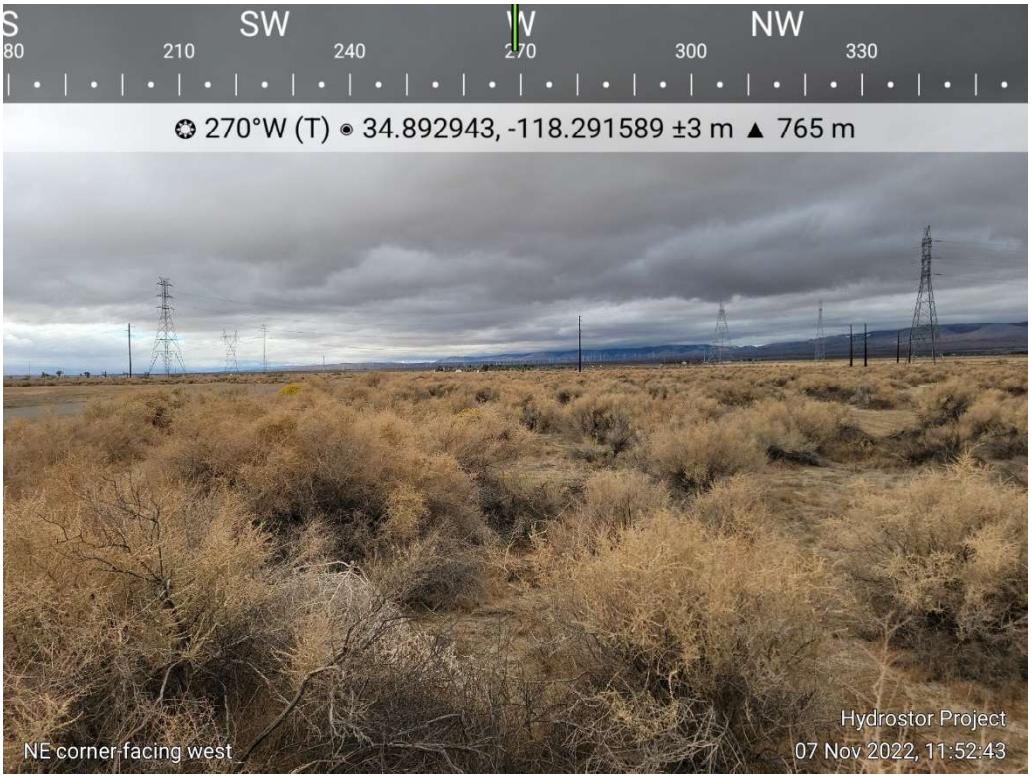

Photo 1: Allscale scrub in northeastern portion of project.

Photo 2: Nevada joint-fir-winterfat scrub.

Photo 3: Creosote bush scrub within wash area.

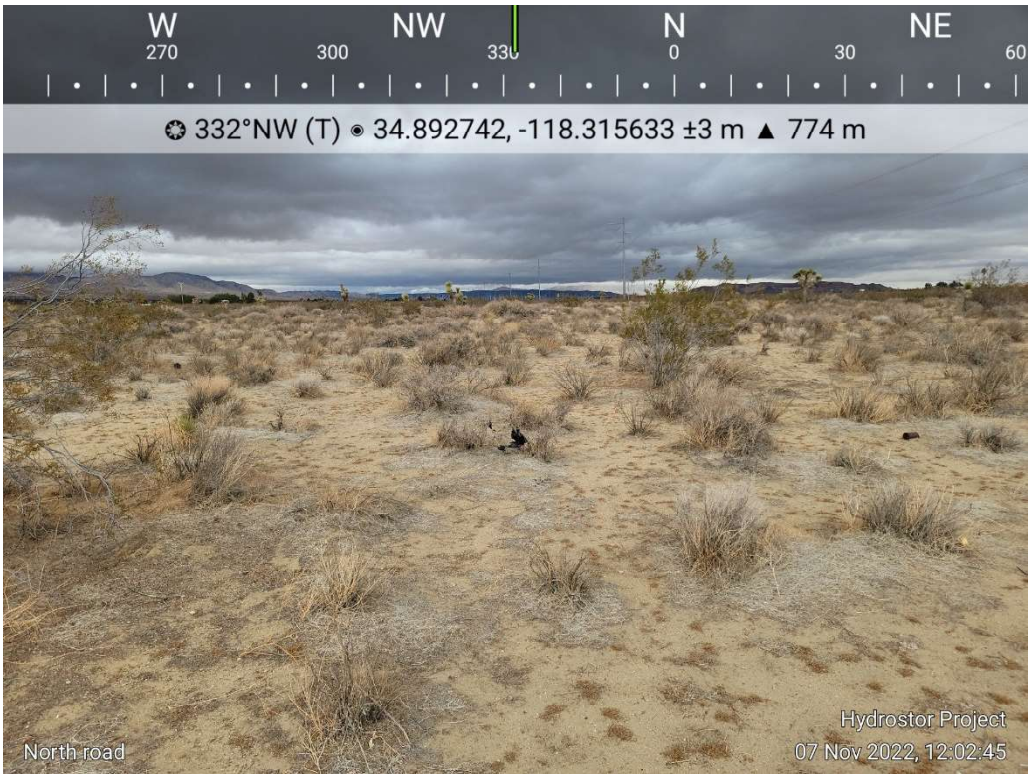

Photo 4: Creosote bush scrub along Hamilton Road.

Photo 5: Disturbed creosote bush scrub along Rosamond Boulevard.

Photo 6: Close-up of winterfat (*Krascheninikovia lanata*), MGS food plant present in project site.