2021 ANNUAL RARE PLANT SURVEY
Fort Ord Natural Reserve
Operable Unit Carbon Tetrachloride Plume, Operable Unit 2, &
Fort Ord Dunes State Park Sites 2/12

CONTRACT NO. W91238-14-D-0010
TASK ORDER W9123819F0015

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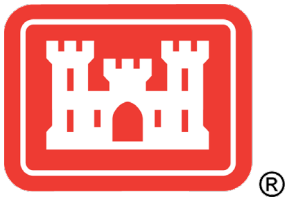

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November 2021

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ACRONYMS AND ABBREVIATIONS

Ahtna	Ahtna Environmental, Inc.
BRAC	Base Realignment and Closure Division
Burleson	Burleson Consulting Inc., A Terracon Company
CNDDB	California Natural Diversity Database
CT	Carbon tetrachloride
DD&A	Denise Duffy & Associates
EISB	Enhanced In Situ Bioremediation
FODSP	Fort Ord Dunes State Park
FONR	Fort Ord Natural Reserve
ft	foot/feet
ft^2	square feet
HMP	Habitat Management Plan
in	inches
OU1	Operable Unit 1
OU2	Operable Unit 2
OUCTP	Operable Unit Carbon Tetrachloride Plume
PBO	Programmatic Biological Opinion
TCE	Trichloroethene
UC	University of California
USACE	United States Army Corps of Engineers

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1. INTRODUCTION

Burleson Consulting Inc., A Terracon Company (Burleson) was issued Task Order W9123819F0015 on Contract W91238-14-D-0010 by the United States Army Corps of Engineers (USACE) to survey rare plants in Fort Ord Natural Reserve (FONR) and Fort Ord Dunes State Park (FODSP) at former Fort Ord in Marina, California (see Figure 1-1). This report summarizes the 2021 (Year 3) rare plant survey results at two reference sites and in Operable Unit Carbon Tetrachloride Plume (OUCTP), Operable Unit 2 (OU2), and at Sites 2/12 in FODSP.

The Fort Ord U.S. Army Base was closed in 1994 and a portion of former Fort Ord was transferred to the University of California (UC). Fort Ord Natural Reserve was established in 1996 as part of the UC Natural Reserve system. Fort Ord Dunes State Park was established in 2009 when the Army transferred land to California State Parks. Groundwater in the aquifer under FONR and FODSP was contaminated with trichloroethene (TCE), carbon tetrachloride (CT), and other chemicals of concern due to activities conducted on the former Fort Ord between 1962 and 1985. Groundwater cleanup began in 1988 with the construction of the Groundwater Extraction and Treatment System and is ongoing.

The *Installation-Wide Multispecies Habitat Management Plan* (HMP) and the reinitiated *Programmatic Biological Opinion* (PBO) *for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord* require that rare plant surveys be conducted for three years after destruction or installation of remediation facilities to ensure that project activities protect and maintain special-status species (USACE, 1997; USFWS, 2017). The two rare plants of concern in FONR and FODSP are sand gilia (*Gilia tenuiflora* ssp. *arenaria*) and Monterey spineflower (*Chorizanthe pungens* var*. pungens*). Yadon's piperia (*Piperia yadonii*) was not initially surveyed but was added to the survey in 2016 at the request of the agencies in accordance with the 2017 PBO.

Burleson was contracted by USACE in 2021 to conduct rare plant surveys at two reference sites and at select wells and well access routes within OUCTP, OU2, and Sites 2/12 (see Table 1-1). The OUCTP, OU2, and Sites 2/12 survey areas consisted of six wells and secondary access routes; three of which were installed and three of which were decommissioned in 2018. Baseline surveys (Year 0) for OUCTP, OU2, and Sites 2/12 were conducted in 2018 by Denise Duffy & Associates (DD&A) as a subcontractor to Ahtna Environmental, Inc (Ahtna, 2018) and Year 1 and Year 2 monitoring was conducted by Burleson in 2019 and 2020, respectively (Burleson, 2019; Burleson, 2020).

The 2017 PBO states that, in FONR, "monitoring will be suspended at sites where HMP annuals have not been documented during baseline surveys nor in the first year of follow up surveys. Additionally, surveys for HMP annuals will not be conducted in areas considered low quality habitat for these species" (USFWS, 2017). During Baseline or Year 1 surveys in the OUCTP, OU2, and Sites 2/12 survey areas, sand gilia was observed at four out of six wells and Monterey spineflower was observed at all six wells. Two of the wells (MW-02-12-180 and MW-BW-29-180) did not have sand gilia in Baseline, nor in Year 1 follow up surveys and their locations are within low quality habitat for this species (see Appendix A Table A-1). These two well locations were not surveyed for sand gilia in Year 2 or Year 3 surveys. Monterey spineflower surveys were completed at all six well locations each year.

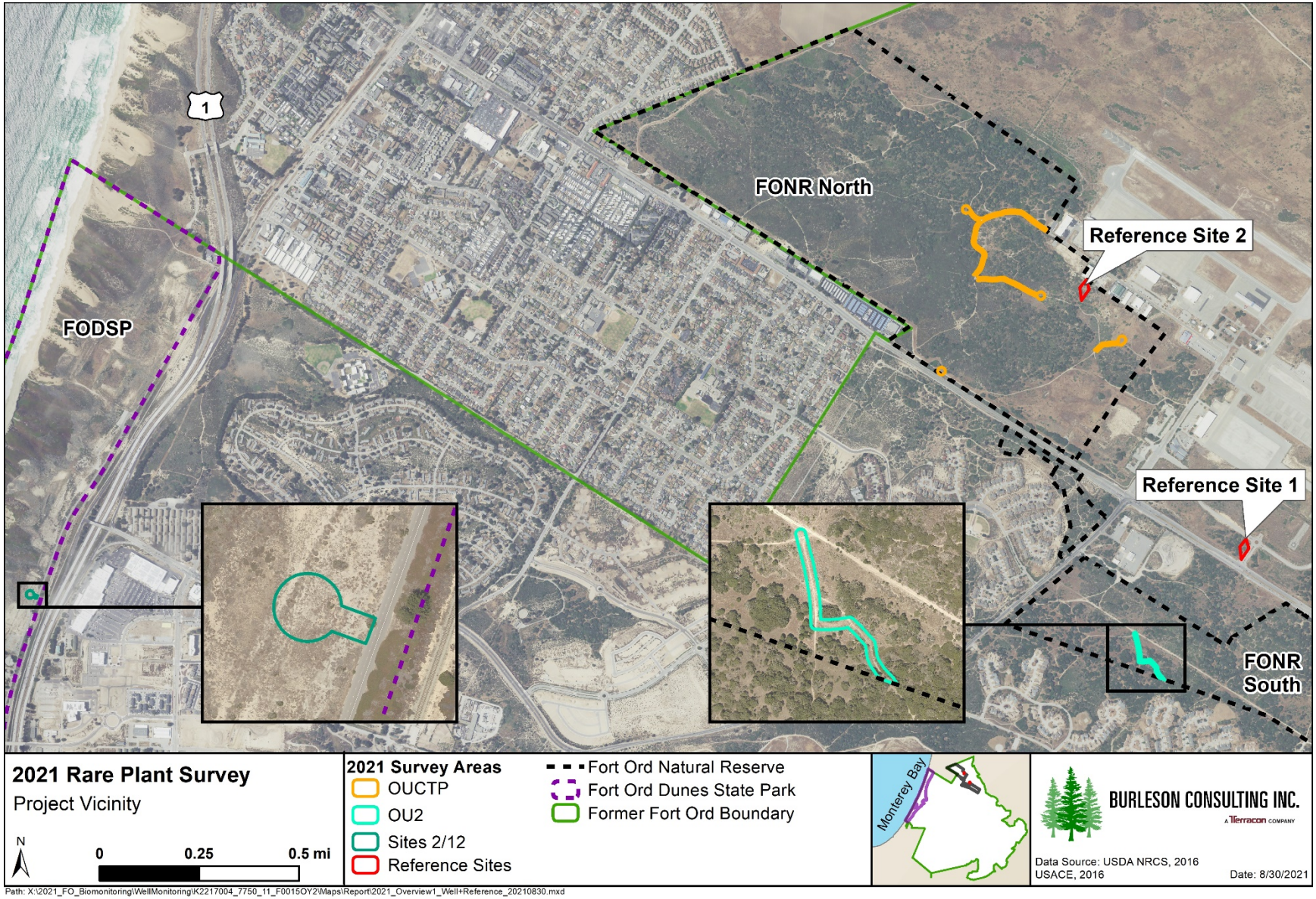

Figure 1-1. Project Vicinity

Table 1-1. Well Locations Surveyed in 2021

Well Installation/ Decommission Year	Location	Unit	Well Identification	Survey Year
2018 (Installation)	FONR North	OUCTP	MW-BW-93-A	3
2018 (Installation)	FONR North	OUCTP	MW-BW-94-A	3
2018 (Installation)	FONR North	OUCTP	MW-BW-95-A	3
2018 (Decommission)	FONR North	OUCTP	MW-BW-29-180*	3
2018 (Decommission)	FONR South	OU2	MW-OU2-59-A	3
2018 (Decommission)	FODSP	Sites 2/12	MW-02-12-180*	3

* Wells that were not surveyed for sand gilia

1.1 Site Location and Description

Fort Ord Natural Reserve is 605 acres of coast live oak woodland, coastal scrub, maritime chaparral, and annual grassland. The property is divided into three parcels: FONR North which contains the OUCTP survey area, FONR South which contains the OU2 survey area, and a small area between the two larger parcels (see Figure 1-1). Fort Ord Dunes State Park is approximately 980 acres of beach strand and sand dunes to the southeast of FONR on the coast and contains the Sites 2/12 survey area. FONR and FODSP provide suitable habitat for several rare plant species including sand gilia and Monterey spineflower. Yadon's piperia prefers maritime chaparral, Monterey pine forest, and Monterey cypress forest; it was included in rare plant surveys beginning in 2016 per agencies request.

1.1.1 Reference Sites

The reference site typically used for this study (Reference Site 1) is located southeast of FONR North and was established by DD&A in 2010 due to its known populations of sand gilia and Monterey spineflower and easy accessibility (see Figure 1-2; HGL, 2011). The dominant habitat type of the reference site is coast live oak woodland with patches of annual grasslands that support populations of Monterey spineflower and sand gilia. It is bounded on three sides by paved roads (Reservation Road, MBEST Drive, and University Drive).

Reference Site 2 was established by DD&A in 2019, per regulatory agency request, as Reference Site 1 had become overgrown by annual grasses and was generally not representative of conditions present at well locations (Ahtna 2020; USACE 2019a). Reference Site 2 is located on FONR North, has a similar disturbance history as the monitored wells, and is characterized by maritime chaparral with open sandy areas that support populations of Monterey spineflower and sand gilia (see Figure 1-3). The northern-most point of the site abuts the southern edge of 730 Neeson Road, Marina, CA.

1.1.2 Operable Unit 2, OUCTP, and Sites 2/12 Survey Areas

Cleanup of groundwater in OUCTP is underway; the chemicals of concern are CT, tetrachloroethene, chloroform, 1,1-dichloroethene, total-1,2-dichloroethene, methylene chloride, vinyl chloride, and TCE. In 2016, the Enhanced In Situ Bioremediation (EISB) Deployment Area was constructed to treat groundwater in OUCTP (Ahtna, 2018). USACE contracted with Ahtna in 2014 to monitor groundwater gradients and implement additional EISB deployment areas if necessary.

Wells in the OUCTP, OU2, and Sites 2/12 survey areas were either decommissioned or installed in 2018 (see Table 1-1 and Figure 1-4). One decommissioned well and three newly installed wells were surveyed

in OUCTP in the eastern half of FONR North. The one decommissioned well in OU2 was located outside the southern FONR property boundary (MW-OU2-59-A); only the secondary access route inside FONR South was surveyed. One decommissioned well was surveyed at Sites 2/12. Sand gilia was not surveyed at well MW-BW-29-180 and Sites 2/12 while Monterey spineflower was surveyed at all six wells (see Table 1-1).

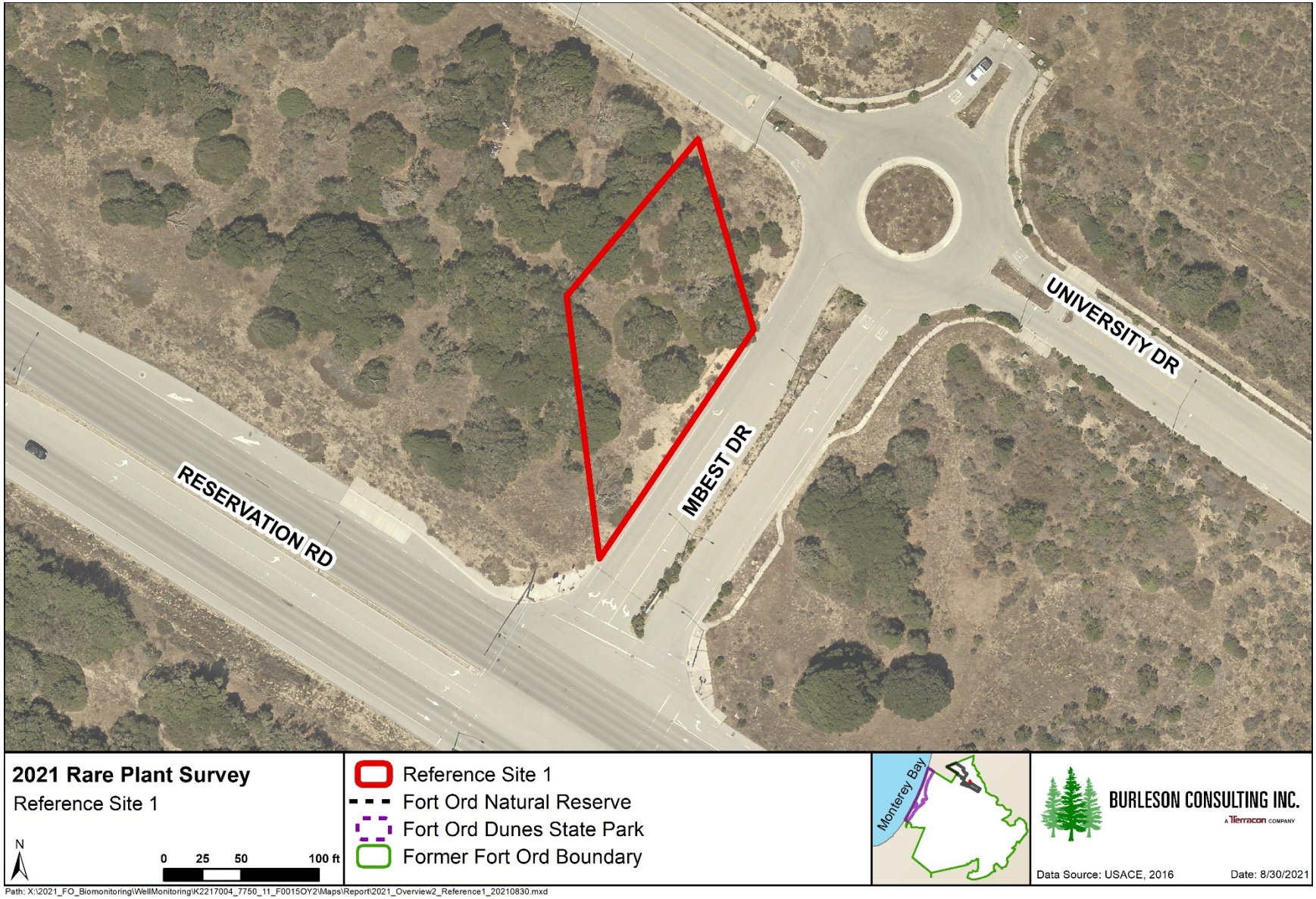

Figure 1-2. Reference Site 1 Overview

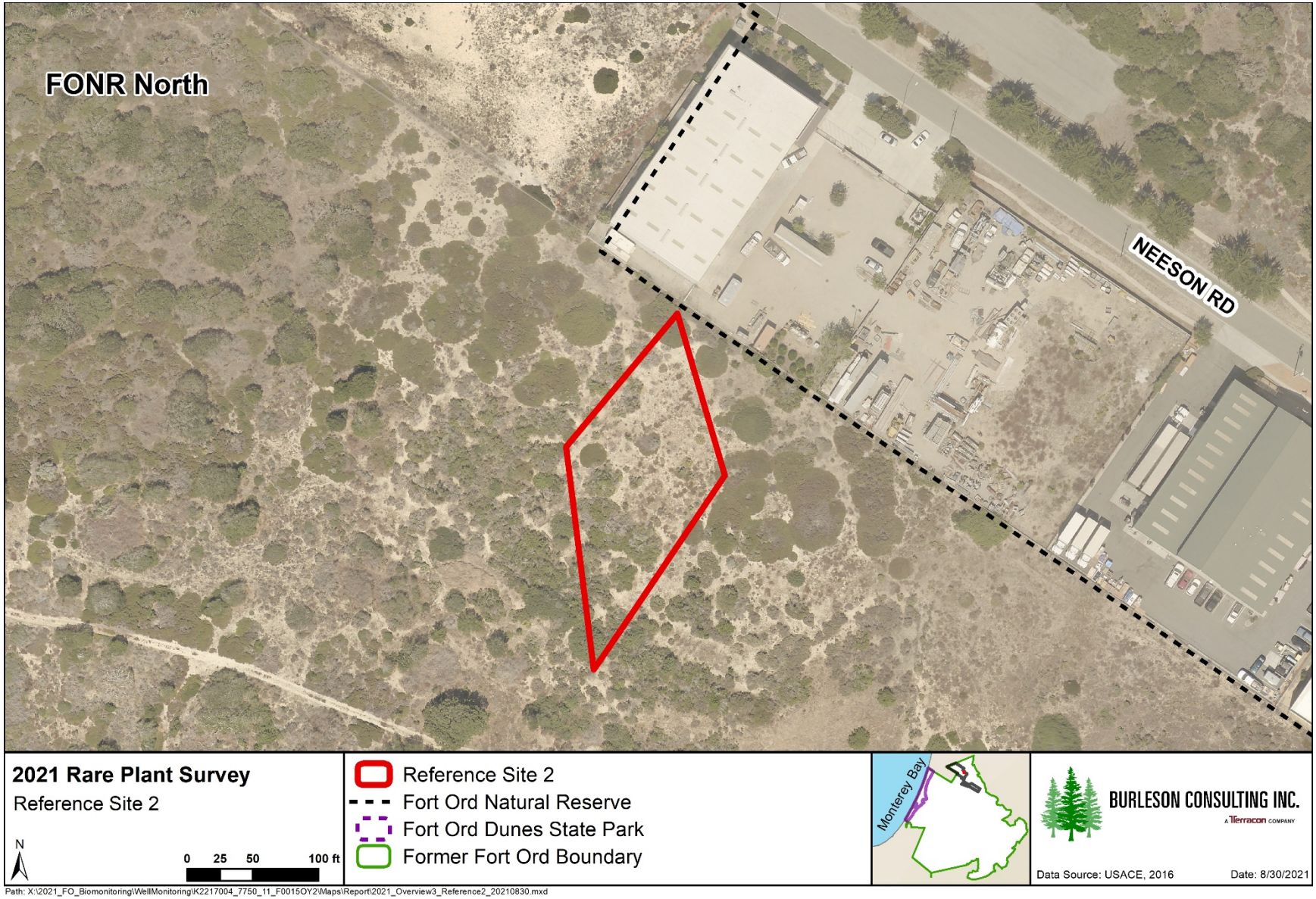

Figure 1-3. Reference Site 2 Overview

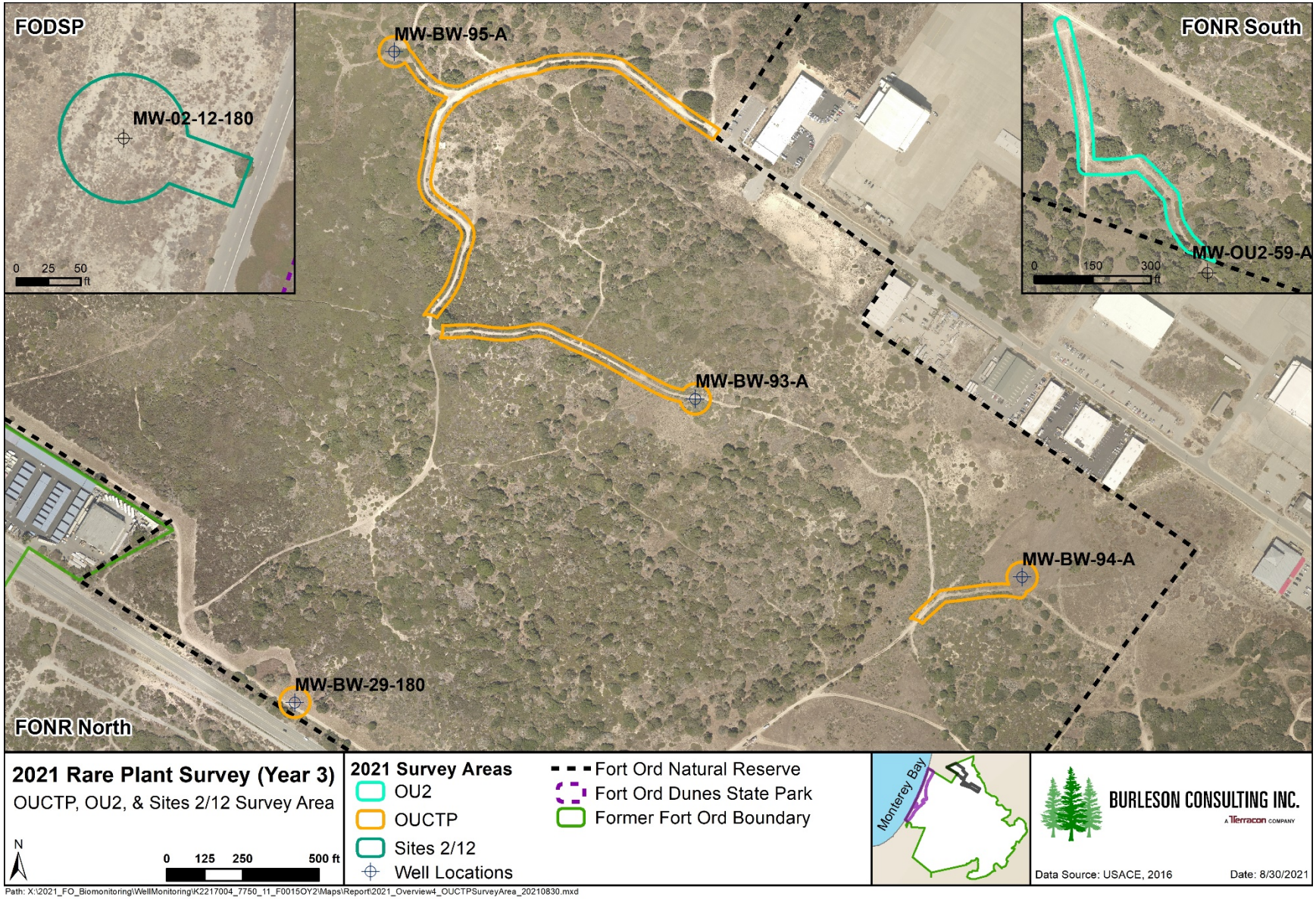

Figure 1-4. OUCTP, OU2, and Sites 2/12 Survey Area Overview

1.2 Special Status Species

1.2.1 Sand Gilia

Sand gilia is a native, annual herb in the phlox family (Polemoniaceae). It is listed as state Threatened and federally Endangered (CNDDB, 2021). Sand gilia occurs in open sandy soil in maritime chaparral, dune scrub, coastal scrub, and disturbed areas. The plant forms a prostrate, basal rosette with serrate or once pinnate leaves (Porter, 2018). The branching flowering stalks range from two to six inches (in) tall and are densely glandular. The plant blooms from April through June and the flower consists of a narrow tube with a purple throat and pink to purple lobes. Sand gilia is endemic to Monterey Bay. The California Natural Diversity Database (CNDDB) lists 28 occurrences in Monterey County, four of which are extirpated (CNDDB, 2021).

1.2.2 Monterey Spineflower

Monterey spineflower is a native, annual herb in the buckwheat family (Polygonaceae). It is listed as federally Threatened (CNDDB, 2021). Monterey spineflower occurs in open sandy soil in maritime chaparral, dune scrub, coastal scrub, and disturbed areas. The plant is prostrate with dense inflorescences and a white to pink corolla; it blooms from April to June (Reveal and Rosatti, 2014). Monterey spineflower may be confused with diffuse spineflower (*Chorizanthe diffusa*) and Fort Ord spineflower (*Chorizanthe minutiflora*) except that diffuse spineflower has yellow-throated white flowers and an upright inflorescence and Fort Ord spineflower has very small greenish white flowers barely exserted from the calyx (Yeager and Mitchell, 2016). The CNDDB lists 39 occurrences of Monterey spineflower in Monterey County, two of which are possibly extirpated, and one which is extirpated (CNDDB, 2021).

1.2.3 Yadon's Piperia

Yadon's piperia is a native perennial herb in the orchid family (Orchidaceae). It is listed as federally Endangered (CNDDB, 2021). Yadon's piperia occurs in maritime chaparral, Monterey pine forest, and Monterey cypress forest. The plant has two to three basal leaves and a single erect flowering stalk (Ackerman and Lauri, 2013). Its white flowers are distinguished from other piperia species by the distinctive short, downward facing spur. Yadon's piperia blooms from May to August. The CNDDB lists 26 occurrences in Monterey County, one of which is possibly extirpated (CNDDB, 2021).

1.3 Survey Objectives

The objectives of the 2021 rare plant surveys were to:

1. Identify locations and estimate populations of select rare plants at two reference sites.
2. Identify locations and estimate populations of select rare plants at three 2018 well destruction sites, three 2018 well installation sites, and secondary access routes in FONR and FODSP (Year 3).
3. Map sand gilia, Monterey spineflower, and Yadon's piperia populations for comparison to past surveys and to inform future management activities.
4. Assess results with respect to Success Criteria specified in the 2017 PBO. Those are:
   4.1. Densities and acreage of HMP annual species are within a normal range compared with information from reference sites, and
   4.2. The number of wells where HMP annual species are detected in follow up surveys will be the same or greater than the number of wells where these species were found in Baseline surveys.

2. METHODS

Sand gilia and Monterey spineflower were surveyed during peak bloom to map population size and abundance. Peak bloom was determined by visiting the reference sites and communicating with FONR staff and the Base Realignment and Closure (BRAC) biologist. Piperia was surveyed for the presence of vegetative structures at the same times as sand gilia and Monterey spineflower. If piperia plants were observed, locations were reported to the BRAC office so that the BRAC biologist could return during the appropriate bloom period to identify the species.

Burleson biologists mapped rare plants using a Trimble® Juno® T41/5B Series GPS unit with an external Trimble® R1 GNSS receiver. For OUCTP, OU2, and Sites 2/12, rare plants were considered within the survey area if they were within a 50 foot (ft) radius of a well location or within 20 ft of secondary access routes (see Figure 1-4). When sand gilia, Monterey spineflower, or Yadon's piperia were encountered, the survey was extended beyond the survey area to the boundary of the population encountered. If the population extended more than 500 ft beyond the survey area, then the polygon was cut off at the survey area boundary.

Following protocol from the *2016 FONR Impact Assessment and Habitat and Rare Plant Species Survey Results, Operable Unit 1* and conversations with DD&A biologists, we considered populations discrete if there was a gap of greater than three feet between individuals (HGL, 2017). Populations of five or fewer individuals were mapped as points and the number of individual plants for each point was recorded. Populations with more than five individuals were mapped using polygons. Individual plants were counted for all sand gilia and Yadon's piperia populations (points and polygons), whereas Monterey spineflower individuals were only counted for points. Monterey spineflower populations mapped as polygons were instead characterized by the average absolute percent cover within the polygon. Percent cover was decided by visually assessing the entire polygon and determining which cover class best fit the polygon on average.

The cover classes used, as defined by HGL in 2017, were:

- Very Sparse (corresponding to an absolute cover of less than 3 percent)
- Sparse (3 to 25 percent)
- Medium Low (26 to 50 percent)
- Medium (51 to 75 percent)
- Medium High (76 to 97 percent)
- Very High (greater than 97 percent)

Data defining rare plant populations were exported from the GPS unit to shapefile format and were projected into NAD 1983 State Plane California IV FIPS 0404 (US Feet) using ArcGIS 10.8.1 software (ESRI, 2020). Polygons were manually cleaned to remove loop backs along edges and individual points were buffered to one foot.

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3. RESULTS

3.1 Sand Gilia

Sand gilia was surveyed on April 12, 13, and 14, 2021. The following sections describe sand gilia populations mapped within the reference sites, OUCTP, and OU2 survey areas.

3.1.1 Reference Sites

Sand gilia was present at both reference sites in 2021. Twenty-three populations of sand gilia (10 points and 13 polygons) were mapped at Reference Site 1 (see Figure 3-1 and Appendix B Table B-1). The populations totaled 926 individuals and occupied 1,062 square feet (ft^2). Eight populations of sand gilia (six points and two polygons) were mapped at Reference Site 2 (see Figure 3-2 and Appendix B Table B-2). The populations totaled 39 individuals and occupied 45 ft^2.

3.1.2 OUCTP and Operable Unit 2

Sand gilia was present at the three wells surveyed within the OUCTP survey area and along the access route in the OU2 survey area (see Figures 3-3 through 3-8, 3-10, and Appendix B Table B-3). Thirty populations of sand gilia (20 points and 10 polygons) totaling 629 individuals and occupying 604 ft^2 were mapped in the OUCTP survey area. Thirteen populations of sand gilia (six points and seven polygons) totaling 922 individuals and occupying 1,267 ft^2 were mapped in the OU2 survey area.

3.2 Monterey Spineflower

Monterey spineflower was surveyed on May 12, 13, 14, and 17, 2021. The following sections describe Monterey spineflower populations mapped within the reference sites, OUCTP, OU2, and Sites 2/12 survey areas.

3.2.1 Reference Sites

Monterey spineflower was present at both reference sites in 2021. Thirty Monterey spineflower populations (15 points and 15 polygons) occupying 1,890 ft^2 were mapped at Reference Site 1 (see Figure 3-1 and Appendix B Table B-4). Of the fifteen populations represented by polygons, four were Very Sparse (less than three percent cover) and 11 were Sparse (3-25 percent cover). Twenty-eight Monterey spineflower populations (20 points and eight polygons) occupying 4,286 ft^2 were mapped at Reference Site 2 (see Figure 3-2 and Appendix B Table B-5). Of the eight populations represented by polygons, three were Very Sparse and five were Sparse.

3.2.2 OUCTP, Operable Unit 2, and Sites 2/12

Monterey spineflower was present at the four wells in the OUCTP survey area, along the OU2 access route, and at one well surveyed at Sites 2/12 (see Figures 3-3 through 3-11 and Appendix B Table B-6). One hundred fifty-eight populations (95 points and 63 polygons) occupying 8,655 ft^2 were mapped within the OUCTP survey area. Of the 63 populations represented by polygons, 16 were Very Sparse, 46 were Sparse, and one was Medium Low.

Fifty-four populations (37 points and 17 polygons) occupying 14,379 ft^2 were mapped within the OU2 survey area. Of the 17 populations represented by polygons, four were Very Sparse and 13 were Sparse.

Two populations (both polygons) occupying 202 ft^2 were mapped within the Sites 2/12 survey area. One population was Very Sparse and one was Sparse.

3.3 Yadon's Piperia

Yadon's piperia was surveyed simultaneously with sand gilia and Monterey spineflower. No individuals were observed at the reference sites. Two piperia rosettes were identified within the MW-OU2-59-A well access route on April 14, 2021, but when the site was surveyed again in May, the rosettes had dried without flowering and the plants were not identifiable to species. No piperia were found within the remaining 2021 survey areas. Yadon's piperia will not be discussed further in this report.

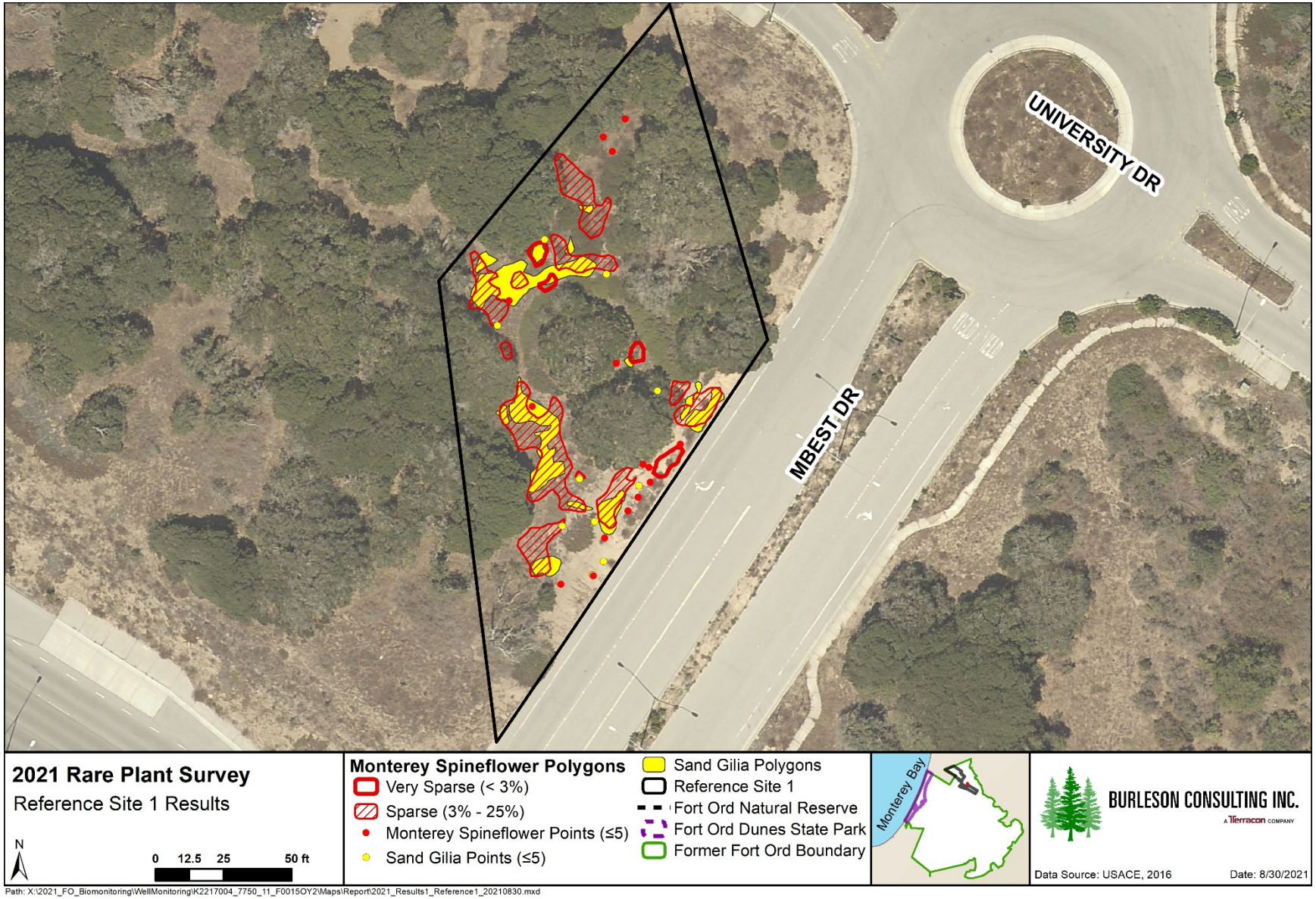

Figure 3-1. 2021 Reference Site 1 Sand Gilia and Monterey Spineflower Populations

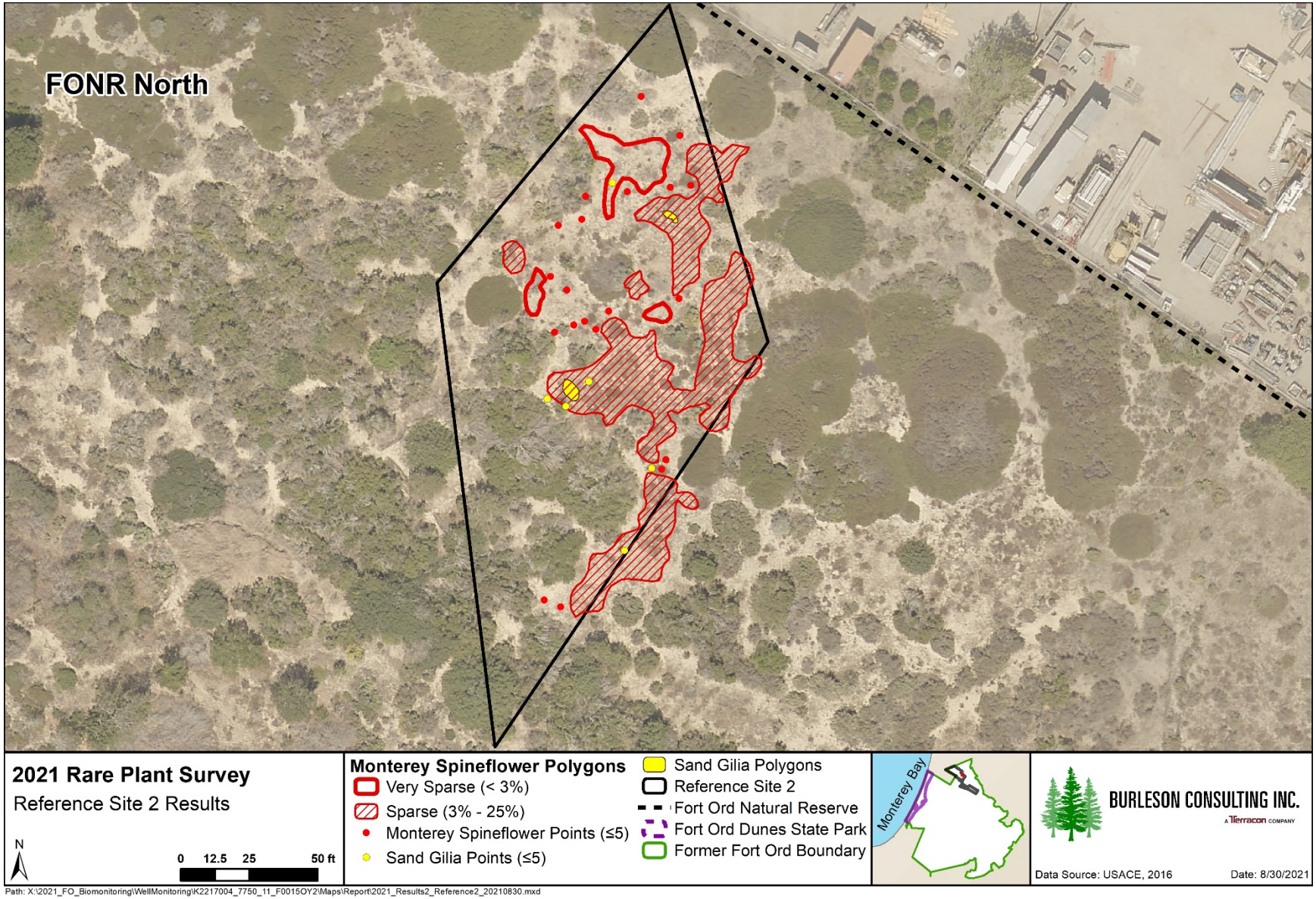

Figure 3-2. 2021 Reference Site 2 Sand Gilia and Monterey Spineflower Populations

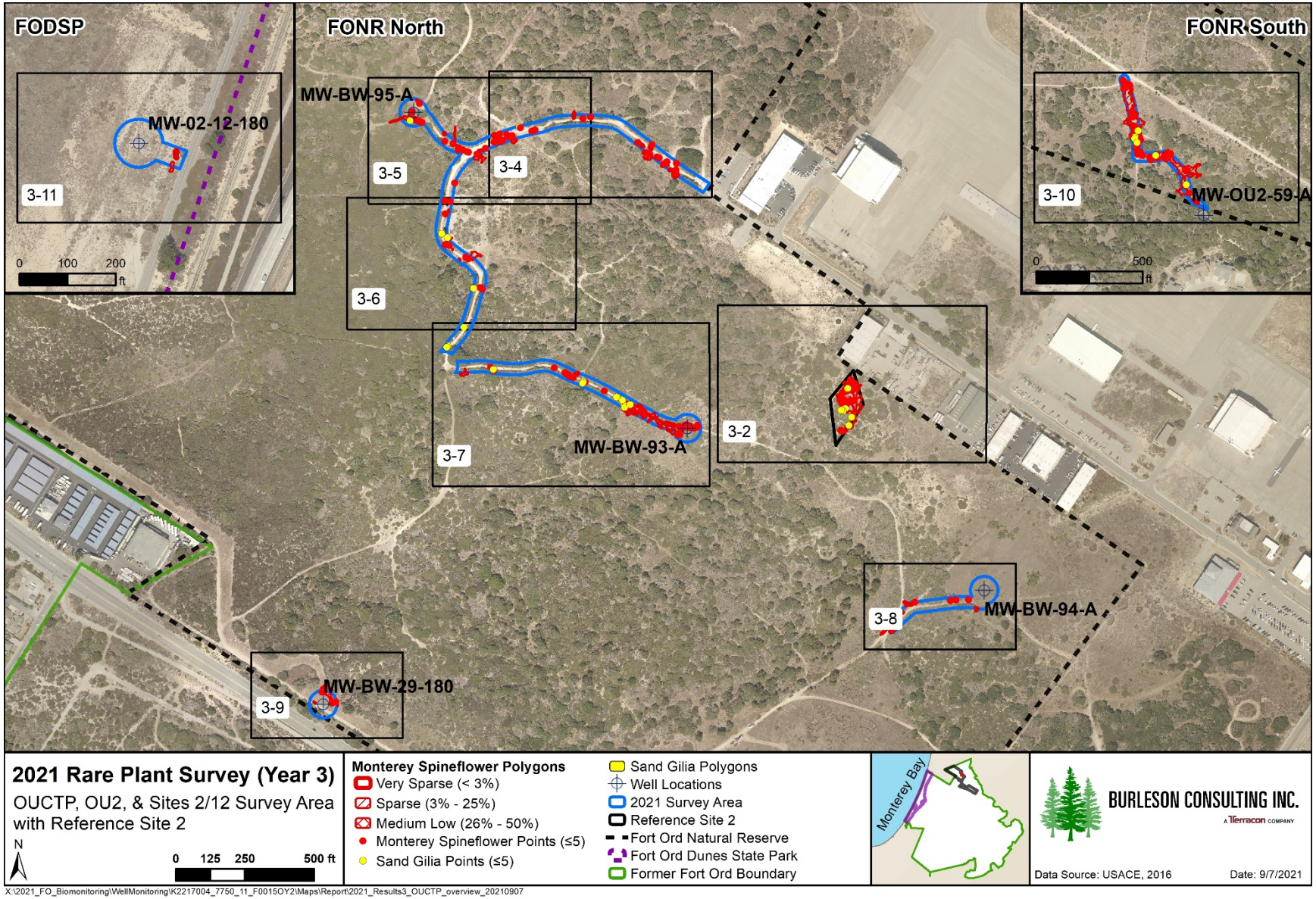

Figure 3-3. 2020 OUCTP, OU2, and Sites 2/12 Survey Area Rare Plant Populations Overview

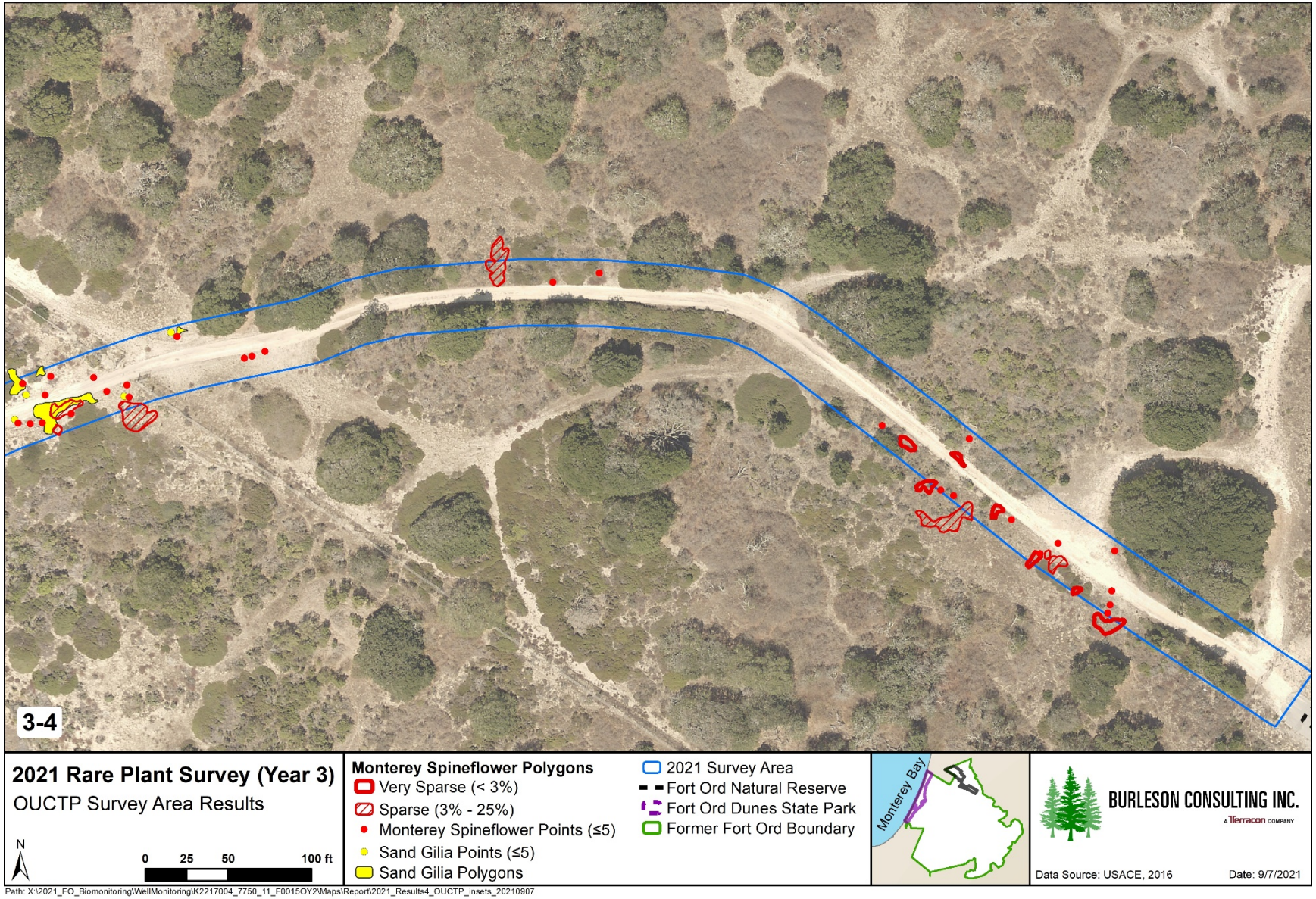

Figure 3-4. 2021 OUCTP Survey Area Sand Gilia and Monterey Spineflower Populations

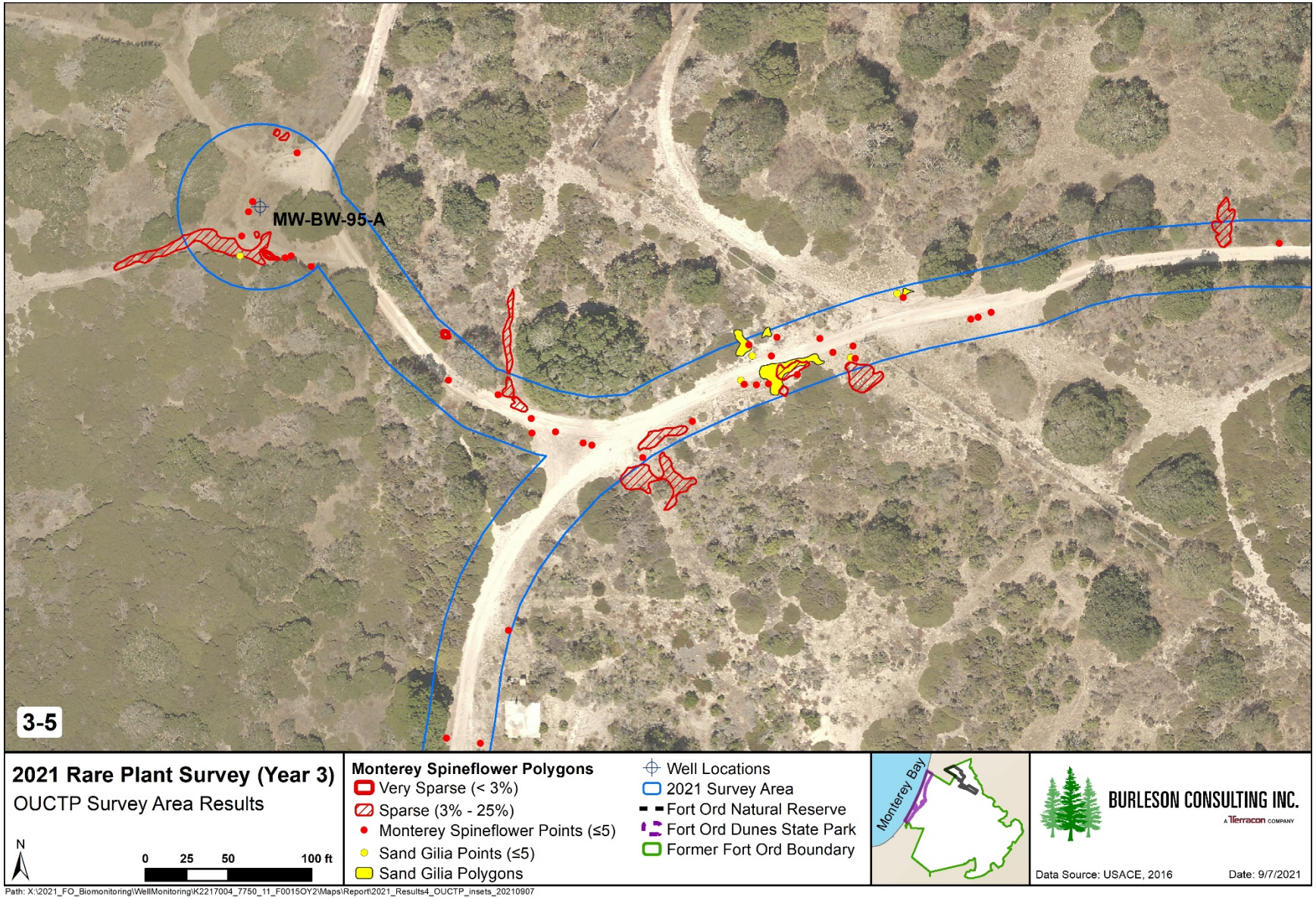

Figure 3-5. 2021 OUCTP Survey Area Sand Gilia and Monterey Spineflower Populations

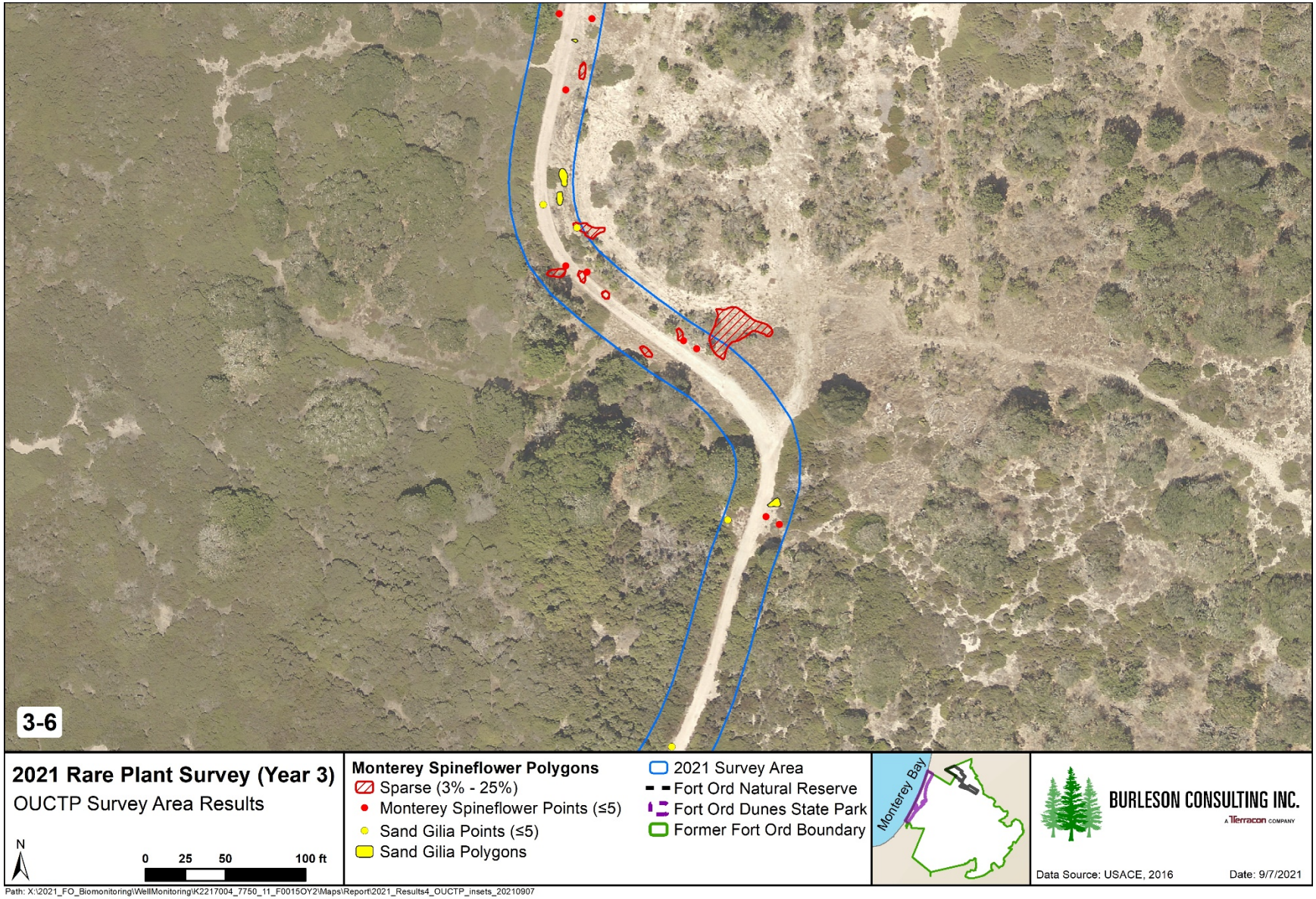

Figure 3-6. 2021 OUCTP Survey Area Sand Gilia and Monterey Spineflower Populations

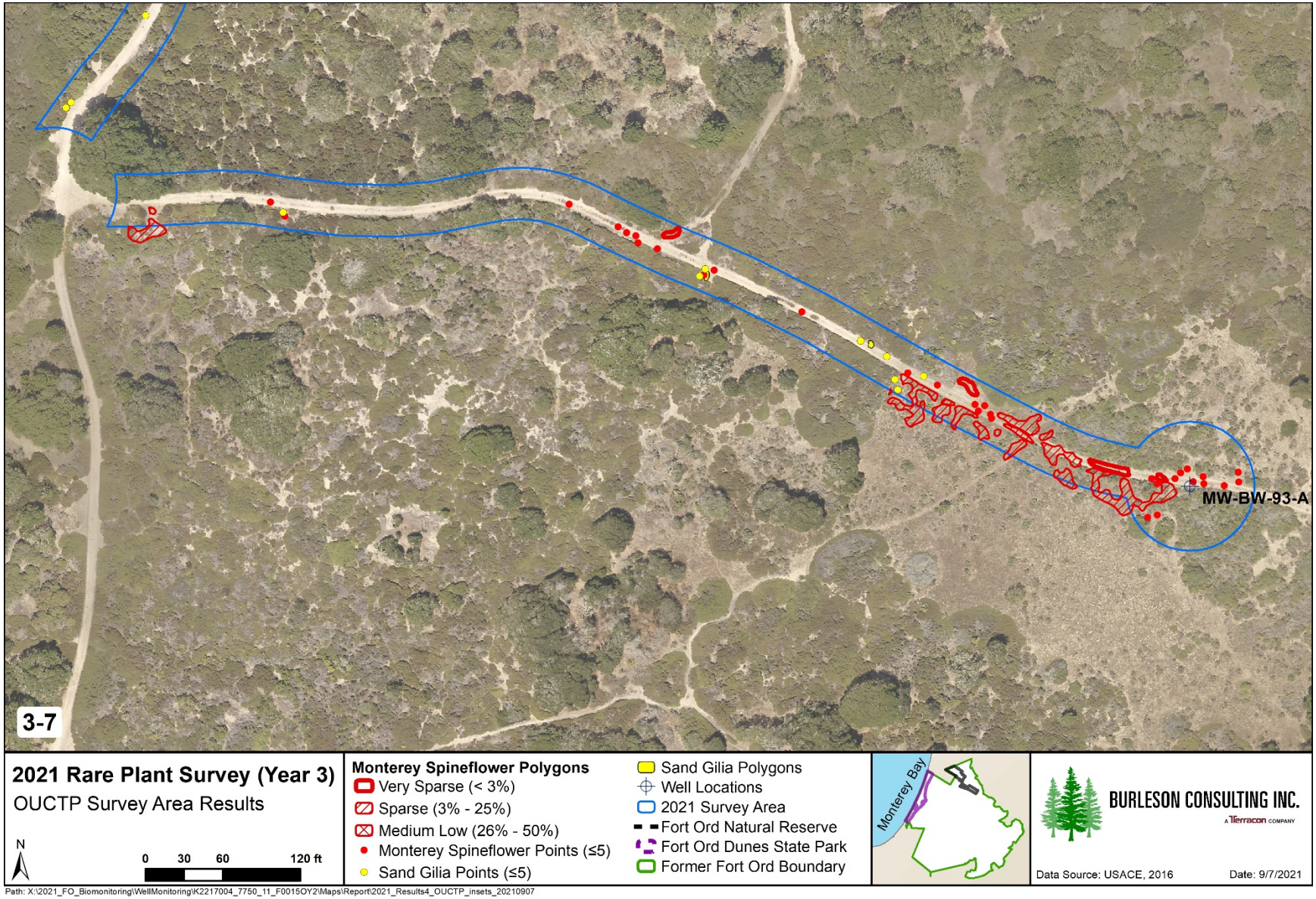

Figure 3-7. 2021 OUCTP Survey Area Sand Gilia and Monterey Spineflower Populations

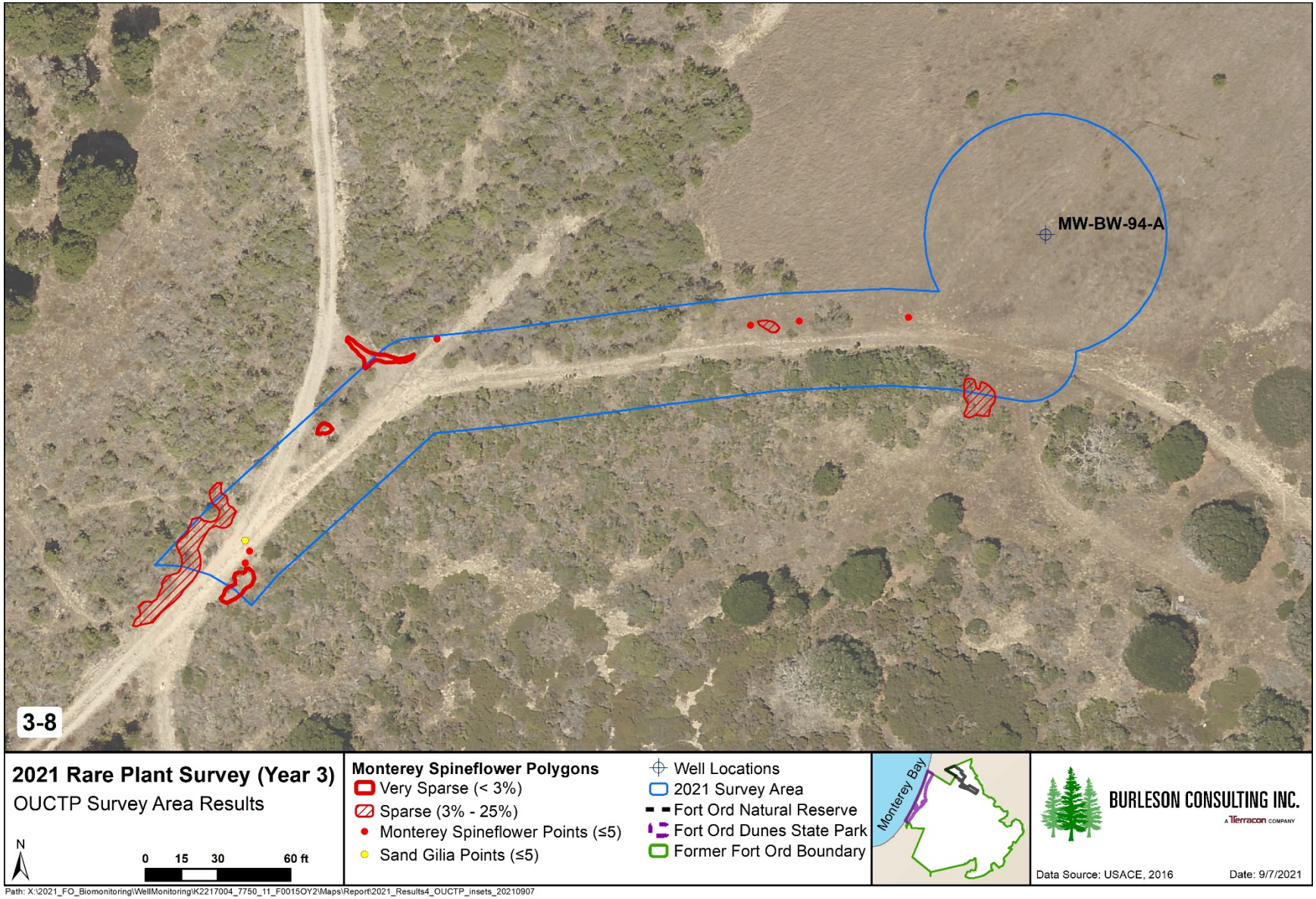

Figure 3-8. 2021 OUCTP Survey Area Sand Gilia and Monterey Spineflower Populations

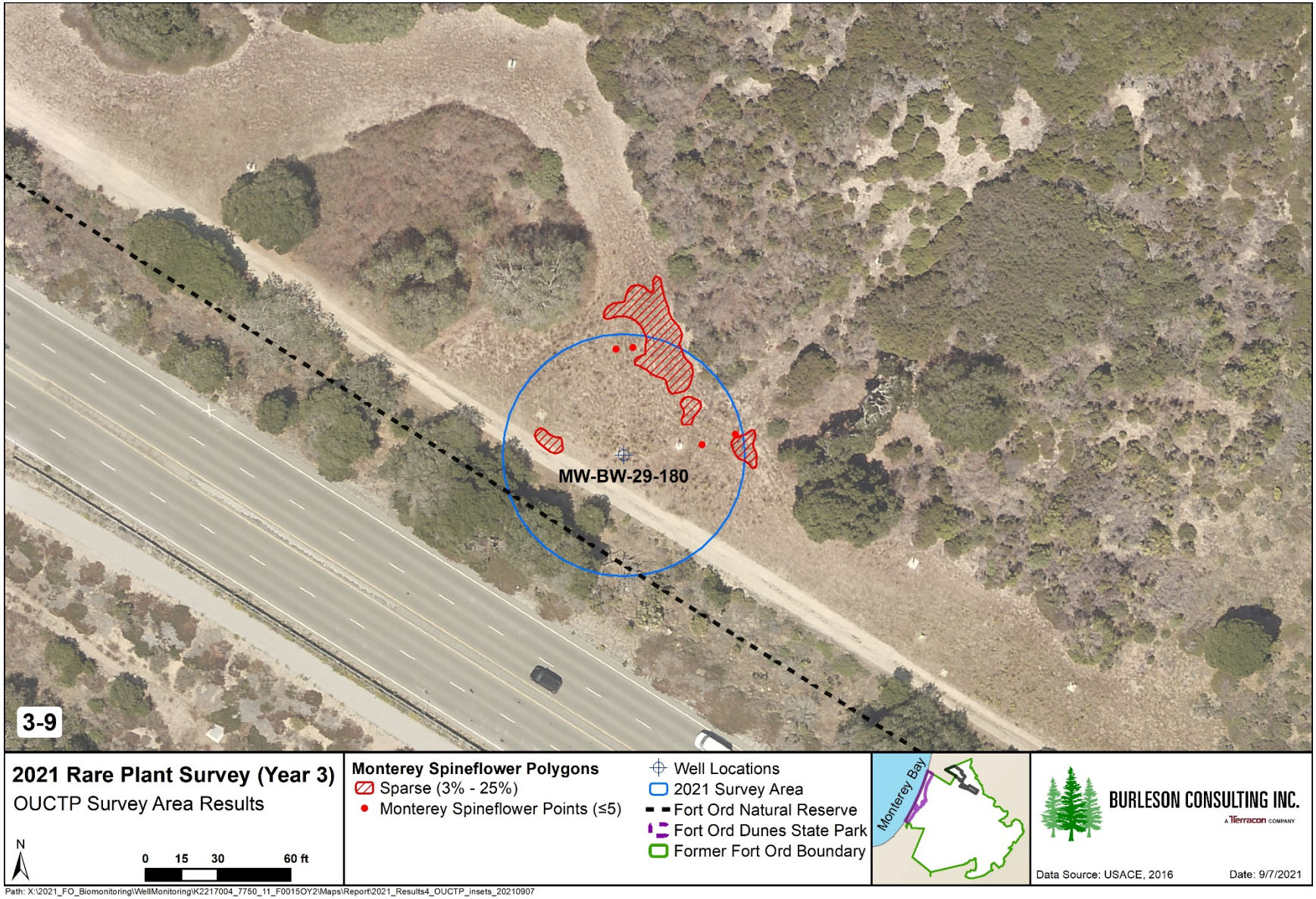

Figure 3-9. 2021 OUCTP Survey Area Monterey Spineflower Populations

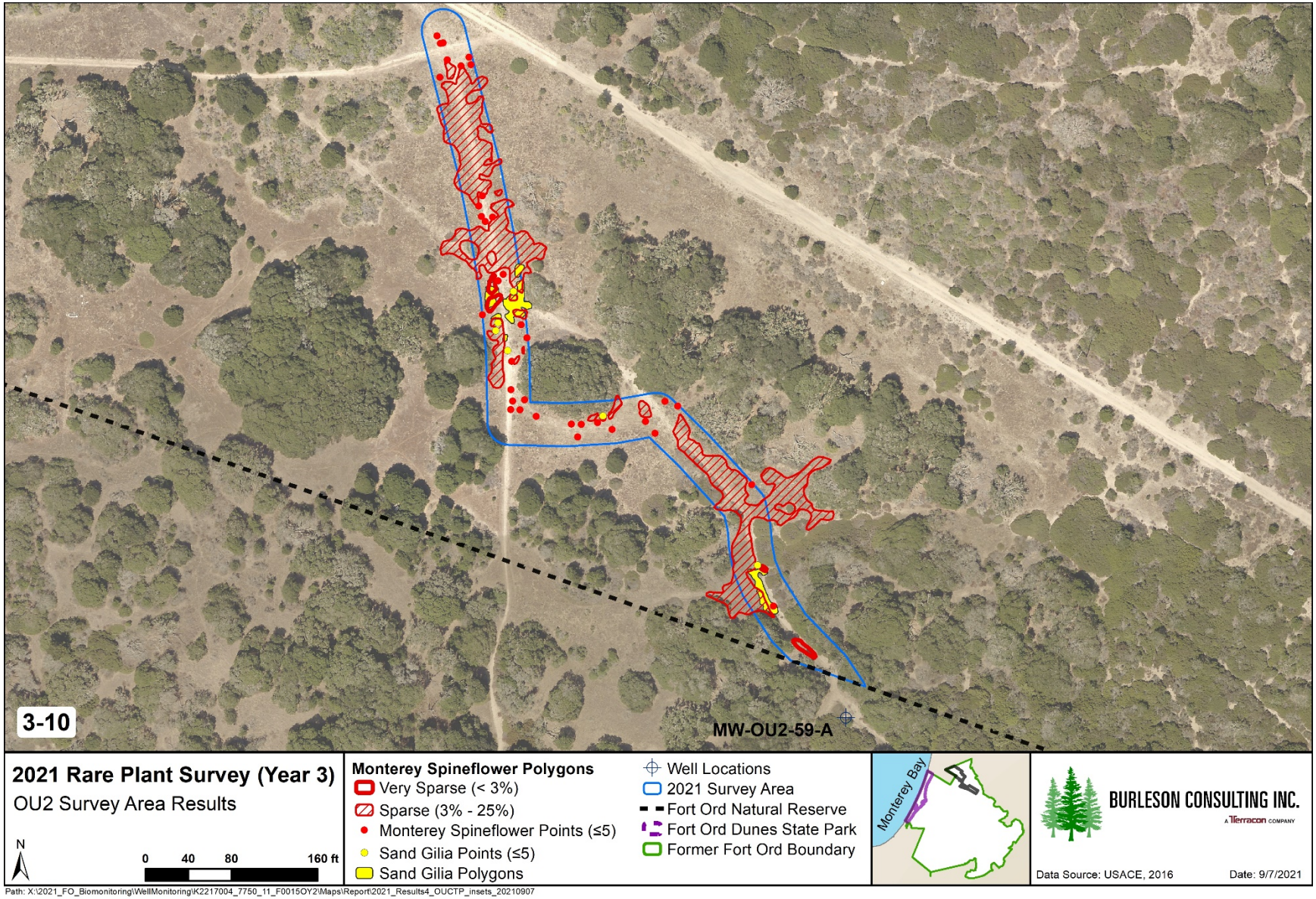

Figure 3-10. 2021 OU2 Survey Area Sand Gilia and Monterey Spineflower Populations

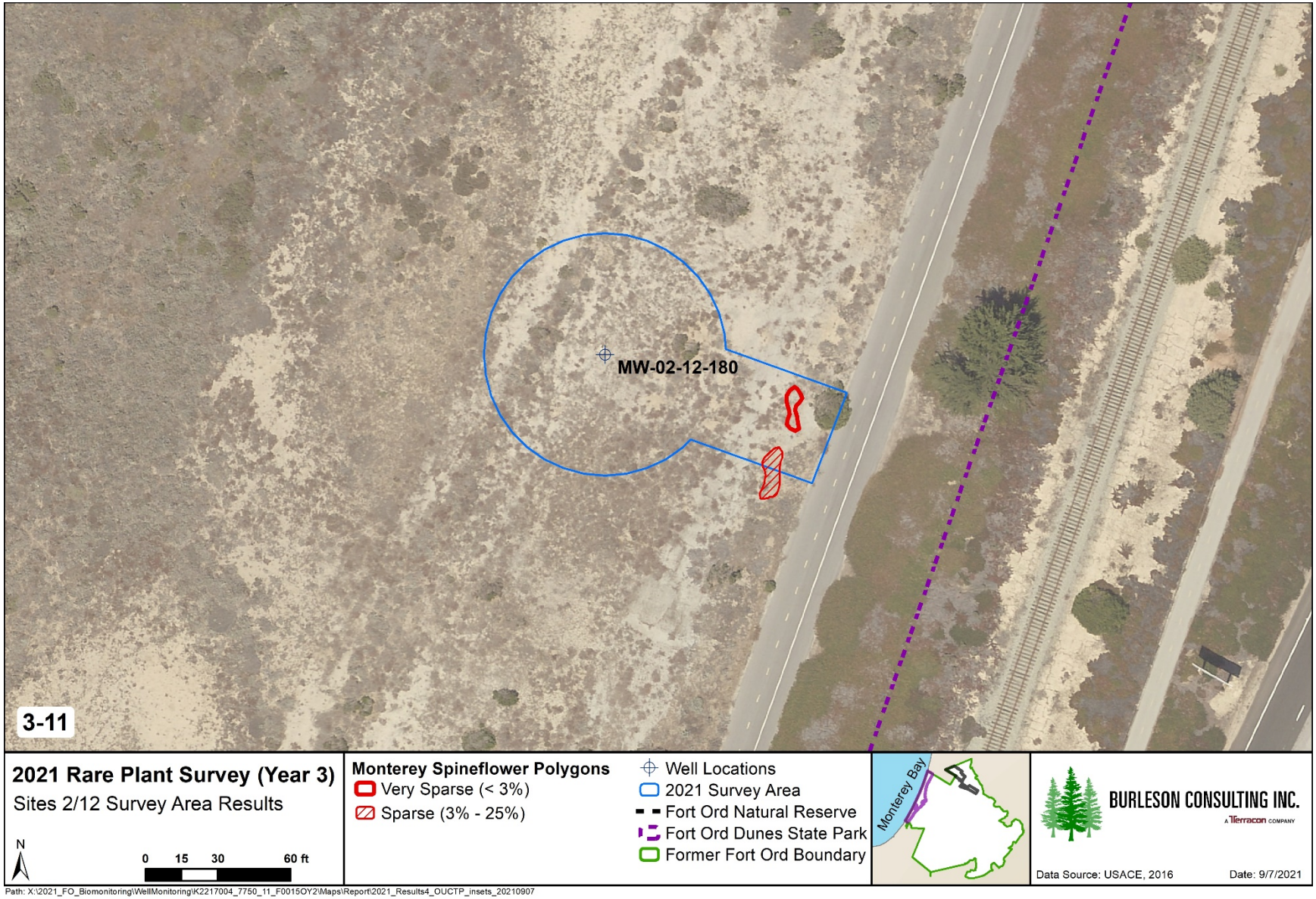

Figure 3-11. 2021 Sites 2/12 Survey Area Monterey Spineflower Populations

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4. DISCUSSION

Rare plant surveys are conducted for three years after a disturbance occurs during the remediation effort as required by the HMP and the 2017 PBO (USACE, 1997; USFWS, 2017). The 2021 surveys were Year 3 follow up surveys for wells decommissioned or installed in 2018 (HGL, 2018; Ahtna, 2018). Rare plants were mapped in the OUCTP, OU2, and Sites 2/12 survey areas if they were within a 50 ft radius of a well location or within 20 ft of secondary access routes. The following sections compare survey area population trends between years.

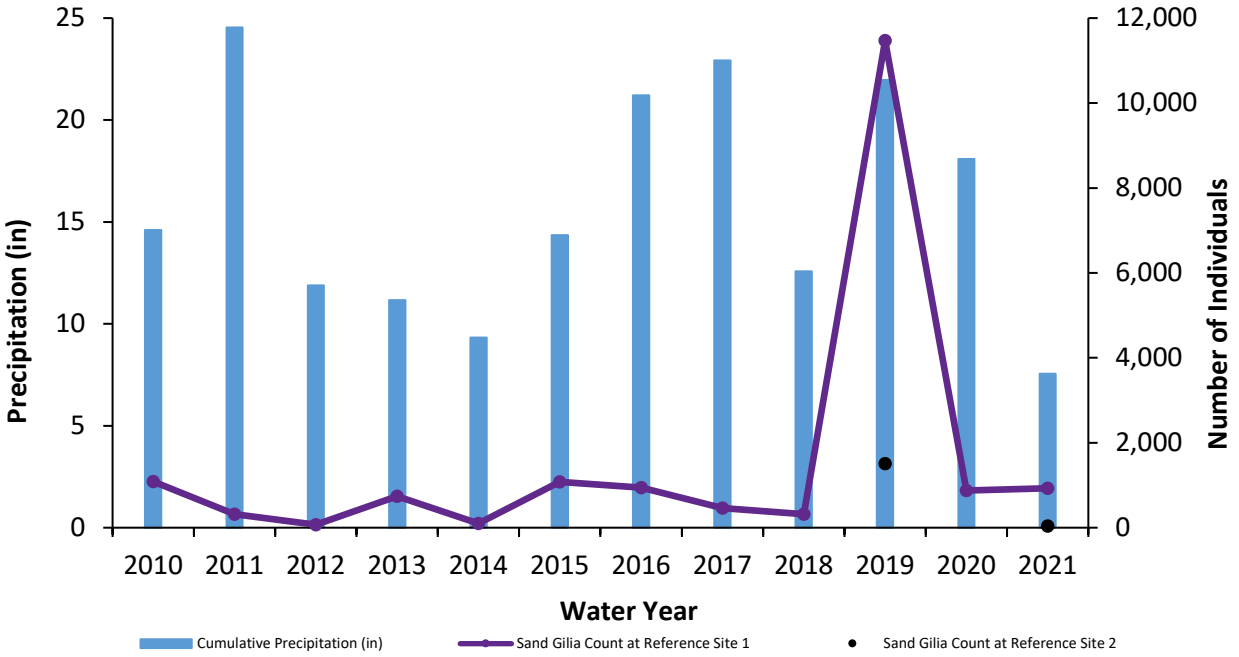
4.1 Sand Gilia

4.1.1 Reference Sites

At Reference Site 1, sand gilia increased by 51 individuals and population area increased by 8% from 2020 to 2021 (see Table 4-1). Sand gilia populations naturally vary from year to year. Their abundance may depend on the timing and amount of precipitation and the level of herbivory (Dorrell-Canepa, 1994; Fox *et al*, 2006; Fox, 2007). Reference Site 1 populations do not seem to fluctuate consistently with the total amount of precipitation in a water year (see Figure 4-1). Sand gilia populations did not change considerably between 2020 and 2021 despite a dramatic decrease in spring rainfall in 2021 (see Tables 4-1 and 4-2). The similar population counts between 2020 and 2021 suggest that the abundant seed set from 2019 could be contributing to relatively high numbers compared to 2017 and 2018, as sand gilia seed can remain viable at three years (see Table 4-1; Dorell-Canepa 1994).

Table 4-1. Sand Gilia Populations within Reference Site 1 from 2017-2021

Year	Total Populations	Individual Plants	Indiv. Plants % Δ from Prev. Year	Points	Polygons	Area (ft^2)	Area % Δ from Prev. Year
2017	8	463	-	6	2	1,950	-
2018	7	321	-31%	1	6	1,102	-43%
2019	19	11,469	3473%	8	11	2,541	131%
2020	19	875	-92%	10	9	979	-61%
2021	23	926	6%	10	13	1,062	8%



Precipitation data from NPS, 2021; 2010-2017 rare plant data from HGL, 2018; 2019 Reference Site 2 data from Ahtna, 2020.

Figure 4-1. Sand Gilia Populations at the Reference Sites Versus Monthly Precipitation

Table 4-2. Precipitation for 2017-2021 and Average Precipitation from 1981-2010

Timeframe	Precipitation (in)					
	2017	2018	2019	2020	2021	Average (1981-2010)†
Water Year (Cumulative)	22.92	12.57	21.97	18.08	7.57	17.84
Winter (October-January)	13.05	5.01	8.04	9.36	5.60	9.18
Spring (February-May)	9.77	7.53	13.82	8.68	1.95	8.23
Dry Season (June-September)	0.10	0.03	0.11	0.04	0.02	0.43

2017 - 2021 precipitation from NPS, 2021

† Average precipitation from NOAA, 2018

Reference Site 2 was monitored for the first time in 2019 for sand gilia but was not monitored in 2020. The number of populations, count of individual plants, and areal extent of populations decreased dramatically between 2019 and 2021 (see Figure 4-1 and Table 4-3).

Table 4-3. Sand Gilia Populations within Reference Site 2 in 2019 and 2021

Year	Total Populations	Individual Plants	Indiv. Plants % Δ from 2019	Points	Polygons	Area (ft^2)	Area % Δ from 2019
2019*	22	1,509	-	5	17	476	-
2021	8	39	-97%	6	2	45	-91%

* 2019 Reference Site 2 data from Ahtna, 2020.

The number of populations and count of individual plants differed considerably between Reference Site 2 and Reference Site 1 in 2021 (see Table 4-4). Eight populations totaling 39 individuals were observed at Reference Site 2 while 23 populations totaling 926 individuals were observed at Reference Site 1. Additionally, the areal extent of populations at Reference Site 2 (45 ft^2) was much smaller than at Reference Site 1 (1,062 ft^2) despite survey areas being the same size.

Table 4-4. Sand Gilia Populations within Reference Sites 1 and 2 in 2021

Location	Total Populations	Individual Plants	Points	Polygons	Area (ft^2)
Reference Site 1	23	926	10	13	1,062
Reference Site 2	8	39	6	2	45

4.1.2 OUCTP, Operable Unit 2, and Sites 2/12

Sand gilia decreased by 1,324 individuals from 2020 (Year 2) to 2021 (Year 3) within the OUCTP survey area while it increased by 554 individuals between the 2018 Baseline survey and Year 3 (see Tables 4-5 and 4-6). Sand gilia decreased by 90 individuals along the access route within the OU2 survey area from Year 2 to Year 3 and increased by 903 individuals between Baseline and Year 3.

Sand gilia was observed at three of four OUCTP wells in 2019, two of three wells in 2020, and three of three wells in 2021. Historically, from 1998 to 2010, sand gilia was observed multiple times at MW-BW-93-A and MW-BW-95-A wells and secondary access routes. Sand gilia was observed along the MW-OU2-59-A access route in 1998 and 2010 and once at MW-BW-29-180 in 1998. Sand gilia was not observed in historical surveys at MW-02-12-180 at Sites 2/12 or at well MW-BW-94-A. Historical survey results are summarized in Appendix A Table A-1. Though wells MW-BW-29-180 and MW-02-12-180 were not surveyed in 2020 or 2021 for sand gilia, occurrences would have been recorded if the species was observed during Monterey Spineflower surveys.

Table 4-5. Sand Gilia Populations within the OUCTP, OU2, & Sites 2/12 Survey Areas from 2018-2021

Location	Year	Total Populations	Individual Plants	Indiv. Plants % Δ from Prev. Year	Points	Polygons	Area (ft^2)	Area % Δ from Prev. Year
OUCTP	2018 (Year 0)	11	75	-	7	4	79	-
	2019 (Year 1)	73	12,540	16,620%	43	30	3,574	4,424%
	2020 (Year 2)	44	1,953	-84%	26	18	1,923	-46%
	2021 (Year 3)	30	629	-68%	20	10	604	-69%
OU2	2018 (Year 0)	9	19	-	8	1	25	-
	2019 (Year 1)	28	1,884	9,816%	13	15	1,200	4,700%
	2020 (Year 2)	8	1,012	-46%	2	6	1,223	2%
	2021 (Year 3)	13	922	-9%	6	7	1,267	4%
Sites 2/12	2018 (Year 0)	0	0	-	0	0	0	-
	2019 (Year 1)	0	0	-	0	0	0	-
	2020 (Year 2)	NS	NS	-	NS	NS	-	-
	2021 (Year 3)	NS	NS	-	NS	NS	-	-

*Sand gilia occurrences at Sites 2/12 would have been recorded if found during Monterey spineflower surveys
NS – Not Surveyed

Table 4-6. OU2, OUCTP, & Sites 2/12 Monterey Spineflower and Sand Gilia Populations by Well Surveyed from 2018-2021

Well ID	Discrete Monterey Spineflower Populations (No. Individuals or Cover Class)				Discrete Sand Gilia Populations (No. Individuals)			
	2018	2019	2020	2021	2018	2019	2020	2021
MW-BW-93-A	1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 3, 3, 3, 3, VS, VS, S, S, S, S, S, ML	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 4, S, S, S, S, S, S, S, S, S, S, S, VS, VS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 4, 4, 5, 5, 5, ML, S, S, S, S, S, S, S, S, VS, VS, VS, VS, VS, VS, VS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 4, 4, 4, 5, 5, 5, ML, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, VS, VS, VS, VS	2, 2, 2, 11	1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 5, 6, 6, 10, 14, 18, 20, 27, 34, 69, 96, 160, 250, 1464	1, 1, 1, 3, 3, 3, 5, 6, 9, 32, 37, 66, 144, 672	1, 1, 1, 1, 1, 1, 5, 5, 12, 20
MW-BW-94-A	1, 1, VS, VS, VS, VS, VS, S, S, S, ML	1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 4, S, S, S, S, S, S, S, S, S, S	1, 1, 2, 3, S, S, S, S, S, S, S, S, VS, VS, VS	1, 2, 3, 4, 5, 5, S, S, S, VS, VS, VS	0	34	0	3
MW-BW-95-A	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 3, 4, 4, S, S, S, S, S, S, S, S, S, S, S, S, S, S, ML, ML, ML, ML	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, ML, ML, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, VS, VS, VS, VS, VS, VS, VS, VS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, ML, ML, ML, ML, ML, ML, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS, VS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, S, VS, VS, VS, VS, VS, VS, VS, VS, VS	1, 1, 1, 4, 15, 15, 21	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 6, 7, 26, 26, 45, 63, 122, 145, 167, 187, 590, 591, 862, 937, 952, 5529	1, 1, 1, 1, 1, 1, 2, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 5, 5, 9, 9, 13, 16, 20, 24, 67, 80, 80, 140, 458	1, 1, 1, 1, 1, 1, 2, 2, 3, 4, 5, 7, 7, 7, 16, 25, 50, 92, 352

Table 4-6. OU2, OUCTP, & Sites 2/12 Monterey Spineflower and Sand Gilia Populations by Well Surveyed from 2018-2021

Well ID	Discrete Monterey Spineflower Populations (No. Individuals or Cover Class)				Discrete Sand Gilia Populations (No. Individuals)			
	2018	2019	2020	2021	2018	2019	2020	2021
MW-BW-29-180	S	1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 4, S	1, 1, S, VS, VS	1, 1, 4, 5, S, S, S, S	0	0	-	-
MW-OU2-59-A	1, 1, 3, S, S, S, S, S, S, S, ML	1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 4, 4, 4, 5, 5, S, S, S, S, S, S, S, S, S, S, S, S, VS	1, 1, 2, 5, S, S, S, S, S, S, VS, VS, VS, VS, VS, VS	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 5, 5, S, S, S, S, S, S, S, S, S, S, S, S, S, S, VS, VS, VS, VS	1, 1, 2, 2, 2, 2, 3, 5, 7	1, 1, 1, 1, 2, 2, 3, 3, 3, 3, 5, 5, 5, 6, 10, 12, 13, 20, 21, 27, 27, 36, 45, 62, 71, 222, 569, 708	1, 1, 6, 22, 61, 127, 259, 535	1, 1, 2, 2, 2, 2, 6, 6, 11, 25, 68, 357, 439
MW-02-12-180	S, S, S	1, 1, 3, S, VS	1, S, VS	S, VS	0	0	-	-

2018 data from the GIS data deliverable for the *2018 Annual Rare Plant Survey for the Ahtna Monitoring Wells and Enhanced in situ Bioremediation (EISB) Deployment Area at the Operable Unit Carbon Tetrachloride Plume (OUCTP)* report (Ahtna, 2018).

- Not Surveyed
M - Medium
ML - Medium Low
MW - Monitoring Well
S - Sparse
VS - Very Sparse

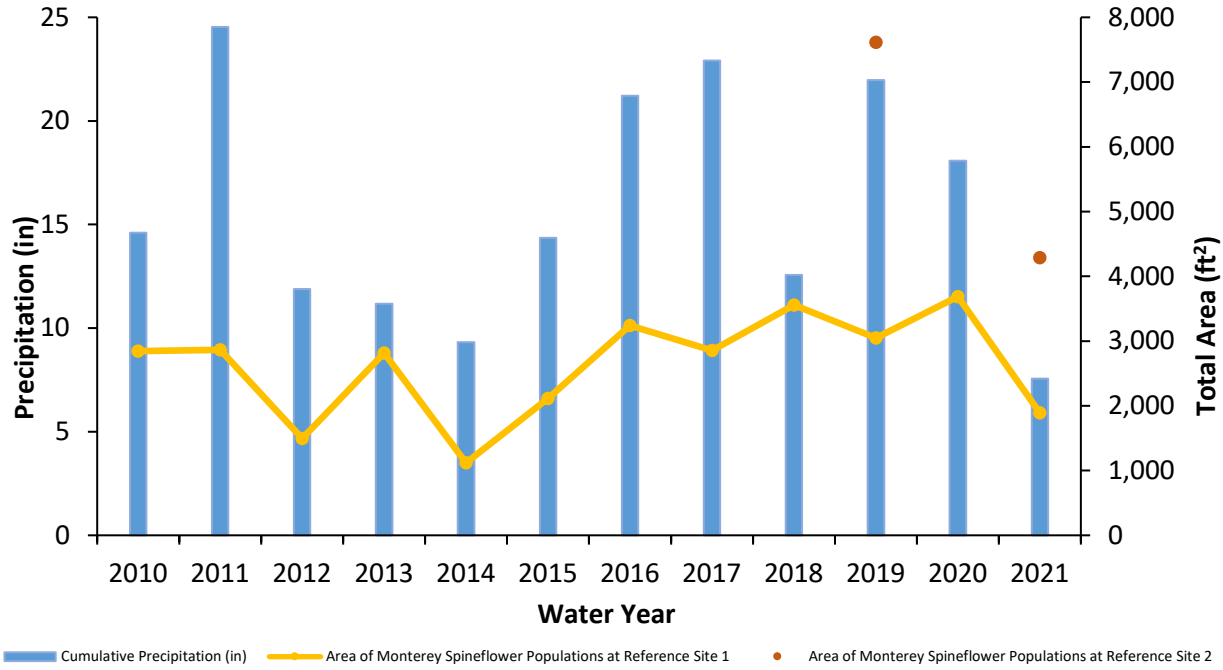
4.2 Monterey Spineflower

4.2.1 Reference Sites

At Reference Site 1, Monterey spineflower populations decreased by 1,797 ft^2 from 2020 to 2021 (see Table 4-7). The 2021 Reference Site 1 populations occupied the smallest area recorded since 2017 and generally had lower densities than in previous years. The total number of discrete populations was the highest recorded since 2017, which is evidence of populations becoming more isolated than continuous. Monterey spineflower typically germinates more readily in dry years than in wet years but adult survival and seed set increases with wetter, warmer weather in spring. Additionally, seedling abundance often reflects recent additions to and depletions of the seed bank rather than prevailing weather (Fox *et al,* 2006). Monterey spineflower population trends at Reference Site 1 could be explained by the following: seed set resulting from wetter conditions in 2019, coupled with dry spring conditions in 2020, contributed to an expansion of populations during 2020, while populations likely contracted in 2021 due to extremely dry spring conditions following a year of lower seed set in 2020. The decline in area of Monterey spineflower populations between 2020 and 2021 is similar to the decline seen between the dry years of 2013 and 2014 (see Figure 4-2).

Table 4-7. Monterey Spineflower Populations within Reference Site 1 from 2017-2021

Year	Total Populations	Points	Polygons per Density Class			Area of Polygons (ft^2)	Area % Δ from Prev. Year
			Very Sparse	Sparse	Medium Low		
2017	4	0	0	3	1	2,855	-
2018	4	1	2	1	0	3,556	25%
2019	18	11	0	6	1	3,045	-14%
2020	8	1	2	4	1	3,687	21%
2021	30	15	4	11	0	1,890	-49%



Precipitation data from NPS, 2021; 2010-2017 rare plant data from HGL, 2018; 2019 Reference Site 2 data from Ahtna, 2020.

Figure 4-2. Area of Monterey Spineflower Populations at the Reference Sites versus Annual Precipitation

Reference Site 2 was monitored for the first time in 2019 for Monterey spineflower but was not monitored in 2020. The total number of populations increased and areal extent decreased between 2019 and 2021 (see Figure 4-2 and Table 4-8).

Table 4-8. Monterey Spineflower Populations within Reference Site 2 in 2019 and 2021

Year	Total Populations	Points	Polygons per Density Class			Area of Polygons (ft^2)	Area % Δ from 2019
			Very Sparse	Sparse	Medium Low		
2019	4	0	4	0	0	7,614	-
2021	28	20	3	5	0	4,286	-44%

Population distributions and densities were similar between Reference Site 2 and Reference Site 1 in 2021 (see Table 4-9). Each reference site had numerous discrete populations, with either half or greater than half of the populations having fewer than five individuals. The total number of populations was similar between reference sites, ranging from 28 to 30. Populations of greater than five individuals were predominantly in the Sparse density class and total acreage of polygons ranged from 1,890 ft^2 at Reference Site 1 to 4,286 ft^2 at Reference Site 2.

Table 4-9. Monterey Spineflower Populations within Reference Sites 1 and 2 in 2021

Location	Total Populations	Points	Polygons per Density Class			Area of Polygons (ft^2)
			Very Sparse	Sparse	Medium Low	
Reference Site 1	30	15	4	11	0	1,890
Reference Site 2	28	20	3	5	0	4,286

4.2.2 OUCTP, Operable Unit 2, and Sites 2/12

Within the OUCTP survey area, Monterey spineflower populations decreased by 111,494 ft^2 from 2020 (Year 2) to 2021 (Year 3), occupied the smallest area recorded since 2018 (Baseline), and had lower densities than in previous years (see Table 4-10). Monterey spineflower was surveyed at four OUCTP wells and was found at all well locations and along secondary access routes (see Table 4-6). The total number of discrete populations increased from 151 in 2020 to 158 in 2021, with a 44% increase in the number of points recorded (populations with fewer than five individuals; see Table 4-10). This is interpreted to be a consequence of populations becoming more isolated than continuous.

Within the OU2 survey area, Monterey spineflower populations decreased by 36,020 ft^2 along the secondary access route from 2020 (Year 2) to 2021 (Year 3). The total number of populations increased from 15 in 2020 to 54 in 2021 and occupied the smallest area recorded since Baseline.

Within the Sites 2/12 survey area, Monterey spineflower decreased by 124 ft^2 at one well from 2020 (Year 2) to 2021 (Year 3). The total number of populations decreased from three in 2020 to two in 2021.

Of the six OUCTP, OU2, and Sites 2/12 well locations surveyed in 2021:

- Monterey spineflower was observed at five well locations at which Monterey spineflower had been observed in historical surveys (1998-2017).
- Monterey spineflower was observed at one well location at which Monterey spineflower was observed in the 2018 Baseline survey but not in any other historical survey.

Historical Monterey spineflower survey results for the OUCTP, OU2, and Sites 2/12 survey areas are summarized in Appendix A Table A-2.

Table 4-10. Monterey Spineflower Populations within the OUCTP, OU2, & Sites 2/12 Survey Areas from 2018-2021

Location	Year	Total Populations	Points	Polygons per Density Class			Area (ft^2)	Area % Δ from Prev. Year
				Very Sparse	Sparse	Medium Low		
OUCTP	2018 (Year 0)	69	34	7	22	6	31,838	-
	2019 (Year 1)	199	129	10	58	2	60,232	89%
	2020 (Year 2)	151	66	29	49	7	120,149	99%
	2021 (Year 3)	158	95	16	46	1	8,655	-93%
OU2	2018 (Year 0)	12	3	0	8	1	18,141	-
	2019 (Year 1)	44	30	1	13	0	31,646	74%
	2020 (Year 2)	15	4	6	5	0	50,399	59%
	2021 (Year 3)	54	37	4	13	0	14,379	-71%
Sites 2/12	2018 (Year 0)	3	0	0	3	0	309	-
	2019 (Year 1)	5	3	1	1	0	78	-75%
	2020 (Year 2)	3	1	1	1	0	326	318%
	2021 (Year 3)	2	0	1	1	0	202	-38%

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5. IMPACT ASSESSMENT

Rare plant survey data are compared to the 2017 PBO Success Criteria in the following sections to assess the impact of remediation activities on rare plant populations within the OUCTP, OU2, and Sites 2/12 survey areas.

5.1 Success Criterion 1

Success Criterion 1 in the 2017 PBO states, "densities and acreage of HMP annual species are within a normal range compared with information from reference sites" (USFWS, 2017). Survey results for sand gilia and Monterey spineflower are compared to Success Criterion 1 in this section.

5.1.1 Sand Gilia

5.1.1.1 OUCTP

Within the OUCTP survey area, year-to-year sand gilia densities and acreage were within a normal range when compared to those at Reference Site 1 from 2018 (Baseline) to 2020 (Year 2; see Tables 4-1 and 4-5), but were not within a normal range from 2020 to 2021 (Year 3; see Table 5-1). Individual plants and population area both increased slightly at Reference Site 1 between 2020 and 2021, while individual plants and population area decreased considerably within the OUCTP survey area (see Table 5-1). The sharp decline in population area between 2020 and 2021 in OUCTP could be attributed to the extreme lack of precipitation in the spring of 2021, combined with site-specific conditions. The population distributions at OUCTP more closely resembled those at Reference Site 2 in 2021, with the majority of populations consisting of fewer than five individuals (see Table 5-1). When comparing the change in populations at OUCTP between Baseline and Year 3, a more positive trend than at Reference Site 1 is observed (see Table 5-2).

Table 5-1. 2021 Reference Site 1, Reference Site 2, OUCTP, and OU2 Sand Gilia Populations

Location	Total Populations	Individual Plants	Indiv. Plants % Δ from 2020	Points	Polygons	Area (ft^2)	Area % Δ from 2020
Reference Site 1	23	926	6%	10	13	1,062	8%
Reference Site 2	8	39	-	6	2	45	-
OUCTP	30	629	-68%	20	10	604	-69%
OU2	13	922	-9%	6	7	1,267	4%

Table 5-2. 2018 (Baseline) and 2021 (Year 3) Comparison of Reference Site 1, OUCTP, and OU2 Sand Gilia Populations

Location	Year	Total Populations	Individual Plants	Indiv. Plants % Δ from 2018	Points	Polygons	Area (ft^2)	Area % Δ from 2018
Reference Site 1	2018	7	321	-	1	6	1,102	-
	2021	23	926	188%	10	13	1,062	-4%
OUCTP	2018	11	75	-	7	4	79	-
	2021	30	629	739%	20	10	604	665%
OU2	2018	9	19	-	8	1	25	-
	2021	13	922	4,753%	6	7	1,267	4,969%

Success Criterion 1 was met for sand gilia from 2018 to 2021 in the OUCTP survey area. Year 3 sand gilia densities and acreages within the OUCTP survey area are higher than in Baseline and the populations continue to persist in the same areas as in recent years, suggesting that well installation activities in 2018 have not adversely impacted sand gilia abundance in the OUCTP survey area.

5.1.1.2 Operable Unit 2

Within the OU2 survey area, year-to-year sand gilia densities and acreage were within a normal range when compared to those at Reference Site 1 from 2018 (Baseline) to 2020 (Year 2; Burleson, 2020). From 2020 to 2021 (Year 3), sand gilia populations within the OU2 survey area decreased slightly in abundance and increased in area while populations at Reference Site 1 increased in both abundance and area (see Table 5-1). The population distributions at OU2 more closely resembled those at Reference Site 1 than at Reference Site 2 in 2021, with a higher proportion of populations with greater than five individuals and a total individual plant count greater than 900. When comparing the change in populations directly between Baseline and Year 3, the OU2 survey area shows a substantially more positive trend than at Reference Site 1 (see Table 5-2).

Success Criterion 1 was met for sand gilia from 2018 to 2021 in the OU2 survey area. Densities and acreage are within a normal range from 2018 to 2021 and Year 3 populations are larger than in Baseline. These findings suggest that well installation activities in 2018 have not adversely impacted sand gilia abundance in the OU2 survey area.

5.1.2 Monterey Spineflower

Monterey spineflower densities and acreage within the OUCTP, OU2, and Sites 2/12 survey areas were partially consistent with those at Reference Site 1 from 2018 (Baseline) to 2021 (Year 3; see Tables 4-7 and 4-10). From 2018 to 2020, total area of Monterey spineflower populations either were similar to or exhibited more positive trends than at Reference Site 1 and densities were similar across all surveyed areas. In 2021, population densities and total area were within normal range compared to the reference sites. A decline in total area from 2020 was observed at all sites and the largest reductions in total area were observed within the OUCTP and OU2 survey areas (see Table 5-3). These reductions can be attributed in part to the survey methodology as populations are only mapped beyond the site boundary if they are separated by less than three feet. Most populations within the OUCTP and OU2 survey areas had fewer than five individuals, suggesting lack of continuity between populations and therefore a lower likelihood of detecting populations outside the survey area that were included in previous years' results.

Table 5-3. 2021 Reference Site 1, Reference Site 2, OUCTP, OU2, and Sites 2/12 Monterey Spineflower Populations

Year	Total Populations	Points	Polygons per Density Class			Area of Polygons (ft^2)	Area % Δ from 2020
			Very Sparse	Sparse	Medium Low		
Reference Site 1	30	15	4	11	0	1,890	-49%
Reference Site 2	28	20	3	5	0	4,286	-
OUCTP	158	95	16	46	1	8,655	-93%
OU2	54	37	4	13	0	14,379	-71%
Sites 2/12	2	0	1	1	0	202	-38%

When comparing changes in Monterey spineflower densities and acreage between Baseline and Year 3, the OUCTP, OU2, and Sites 2/12 survey area populations are within a normal range of Reference Site 1. Densities are predominantly within the Sparse and Very Sparse density classes and all populations cover less area than in 2018 (see Table 5-4). Given the highest total area of Monterey spineflower populations from 2018 to 2021 was recorded in 2020 at all survey areas (see Table 4-10), the reduction in population area from Baseline to 2021 does not appear to be a result of well installation or decommissioning activities.

Table 5-4. 2018 (Baseline) and 2021 (Year 3) Comparison of Reference Site 1, OUCTP, OU2, and Sites 2/12 Monterey Spineflower Populations

Location	Year	Total Populations	Points	Polygons per Density Class			Area of Polygons (ft^2)	Area % Δ from 2018
				Very Sparse	Sparse	Medium Low		
Reference Site 1	2018	4	1	2	1	0	3,556	
	2021	30	15	4	11	0	1,890	-47%
OUCTP	2018	69	34	7	22	6	31,838	
	2021	158	95	16	46	1	8,655	-73%
OU2	2018	12	3	0	8	1	18,141	
	2021	54	37	4	13	0	14,379	-21%
Sites 2/12	2018	3	0	0	3	0	309	
	2021	2	0	1	1	0	202	-35%

Success Criterion 1 was adequately met for Monterey spineflower from 2018 to 2021 within the OUCTP, OU2, and Sites 2/12 survey areas. Each year of monitoring, the total area of Monterey spineflower populations either were similar to or exhibited more positive trends than at Reference Site 1. This suggests that well installation or decommissioning activities in 2018 have not adversely impacted Monterey spineflower abundance in the OUCTP, OU2, and Sites 2/12 survey areas.

5.2 Success Criterion 2

Success Criterion 2 in the 2017 PBO states that "the number of wells where HMP annual species are detected in follow up surveys will be the same or greater than the number of wells where these species were found in baseline surveys" (USFWS, 2017). Survey results for sand gilia and Monterey spineflower are compared to Success Criterion 2 in this section.

5.2.1 Sand Gilia

Sand gilia was detected at four out of four well locations in 2021, three out of four in 2020, four out of six in 2019, three out of six in 2018, and four out of six in 1998. Five impact categories were defined in previous FONR rare plant survey reports as follows (HGL, 2018):

1. Rare plant species not detected in any survey – 1 well
   MW-02-12-180
2. Rare plant species detected before but not after well construction – 1 well
   MW-BW-29-180
3. Rare plant species detected before and after well construction – 2 wells
   MW-BW-93-A, MW-BW-95-A

4. Rare plant species detected only after well construction – 1 well
   MW-BW-94-A
5. Well was constructed before earliest rare plant survey in 1998 – 2 wells
   MW-02-12-180, MW-OU2-59-A

Sand gilia was not surveyed at well MW-BW-29-180 or Sites 2/12 in 2021 following the 2017 PBO guidelines on discontinuing follow up surveys based on Baseline and Year 1 results and habitat quality. However, it should be noted that a single population of sand gilia, five square feet in size, was mapped at well MW-BW-29-180 in 1998 but was not observed in 2018 Baseline or Year 1 surveys (USACE, 2019b; Burleson, 2019). It is unclear if cleanup activities were the cause of presumed extirpation as a small population like the one documented could be negatively impacted by a number of natural factors over a twenty-year timeframe.

Success Criterion 2 was met for sand gilia from 2018 to 2021 within the OUCTP and OU2 survey areas. Year 1 (2019) through Year 3 (2021) surveys indicate that the number of wells where sand gilia was detected was the same or greater than the number of wells where it was found in Baseline surveys (1998 and 2018; Appendix A Table A-1). OUCTP and OU2 well installation or decommissioning did not appear to adversely impact sand gilia populations.

5.2.2 Monterey Spineflower

Monterey spineflower was detected at all six well locations from 2018 to 2021 and at five out of five well locations in 1998. Five impact categories were defined in previous FONR rare plant survey reports as follows (HGL, 2018):

1. Rare plant species not detected in any survey – none
2. Rare plant species detected before but not after well construction – none
3. Rare plant species detected before and after well construction – 4 wells
   MW-BW-29-180, MW-BW-93-A, MW-BW-94-A, MW-BW-95-A
4. Well was constructed before earliest rare plant survey in 1998 – 2 wells
   MW-02-12-180, MW-OU2-59-A

Success Criterion 2 was met for Monterey spineflower from 2018 to 2021 within the OUCTP, OU2, and Sites 2/12 survey areas. Year 1 (2019) through Year 3 (2021) surveys indicate that the number of wells where Monterey spineflower was detected was the same or greater than the number of wells where it was found in Baseline surveys (1998 and 2018; Appendix A Table A-2). OUCTP, OU2, and Sites 2/12 well installation or decommissioning did not appear to adversely impact Monterey spineflower populations.

5.3 Recommendations

In accordance with the HMP and PBO, monitoring is complete after three years if sand gilia and Monterey spineflower populations meet both success criteria outlined in the 2017 PBO. The OUCTP, OU2, and Sites 2/12 survey areas have been monitored for sand gilia and Monterey spineflower for three consecutive years. Success Criterion 1 has been adequately met in OUCTP and OU2 for sand gilia and in OUCTP, OU2, and Sites 2/12 for Monterey Spineflower. Success Criterion 2 has been met for both species in all survey areas.

Densities and acreage of sand gilia and Monterey spineflower in the OUCTP, OU2, and Sites 2/12 survey areas have been within a normal range compared to reference populations from Baseline to Year 3 and the species have been detected in the same or greater than the number of wells where they were found in Baseline surveys. The intent of Success Criterion 1 and Success Criterion 2 has been met and there is no indication of adverse impacts due to 2018 well installation or decommissioning.

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APPENDIX A

FONR Historical Rare Plant Survey Results

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Table A-1. Historical Sand Gilia Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
Sites 2/12	MW-02-12-180	1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	N	N	--	--
OU2	MW-OU2-59-A	1997	SG	--	--	--	--	--	--	--	--	--	--	--	SG	--	SG[1]; SG[1]; SG[2]; SG[2]; SG[2]; SG[2]; SG[3]; SG[5]; SG[7]	SG#461[1]; SG#462[1]; SG#463[1]; SG#466[1]; SG#468[2]; SG#471[2]; SG#465[3]; SG#467[3]; SG#469[3]; SG#470[3]; SG#459[5]; SG#460[5]; SG#464[5]; SG#37[6]; SG#38[10]; SG#34[12]; SG#43[13]; SG#44[20]; SG#35[21]; SG#42[27]; SG#46[27]; SG#41[36]; SG#36[45]; SG#33[62]; SG#45[71]; SG#40[222]; SG#39[569]; SG#47[708]	SG#22[127]; SG#23[6]; SG#24[61]; SG#65[1]; SG#66[1]; SG#76[22]; SG#77[535]; SG#78[259]	SG#293[1]; SG#297[1]; SG#292[2]; SG#294[2]; SG#295[2]; SG#296[2]; SG#98[6]; SG#103[6]; SG#100[11]; SG#101[25]; SG#99[68]; SG#104[357]; SG#102[439]
OUCTP	MW-BW-29-180	2000	SG	--	--	--	--	--	--	--	--	--	--	N	N	--	N	N	--	--
OUCTP	MW-BW-93-A	2018	SG	SG	SG	SG	SG	SG	--	SG	--	--	--	--	--	--	SG[2]; SG[2]; SG[2]; SG[11]	SG#448[1]; SG#451[1]; SG#452[1]; SG#454[1]; SG#457[1]; SG#458[1]; SG#445[2]; SG#446[2]; SG#447[2]; SG#449[2]; SG#450[2]; SG#455[2]; SG#456[3]; SG#453[5]; SG#23[6]; SG#27[6]; SG#29[10]; SG#28[14]; SG#25[18]; SG#31[20]; SG#20[27]; SG#24[34]; SG#30[69]; SG#32[96]; SG#21[160]; SG#26[250]; SG#22[1464]	SG#1[9]; SG#2[672]; SG#3[6]; SG#4[37]; SG#5[32]; SG#6[144]; SG#35[1]; SG#36[3]; SG#37[1]; SG#38[1]; SG#39[3]; SG#40[3]; SG#41[5]; SG#67[66]	SG#278[1]; SG#279[1]; SG#280[1]; SG#282[1]; SG#283[1]; SG#284[1]; SG#277[5]; SG#281[5]; SG#95[12]; SG#94[20]
OUCTP	MW-BW-94-A	2018	N	--	--	--	--	--	--	N	--	--	--	--	--	--	N	SG#19[34]	N	SG#137[3]

Table A-1. Historical Sand Gilia Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
OUCTP	MW-BW-95-A	2018	SG	SG	SG	SG	SG	SG	SG	SG	SG	SG	--	--	--	--	SG[1]; SG[1]; SG[1]; SG[4]; SG[15]; SG[15]; SG[21]	SG#473[1]; SG#474[1]; SG#476[1]; SG#478[1]; SG#480[1]; SG#481[1]; SG#482[1]; SG#483[1]; SG#484[1]; SG#485[1]; SG#491[1]; SG#492[1]; SG#494[1]; SG#495[1]; SG#496[1]; SG#499[1]; SG#500[1]; SG#477[2]; SG#479[2]; SG#486[2]; SG#487[2]; SG#493[2]; SG#472[3]; SG#489[3]; SG#497[3]; SG#498[3]; SG#475[4]; SG#488[4]; SG#490[4]; SG#61[6]; SG#53[7]; SG#51[26]; SG#55[26]; SG#58[45]; SG#48[63]; SG#56[122]; SG#50[145]; SG#54[167]; SG#62[187]; SG#52[590]; SG#49[591]; SG#59[862]; SG#57[937]; SG#60[952]; SG#63[5529]	SG#7[9]; SG#8[80]; SG#9[20]; SG#10[9]; SG#11[16]; SG#12[13]; SG#13[24]; SG#14[458]; SG#15[80]; SG#16[140]; SG#17[67]; SG#42[4]; SG#43[1]; SG#44[1]; SG#45[4]; SG#46[5]; SG#47[3]; SG#48[3]; SG#49[1]; SG#50[5]; SG#51[1]; SG#52[5]; SG#53[4]; SG#54[5]; SG#55[3]; SG#56[3]; SG#57[2]; SG#58[1]; SG#59[1]; SG#60[2]	SG#267[1]; SG#270[1]; SG#271[1]; SG#273[1], SG#274[1], SG#275[1], SG#268[2]; SG#272[2]; SG#266[3]; SG#276[4]; SG#269[5]; SG#86[7]; SG#90[7]; SG#91[7]; SG#92[16]; SG#93[25]; SG#87[50], SG#88[92]; SG#89[352]

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-- Not Surveyed
SG - Sand gilia
MW - Monitoring Well
N - Area surveyed; no rare plants detected
SG#49[VS] - population ID # [number of plants]

Table A-2. Historical Monterey Spineflower Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
Sites 2/12	MW-02-12-180	1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	MS[S]; MS[S]; MS[S]	MS#306[1]; MS#308[1]; MS#307[3]; MS#140[S]; MS#141[VS]	MS#122[1]; MS#280[VS]; MS#281[S]	MS#53[S]; MS#[VS]
OU2	MW-OU2-59-A	1997	MS	--	--	--	--	--	--	--	--	--	--	--	MS	--	MS[1]; MS[1]; MS[3]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[ML]	MS#309[1]; MS#319[1]; MS#322[1]; MS#323[1]; MS#325[1]; MS#327[1]; MS#334[1]; MS#337[1]; MS#338[1]; MS#310[2]; MS#311[2]; MS#312[2]; MS#313[2]; MS#314[2]; MS#317[2]; MS#318[2]; MS#324[2]; MS#326[2]; MS#328[2]; MS#329[2]; MS#331[2]; MS#332[2]; MS#335[2]; MS#316[3]; MS#333[3]; MS#321[4]; MS#330[4]; MS#336[4]; MS#315[5]; MS#320[5]; MS#151[S]; MS#142[S]; MS#144[S]; MS#145[S]; MS#146[S]; MS#147[S]; MS#148[S]; MS#149[S]; MS#150[S]; MS#152[S]; MS#153[S]; MS#154[S]; MS#155[S]; MS#143[VS]	MS#137[5]; MS#138[1]; MS#139[1]; MS#140[2]; MS#263[S]; MS#264[VS]; MS#265[S]; MS#266[VS]; MS#267[S]; MS#268[VS]; MS#269[S]; MS#270[S]; MS#300[VS]; MS#301[VS]; MS#302[VS]	MS#189[1]; MS#191[1]; MS#194[1]; MS#199[1]; MS#203[1]; MS#206[1]; MS#207[1]; MS#209[1]; MS#210[1]; MS#211[1]; MS#212[1]; MS#213[1]; MS#216[1]; MS#217[1]; MS#219[1]; MS#222[1]; MS#223[1]; MS#224[1]; MS#192[2]; MS#193[2]; MS#196[2]; MS#198[2]; MS#200[2]; MS#202[2]; MS#205[2]; MS#225[2]; MS#195[3]; MS#208[3]; MS#218[3]; MS#221[3]; MS#190[4]; MS#201[4]; MS#204[4]; MS#197[5]; MS#214[5]; MS#215[5], MS#220[5]; MS#36[S]; MS#37[S]; MS#38[S]; MS#39[S]; MS#42[S]; MS#43[S]; MS#44[S]; MS#45[S]; MS#46[S]; MS#47[S]; MS#48[S]; MS#49[S]; MS#50[S]; MS#40[VS]; MS#41[VS]; MS#51[VS]; MS#52[VS]
OUCTP	MW-BW-29-180	2000	MS	--	--	--	--	--	--	--	--	--	--	MS	MS	--	MS[S]	MS#419[1]; MS#422[1]; MS#425[1]; MS#426[1]; MS#427[1]; MS#429[1]; MS#431[1]; MS#434[1]; MS#421[2]; MS#423[2]; MS#428[2]; MS#433[2]; MS#420[3]; MS#424[3]; MS#432[3]; MS#430[4]; MS#181[S]	MS#188[1]; MS#189[1]; MS#342[VS]; MS#343[VS]; MS#344[S]	MS#228[1]; MS#229[1]; MS#226[4]; MS#227[5]; MS#55[S]; MS#56[S]; MS#57[S]; MS#58[S]

Table A-2. Historical Monterey Spineflower Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
OUCTP	MW-BW-93-A	2018	MS	N	MS	MS	MS	MS	--	--	--	--	--	--	--	--	MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[2]; MS[3]; MS[3]; MS[3]; MS[3]; MS[VS]; MS[VS]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[ML]	MS#208[1]; MS#209[1]; MS#213[1]; MS#214[1]; MS#215[1]; MS#216[1]; MS#217[1]; MS#218[1]; MS#223[1]; MS#224[1]; MS#226[1]; MS#227[1]; MS#228[1]; MS#229[1]; MS#230[1]; MS#231[1]; MS#232[1]; MS#235[1]; MS#210[2]; MS#220[2]; MS#221[2]; MS#222[2]; MS#234[2]; MS#212[3]; MS#219[3]; MS#225[3]; MS#233[3]; MS#236[3]; MS#211[4]; MS#85[S]; MS#88[S]; MS#82[S]; MS#83[S]; MS#84[S]; MS#87[S]; MS#89[S]; MS#91[S]; MS#92[S]; MS#93[S]; MS#94[S]; MS#86[VS]; MS#90[VS]	MS#141[1]; MS#142[5]; MS#143[4]; MS#144[1]; MS#145[1]; MS#146[4]; MS#147[1]; MS#148[1]; MS#149[1]; MS#150[3]; MS#151[5]; MS#152[1]; MS#153[2]; MS#154[3]; MS#155[1]; MS#156[1]; MS#157[5]; MS#158[1]; MS#159[1]; MS#160[2]; MS#161[3]; MS#303[S]; MS#304[ML]; MS#305[S]; MS#306[S]; MS#307[S]; MS#308[S]; MS#309[S]; MS#310[S]; MS#311[VS]; MS#312[VS]; MS#313[VS]; MS#314[VS]; MS#315[VS]; MS#316[VS]; MS#317[S]; MS#318[VS]; MS#354[2]	MS#159[1]; MS#160[1]; MS#161[1]; MS#162[1]; MS#165[1]; MS#168[1]; MS#169[1]; MS#175[1]; MS#176[1]; MS#178[1]; MS#180[1]; MS#187[1]; MS#164[2]; MS#167[2]; MS#170[2]; MS#171[2]; MS#173[2]; MS#179[2]; MS#182[2]; MS#183[2]; MS#184[2]; MS#185[2]; MS#166[3]; MS#177[3]; MS#181[3]; MS#158[4]; MS#163[4]; MS#174[4]; MS#172[5]; MS#186[5]; MS#188[5]; MS#16[S]; MS#17[S]; MS#20[S]; MS#21[S]; MS#22[S]; MS#23[S]; MS#24[S]; MS#25[S]; MS#26[S]; MS#27[S]; MS#28[S]; MS#30[S]; MS#31[S]; MS#33[S]; MS#35[S]; MS#18[VS]; MS#19[VS]; MS#32[VS]; MS#34[VS]; MS#29[ML]
OUCTP	MW-BW-94-A	2018	MS	--	--	--	--	--	--	--	--	--	--	--	--	--	MS[1]; MS[1]; MS[VS]; MS[VS]; MS[VS]; MS[VS]; MS[VS]; MS[S]; MS[S]; MS[S]; MS[ML]	MS#194[1]; MS#199[1]; MS#200[1]; MS#201[1]; MS#205[1]; MS#193[2]; MS#195[2]; MS#197[2]; MS#202[2]; MS#204[2]; MS#206[2]; MS#196[3]; MS#198[3]; MS#207[3]; MS#203[4]; MS#71[S]; MS#72[S]; MS#73[S]; MS#74[S]; MS#75[S]; MS#76[S]; MS#77[S]; MS#78[S]; MS#79[S]; MS#80[S]; MS#81[S]	MS#118[1]; MS#119[1]; MS#120[2]; MS#121[3]; MS#271[VS]; MS#272[S]; MS#273[S]; MS#274[VS]; MS#275[S]; MS#276[VS]; MS#277[S]; MS#278[S]; MS#279[S]; MS#319[S]; MS#320[S]	MS#235[1]; MS#234[2]; MS#230[3]; MS#232[4]; MS#231[5]; MS#233[5]; MS#59[S]; MS#60[S]; MS#64[S]; MS#61[VS]; MS#62[VS]; MS#63[VS]

Table A-2. Historical Monterey Spineflower Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
OUCTP	MW-BW-95-A	2018	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	--	--	--	--	MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[1]; MS[2]; MS[2]; MS[2]; MS[2]; MS[2]; MS[3]; MS[4]; MS[4]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[S]; MS[ML]; MS[ML]; MS[ML]; MS[ML]	MS#238[1]; MS#239[1]; MS#240[1]; MS#242[1]; MS#244[1]; MS#245[1]; MS#246[1]; MS#249[1]; MS#250[1]; MS#252[1]; MS#256[1]; MS#264[1]; MS#265[1]; MS#266[1]; MS#274[1]; MS#275[1]; MS#279[1]; MS#282[1]; MS#283[1]; MS#284[1]; MS#285[1]; MS#286[1]; MS#288[1]; MS#290[1]; MS#292[1]; MS#293[1]; MS#297[1]; MS#298[1]; MS#299[1]; MS#300[1]; MS#301[1]; MS#302[1]; MS#303[1]; MS#305[1]; MS#237[2]; MS#254[2]; MS#255[2]; MS#257[2]; MS#259[2]; MS#260[2]; MS#261[2]; MS#262[2]; MS#263[2]; MS#268[2]; MS#270[2]; MS#271[2]; MS#272[2]; MS#277[2]; MS#281[2]; MS#287[2]; MS#294[2]; MS#304[2]; MS#248[3]; MS#251[3]; MS#258[3]; MS#276[3]; MS#278[3]; MS#243[4]; MS#247[4]; MS#253[4]; MS#267[4]; MS#269[4]; MS#280[4]; MS#295[4]; MS#241[5]; MS#273[5]; MS#289[5]; MS#291[5]; MS#296[5]; MS#106[ML]; MS#129[ML]; MS#98[S]; MS#124[S]; MS#122[S]; MS#96[S]; MS#95[S]; MS#97[S]; MS#99[S]; MS#100[S]; MS#101[S]; MS#103[S]; MS#104[S]; MS#105[S]; MS#107[S]; MS#108[S]; MS#109[S]; MS#110[S]; MS#112[S]; MS#113[S]; MS#115[S]; MS#116[S];	MS#80[1]; MS#81[1]; MS#82[3]; MS#83[5]; MS#84[1]; MS#85[3]; MS#86[3]; MS#87[1]; MS#88[3]; MS#89[2]; MS#90[2]; MS#91[2]; MS#92[4]; MS#93[1]; MS#94[1]; MS#95[3]; MS#96[5]; MS#97[1]; MS#98[1]; MS#99[4]; MS#100[1]; MS#101[2]; MS#102[3]; MS#103[1]; MS#104[1]; MS#105[3]; MS#106[5]; MS#107[2]; MS#108[1]; MS#109[2]; MS#110[4]; MS#111[1]; MS#112[1]; MS#113[1]; MS#114[1]; MS#115[5]; MS#116[1]; MS#117[4]; MS#208[VS]; MS#209[VS]; MS#210[S]; MS#211[S]; MS#212[S]; MS#213[VS]; MS#214[VS]; MS#215[VS]; MS#216[S]; MS#217[S]; MS#218[S]; MS#219[S]; MS#220[S]; MS#221[S]; MS#222[ML]; MS#223[S]; MS#224[S]; MS#225[VS]; MS#226[VS]; MS#227[S]; MS#228[S]; MS#229[VS]; MS#230[S]; MS#231[ML]; MS#232[S]; MS#233[S]; MS#234[VS]; MS#235[S]; MS#236[ML]; MS#237[S]; MS#238[S]; MS#239[VS]; MS#240[S]; MS#241[ML]; MS#242[S]; MS#243[S]; MS#244[S]; MS#245[S]; MS#246[S]; MS#247[VS]; MS#248[VS]; MS#249[S]; MS#250[VS]; MS#251[VS]; MS#252[VS]; MS#253[VS]; MS#254[S]; MS#255[ML]; MS#256[S]; MS#257[S]; MS#258[S]; MS#259[VS];	MS#138[1]; MS#139[1]; MS#141[1]; MS#142[1]; MS#145[1]; MS#146[1]; MS#147[1]; MS#151[1]; MS#152[1]; MS#154[1]; MS#156[1]; MS#315[1]; MS#316[1]; MS#317[1]; MS#320[1]; MS#322[1]; MS#325[1]; MS#326[1]; MS#327[1]; MS#328[1]; MS#329[1]; MS#330[1]; MS#334[1]; MS#337[1]; MS#338[1]; MS#339[1]; MS#341[1]; MS#342[1]; MS#343[1]; MS#344[1]; MS#346[1]; MS#140[2]; MS#144[2]; MS#313[2]; MS#318[2]; MS#319[2]; MS#332[2]; MS#333[2]; MS#345[2]; MS#143[3]; MS#155[3]; MS#314[3]; MS#323[3]; MS#324[3]; MS#335[3]; MS#336[3]; MS#150[4]; MS#157[4]; MS#321[4]; MS#340[4]; MS#148[5]; MS#149[5]; MS#153[5]; MS#331[5]; MS#0[S]; MS#1[S]; MS#2[S]; MS#3[S]; MS#4[S]; MS#5[S]; MS#6[S]; MS#8[S]; MS#9[S]; MS#10[S], MS#11[S]; MS#12[S]; MS#13[S]; MS#14[S]; MS#15[S]; MS#122[S]; MS#123[S]; MS#126[S]; MS#130[S]; MS#131[S]; MS#132[S]; MS#133[S]; MS#134[S]; MS#135[S]; MS#7[VS]; MS#120[VS]; MS#121[VS]; MS#124[VS]; MS#125[VS]; MS#127[VS]; MS#128[VS]; MS#129[VS]; MS#136[VS]

Table A-2. Historical Monterey Spineflower Survey Results Relative to OUCTP, OU2, & Sites 2/12 Well Locations

Location	Well Identification	Year Installed	1998	Harding Lawson Associates					HydroGeoLogic, Inc.								Ahtna Environmental, Inc.	Burleson Consulting Inc.		
				1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011-2017	2018	2019	2020	2021
																		MS#117[S]; MS#119[S]; MS#120[S]; MS#121[S]; MS#125[S]; MS#126[S]; MS#127[S]; MS#130[S]; MS#131[S]; MS#132[S]; MS#133[S]; MS#135[S]; MS#136[S]; MS#137[S]; MS#138[S]; MS#128[VS]; MS#102[VS]; MS#111[VS]; MS#114[VS]; MS#118[VS]; MS#123[VS]; MS#134[VS]; MS#139[VS]	MS#260[ML]; MS#261[S]; MS#262[S]	

1998-2017 data from Fort Ord Data Integration System (USACE, 2019b; USACE, 2019c). 2018 data from the GIS data deliverable for the *2018 Annual Rare Plant Survey for the Ahtna Monitoring Wells and Enhanced In Situ Bioremediation (EISB) Deployment Area at the Operable Unit Carbon Tetrachloride Plume (OUCTP)* report (Ahtna, 2018).

-- Not Surveyed
IW - Injection Well
M - Medium
MH - Medium High
ML - Medium Low
MS - Monterey Spineflower
MS#49[VS] - population ID # [density category or number of plants]
MW - Monitoring Well
N - Area surveyed; no rare plants detected
S -Sparse
VS - Very Sparse

APPENDIX B

2021 Rare Plant Survey Results

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Table B-1. Sand Gilia Populations Found in 2021 Reference Site 1 Survey

Population Number	Well ID	Individuals (#)	Area (ft^2)	GIS Feature Type	Survey Date
73	Reference 1	50	92.25	Polygon	4/12/2021
74	Reference 1	38	59.40	Polygon	4/12/2021
75	Reference 1	22	15.29	Polygon	4/12/2021
76	Reference 1	74	32.52	Polygon	4/12/2021
77	Reference 1	125	83.57	Polygon	4/12/2021
78	Reference 1	44	19.22	Polygon	4/12/2021
79	Reference 1	274	294.45	Polygon	4/12/2021
80	Reference 1	14	31.40	Polygon	4/12/2021
81	Reference 1	14	26.23	Polygon	4/12/2021
82	Reference 1	17	12.25	Polygon	4/12/2021
83	Reference 1	20	11.03	Polygon	4/12/2021
84	Reference 1	210	374.58	Polygon	4/12/2021
85	Reference 1	8	9.67	Polygon	4/12/2021
256	Reference 1	2	-	Point	4/12/2021
257	Reference 1	1	-	Point	4/12/2021
258	Reference 1	1	-	Point	4/12/2021
259	Reference 1	1	-	Point	4/12/2021
260	Reference 1	2	-	Point	4/12/2021
261	Reference 1	2	-	Point	4/12/2021
262	Reference 1	2	-	Point	4/12/2021
263	Reference 1	1	-	Point	4/12/2021
264	Reference 1	1	-	Point	4/12/2021
265	Reference 1	3	-	Point	4/12/2021

Table B-2. Sand Gilia Populations Found in 2021 Reference Site 2 Survey

Population Number	Well ID	Individuals (#)	Area (ft^2)	GIS Feature Type	Survey Date
96	Reference 2	11	12.88	Polygon	4/13/2021
97	Reference 2	16	32.10	Polygon	4/13/2021
285	Reference 2	1	-	Point	4/13/2021
286	Reference 2	1	-	Point	4/13/2021
287	Reference 2	1	-	Point	4/13/2021
288	Reference 2	4	-	Point	4/13/2021
289	Reference 2	2	-	Point	4/13/2021
290	Reference 2	3	-	Point	4/13/2021

Table B-3. Sand Gilia Populations Found in 2021 OUCTP & OU2 Survey

Population Number	Region	Well ID	Individuals (#)	Area (ft^2)	GIS Feature Type	Survey Date
98	OU2	MW-OU2-59-A	6	16.86	Polygon	4/14/2021
99	OU2	MW-OU2-59-A	68	205.69	Polygon	4/14/2021
100	OU2	MW-OU2-59-A	11	38.44	Polygon	4/14/2021
101	OU2	MW-OU2-59-A	25	76.18	Polygon	4/14/2021
102	OU2	MW-OU2-59-A	439	508.60	Polygon	4/14/2021
103	OU2	MW-OU2-59-A	6	22.88	Polygon	4/14/2021
104	OU2	MW-OU2-59-A	357	398.49	Polygon	4/14/2021
292	OU2	MW-OU2-59-A	2	-	Point	4/14/2021
293	OU2	MW-OU2-59-A	1	-	Point	4/14/2021
294	OU2	MW-OU2-59-A	2	-	Point	4/14/2021
295	OU2	MW-OU2-59-A	2	-	Point	4/14/2021
296	OU2	MW-OU2-59-A	2	-	Point	4/14/2021
297	OU2	MW-OU2-59-A	1	-	Point	4/14/2021
86	OUCTP	MW-BW-95-A	7	14.61	Polygon	4/12/2021
87	OUCTP	MW-BW-95-A	50	21.98	Polygon	4/12/2021
88	OUCTP	MW-BW-95-A	92	93.66	Polygon	4/12/2021
89	OUCTP	MW-BW-95-A	352	310.39	Polygon	4/12/2021
90	OUCTP	MW-BW-95-A	7	5.22	Polygon	4/12/2021
91	OUCTP	MW-BW-95-A	7	28.57	Polygon	4/13/2021
92	OUCTP	MW-BW-95-A	16	45.60	Polygon	4/13/2021
93	OUCTP	MW-BW-95-A	25	30.35	Polygon	4/13/2021
94	OUCTP	MW-BW-93-A	20	33.77	Polygon	4/13/2021
95	OUCTP	MW-BW-93-A	12	20.33	Polygon	4/13/2021
137	OUCTP	MW-BW-94-A	3	-	Point	4/13/2021
266	OUCTP	MW-BW-95-A	3	-	Point	4/12/2021
267	OUCTP	MW-BW-95-A	1	-	Point	4/12/2021
268	OUCTP	MW-BW-95-A	2	-	Point	4/12/2021
269	OUCTP	MW-BW-95-A	5	-	Point	4/12/2021
270	OUCTP	MW-BW-95-A	1	-	Point	4/12/2021
271	OUCTP	MW-BW-95-A	1	-	Point	4/13/2021
272	OUCTP	MW-BW-95-A	2	-	Point	4/13/2021
273	OUCTP	MW-BW-95-A	1	-	Point	4/13/2021
274	OUCTP	MW-BW-95-A	1	-	Point	4/13/2021
275	OUCTP	MW-BW-95-A	1	-	Point	4/13/2021
276	OUCTP	MW-BW-95-A	4	-	Point	4/13/2021
277	OUCTP	MW-BW-93-A	5	-	Point	4/13/2021
278	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021
279	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021
280	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021

Table B-3. Sand Gilia Populations Found in 2021 OUCTP & OU2 Survey

Population Number	Region	Well ID	Individuals (#)	Area (ft^2)	GIS Feature Type	Survey Date
281	OUCTP	MW-BW-93-A	5	-	Point	4/13/2021
282	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021
283	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021
284	OUCTP	MW-BW-93-A	1	-	Point	4/13/2021

Table B-4. Monterey Spineflower Populations Found in 2021 Reference Site 1 Survey

Population Number	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
105	Reference 1	3-25%	Sparse	142.28	Polygon	5/12/2021
106	Reference 1	3-25%	Sparse	41.04	Polygon	5/12/2021
107	Reference 1	<3%	Very Sparse	57.99	Polygon	5/12/2021
108	Reference 1	3-25%	Sparse	137.26	Polygon	5/12/2021
109	Reference 1	3-25%	Sparse	176.67	Polygon	5/12/2021
110	Reference 1	3-25%	Sparse	5.93	Polygon	5/12/2021
111	Reference 1	3-25%	Sparse	593.45	Polygon	5/12/2021
112	Reference 1	3-25%	Sparse	19.03	Polygon	5/12/2021
113	Reference 1	3-25%	Sparse	188.03	Polygon	5/12/2021
114	Reference 1	3-25%	Sparse	26.79	Polygon	5/12/2021
115	Reference 1	<3%	Very Sparse	37.99	Polygon	5/12/2021
116	Reference 1	<3%	Very Sparse	19.59	Polygon	5/12/2021
117	Reference 1	3-25%	Sparse	152.05	Polygon	5/12/2021
118	Reference 1	3-25%	Sparse	264.32	Polygon	5/12/2021
119	Reference 1	<3%	Very Sparse	27.91	Polygon	5/12/2021
298	Reference 1	2		-	Point	5/12/2021
299	Reference 1	2		-	Point	5/12/2021
300	Reference 1	1		-	Point	5/12/2021
301	Reference 1	2		-	Point	5/12/2021
302	Reference 1	5		-	Point	5/12/2021
303	Reference 1	3		-	Point	5/12/2021
304	Reference 1	2		-	Point	5/12/2021
305	Reference 1	4		-	Point	5/12/2021
306	Reference 1	4		-	Point	5/12/2021
307	Reference 1	5		-	Point	5/12/2021
308	Reference 1	1		-	Point	5/12/2021
309	Reference 1	1		-	Point	5/12/2021
310	Reference 1	3		-	Point	5/12/2021
311	Reference 1	1		-	Point	5/12/2021
312	Reference 1	1		-	Point	5/12/2021

Table B-5. Monterey Spineflower Populations Found in 2021 Reference Site 2 Survey

Population Number	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
65	Reference 2	3-25%	Sparse	841.61	Polygon	5/17/2021
66	Reference 2	3-25%	Sparse	2,010.10	Polygon	5/17/2021
67	Reference 2	<3%	Very Sparse	75.72	Polygon	5/17/2021
68	Reference 2	3-25%	Sparse	74.03	Polygon	5/17/2021
69	Reference 2	<3%	Very Sparse	44.22	Polygon	5/17/2021
70	Reference 2	3-25%	Sparse	52.40	Polygon	5/17/2021
71	Reference 2	3-25%	Sparse	750.00	Polygon	5/17/2021
72	Reference 2	<3%	Very Sparse	438.22	Polygon	5/17/2021
236	Reference 2	2		-	Point	5/17/2021
237	Reference 2	1		-	Point	5/17/2021
238	Reference 2	3		-	Point	5/17/2021
239	Reference 2	1		-	Point	5/17/2021
240	Reference 2	3		-	Point	5/17/2021
241	Reference 2	2		-	Point	5/17/2021
242	Reference 2	2		-	Point	5/17/2021
243	Reference 2	1		-	Point	5/17/2021
244	Reference 2	1		-	Point	5/17/2021
245	Reference 2	1		-	Point	5/17/2021
246	Reference 2	1		-	Point	5/17/2021
247	Reference 2	1		-	Point	5/17/2021
248	Reference 2	1		-	Point	5/17/2021
249	Reference 2	1		-	Point	5/17/2021
250	Reference 2	1		-	Point	5/17/2021
251	Reference 2	4		-	Point	5/17/2021
252	Reference 2	3		-	Point	5/17/2021
253	Reference 2	1		-	Point	5/17/2021
254	Reference 2	2		-	Point	5/17/2021
255	Reference 2	2		-	Point	5/17/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
53	Sites 2/12	MW-02-12-180	3-25%	Sparse	130.50	Polygon	5/17/2021
54	Sites 2/12	MW-02-12-180	<3%	Very Sparse	71.49	Polygon	5/17/2021
36	OU2	MW-OU2-59-A	3-25%	Sparse	102.12	Polygon	5/14/2021
37	OU2	MW-OU2-59-A	3-25%	Sparse	22.89	Polygon	5/14/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
38	OU2	MW-OU2-59-A	3-25%	Sparse	3,591.33	Polygon	5/14/2021
39	OU2	MW-OU2-59-A	3-25%	Sparse	3,097.52	Polygon	5/14/2021
40	OU2	MW-OU2-59-A	<3%	Very Sparse	81.34	Polygon	5/14/2021
41	OU2	MW-OU2-59-A	<3%	Very Sparse	113.29	Polygon	5/14/2021
42	OU2	MW-OU2-59-A	3-25%	Sparse	38.09	Polygon	5/14/2021
43	OU2	MW-OU2-59-A	3-25%	Sparse	77.31	Polygon	5/14/2021
44	OU2	MW-OU2-59-A	3-25%	Sparse	9.40	Polygon	5/14/2021
45	OU2	MW-OU2-59-A	3-25%	Sparse	21.50	Polygon	5/14/2021
46	OU2	MW-OU2-59-A	3-25%	Sparse	648.93	Polygon	5/14/2021
47	OU2	MW-OU2-59-A	3-25%	Sparse	34.45	Polygon	5/14/2021
48	OU2	MW-OU2-59-A	3-25%	Sparse	101.68	Polygon	5/14/2021
49	OU2	MW-OU2-59-A	3-25%	Sparse	126.66	Polygon	5/14/2021
50	OU2	MW-OU2-59-A	3-25%	Sparse	6,176.54	Polygon	5/14/2021
51	OU2	MW-OU2-59-A	<3%	Very Sparse	18.40	Polygon	5/14/2021
52	OU2	MW-OU2-59-A	<3%	Very Sparse	117.94	Polygon	5/14/2021
189	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
190	OU2	MW-OU2-59-A	4		-	Point	5/14/2021
191	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
192	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
193	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
194	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
195	OU2	MW-OU2-59-A	3		-	Point	5/14/2021
196	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
197	OU2	MW-OU2-59-A	5		-	Point	5/14/2021
198	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
199	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
200	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
201	OU2	MW-OU2-59-A	4		-	Point	5/14/2021
202	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
203	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
204	OU2	MW-OU2-59-A	4		-	Point	5/14/2021
205	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
206	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
207	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
208	OU2	MW-OU2-59-A	3		-	Point	5/14/2021
209	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
210	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
211	OU2	MW-OU2-59-A	1		-	Point	5/14/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
212	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
213	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
214	OU2	MW-OU2-59-A	5		-	Point	5/14/2021
215	OU2	MW-OU2-59-A	5		-	Point	5/14/2021
216	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
217	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
218	OU2	MW-OU2-59-A	3		-	Point	5/14/2021
219	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
220	OU2	MW-OU2-59-A	5		-	Point	5/14/2021
221	OU2	MW-OU2-59-A	3		-	Point	5/14/2021
222	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
223	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
224	OU2	MW-OU2-59-A	1		-	Point	5/14/2021
225	OU2	MW-OU2-59-A	2		-	Point	5/14/2021
55	OUCTP	MW-BW-29-180	3-25%	Sparse	66.95	Polygon	5/17/2021
56	OUCTP	MW-BW-29-180	3-25%	Sparse	101.31	Polygon	5/17/2021
57	OUCTP	MW-BW-29-180	3-25%	Sparse	735.14	Polygon	5/17/2021
58	OUCTP	MW-BW-29-180	3-25%	Sparse	69.80	Polygon	5/17/2021
226	OUCTP	MW-BW-29-180	4		-	Point	5/17/2021
227	OUCTP	MW-BW-29-180	5		-	Point	5/17/2021
228	OUCTP	MW-BW-29-180	1		-	Point	5/17/2021
229	OUCTP	MW-BW-29-180	1		-	Point	5/17/2021
16	OUCTP	MW-BW-93-A	3-25%	Sparse	18.48	Polygon	5/13/2021
17	OUCTP	MW-BW-93-A	3-25%	Sparse	271.35	Polygon	5/13/2021
18	OUCTP	MW-BW-93-A	<3%	Very Sparse	53.09	Polygon	5/13/2021
19	OUCTP	MW-BW-93-A	<3%	Very Sparse	82.54	Polygon	5/13/2021
20	OUCTP	MW-BW-93-A	3-25%	Sparse	253.10	Polygon	5/13/2021
21	OUCTP	MW-BW-93-A	3-25%	Sparse	43.55	Polygon	5/13/2021
22	OUCTP	MW-BW-93-A	3-25%	Sparse	79.66	Polygon	5/13/2021
23	OUCTP	MW-BW-93-A	3-25%	Sparse	244.60	Polygon	5/13/2021
24	OUCTP	MW-BW-93-A	3-25%	Sparse	28.77	Polygon	5/13/2021
25	OUCTP	MW-BW-93-A	3-25%	Sparse	130.49	Polygon	5/13/2021
26	OUCTP	MW-BW-93-A	3-25%	Sparse	123.06	Polygon	5/13/2021
27	OUCTP	MW-BW-93-A	3-25%	Sparse	3.14	Polygon	5/13/2021
28	OUCTP	MW-BW-93-A	3-25%	Sparse	451.52	Polygon	5/13/2021
29	OUCTP	MW-BW-93-A	26-50%	Medium Low	18.51	Polygon	5/13/2021
30	OUCTP	MW-BW-93-A	3-25%	Sparse	83.40	Polygon	5/13/2021
31	OUCTP	MW-BW-93-A	3-25%	Sparse	110.65	Polygon	5/13/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
32	OUCTP	MW-BW-93-A	<3%	Very Sparse	25.58	Polygon	5/13/2021
33	OUCTP	MW-BW-93-A	3-25%	Sparse	147.14	Polygon	5/13/2021
34	OUCTP	MW-BW-93-A	<3%	Very Sparse	134.79	Polygon	5/13/2021
35	OUCTP	MW-BW-93-A	3-25%	Sparse	758.02	Polygon	5/13/2021
158	OUCTP	MW-BW-93-A	4		-	Point	5/13/2021
159	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
160	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
161	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
162	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
163	OUCTP	MW-BW-93-A	4		-	Point	5/13/2021
164	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
165	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
166	OUCTP	MW-BW-93-A	3		-	Point	5/13/2021
167	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
168	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
169	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
170	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
171	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
172	OUCTP	MW-BW-93-A	5		-	Point	5/13/2021
173	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
174	OUCTP	MW-BW-93-A	4		-	Point	5/13/2021
175	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
176	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
177	OUCTP	MW-BW-93-A	3		-	Point	5/13/2021
178	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
179	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
180	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
181	OUCTP	MW-BW-93-A	3		-	Point	5/13/2021
182	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
183	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
184	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
185	OUCTP	MW-BW-93-A	2		-	Point	5/13/2021
186	OUCTP	MW-BW-93-A	5		-	Point	5/13/2021
187	OUCTP	MW-BW-93-A	1		-	Point	5/13/2021
188	OUCTP	MW-BW-93-A	5		-	Point	5/13/2021
59	OUCTP	MW-BW-94-A	3-25%	Sparse	153.52	Polygon	5/17/2021
60	OUCTP	MW-BW-94-A	3-25%	Sparse	26.92	Polygon	5/17/2021
61	OUCTP	MW-BW-94-A	<3%	Very Sparse	76.71	Polygon	5/17/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
62	OUCTP	MW-BW-94-A	<3%	Very Sparse	19.15	Polygon	5/17/2021
63	OUCTP	MW-BW-94-A	<3%	Very Sparse	90.47	Polygon	5/17/2021
64	OUCTP	MW-BW-94-A	3-25%	Sparse	501.65	Polygon	5/17/2021
230	OUCTP	MW-BW-94-A	3		-	Point	5/17/2021
231	OUCTP	MW-BW-94-A	5		-	Point	5/17/2021
232	OUCTP	MW-BW-94-A	4		-	Point	5/17/2021
233	OUCTP	MW-BW-94-A	5		-	Point	5/17/2021
234	OUCTP	MW-BW-94-A	2		-	Point	5/17/2021
235	OUCTP	MW-BW-94-A	1		-	Point	5/17/2021
0	OUCTP	MW-BW-95-A	3-25%	Sparse	48.60	Polygon	5/13/2021
1	OUCTP	MW-BW-95-A	3-25%	Sparse	52.36	Polygon	5/13/2021
2	OUCTP	MW-BW-95-A	3-25%	Sparse	149.69	Polygon	5/13/2021
3	OUCTP	MW-BW-95-A	3-25%	Sparse	10.47	Polygon	5/13/2021
4	OUCTP	MW-BW-95-A	3-25%	Sparse	14.18	Polygon	5/13/2021
5	OUCTP	MW-BW-95-A	3-25%	Sparse	8.01	Polygon	5/13/2021
6	OUCTP	MW-BW-95-A	3-25%	Sparse	632.46	Polygon	5/13/2021
7	OUCTP	MW-BW-95-A	<3%	Very Sparse	22.54	Polygon	5/13/2021
8	OUCTP	MW-BW-95-A	3-25%	Sparse	30.92	Polygon	5/13/2021
9	OUCTP	MW-BW-95-A	3-25%	Sparse	95.32	Polygon	5/13/2021
10	OUCTP	MW-BW-95-A	3-25%	Sparse	44.81	Polygon	5/13/2021
11	OUCTP	MW-BW-95-A	3-25%	Sparse	22.66	Polygon	5/13/2021
12	OUCTP	MW-BW-95-A	3-25%	Sparse	17.29	Polygon	5/13/2021
13	OUCTP	MW-BW-95-A	3-25%	Sparse	27.97	Polygon	5/13/2021
14	OUCTP	MW-BW-95-A	3-25%	Sparse	602.58	Polygon	5/13/2021
15	OUCTP	MW-BW-95-A	3-25%	Sparse	21.42	Polygon	5/13/2021
120	OUCTP	MW-BW-95-A	<3%	Very Sparse	117.09	Polygon	5/12/2021
121	OUCTP	MW-BW-95-A	<3%	Very Sparse	13.14	Polygon	5/12/2021
122	OUCTP	MW-BW-95-A	3-25%	Sparse	14.70	Polygon	5/12/2021
123	OUCTP	MW-BW-95-A	3-25%	Sparse	72.58	Polygon	5/12/2021
124	OUCTP	MW-BW-95-A	<3%	Very Sparse	34.75	Polygon	5/12/2021
125	OUCTP	MW-BW-95-A	<3%	Very Sparse	29.26	Polygon	5/12/2021
126	OUCTP	MW-BW-95-A	3-25%	Sparse	250.75	Polygon	5/12/2021
127	OUCTP	MW-BW-95-A	<3%	Very Sparse	48.23	Polygon	5/12/2021
128	OUCTP	MW-BW-95-A	<3%	Very Sparse	20.58	Polygon	5/12/2021
129	OUCTP	MW-BW-95-A	<3%	Very Sparse	45.12	Polygon	5/12/2021
130	OUCTP	MW-BW-95-A	3-25%	Sparse	230.39	Polygon	5/12/2021
131	OUCTP	MW-BW-95-A	3-25%	Sparse	263.39	Polygon	5/12/2021
132	OUCTP	MW-BW-95-A	3-25%	Sparse	20.88	Polygon	5/12/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
133	OUCTP	MW-BW-95-A	3-25%	Sparse	118.80	Polygon	5/12/2021
134	OUCTP	MW-BW-95-A	3-25%	Sparse	169.73	Polygon	5/12/2021
135	OUCTP	MW-BW-95-A	3-25%	Sparse	487.38	Polygon	5/12/2021
136	OUCTP	MW-BW-95-A	<3%	Very Sparse	13.88	Polygon	5/12/2021
138	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
139	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
140	OUCTP	MW-BW-95-A	2		-	Point	5/13/2021
141	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
142	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
143	OUCTP	MW-BW-95-A	3		-	Point	5/13/2021
144	OUCTP	MW-BW-95-A	2		-	Point	5/13/2021
145	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
146	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
147	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
148	OUCTP	MW-BW-95-A	5		-	Point	5/13/2021
149	OUCTP	MW-BW-95-A	5		-	Point	5/13/2021
150	OUCTP	MW-BW-95-A	4		-	Point	5/13/2021
151	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
152	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
153	OUCTP	MW-BW-95-A	5		-	Point	5/13/2021
154	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
155	OUCTP	MW-BW-95-A	3		-	Point	5/13/2021
156	OUCTP	MW-BW-95-A	1		-	Point	5/13/2021
157	OUCTP	MW-BW-95-A	4		-	Point	5/13/2021
313	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
314	OUCTP	MW-BW-95-A	3		-	Point	5/12/2021
315	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
316	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
317	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
318	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
319	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
320	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
321	OUCTP	MW-BW-95-A	4		-	Point	5/12/2021
322	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
323	OUCTP	MW-BW-95-A	3		-	Point	5/12/2021
324	OUCTP	MW-BW-95-A	3		-	Point	5/12/2021
325	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
326	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021

Table B-6. Monterey Spineflower Populations Found in 2021 OUCTP, OU2, & Sites 2/12 Survey

Population Number	Region	Well ID	Individuals (#) or Percent Cover (%)	Cover Class	Area (ft^2)	GIS Feature Type	Survey Date
327	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
328	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
329	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
330	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
331	OUCTP	MW-BW-95-A	5		-	Point	5/12/2021
332	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
333	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
334	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
335	OUCTP	MW-BW-95-A	3		-	Point	5/12/2021
336	OUCTP	MW-BW-95-A	3		-	Point	5/12/2021
337	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
338	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
339	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
340	OUCTP	MW-BW-95-A	4		-	Point	5/12/2021
341	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
342	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
343	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
344	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021
345	OUCTP	MW-BW-95-A	2		-	Point	5/12/2021
346	OUCTP	MW-BW-95-A	1		-	Point	5/12/2021