Jaton LLC

Botanical Survey and Search for Sensitive Plants at Jaton Sheep Creek Solar Power Generation Project San Bernardino County, CA

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Building a Sustainable Future

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Introduction

Jaton LLC is proposing construction and operation of the new Jaton Sheep Creek Solar Power Generating Project (hereafter, "project") on a 20-acre parcel of undeveloped desert habitat under private ownership at the southeastern corner of Sheep Creek Road and Parkdale Road in western San Bernardino County (Figure 1). Construction plans are not yet available for the solar power generating facility. It is presumed that construction of the solar project would disturb soils across the entire site and would displace the parcel's currently existing assemblage of native and naturalized non-native vegetation. Following a review of available data published by interested agencies and in local botanical literature, a botanical survey of the entire parcel was performed in April 2018 using botanical field methods in conformance with the State of California Department of Fish and Wildlife (CDFW) guidance document, "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" (CDFW, 2009), The results of the literature review and field survey are reported here.

Study Area Setting

The study area for the project includes the entire extent of the rectangular 20-acre parcel where solar energy development will occur, as well as buffers extending 100 feet beyond in each direction (Figure 1). This area, which totals 30.0 acres, is currently undeveloped except for roadways at the north and west edges. The entire study area was surveyed to inventory the vegetation resources and search for rare plant species in April 2018.

The study area is located within the El Mirage Dry Lake Basin, near the southwestern edge of the Desert Floristic Province. The elevation of the study area averages 3010 feet (920 meters). The terrain is nearly flat and would be overall monotonous except for dune-like low, mounded deposits of the area's mobile, sandy soils that occur wherever plants have become established. Shrubs and grasses in the study area that have survived longer than one year have invariably collected blowing soil. The crowns and lower stems of dominant creosote bush, for example, are now buried to an average 2-3 feet height. It is likely that some fraction of the lower-growing vegetation has been buried. Fugitive soil migration appears to have been locally tempered in 2017 and prior to survey in 2018 due to a dense standing cover of annual plants in senesced condition. All of this cover provided by annual plants was developed when the site received above-average precipitation in early 2017. Despite this added surface protection, some recent, negative impacts of the area's soil mobility were evident, including leaf loss by abrasion and ongoing importation of the region's non-native, weedy species into the local seedbank.

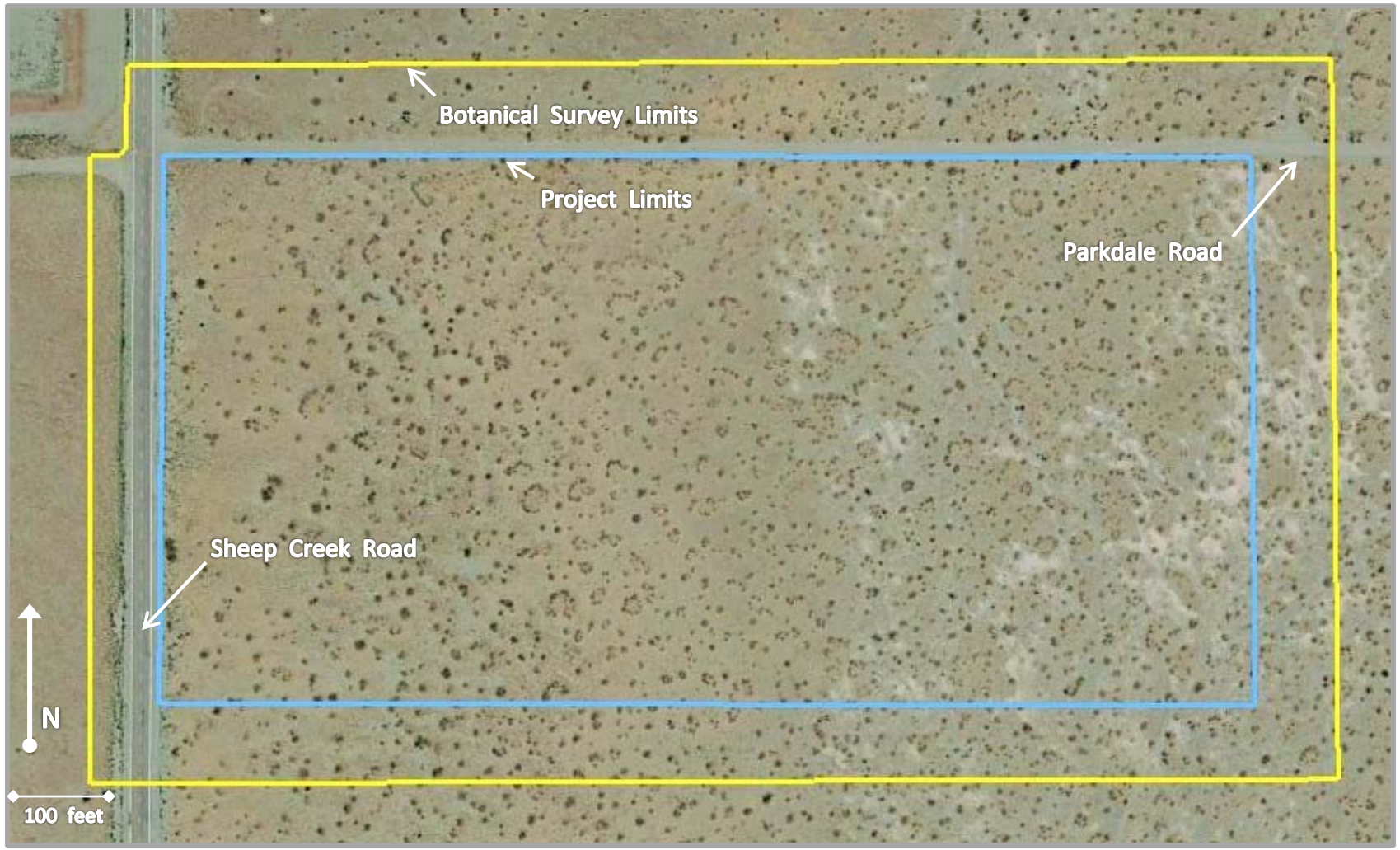
Plants currently occupying the available habitat must also be adapted to a high desert climate regime. This climate is characterized by long drought during hot and dry summer months, and highly variable, undependable precipitation during cold winter months. Seasonal temperatures vary from over 100 to around 20 degrees Fahrenheit. Precipitation averages only 5.8 inches annually (NOAA data collected at El Mirage), which falls mainly as rain during the months of December through March (Western Regional Climate Center, 2018). Surface runoff may shallowly flow into or across the study area only ephemerally following significant storm events. In contrast to the abundant rainfall that was recorded during the 2017 growing season, less than 25% of the historical average total precipitation was recorded locally during the October 1, 2017 to April 20, 2018 period; ecologically significant precipitation events failed to occur during the late winter and spring months of January through April (prior to survey) in 2018, the period when annual plants would under normal conditions germinate and mature. In response to the normally unreliable pattern of precipitation, populations of the native and naturalized annual plants

now established within the project site must have developed adaptations that allow them to persist in the seedbank only, in order to be sustainable when a span of one or more drought years occurs.

A new power transmission corridor of 1300 feet length has been tentatively identified beginning at the northwestern corner of the study area. Placement of overhead power transmission poles would cause only small areas of new disturbance at the western shoulder of Sheep Creek Road. In April 2018, this roadside corridor closely resembled the study area with regard to the existing level of habitat disturbance and the occurring vegetation. The road shoulder in this area is currently devegetated or supports only sparse non-native stands, with no shifts in habitat quality or type, as viewed from Sheep Creek Road. While not included in the study area for the surveys described below, botanical survey results from this corridor would likely mirror the results that are described below for the 20-acre facility site.

Figure 1. Location of the Jaton Sheep Creek Solar Power Generation Project in the El Mirage Lake Basin, near El Mirage, San Bernardino County, California.

Figure 2. Study area for the April 2018 botanical resources inventory and sensitive species search at the Jaton Sheep Creek Solar Power Generation Project. The project will disturb an area totaling up to 20 acres (blue outline). The study area totals 30 acres (gold outline).



Literature Review – Sensitive Plant Species

A list of sensitive plant species that could have some potential to occur within the habitat available at the Jaton Sheep Creek Solar Power Generation Project was compiled (Table 1), based upon a review of regional data (Bureau of Land Management (BLM), 2015, CalFlora, 2018, California Department of Fish and Wildlife (CDFW), 2018a, 2018b), California Native Plant Society (CNPS), 2018, U.S. Fish and Wildlife Service, 2018, published regional floras (Baldwin, *et al.*, 2012, Jepson Herbarium, 2018), and an April 2018 search of the California Natural Diversity Database (CNDDB) records for the Shadow Mountains SE, Shadow Mountains, Adobe Mountain, El Mirage, Mescal Creek, Phelan, Baldy Mesa, Adelanto, and Victorville NW USGS quadrangles (CDFW, 2018c). Potentially occurring plant species were considered to be "sensitive" if they meet any of the following criteria:

- current state or federal status as Rare, Threatened, Endangered, or Candidate (CDFW, 2018a)
- listed in the CNDDB list of special plants (CDFW, 2018b)
- listed by the CNPS in their inventory of sensitive California plants (CNPS, 2001, 2018)
- included in the most recent sensitive plant or watch lists prepared by the Bureau of Land Management, Barstow Office (BLM, 2015).

The CNDDB records and literature search results indicate that five sensitive plant species are known to occur within 15 miles of the project and in Mojavean high desert settings that bear some resemblance to the xeric Creosote Bush Shrubland habitat available within the study area. The list of potentially occurring sensitive species includes three annuals, white pygmy poppy (*Canbya candida*), Barstow woolly sunflower (*Eriophyllum mohavense*), and spreading pygmyleaf (*Loeflingia squarrosa*), which if present would be expected to exhibit leaves, flowers, and maturing or mature fruit in April when the survey was conducted. The potentially occurring shrub short-joint beavertail (*Opuntia basilaris* var. *brachyclada*), and the perennial herb beaver dam breadroot (*Pediomelum castoreum*) would be expected to be exhibiting leaves, flowers, and maturing or mature fruits in April (Table 1). None of the included taxa are currently listed as state or federal Rare, Threatened, Endangered, or Candidate species.

Table 1. Sensitive plant species that potentially could occur at the proposed Jaton Sheep Creek Solar Power Generation Project.

Scientific Name Common Name Life Form	Rank or Status			Habitat	Flowering Period
	CDFG USFWS	CNPS	CNDDB		
Canbya candida white pygmy poppy herbaceous annual	NL	4.2	S3S4	sagebrush scrub, pinyon-juniper woodland	March-June
Eriophyllum mohavense Barstow woolly sunflower herbaceous annual	NL	1B.2	S2	creosote bush scrub, sandy	April-May
Loeflingia squarrosa spreading pygmyleaf herbaceous annual	NL	2B.2	S2	sandy or gravelly slopes, dunes, disturbed areas	April-May

Scientific Name Common Name Life Form	Rank or Status			Habitat	Flowering Period
	CDFG USFWS	CNPS	CNDDB		
Opuntia basilaris *var. brachyclada* short-joint beavertail cactus herbaceous shrub	NL	1B.2	S3	oak woodland, sagebrush scrub	April-June
Pediomelum castoreum beaver dam breadroot herbaceous perennial	NL	1B.2	S2	open desert habitats, often rocky	April-May

Note: Flowering period data is from CNPS (2018).

Rank or status, by agency:

CDFW, USFWS (CDFW, 2018a)

NL = Not Listed. None of these species are federal or state listed as Rare, Threatened, Endangered or Candidate

CNPS = California Native Plant Society listings (CNPS, 2001, 2018)

1B = rare and endangered in California and elsewhere

2B = rare, threatened or endangered in California, but more common elsewhere

4 = watchlist species of limited distribution

Threat Code extensions:

.1 is Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2 is Fairly endangered in California (20-80% of occurrences threatened)

.3 is Not very endangered in California (< 20% of occ's threatened or no current threats known.

CNDDB = California Natural Diversity Data Base rankings by the CDFG (CDFW, 2018b)

S2 = Imperiled in California because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.

S3 = Vulnerable in California due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.

S4 = Apparently Secure. The species is uncommon but not rare in California; some cause for long-term concern due to declines or other factors.

No previously recorded occurrences of any sensitive plants within the project area were uncovered during the literature search or in CNDDB records. It should be noted that the absence of known occurrences does not imply that sensitive plant populations are absent from the study area, merely that to date none have been found and reported.

Methods Used to Inventory Plants and Search for Sensitive Species

An inventory of vegetation types and species present within the entire study area was completed using transect-style field surveys conducted on April 6 and April 20-21, 2018. The study area for botanical resources that may be affected by the project totals 30 acres (Figure 2). This area includes the 20-acre project footprint where the direct impacts of soil disturbance and loss of vegetative cover will occur, as well as a buffer of 100 feet in all directions.

All plant species encountered along wandering transects spaced at 10 m intervals were identified to the level of taxa sufficient to determine sensitive species presence or absence. The scattered and overall open, even distribution of scrub vegetation throughout the site facilitated the completeness of the floristic inventory; it was possible to look under and around every shrub, so that even small populations of diminutive plants such could be detected. Any species that were not at once recognized were keyed by the consulting botanist using The Jepson Manual (Baldwin, *et al.*, 2012). The methods employed comply with guidelines published by the BLM (2009) and CDFW (CDFG, 2009); the May-June survey period is within the normal anthesis periods for all of the potentially occurring special status plants (Table 1). Botanist J. Paulus of Oakhurst, California, performed all survey work, totaling 24 hours.

Dominant species frequencies were visually estimated along each search transect, in order to map any shift signaling plant community boundaries. The identified dominant shrub and perennial plant species associations were grouped within Upland Shrublands Alliance types as defined by Sawyer, *et al.* (2009), and characterized based the typical relative frequencies of dominants and ocular estimation (± 10%) of total cover and average height. The lack of diversity of occurring live plants, especially native annuals (Appendix A) and their low abundances suggest that the complete flora was not represented well at the time of survey, due to the unfavorable climate during the early portion of the growing season in 2018. However, the impressive standing crop of senesced annuals from the 2017 growing season provided a more robust inventory that likely well represents all but the most delicate or diminutive species residing within the seedbank at the study area.

Plant Communities and Species

The study area supports a single plant community type classified as Creosote Bush Shrublands. Nearly 100% of the perennial vegetative cover is creosote (*Larrea tridentata*) shrubs to 10 ft height. Scattered xerophyllic shrubs such as white bursage (*Ambrosia dumosa*) and winter fat (*Krascheninnikovia lanata*) grow in the open spaces between creosote clumps. Native perennial sand rice grass (*Stipa hymenoides*) is present but very few live individuals were observed. Total living cover gradually decreases eastward across the study area, never averaging more than 5%. Average creosote height is 5-6 ft. Areas that have been mechanically cleared or recently disturbed by human activity were not found. Currently, this vegetation functions to capture wind-borne sands and, to some degree, its uniform distribution lifts winds off of the soil surface thereby reducing fugitive soil (dust and sand) emissions and loss of topsoil.

In 2018, germination of the study area's seedbank members was essentially absent except for a very limited set of native and non-native annual species. None of the occurring live seedlings were found in substantial abundance, rather individuals were widely scattered and restricted to microtopography that apparently collected or retained relatively favorable soil moisture. However, the robustness of diversity and potential abundance in the seedbank of the study area was more clearly revealed by the presence of a large standing crop of senesced annual plants remnant from the 2017 growing season. Preservation among this assemblage into the April 2018 survey period was found to be sufficient for identifications and separation of occurring (seedbank) species from potentially occurring sensitive plants. These species were then added to the overall study area's plants species inventory (Appendix A). Coarser and larger species of the local assemblage were likely well-represented by this effort. Small, fragile, and very low-statured plants were less likely to be identified or found, however, due to the effects of time and sand movement during wind events of the past year.

The diversity of annual species, like that of the perennial and shrub species, is relatively low within the study area. Abundance is high for only a few species when climate conditions are favorable. The most prominent species are the non-native annual Mediterranean grass (*Schismus* barbatus) and the non-native weed redstem filaree (*Erodium cicutarium*). Nearly all annual plant cover is comprised of typical

invasive weeds of non-native origin that have achieved widespread dominance in this region of the desert. The native annual most commonly seen in 2018 (an among senesced 2017 plants) was desert fiddleneck (*Amsinckia tessellata*). This assemblage is indicative of a high degree of ecological disturbance to the area, even though mechanical devegetation is not currently indicated onsite. Diversity has been decreased and shifted to plant species that are adapted to ongoing disturbance caused by aeolian sands. Apparently, the decline in native annual presence and prominence, observable even when the climate is favorable for dense germination and growth, has been ongoing, and likely has been increasing absent of any mitigation, for the last few decades as development and devegetation have spread through the region.

Joshua tree (*Yucca brevifolia*) is a Regulated Plant as defined under Section 88.01 of the San Bernardino County Development Code, thus requiring a permit for removal. One live individual was found within the project area boundaries and thus may be affected by implementation (see Appendix A). If this individual is to be removed, mandatory conditions for permit approval (Code Section 88.01.050(f)(3)) will include transplanting in compliance with the provisions of the California Desert Native Plants Act. The occurring individual is not large enough to be considered "specimen size" as defined in this same Code section. Creosote clonal rings of greater than 10 feet diameter, which are common throughout the entire project area, are also regulated plants as defined in the San Bernardino County Development Code (Section 88.01.060 (c)). Rings of up to 30 feet diameter were observed on-site in April. Removal of creosote rings must be permitted by the County prior to grading, but transplanting is not required. This process allows the County to provide coordination with the State Department of Food and Agriculture's enforcement of the Desert Native Plants Act.

Sensitive Plants

No populations of sensitive plant species were found during the April 2018 search. Only species that are regionally common were found. There was no evidence that grazing of range cattle had occurred on site during months prior to the survey, and OHV-related disturbances that may have affected the inventory outcome were very limited. The timing of the survey dates coincided with the flowering and fruiting periods for all of the potentially occurring sensitive species (Table 1); however, as described above (see Plant Communities and Species), precipitation in 2018 did not favor seedbank germination.

No diminutive herbs resembling the potentially occurring white pygmy poppy (*Canbya candida*) were found. The sensitive white pygmy poppy is a tiny, white-flowered annual that is widely distributed in the central Mojave Desert. The El Mirage Basin is currently the southernmost extent of this species' known range (Consortium of California Herbaria, 2018), where it has been collected at the same elevation as the study area in habitat that is less disturbed. The nearest such population (recorded in 1914) is located on the Sheep Creek fan 4.5 miles to the south. Other known Mojavean populations are associated with a greater presence of gravelly (non-erosive) topsoil. While no conclusion may be drawn from the available inventory data for the study area, this species' occurrence there is considered unlikely due to habitat degradation and lack of topsoil stability. The actions of blowing and accumulating sand over decades has altered the environment to one that currently favors non-native grasses and other coarse, weedy plants.

Small members of the sunflower family including Barstow woolly sunflower (*Eriophyllum mohavense*) were not found. Barstow woolly sunflower, an herbaceous annual of less than 5 cm (2 inches) height, has been relatively recently recorded (in 2011) as occurring 13 miles north of the project, in creosote scrub at similar elevation (CDFW, 2018c). This reference population was visited in April 2018. At that time, few annual plants were present and no Barstow woolly sunflowers were located. The habitat similarities of this reference population included creosote dominance as recorded at the study area, but significantly there was no substantial disturbance due to sand movement found. This portion of the

desert is locally less developed, the topsoil is rockier, and native plants in general have maintained greater diversity. This more stable habitat contrasts starkly with that available for Barstow woolly sunflower at the study area, and therefore the current presence of a sustainable population of this species at the project area is considered unlikely.

Spreading pygmyleaf (*Loeflingia squarrosa*) is an annual species that grows to at most 12 cm (5 inches) height. No small, glandular-hairy herbs such as spreading pygmyleaf were found. This species is widely distributed among sandy or gravelly, relatively arid habitats in California, but documented occurrences in the El Mirage Basin region are sparse. The nearest known population is about nine miles southwest in relatively diverse creosote scrub. This reference population was visited in April 2018. Annuals that were present at the recorded population coordinates were, like at the study area, mainly non-natives such as Mediterranean grass. No Spreading pygmyleaf were located. Sandy soils with indications such as scour and mounding to less than 1 foot were present, but the overall impacts of mobile sands upon plants were much less apparent when compared to the conditions of the study area habitat. More generally, the known Mojave Desert populations of spreading pygmyleaf include some that occupy relatively less stable habitats including the margins of active dune fields (personal observation). The impacts of many years of intense sandstorm episodes at the project site (inferred from current conditions) likely would be far more extreme than what sustained reference populations such as these must endure. While no conclusion may be drawn from the available inventory data for the study area, this species' occurrence there as a sustained population is considered unlikely due to ongoing habitat degradation and lack of topsoil stability.

Occurrences of the native cactus shortjoint beavertail (*Opuntia basilaris* var. *brachycarpa*) likely are restricted to upslope margins of the Mojave Desert, in habitats that are characterized by rocky slopes and chaparral or oak woodlands vegetation (CDFW, 2018c). Known occurrences include some that are located in the upper, marginally montane portions of the Sheep Creek watershed. None were detected within the study area in 2018. Individuals would have been readily detected given the transect spacing and searching intensity that was performed. No members of the cactus family or other succulent shrubs that could be confused with shortjoint beavertail were present, and it is concluded that its presence at the project site is very unlikely.

Beaver dam breadroot (*Pediomelum castoreum*) is a short-statured but distinctive perennial species that if present at the time of survey would have exhibited hairy herbage with compound trifoliate leaves and possibly blue-tinged inflorescence structures. The nearest known occurrence is at Fremont Wash, 8.5 miles northeast, in sandy soil and relatively diverse creosote scrub at similar elevation (CDFW, 2018c). No plants bearing trifoliate herbage or other members of the legume family were detected within the study area in 2018. Even very small populations would have been detected using the methods applied at the study area, as both live and senesced perennial structures would have been distinctive among the assemblage. It is concluded that presence of beaver dam breadroot is very unlikely.

Summary of Potential Impacts

Construction-related disturbance will occur entirely within areas that were mapped in 2018 as Creosote Bush Shrublands. This vegetation community type is regionally widespread and common. The loss of 20 acres of this community in highly degraded condition will not substantially alter the environment with respect to the amount of the plant community type that is regionally available. As development of the High Desert Corridor Project is implemented throughout the local landscape, it can be expected that these plants and their habitat will become increasingly disturbed and isolated, even if the project does not occur.

With the exception of the long-lived native creosote shrubs, plant presence within the study area is currently almost entirely limited to naturalized non-native plants such as Mediterranean grass, redstem filaree, Russian thistle (*Salsola tragus*), red brome (*Bromus madritensis* ssp. *rubra*), and cheat grass (*Bromus tectorum*). It is unlikely that any potentially occurring sensitive annual plant populations will be affected. It is very unlikely that any potentially occurring sensitive perennial species including cacti will be affected. There is one Joshua tree located adjacent to Parkdale Road that may be affected. Project-related devegetation, while removing only common and weedy non-native plants, nevertheless could in the absence of mitigation, lead to greater site soil mobility and fugitive dust emissions. Windspeeds and associated saltation of sand particles will be increased at the soil surface with the removal of the current shrub cover, potentially exacerbating the ongoing habitat degradation that is already occurring at neighboring properties.

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Appendix A. List of plant species occurring at the proposed 20-acre Jaton Sheep Creek Solar Power Generation Project near El Mirage, San Bernardino County, California. The study area totals 30 acres and ranges in elevation between 918 meters (3005 feet) and 923 meters (3020 feet). The study area is currently undeveloped and supports a Creosote Bush Scrub plant community alliance. Growth form codes are defined below.

Plant Species		Growth Form
Agavaceae		
Yucca brevifolia	Joshua tree - 1 individual**	NS
Amaranthaceae		
Amaranthus albus (s)*	white tumbleweed	NAH
Asteraceae		
Ambrosia acanthicarpa (s)	annual bur-sage	NAH
Ambrosia dumosa	white bur-sage	NS
Malacothrix glabrata (s)	desert dandelion	NAH
Boraginaceae		
Amsinckia tessellata var. *tessellata*	desert fiddleneck	NAH
Cryptantha micrantha (s)	redroot cryptantha	NAH
Brassicaceae		
Descurainia pinnata ssp. *glabra* (s)	tansy mustard	NAH
Descurainia sophia (s)	flixweed	IAH
Sisymbrium altissimum	tumble mustard	IAH
Chenopodiaceae		
Krascheninnikovia lanata	winter fat	NS
Salsola tragus (s)	Russian thistle	IAH
Euphorbiaceae		
Euphorbia albomarginata (s)	rattlesnake sandmat	NPH
Geraniaceae		
Erodium cicutarium	cranesbill	IAH
Onagraceae		
Chylismia cf. *claviformis* (s)	brown-eyed primrose	NAH
Poaceae		
Bromus madritensis ssp. *rubens*	red brome	IAG
Bromus tectorum	cheat grass	IAG
Festuca cf. *bromoides* (s)		IAG
Schismus barbatus	Mediterranean grass	IAG
Stipa hymenoides	sand rice grass	NPG
Polemoniaceae		
Eriastrum sp. (s)		NAH
Gilia brecciarum (s)	Nevada gilia	NAH
Gilia sp. (*ochroleuca*?)		NAH
Loeseliastrum sp. (s)		NAH
Zygophyllaceae		
Larrea tridentata	creosote bush	NS

***** (s) denotes taxa identified solely from standing plants that grew and senesced during 2017.

** located adjacent to Parkdale Road at UTM Zone 11S 447236 E, 3825821 N.

Growth Form Codes:

A = annual; H = herb; G = grass; I = introduced; N = native; P = perennial; S = shrub.