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**Gaviota Tarplant Mitigation Plan for the  
Strauss Wind Energy Project**

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# Acronyms and Abbreviations

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Acronym/Abbreviation	Definition
amsl	above mean sea level
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
GIS	geographic information system
INRMP	Integrated Natural Resources Management Plan
MM	Mitigation Measure
O&M	operations and maintenance
Project	Strauss Wind Energy Project
Strauss	Strauss Wind, LLC
TAC	Technical Advisory Committee
USFWS	U.S. Fish and Wildlife Service
VAFB	Vandenberg Air Force Base
WEAP	Worker Education and Awareness Program

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# 1 Introduction

This Gaviota tarplant mitigation plan (Mitigation Plan) outlines a conservation, restoration, and adaptive management program for Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) and is intended to fully mitigate for impacts to Gaviota tarplant associated with the Strauss Wind Energy Project (Project). Gaviota tarplant is the subject of a Biological Opinion from the U.S. Fish and Wildlife Service (USFWS) through a Section 7 consultation process with the U.S. Army Corps of Engineers, and an Incidental Take Permit from the California Department of Fish and Wildlife (CDFW) issued for the Project. The County of Santa Barbara (County) also issued mitigation and guidance relevant to Gaviota tarplant through Mitigation Measure (MM) BIO-6 outlined in the Draft Supplemental Environmental Impact Report, which will ultimately be included in the Final Supplemental Environmental Impact Report pursuant to the California Environmental Quality Act (CEQA). The Project occurs south of the City of Lompoc in western Santa Barbara County (Figure 1). Construction of the Project would cause impacts to the Tranquillon Mountain/Sudden Peak population of Gaviota tarplant, and this Mitigation Plan outlines the conservation, restoration, and adaptive management program created to enhance the long-term viability of this occurrence.

## 1.1 Purpose of the Plan

Implementation of the Project would result in impacts to Gaviota tarplant. Impacts will be discussed in the Incidental Take Permit (CDFW), Biological Opinion (USFWS), and Draft Supplemental Environmental Impact Report. This Mitigation Plan outlines a program to mitigate Gaviota tarplant impacts through conservation of known occurrences of Gaviota tarplant, research studies to learn more about the ecology of the species, restoration of Gaviota tarplant within Conservation Lands on site, and to monitor and adaptively manage the Conservation Lands for Gaviota tarplant persistence.

This Mitigation Plan is required as mitigation for impacts to Gaviota tarplant and addresses all Gaviota tarplant mitigation requirements associated with the Project. Mitigation requirements are shown in Table 1.

**Table 1. Gaviota Tarplant Mitigation Requirements**

California Department of Fish and Wildlife	United States Fish and Wildlife Service	County of Santa Barbara
Conservation of 196.7 acres of occupied tarplant habitat and 5,811,308 individuals	Conservation of 196.7 acres of occupied tarplant habitat and 5,811,308 individuals	Mitigation of impacted habitat at a 3:1 ratio. <sup>1</sup>
-	-	Restoration of temporary disturbance areas to pre-disturbance conditions.
-	-	Operations and maintenance impacts mitigated at a 3:1 ratio. <sup>1</sup>

<sup>1</sup> Per MM-BIO-6 from the EIR, temporary impacts to Gaviota tarplant habitat must be mitigated as permanent impacts unless monitoring demonstrates full recovery of Gaviota tarplant occurrences (plant density and extent of occupied area) in the temporarily impacted areas. The Project will mitigate all impacts as permanent with the 3:1 ratio.

## 1.2 Project Background

The Project is a commercial wind farm proposed by Strauss Wind, LLC (Strauss), an affiliate of BayWa r.e. Wind, LLC, which would be located on approximately 5,887 acres of rural, agriculturally zoned land south of the City of Lompoc. The Project would have an aggregate electrical-generating capacity of approximately 98 megawatts, which would generate on an annual basis enough power to supply approximately 44,700 homes with electricity. The Project could potentially generate up to approximately 300 gigawatt-hours of electricity annually. The major Project components include the following:

- 29 wind turbine generators
- New access roads and road improvements
- A communication system
- Meteorological towers/devices
- On-site electrical collection lines
- An on-site substation
- An on-site operations and maintenance (O&M) facility
- A new 7.3-mile, 115-kilovolt transmission line to interconnect with the Pacific Gas & Electric Company's electric grid
- A new switchyard
- Upgrades to existing Pacific Gas & Electric Company's facilities

The majority of the Project is located near the City of Lompoc in the unincorporated territory of Santa Barbara County, California, within the southeastern section of the Lompoc, and north central section of the Punta De La Concepcion, Land Grant boundaries. The Project area is bounded by Vandenberg Air Force Base (VAFB) on the south and west sides and private property on the north and east sides (Figure 1). The Project lies within the Tranquillon Mountain, Lompoc Hills, and Lompoc U.S. Geological Survey 7.5-minute quadrangles.

The Project area is largely situated on agriculturally zoned parcels that have primarily been subject to past and ongoing ranching operations. The current land uses in the immediate vicinity of the Project area include land uses and operations supporting VAFB, additional active rangeland, farmland, mining operations, and Miguelito Park.

## 1.3 Species Distribution and Phenology

Gaviota tarplant is an annual wildflower in the sunflower (*Asteraceae*) family that was listed as endangered by USFWS in 2000, and is listed as endangered by CDFW and assigned a California Rare Plant Rank of 1B.1 (65 FR 14888–14898; CDFW 2019a). The species is endemic to the mainland portion of Santa Barbara County, California. It has a highly localized distribution in western Santa Barbara County, with seven main populations that range from the vicinity of Point Sal in the north to Gaviota in the south (USFWS 2011).

### 1.3.1 Species Phenology

Gaviota tarplant generally blooms from June through September, and slight inter-annual and inter-occurrence variation in blooming period is likely driven by annual climatic conditions and microclimates, as well as other small



spatial scale ecological factors. As with other species in the Asteraceae family, Gaviota tarplant has disk and ray flowers, which in the case of Gaviota tarplant are pale yellow in color and occur in heads that are tightly grouped. Peduncles are generally smaller in length than the involucre. Ray flowers are usually 13, but can be 8 or 15 (Baldwin & Strother 2006). Gaviota tarplant is self-sterile, and thus relies on outcrossing pollination for reproduction. Pollinators observed on the flowers of Gaviota tarplant include several species of flies, bees, skippers, and butterflies (USFWS 2011).

As with other species in the Asteraceae family, Gaviota tarplant produces one-seeded fruits known as achenes. In *Deinandra* species, the achenes are dimorphic, with the achenes of the ray flower having a thicker fruit wall and germinating later than the achenes of the disk flower, which tend to germinate earlier and in higher percentages, although fewer of them are produced (USFWS 2011). This difference in fruit wall thickness likely aids resource compartmentalization between quick germination and storage in the soil seed bank. Given the annual life cycle of Gaviota tarplant, seed banks are likely important to the persistence of the species.

Seed dispersal has not been studied directly for Gaviota tarplant, but is most likely dependent upon fauna with fur or feathers brushing up against the plant's sticky bracts thereby dislodging them and carrying achenes to new locations. The achenes of Gaviota tarplant are not equipped with awns that would be suitable for significant wind-based dispersal.

### 1.3.2 Current Distribution and Abundance

Historically, Gaviota tarplant was known only from the immediate vicinity of the unincorporated town of Gaviota, with plants occurring up to several kilometers in either direction along the immediate coast. As of publication of the USFWS 5-Year Review: Summary and Evaluation (USFWS 2011) (USFWS 5-Year Review), it has a highly localized distribution in western Santa Barbara County, California, with seven main populations that range from the vicinity of Point Sal in the north to Gaviota in the south (Figure 2) (USFWS 2011).

Population trend information is unavailable for most populations of Gaviota tarplant (USFWS 2011). The number of standing Gaviota tarplant plants varies considerably within any given occurrence from year to year. It is important to consider the location and apparent density of viable seeds in soils because seed banks are critical to sustaining annual species like Gaviota tarplant (USFWS 2011). Given the ephemeral nature of aboveground plants, population management focus on both seed banks and aboveground plants is likely to be important for the long-term survival of this species (USFWS 2011).

According to the USFWS 5-Year Review, the seven populations of Gaviota tarplant include (1) Lion's Head (near Point Sal), (2) Point Arguello, (3) Tranquillion Mountain/Sudden Peak, (4) Point Conception, (5) Hollister Ranch, (6) Santa Ynez Mountains, and (7) Gaviota (USFWS 2011). The occurrences of Gaviota tarplant associated with the Project are part of the Tranquillion Mountain/Sudden Peak population.

#### **Cojo-Jalama Ranch**

Approximately 57% of known Gaviota tarplant occurrences, three California Natural Diversity Database (CNDDDB) occurrences, and one population occur on the Cojo-Jalama Ranch. The Nature Conservancy acquired the 24,364-acre Cojo-Jalama Ranch in 2017. These 24,364 acres have become the Jack and Laura Dangermond Preserve and will be managed to advance conservation, science, and education (Borrell 2018). Therefore, 57% of the known Gaviota tarplant occurrences will be preserved at this site.

### **Signorelli Family**

The known occurrences of Gaviota tarplant on land owned by the Signorelli Family are the occurrences associated with the Project and the Tranquillion Mountain/Sudden Peak population. Currently, the land is used for cattle grazing. The land is leased to Strauss, and any proposed development would require approval by Strauss to ensure compatibility with wind generation.

### **Point Conception (VAFB)**

Approximately 15% of the acreage of known Gaviota tarplant populations occur on VAFB. VAFB is required to implement an Integrated Natural Resources Management Plan (INRMP) (VAFB 2011), which documents how natural resources will be managed on VAFB and provides guidance on how to integrate natural resources stewardship with the VAFB military mission. The INRMP identifies construction projects, habitat degradation from development and decommissioning of oil and gas facilities, and competition with non-native species as key threats to Gaviota tarplant on VAFB. The INRMP requires that VAFB protect Gaviota tarplant and its habitat on VAFB by managing the areas that provide high-quality suitable habitat for this species. In the INRMP, specific management guidelines identified for Gaviota tarplant include invasive species management, avoidance and minimization during maintenance and fire response activities, and additional surveys.

While it is possible that mission requirements could affect Gaviota tarplant, based on the VAFB INRMP, there are stringent guidelines in place that would significantly avoid and minimize impacts to the species. Thus, while VAFB is not a preserve that is protected by a conservation easement, the populations on VAFB are considered protected given the requirements of the INRMP.

### **Other Populations**

All other occurrences of Gaviota tarplant are presumed extant and occur on land that is privately owned (CDFW 2019b). It is anticipated that impacts to Gaviota tarplant on these lands would require or did require permitting through the County and CDFW. Additionally, if there is/was a federal nexus, USFWS would have been or will be consulted on take of Gaviota tarplant.

## 1.3.3 Known Threats to Species

The USFWS 5-Year Review identifies the following threats to Gaviota tarplant: (1) displacement by non-native weeds; (2) altered fire regimes; (3) facility accidents by oil companies; (4) small population sizes; (5) loss of reproductive vigor in small populations; (6) habitat fragmentation (due to residential, commercial, agricultural, and oil and gas development; roads and pathways); (7) herbicides used to control non-native species; (8) stochastic (i.e., random) extirpation/extinction events (due to the small size and isolation of the species it is more vulnerable to natural events, such as drought, flooding, fires, earthquakes, outbreaks of insects or disease, or other catastrophic events); (9) genetics issues as affected by small population size; (10) climate change; (11) wind energy projects; (12) crushing of plants resulting from emergency response activities; and (13) loss of and damage to plants from mission operations at VAFB (USFWS 2011).

Climate change could affect Gaviota tarplant by resulting in sea-level rise, which could increase beach erosion and potentially cause subsequent adverse effects to the known occurrences on the coastal terrace. The National Oceanic and Atmospheric Administration (NOAA) has a published viewer that depicts the potential inundation of coastal areas resulting from a projected 1- to 10-foot rise in sea level above current Mean Higher High Water conditions. The process

used to produce the data is described as a *modified bathtub approach* that attempts to account for both local and regional tidal variability as well as hydrological connectivity (NOAA 2019). According to the model from the NOAA, under a climate change scenario with a projected sea-level rise of 10 feet, approximately 33.2 acres of Gaviota tarplant habitat would be inundated; this represents a maximum 0.8% of all known populations.

## 1.4 Tranquillon Mountain/Sudden Peak Occurrence

Gaviota tarplant was first identified in the Santa Ynez Mountains and the Sudden Peak area between 1998 and 2002. Prior to that time, the species was only known from marine terraces in the immediate vicinity of Gaviota (USFWS 2011). At the time of listing in 2000, the range of Gaviota tarplant was considered to be quite narrow in the Gaviota area; however, since that time, it is now known that the species has a broader range.

The CNDDDB occurrence records for Gaviota tarplant in the Tranquillon Mountain/Sudden Peak location are based on polygons delineated during 2002 and 2005 surveys on U.S. Geological Survey topographic quadrangle maps enlarged to 1 inch = 500 feet and later digitized using geographic information system (GIS) software. These surveys were generally limited to the impact footprint of the previous Lompoc Wind Energy Project, designed by Acciona Energy. Subsequent surveys confirmed that Gaviota tarplant was generally present in the occurrences mapped in the CNDDDB, but did not further refine these occurrences. Surveys conducted by Dudek in 2018 further refined occurrence data based on the CNDDDB occurrences generally associated with the Project's impact area.

In 2019, Dudek conducted surveys throughout the majority of the lands associated with the Project (Project Boundary) (Dudek 2019a). During these surveys, Dudek biologists identified and mapped populations of Gaviota tarplant that were previously unknown to science, at a scale that greatly improved what is known about the extent and density of the Tranquillon Mountain/Sudden Peak occurrence (Figure 3).

Within the Tranquillon Mountain/Sudden Peak occurrence, Gaviota tarplant is known to occur most commonly along ridgelines and mesas, although the species also occurs on sloping terrain of various aspect. During the 2019 survey effort, Dudek biologists observed that Gaviota tarplant occurs primarily on ridgelines and convex slopes, including top-of-slope and mid-slope positions. Occupied habitat typically included moderately invaded, open-canopy annual and perennial grasslands with a history of grazing. Adjacent habitats that were unsuitable for Gaviota tarplant included dense coastal scrub, oak woodland, and dense annual grassland where non-native grasses exceeded approximately 75% cover. Gaviota tarplant was observed along game trails and within sparse openings dominated by grasslands between coastal scrub and oak woodland species; Gaviota tarplant was not observed within intact coastal scrub and oak woodland vegetation communities during 2018 and 2019 field surveys.

Soil disturbance was frequently observed within occupied Gaviota tarplant habitat, usually consisting of small mammal burrows, cattle tracks, game trails, minor erosional features (<0.5 meters deep), and road shoulders. Non-native grasslands with no signs of physical disturbance often appeared to lack sufficient open ground to support Gaviota tarplant. Gaviota tarplant was observed within active and apparently inactive roadbeds and was observed to be growing in great density within dry land agricultural fields that appear to be disked on an annual basis to grow hay.

### 1.4.1 Soils and Geology

In the Tranquillon Mountain/Sudden Peak occurrence on site, Gaviota tarplant occurs in areas mapped as containing the Santa Lucia, Los Osos, Milpitas-Positas, Diablo, Gaviota, Tierra, San Andreas, Botella, Lopez, and Maymen soil series. It occurs on a mixture of surface textures with varying slopes and levels of erosion (USDA 2019). Gaviota tarplant in the Tranquillon Mountain/Sudden Peak occurrence has been observed in soil types with six surface textures: (1) channery clay loam, (2) clay, (3) clay loam, (4) fine sandy loam, (5) sandy loam, and (6) silty

clay loam. Gaviota tarplant habitat within the Tranquillon Mountain/Sudden Peak occurrence exists primarily in sandy loam (approximately 78%) and clay loam (approximately 13%), accounting for approximately 92% of the occurrence. Gaviota sandy loam (approximately 38%) and Tierra-San Andreas complex soil series (approximately 40%) underlie approximately 77% of the Tranquillon Mountain/Sudden Peak occurrence on site.

The USFWS 5-year Review notes that Gaviota tarplant consistently occurs where there is a shallow depth to clay of approximately 1 to 2 inches (USFWS 2011). However, comparison of the Tranquillon Mountain/Sudden Peak occurrence to soil survey data, and observations from the 2018 and 2019 surveys did not indicate a strong preference for clay layers at such shallow depths within the Tranquillon Mountain/Sudden Peak occurrence available to the Project.

The profile of Gaviota sandy loam includes sandy loam from 0 to 10 inches, with hard meta-sandstone occurring at a depth of 10 to 17 inches (USDA 2019). The Tierra soil series includes loam from 0 to 11 inches with a clay layer beginning at 12 inches and continuing to 25 inches below ground surface (USDA 2019). The San Andreas soil series profile includes fine sandy loam from 0 to 28 inches below ground surface with a bedrock of soft medium-grained sandstone starting at approximately 28 inches below ground surface (USDA 2019). While soil series maps are meant to be used at large scales, the high correlation of Gaviota tarplant occupied habitat and these soil series and textures appears to indicate a meaningful relationship. Additional study of the soil profile underlying occupied Gaviota tarplant habitat in the Tranquillon Mountain/Sudden Peak occurrence will be discussed in Section 2.4 (Habitat Characterization Study).

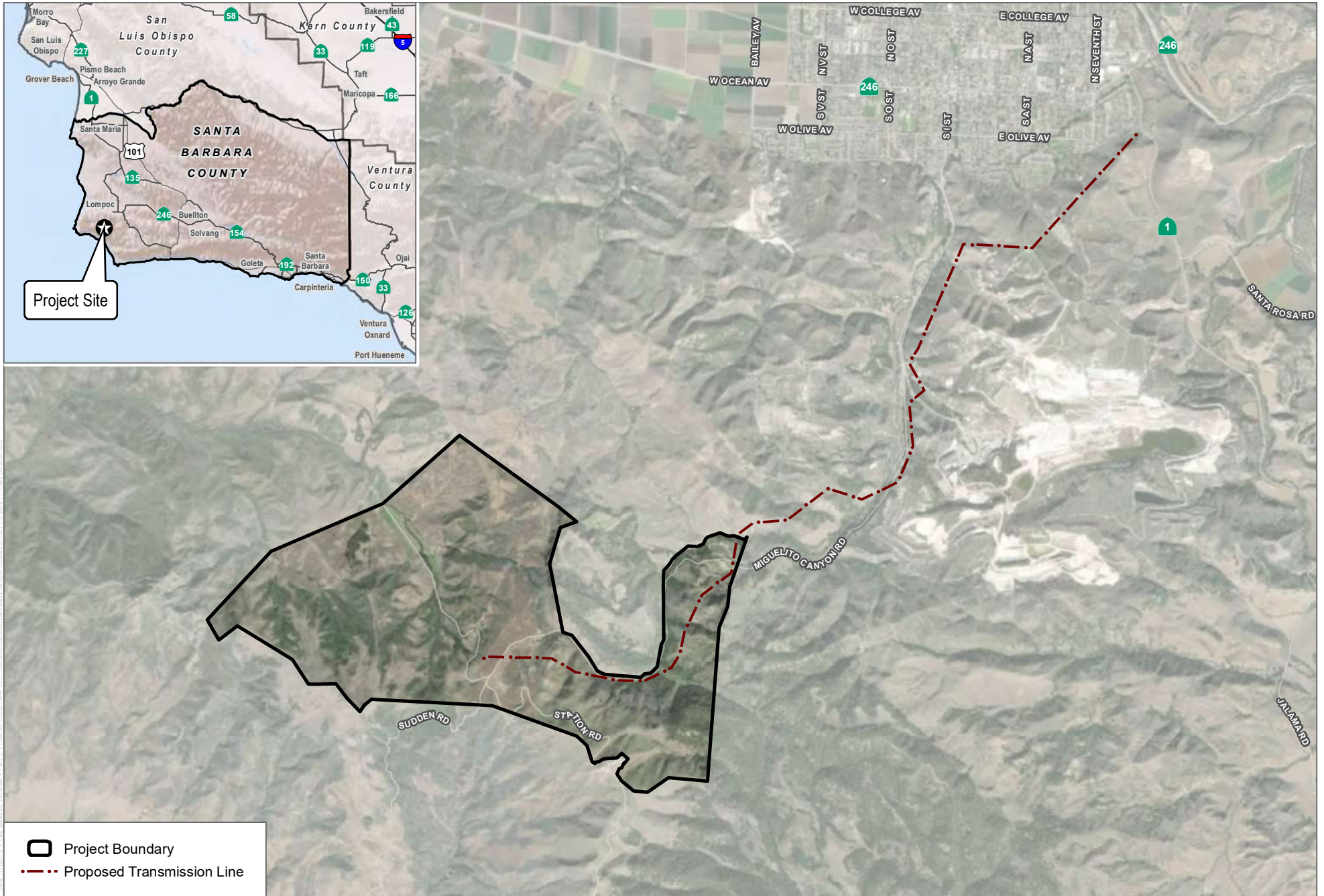
## 1.4.2 Topographic Preferences (Elevation, Slope, Aspect)

The topography within the Tranquillon Mountain/Sudden Peak occurrence is variable, with generally convex to flat ridgetops and steeply sloping hillsides. Elevations within the vicinity vary from approximately 200 feet above mean sea level (amsl) to 1,930 feet amsl. Gaviota tarplant has been observed within an elevation range of approximately 680 feet amsl to 1,928 feet amsl. Approximately 95% of Gaviota tarplant habitat within the Tranquillon Mountain/Sudden Peak occurrence occurs within 1,000 feet amsl to 1,599 feet amsl.

Slopes occupied by Gaviota tarplant within the Tranquillon Mountain/Sudden Peak occurrence range from 0% slope to 260% slope. Approximately 89% of Gaviota tarplant within the occurrence occupy areas with greater than 30% slope, with approximately 50% of Gaviota tarplant occurring on 46% to 90% slopes. Gaviota tarplant occurs on all slope aspects within the Tranquillon Mountain/Sudden Peak occurrence with 43% of occupied habitat being situated on west-facing slopes (226° to 315°).

## 1.4.3 Pollinators

During 2019 field surveys, Dudek biologists qualitatively surveyed for potential pollinators, defined as insects landing on and interacting with the flowering heads of Gaviota tarplant individuals. Observations recorded by Dudek biologists were consistent with the known pollinators, listed previously as flies, bees, skippers, and butterflies, but also indicated that various species of beetles appeared to visit flowering Gaviota tarplant heads frequently. Observations in 2019 indicated that the majority of visits to flowering Gaviota tarplant heads were made by various species of bees and beetles, with additional visits made by butterflies and skippers, and some minor interaction provided by ants. These observations are consistent with the scientific literature indicating that plants in the Asteraceae family, which Gaviota tarplant is a part of, appeal widely to many generalist pollinators (Mani and Saravanan 1999; Proctor et al. 1996; Wist and Davis 2006). No Crotch's bumblebees (*Bombus crotchii*) were observed incidentally during rare plant surveys in 2019 (Dudek 2019c).



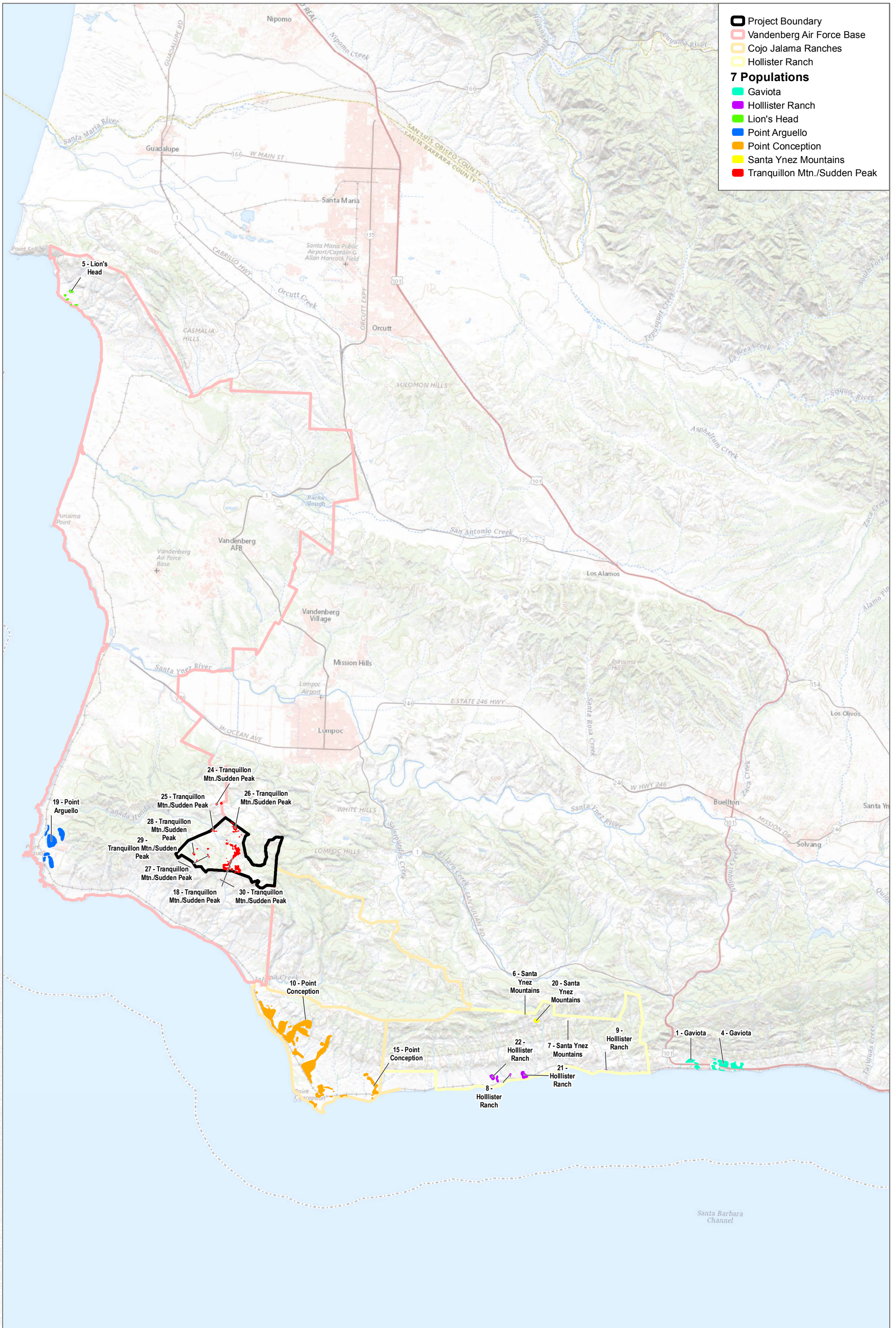
SOURCE: DigitalGlobe 2017



**FIGURE 1**  
**Project Location**  
 Strauss Wind Energy Project

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SOURCE: USGS Nation Map 2019

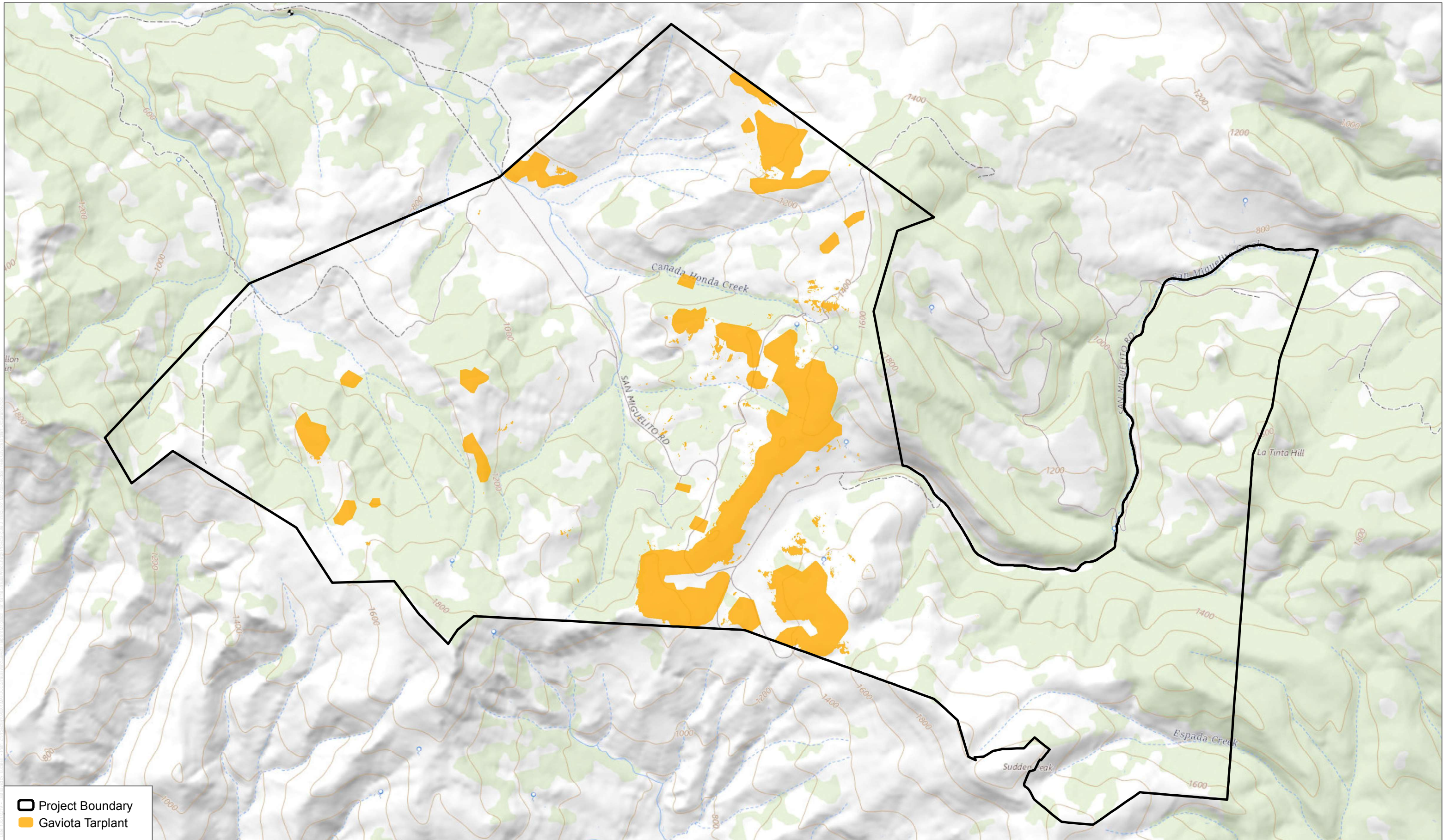


**FIGURE 2**  
**Gaviota Tarplant Occurrences**  
 Strauss Wind Energy Project



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SOURCE: USGS National Map 2019

**FIGURE 3**

Tranquillon Mountain/Sudden Peak Gaviota tarplant Occurrence

Strauss Wind Energy Project



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# 2 Gaviota Tarplant Conservation Plan

The Mitigation Program for impacts to Gaviota tarplant associated with the Project includes conservation of all occurrences with the Tranquillon Mountain/Sudden Peak occurrence available to the Project; restoration of temporary disturbance areas to pre-disturbance conditions; enhancing the likelihood of species persistence through monitoring; preparing a detailed habitat characterization study; collaboration of experts within a Technical Advisory Committee; focused seed collection; and Gaviota tarplant restoration through seeding.

## 2.1 Conservation

All Gaviota tarplant occurrences associated with the Project will be conserved in perpetuity through conservation easements and managed through an endowment (Figure 4). The preserved area includes the primary elements of occupied Gaviota tarplant habitat observed within the Tranquillon Mountain/Sudden Peak occurrence, while also preserving 769.1 acres of Gaviota tarplant Critical Habitat as designated by the USFWS. The Conservation Lands includes 200-meter buffers around all known occupied Gaviota tarplant habitat with additional conserved land for connectivity of distant occurrences, preservation of Gaviota tarplant Critical Habitat, as well as some reductions in buffer to avoid existing residential buildings when possible. The Conservation Lands captures the diversity of Gaviota tarplant growing conditions in the vicinity of the Project to enhance the likelihood of long-term survival of the Tranquillon Mountain/Sudden Peak population (Table 2) (Dudek 2019b).

**Table 2: Conservation Lands**

	Total Area (acres)	Occupied Gaviota Tarplant Habitat (Acres)	Gaviota Tarplant Individuals
Conservation Lands	1,903.1	196.7	~5,811,308

Additional mitigation requirements for the Project, including a riparian restoration site and an oak restoration site, provide further habitat conservation and connectivity of the conserved lands. Conservation easements for the conserved lands will consider existing homes, personal uses, historical ranching, and agricultural activities as allowable uses. Monitoring and management of these existing uses will be directed by the Gaviota tarplant monitoring program (See Section 3.3, Preserve Monitoring Program) and a grazing management plan (See Appendix A Grazing Management Plan). The overall goal for the conserved lands will be to maximize the likelihood of Gaviota tarplant persistence on site in perpetuity.

### 2.1.1 Suitability of Conservation Approach

Assessment of the suitability of the conservation approach relies on ecological principles and landscape ecology including edge effects, habitat fragmentation, island biogeographic theory, patch size, and minimum viable populations. The necessity of applying preserve design theory to real world landscapes often necessitates some level of compromise. Soulé and Simberloff (1986) consider that preserve design should (1) define the target species, (2) determine the minimum number of individuals in a population to give the target species a high probability of survival, and (3) include the area required to sustain that minimum number. The important aspect of preserve design is not so much what is conserved at the time of conservation, but what the population dynamics of the focus species within the preserve will be after the preserve is set up (Soulé and Simberloff 1986).

No minimum viable population analyses have been performed for Gaviota tarplant; however, minimum viable population analyses for other herbaceous plants have identified minimum viable populations of approximately 1,000 individuals for other species (see Section 2.1.2, Minimum Viable Population Literature Review). These estimates are for self-compatible species, while Gaviota tarplant is self-incompatible. However, with high ovule production and low mortality prior to reproduction, self-incompatible and self-compatible species are demographically similar, so self-incompatibility does not automatically reduce population viability (Thrall et al. 2014). Modeled population viability for self-incompatible plants anticipates threshold effects, where reductions in population size do not affect population viability significantly until a particular threshold is met (Thrall et al. 2014). Importantly, chronically rare species are considered more likely to survive when gamete dispersers are highly mobile, which is the case for Gaviota tarplant (Vermeij and Grosberg 2017).

The majority of Gaviota tarplant populations in off-site locations have ranged from approximately 150 individuals to approximately 10,000 individuals within the period that the species has been known to science. Two of the most well-surveyed occurrences include those identified in the CNDDDB with ID numbers 1 and 4. These two occurrences have shown relatively stable population trends while ranging from approximately 150 plants to 3,000 plants (USFWS 2011). Continued persistence of these populations indicates that the conservation approach, which includes monitoring and management of approximately 5,811,308 individuals conserved in perpetuity within a single consolidated occurrence (per CNDDDB mapping methodology an assemblage of plants within 0.25 miles of each other), is very conservative and will substantially limit extinction risk. The overall size of the Conservation Lands and diversity of habitat types also maximizes the available buffering of the Tranquillon Mountain/Sudden Peak occurrence from stochastic disturbance events, including wildfire, pests, disease, and other catastrophic events.

## 2.1.2 Minimum Viable Population Literature Review

Matthies et al. (2004) conducted an empirical study of plant population size based on a comprehensive dataset for endangered species in Germany over a 10-year period. The dataset included 359 populations of eight short-lived species that propagate only by seeds, and which are considered to have transient seed banks or seed banks that are “short-term persistent but depleted quickly.” They examined the relationship between population size and survival, as well as mean population growth in relation to population size. Overall, 73% of the 359 populations survived. Large populations had a much greater chance of survival than small populations—most populations with fewer than 6 individuals did not survive, whereas 100% of populations with greater than 1,000 individuals did survive. The population size necessary for 90% probability of survival over 10 years varied from 71 individuals for field pepper grass (*Lepidium campestre*) to 1,276 individuals for field cow-wheat (*Melampyrum arvense*). Matthies et al. (2004) concluded that extinction risk for populations over 1,000 individuals was “very small.” The species included in this research are all self-compatible, while Gaviota tarplant is not.

Bell et al. (2003) conducted a population restoration viability analysis for an annual herb, Pitcher’s thistle (*Cirsium pitcheri*), which is a short-lived monocarpic herb endemic to sand dunes of the western Great Lakes. The species reproduces through seed. It is mostly an outcrosser through insect pollination but can self-pollinate, resulting in lower seed set. Pitcher’s thistle exhibits seed dormancy but little seed banking. Its dune habitat is considered to have high environmental variability. The population restoration viability analysis assessed the viability of a restoration project by comparing its population size to the minimum viable population size required to achieve an extinction probability <5%. The minimum viable populations for restored populations at two different sites were estimated to be approximately 500 and 200 individuals.

Garcia (2007) conducted a 6-year study of a narrow endemic faguera (*Petrocoptis pseudoviscosa*), a self-compatible rocky outcrop perennial herb species in Spain that reproduces from seed near the mother plant, but with limited dispersal. The study included three populations ranging from 130 to 45,000 individuals with 130, 850, and 1,500 individuals per patch, including spatio-temporal reproductive and survival parameters and growth rates and life history traits in relation to variability in population dynamics, and assessed long-term vulnerability in relation to life history and population size. Garcia found that all three populations had low recruitment rates (10% to 19%); however, stochastic models showed no extinction risk for populations of 130 and 850 individuals over 100 years and 5.7% probability of extinction of the largest patch of 1,500 individuals. Extinction risk differences were due to spatio-temporal variability in reproduction and demographic traits and not population size alone. Although the study indicates that small plant populations can have low extinction risks, Garcia suggests that past adaptive history may be an important component in the extinction risk of small isolated populations.

## 2.2 Technical Advisory Committee

A Technical Advisory Committee (TAC) will be convened which consists of land managers, resource agency staff, and scientific experts. The TAC will be the ultimate decision-making entity that will guide management, monitoring, and planning activities during the adaptive management program. The TAC will meet annually to review actions taken in the previous year and to approve a work plan for the following year.

## 2.3 Preserve Management

Preserve management will include maintenance and monitoring obligations focused on maintaining Gaviota tarplant on site in perpetuity. Management actions include annual Gaviota tarplant monitoring, Gaviota tarplant restoration, habitat enhancement or other remediation of unanticipated impacts, invasive species control, grazing management, and additional studies, which will feed back into management recommendations (see Section 3, Preserve Management Plan). Preserve management will be overseen by a designated Preserve Manager with oversight from the TAC.

### 2.3.1 Argentine Ant Monitoring

Monitoring will be done to assess the status of invasive Argentine ants (*Linepithema humile*) within occupied Gaviota tarplant habitat within the Conservation Lands. Upon initiation of construction, the following monitoring actions will be implemented adjacent to new construction within the Conservation Lands.

1. Quarterly monitoring along the rights-of-way constructed for the Project, remedying any inadvertent sources of moisture that could create suitable ant habitat.
2. Wet season monitoring adjacent to occupied Gaviota tarplant habitat within the Conservation Lands to detect and remedy inadvertent introductions into naturally wet areas created within the Conservation Lands during and after winter rain events.
3. Quarterly monitoring within occupied Gaviota tarplant habitat to determine the presence or absence of native ant species. If native ant species are determined to be absent, further research into the cause of their disappearance will be conducted, and management measures will be developed to mitigate the negative effect.

Argentine ant populations disperse at a rate of about 15 to 270 meters per year, so quarterly monitoring for Argentine ants should be adequate for detecting incipient invasions (Suarez et al. 2001). If Argentine ants are detected during monitoring, an assessment of foraging versus nesting ants will be implemented along with appropriate direct control measures to help prevent the invasion from worsening. Direct control may include, but is not limited to, nest/mound insecticide treatment, or available natural control methods in development.

## 2.4 Seed Collection and Banking

A primary conservation-focused seed collection event will occur prior to impacts associated with Project construction. All of the Gaviota tarplant seed available within the direct impact footprint will be collected, cleaned, and stored at a reputable native seed bank or botanical garden, such as Rancho Santa Ana Botanic Garden, as approved by CDFW and USFWS.

Two additional conservation-focused seed-collection events will be completed during the first ten years of the preserve management period following dedication of the conservation easement. During these additional seed-collection events, less than 5% of available seed will be collected from any Gaviota tarplant patch within the Tranquillon Mountain/Sudden Peak occurrence. The seed produced in these seed-collection events will be cleaned and stored similarly to the initial collection event. Up to half of the collected seed will be used in Gaviota tarplant restoration within the Conservation Lands. Additional seed will be available for conservation-related use in coordination with CDFW and USFWS.

## 2.5 Habitat Characterization Study

An initial habitat characterization study based on 2019 field surveys and spatial analysis in ArcGIS has been conducted for the Tranquillon Mountain/Sudden Peak occurrences associated with the Project Boundary (Dudek 2019b). A detailed Habitat Characterization Study will be conducted prior to Project construction. The Habitat Characterization Study will include soil tests for major constituent analyses and analysis of the textural profile with a focus on identifying textural breaks that could indicate hardpans. The study will also measure cover of Gaviota tarplant, cover of co-occurring plant species, non-Gaviota tarplant residual dry matter, micro-topography, slope aspect, slope, and disturbance within a 5x5-meter plot, and will assess slope, slope shape, slope aspect, disturbance, elevation, and vegetation communities within a 20-meter circular buffer area. Monitoring plots will be spread throughout the Tranquillon Mountain/Sudden Peak occurrence as available to the Project. The goal of the study will be to define which ecological characteristics have a significant effect on Gaviota tarplant performance, measured as density and cover.

Results of the Habitat Characterization Study will be incorporated into a standalone report and distributed to CDFW, USFWS, and the County. No study of this kind has been performed on Gaviota tarplant anywhere within its range and it will add significantly to the body of knowledge on the species. The results of this study will also be incorporated into enhancement of the Conservation Lands, planning of Gaviota tarplant restoration activities, and adaptive management during long-term management of the Conservation Lands.

## 2.6 Gaviota Tarplant Restoration

All temporary impacts from activities associated with construction of the Project, namely the laydown yard and transmission line pull sites, will be restored to pre-Project conditions through the Site Restoration and Revegetation

Plan, required by mitigation measure BIO-3. Gaviota tarplant seed-bearing topsoil will be salvaged and placed in accordance with the requirements laid out in that plan. In addition to this topsoil work, Gaviota tarplant will be introduced within approximately 3.0 acres of suitable habitat, which has never been occupied but contains the conditions found to be positively associated with Gaviota tarplant in the Habitat Characterization Study. Introduction of Gaviota tarplant will use collected seed. Restoration of Gaviota tarplant will begin within 10 years of dedication of the Conservation Lands. Restoration actions will be detailed in a work plan which will be submitted to the TAC for approval prior to implementation.

## 2.7 Genetic Study

A genetic study will be implemented on Gaviota tarplant within the Conservation Lands. The study will focus on identifying genetic variance between subpopulations relative to total genetic variance within the Conservation Lands (referred to in genetic research as  $F_{ST}$ ).

## 2.8 Grazing Management Plan

Grazing management will set forth the best management practices (BMPs), management goals and objectives, and the monitoring and reporting requirements associated with ranching activities within the Conservation Lands. A grazing management plan will institute grazing management practices that are consistent with maintaining and improving the existing biological resource conditions that support Gaviota tarplant, provide for the continued operation of a sustainable commercial ranching operation, and provide an important fuel modification tool to manage fire risk (see Appendix A, Grazing Management Plan). The monitoring and reporting elements will ensure that the grazing program maintains or improves the biological resource conditions for the benefit of Gaviota tarplant, including the development of measureable goals and objectives.

## 2.9 Insect and Pollinator Database

Insects and pollinators will be monitored adjacent to occupied Gaviota tarplant habitat annually through environmental DNA (eDNA) monitoring. Monitoring through eDNA, defined as testing of genetic material obtained directly from environmental samples, will be performed when turbines are stopped for required maintenance activities. A swipe of the front-facing turbine blade will be processed using DNA metabarcoding to identify insect species interacting with the turbine blade. An insect and pollinator database will be maintained for at least the first 5 years after dedication of the Conservation Lands, and continued annual monitoring will be instituted if considered useful by the TAC.

## 2.10 Additional Mitigation Measures

Compliance with County-required mitigation measures associated with the Project will benefit Gaviota tarplant and other biological resources in the vicinity of the Project. Mitigation Measures that apply directly to Gaviota tarplant are addressed in this Mitigation Plan. Excerpts from the mitigation measures that are relevant to Gaviota tarplant in the Conservation Lands, and that are additional to the requirements laid out in this Mitigation Plan are included below.

**MM BIO-1 Worker Education and Awareness Program.** The Applicant shall fund a County-approved biologist to develop and implement a worker education and awareness program (WEAP) specific to the Project. The program shall be presented to all individuals involved in the construction and operations and maintenance phases of the Project. The program shall include information focused on sensitive habitats and species and shall include, but not be limited to, the following:

- The natural history, including sensitive species and habitats, shall be described as well as the current status, reasons for decline, and protection measures relevant to the species and habitats.
- Workers shall be provided with photographs of sensitive biological resources including sensitive wildlife and plant species, den and burrow entrances, and nest structures. Qualified biologists, familiar with El Segundo blue butterfly and Gaviota tarplant, will provide a brief educational program for all personnel prior to initiation of any construction activities within the Project site. The program will include identification of El Segundo blue butterfly, its host plant, coast buckwheat, and Gaviota tarplant; the general provisions and protections afforded to El Segundo blue butterfly and Gaviota tarplant by the Endangered Species Act; and measures to be implemented during the Project to avoid and minimize adverse effects to El Segundo blue butterfly and Gaviota tarplant.
- Workers shall be informed verbally and in writing of the various Project tasks that require biological surveys and monitoring for resource protection.
- Workers shall be provided with a photograph or description of the markers for active bird nests, trees, salvaged topsoil piles and windrows, or other mitigation areas, so that they shall know these are not to be disturbed without a biological monitor present.
- Workers shall be provided with photographs of invasive weeds and instructed to report to the biologist any new populations observed near Project facilities.
- Workers shall be informed not to litter. All trash and litter shall be picked up and removed from the construction sites at the end of each day.
- Workers shall be informed to obey a speed limit of 15 miles per hour while traveling on the Project site to avoid collisions with wildlife.
- Workers shall avoid driving over or otherwise disturbing areas outside the designated construction areas.

**MM BIO-3 Site Restoration and Revegetation Plan.** The Applicant shall retain a County-approved botanist to prepare and implement a site restoration and revegetation plan for all native vegetation communities subject to temporary impacts during construction and ground-disturbing operations and maintenance activities. The plan shall include, but not be limited to, the following requirements and other provisions:

- The site restoration and revegetation plan will identify quantitative success criteria for all habitat restoration that is based on both native vegetation percent cover and native species richness. Long-term performance standards shall include, but not be limited to, criteria such as requiring that restoration areas support at least 80% of the native species abundance and percent cover and is relatively weed free or demonstrates similar weed cover to surrounding, good quality habitat. All restoration activities and monitoring will be designed and implemented with the objective of achieving the success criteria.
- Native grassland communities shall be avoided to the greatest extent feasible.



- Top soil, and the seed bank it contains, shall be conserved on areas where soil is excavated such as wind turbine generator sites, access roads, and transmission pole locations.
- Woody material shall be removed from the soil surface and piled in an area that will be out of the way during construction. The upper 6 to 8 inches of soil shall be scraped from the disturbance footprint and piled into a stockpile in an area that will not be disturbed during construction.
- Topsoil stockpiles shall be clearly marked for avoidance.
- Stockpiles shall be immediately protected from wind erosion by covering them or hydromulching them to protect the pile from wind erosion. Wind erosion protection shall be renewed as needed.
- Any disturbed area that is not covered with base or paving within 14 days of its disturbance shall be stabilized through use of soil coating mulch, dust palliatives, compaction, reseeding, or other approved methods.
- Salvaged topsoil shall be redistributed on areas that will be revegetated following construction.
- Hydroseed with soil stabilization seed mixture shall be applied to temporarily disturbed areas, as appropriate, to facilitate revegetation and avoid erosion of bare soils. The hydroseed mix shall contain a mulch and binder to retard wind erosion by providing a crust over the soil surface. Native plant seeds shall be added to the hydroseed mixture or hand broadcasted onto the site just prior to hydroseeding. Care shall be taken to avoid premature germination of native species caused by prolonged immersion in the hydroseeder. On slopes, the Applicant shall augment the erosion control seed mixture with seed of native coastal scrub species native to the site and collected from the Project region. Appropriate seed mixtures for use on grassland and coastal scrub areas shall be developed in consultation with and approved by CDFW and County staff using seed of native species originating from the area between the Santa Ynez River and Hollister Ranch, and inland as far as California State Highway 1. Recommendations from USDA Natural Resources Conservation Service for reseeding of agricultural grazing areas will be sought and incorporated as approved by the above agencies. The use of non-native species considered detrimental to agricultural grazing will be avoided.

**MM BIO-4c Invasive Plant Pathogen Abatement (SOD Prevention).** A County-approved biologist will ensure that the spread or introduction of plant pathogens will be avoided to the maximum extent feasible. To reduce the potential for spread of sudden oak death and other pests, all grubbed woody material shall be chipped, spread out to dry, and disposed of on site or at an appropriate facility. To minimize the unintended movement of host material, soil, and water from areas infested with *Phytophthora* spp. the following best management practices will be implemented:

- a. Prior to commencement of construction, the approved biologist shall evaluate the level of currently known *Phytophthora* infestations (e.g., viewable in SODmap) along the entirety of the Project area. In the event that there is a risk of infestation at any Work Area, establish a vehicle and equipment power wash station to remove potentially contaminated accumulations of soil, mud, and organic debris. The station will be located within the potentially infested area, paved or rocked, well-drained so that vehicles exiting the station do not become contaminated by the wash water, and sited where wash water and displaced soil does not have the potential to carry fines to a watercourse.
- b. Prior to entry to any proposed Project area for the first time, equipment must be free of soil and debris on tires, wheel wells, vehicle undercarriages, and other surfaces (a high-

pressure washer and/or compressed air may be used to ensure that soil and debris are completely removed).

- c. Compliance with the provision is achieved by demonstrating that the vehicle or equipment has been cleaned at a commercial vehicle or appropriate truck washing facility.
- d. The interior of equipment (cabs, etc.) must be free of mud, soil, gravel, and other debris (interiors may be vacuumed or washed).
- e. Footwear and small tools must be thoroughly cleaned and sanitized before moving to a new job site. Shoe soles must be free of debris and soil. Water, a stiff brush, screwdriver, or similar tool can be used to remove soil from shoe treads. Once soil or debris have been removed, an appropriate sanitizing agent of ethyl or isopropyl alcohol (at least 70% concentration) must be used to kill pathogen spores which may be present on boot soles or tools (sanitizing agent may be applied by using spray bottles filled with alcohol to thoroughly wet the surface). Boot soles and hand tools must be sprayed with enough alcohol that surfaces are fully coated and wet. Brushes and other implements used to help remove soil will be cleaned after use with alcohol.

**MM BIO-11b Fencing.** To minimize the amount of disturbance to wildlife habitat and sensitive biological resources, the Applicant shall clearly mark environmentally sensitive areas for avoidance in the field. These areas include, but are not limited to, occurrences of special-status plants, trees to be avoided, sensitive vegetation communities adjacent to work areas, and jurisdictional resources. Project boundaries shall be clearly marked with fencing or staking that shall be replaced as needed.

**MM BIO-11c Biological Monitoring.** The Applicant shall fund a County-approved, Environmental Monitor during Project construction to monitor construction activities and to ensure compliance with all mitigation measures. The Environmental Monitor shall be present on site during all vegetation removal and during all of the initial ground disturbance activities for all aspects of the Project and shall regularly inspect the Project site as needed after the initial ground disturbances to ensure that all mitigation measures are being implemented. The Environmental Monitor shall ensure that wildlife do not become entrapped in the excavations during installation of the wind turbine generators and associated underground collection system from the wind turbine generators to the substation (i.e., open trenches). Safeguards shall be implemented during daytime periods of non-activity and overnight, such as a placing a platform over the entire excavation site, flush with the ground surface, installing escape ramps in trenches, or erecting exclusionary fencing. The Environmental Monitor shall be responsible for ensuring these safeguards are in place on a daily basis. Should relocation be required, construction shall be halted until the Designated Biologist arrives on site and clears the work area (in compliance with all applicable permits and authorizations).

**MM BIO-17 Weed Control Plan.** The Applicant shall have a County-approved, qualified restoration ecologist or biologist prepare a comprehensive adaptive Weed Control Plan to be administered during the construction and operation phases of the proposed Project. The Weed Control Plan shall be submitted to the County for review and approval and shall be updated and implemented for weed eradication and monitoring for the life of the proposed Project. The Weed Control Plan shall include, but is not limited to, the following:

1. Conduct a pre-disturbance survey for invasive weeds in all presently undisturbed areas that are proposed for ground-disturbing activity in the proposed Project footprint. Weed

populations that are rated high or moderate for negative ecological impact in the California Invasive Plant Inventory Database (Cal-IPC 2018) shall be mapped and described according to density and area covered. Identify the invasive species that will be subject to control measures (ubiquitous non-native species such as brome grasses and wild oats should be identified and described, but need not be subject to control measures). Areas with weed infestations shall be treated prior to ground disturbance in presently undisturbed areas according to control methods detailed below and best management practices for invasive weed populations.

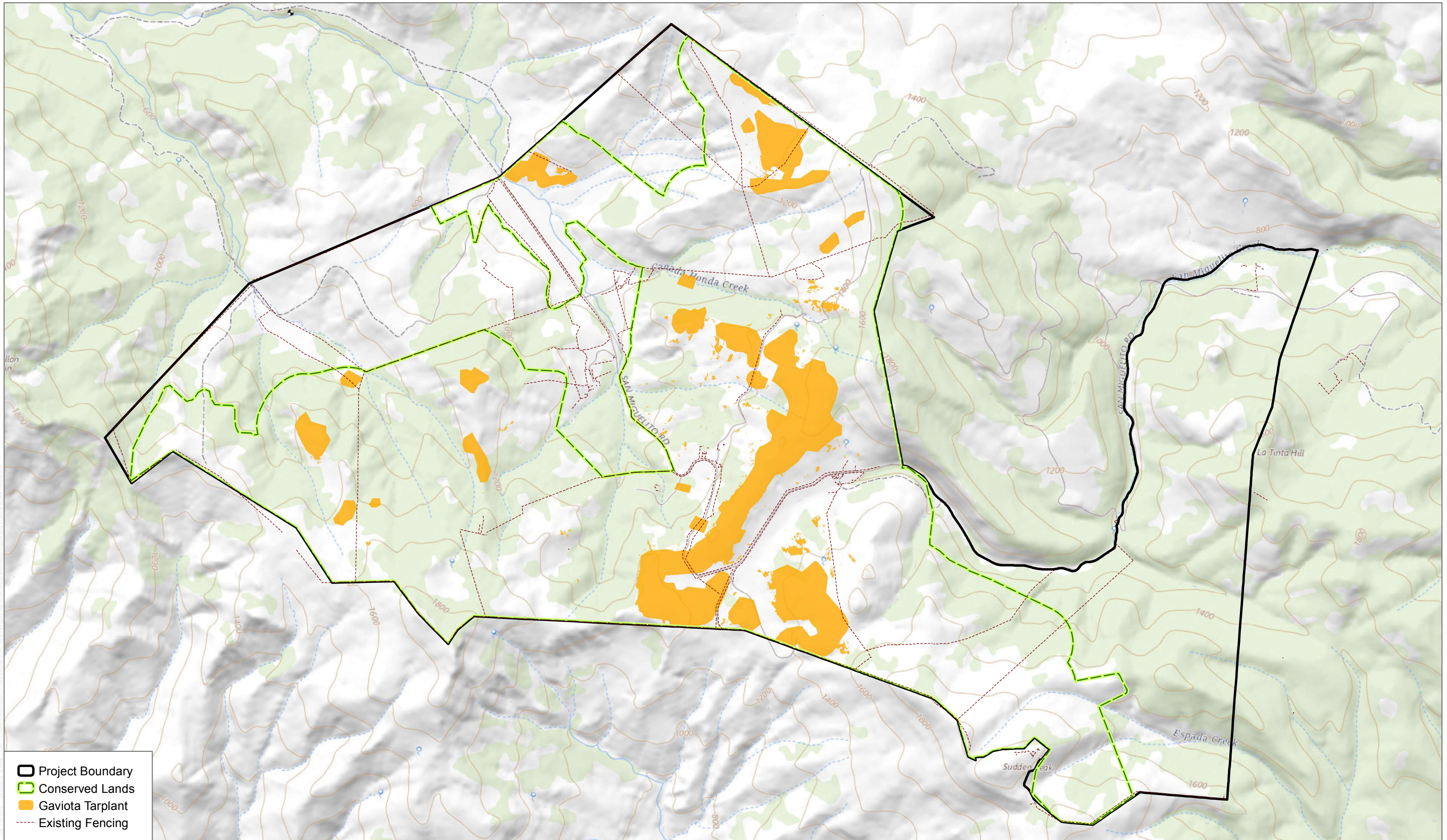
2. Weed control treatments shall include the application of appropriate U.S. Environmental Protection Agency-registered herbicides as well as manual, cultural, and mechanical methods approved for application. The application of herbicides shall be in compliance with State and federal laws and regulations under the prescription of a Pest Control Advisor, with the County's concurrence, and shall be implemented by a Licensed Qualified Applicator. Herbicides shall not be applied during or within 72 hours of a forecasted measurable rain event or during high wind conditions that could cause spray drift onto native vegetation. Where manual or mechanical methods are used, plant debris shall be disposed of at an appropriate off-site location. The timing of the weed control treatment shall be determined for each plant species with the goal of controlling populations before they start producing seeds. Consultation with a County-approved, qualified wildlife biologist or botanist shall be required prior to weed control treatments to develop strategies to avoid any adverse impacts to plants and wildlife in the area.
3. Use appropriate herbicides that are labeled for the site. Applicators must take measures to prevent drift and non-target contamination. These could include the following: wick (wiping onto leaves); inner bark injection; cut stump; frill or hack and squirt (into cuts in the trunk); basal bark girdling; foliar spot spraying with backpack sprayers or pump sprayers at low pressure or with a shield attachment to control drift, and only when wind conditions do not favor drift, or with a squeeze bottle for small infestations.
4. Throughout construction and operation, all sites impacted by the proposed Project (including access roads within the Project site and along the transmission line) shall be surveyed annually for new invasive weed populations and identified weed populations shall be treated and monitored. Treatment of all identified weed populations shall occur at a minimum of once annually. When no new seedlings or re-sprouts are observed at treated sites for three consecutive, normal rainfall years, the weed population can be considered eradicated and weed control efforts may cease for that impact site.

Weed control efforts shall be timed to reduce invasive weed seed production. This entails conducting weed removal when flowering has just started, but before seeds have been produced. All plant debris shall be disposed of at an approved location. Weed control efforts shall generally commence in early spring (February), or as determined each year by a qualified restoration ecologist or biologist.

5. All seeds and straw materials used during proposed Project construction and operation shall be weed-free rice straw or other weed-free product, and all gravel and fill material shall be weed free. All plant materials used during restoration shall be native, certified weed-free, and approved by the County of Santa Barbara.

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SOURCE: USGS National Map 2019



**FIGURE 4**  
 Conserved Lands  
 Strauss Wind Energy Project



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# 3 Preserve Management Plan

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This Preserve Management Plan identifies the protection and management goals and objectives for long-term management of the preserved Gaviota tarplant. The management goals and objectives are primarily based on the ecology of Gaviota tarplant, the occurrence and suitable habitat within the Conservation Lands, the potential threats to Gaviota tarplant associated with permitted uses within the Conservation Lands, and the priority of managing potential threats based upon the magnitude and immediacy of the threat.

A qualified natural lands management entity (Lands Manager) approved by the County, CDFW, and the USFWS will be selected to manage the conservation easement lands in perpetuity. The overall management goal is to provide for the long-term protection and sustainability of Gaviota tarplant, including its seedbank, within the Conservation Lands in perpetuity.

## 3.1 Management Goals and Objectives

General long-range goals, objectives, and potential management actions and compliance requirements, as well as a discussion of management thresholds in the context of long-term management are included herein. Gaviota tarplant occurs within 196.7 acres within the Conservation Lands. This Preserve Management Plan includes six broadly defined long-term goals for the protection and management of Gaviota tarplant within the Conservation Lands, stated as follows:

- Goal 1: Conserve 196.7 acres of Gaviota tarplant-occupied habitat in perpetuity.
- Goal 2: Maintain Gaviota tarplant-occupied habitat at current or greater levels.
- Goal 3: Monitor Gaviota tarplant population dynamics (areal extent, density, total number) within the Conservation Lands.
- Goal 4: Enhance existing suitable Gaviota tarplant habitat within the Conservation Lands through management of conditions on site.
- Goal 5: Monitor conditions within the Conservation Lands for potential deleterious effects (e.g., invasive weeds, Argentine ants, erosion)
- Goal 6: Avoid and minimize direct and indirect impacts to Gaviota tarplant and suitable habitat associated with allowed activities in the Conservation Lands.

These goals are the basis for the conservation strategy designed to fully mitigate the impacts to Gaviota tarplant. Specific management objectives are identified for each goal below, along with corresponding actions and thresholds describing the timing and/or conditions for meeting the objective.

### 3.1.1 Goal 1: Conserve 196.7 Acres of Gaviota Tarplant-Occupied Habitat in Perpetuity

**Objective 1:** Conserve known occurrences of Gaviota tarplant within the Conservation Lands.

**Action:** Record conservation easements on the Conservation Lands. Comply with the Fencing and Signage Plan.

**Compliance Requirement/Threshold:** Dedication of the Conservation Lands through the recording of a conservation easement.

### 3.1.2 Goal 2: Maintain Occupied Habitat at Current or Greater Levels of Suitability for Gaviota Tarplant

**Objective 2:** Maintain occupied Gaviota tarplant habitat at existing suitability or better within the Conservation Lands.

**Action:** Implement annual monitoring protocol, as described in Section 3.3, Preserve Monitoring Program, and implement remedial measures as needed, with guidance and approval from the TAC.

**Compliance Requirement/Threshold:** Baseline suitability will be defined by two standard deviations from the mean value of each variable being analyzed prior to Project-related impacts in the Habitat Characterization Study. These variables include non-native species cover, cover of co-occurring native plant species, non-Gaviota tarplant residual dry matter, and percent cover of disturbance.

### 3.1.3 Goal 3: Monitor Gaviota Tarplant Population Dynamics within the Conservation Lands

**Objective 3:** Quantitatively monitor Gaviota tarplant population dynamics for changes in density, areal extent, and total numbers.

**Action:** Implement annual monitoring protocol, as described in Section 3.3, Preserve Monitoring Program.

**Compliance Requirement/Threshold:** Preserve monitoring will begin at the dedication of Conservation Lands.

### 3.1.4 Goal 4: Enhance Existing Suitable Gaviota Tarplant Habitat within the Conservation Lands

**Objective 4:** Implement enhancement actions to improve habitat quality within occupied Gaviota tarplant habitat within the Conservation Lands. Enhancement actions may be performed within unoccupied adjacent habitat under an adaptive management approach.

**Action:** Implement enhancement activities focused on removal of non-native species negatively correlated with Gaviota tarplant abundance, as informed by the Habitat Characterization Study within occupied suitable habitat in the Conservation Lands. Enhancement activities may also include erosion remediation/control, and/or modifying grazing management for residual dry matter levels proven to enhance Gaviota tarplant performance. Native seeding may also be considered with an adaptive management approach.

**Compliance Requirement/Threshold:** Enhancement activities within the Conservation Lands will be conducted in accordance with the adaptive management approach described in Section 3.7, Adaptive Management Program.



### 3.1.5 Goal 5: Monitor Conditions within the Conservation Lands for Potential Deleterious Effects

**Objective 5:** Monitor habitat conditions within the Conservation Lands for invasive plant species, Argentine ants, erosion, and other potentially problematic factors.

**Action:** Implement annual monitoring protocol, as described in Section 3.3, Preserve Monitoring Program.

**Compliance Requirement/Threshold:** Preserve monitoring will begin at the dedication of Conservation Lands.

### 3.1.6 Goal 6: Avoid and Minimize Direct and Indirect Impacts to Gaviota Tarplant and Suitable Habitat Associated with Allowed Activities in the Conservation Lands

**Objective 6.1:** Regulate livestock grazing and range management activities to maintain or improve existing suitable Gaviota tarplant habitat, while continuing to provide for ranching activities and fire protection.

**Action:** Implement the Habitat Characterization Study and utilize the results of the study, particularly residual dry matter measurements, to inform grazing activities. Implement the Grazing Management Plan (GMP).

**Compliance Requirement/Threshold:** Grazing operations will be conducted in accordance with the GMP and the adaptive management approach described in Section 3.7.

**Objective 6.2:** Minimize the impacts that maintenance of utility infrastructure may have on Gaviota tarplant within the Conservation Lands.

**Action:** Following recordation of conservation easements associated with the Conservation Lands, implement the Fencing and Signage Plan (Appendix B), to manage access controls within the Conservation Lands. Additionally, require all personnel involved in utility infrastructure maintenance to undergo WEAP training as required by MM BIO-1.

**Compliance Requirement/Threshold:** The Fencing and Signage Plan and GMP will be implemented immediately upon recordation of conservation easements associated with the Conservation Lands. All permanent impacts to occupied Gaviota tarplant habitat during O&M will be mitigated at a 3:1 ratio. Temporary impacts to occupied Gaviota tarplant habitat will be mitigated as permanent impacts unless monitoring demonstrates full recovery of Gaviota tarplant occurrences in the temporarily occupied areas.

**Objective 6.3:** Avoid and minimize the adverse effects of private and public access adjacent to Conservation Lands.

**Action:** Following recordation of conservation easements associated with the Conservation Lands, implement the Fencing and Signage Plan (Appendix B), to manage access controls within the Conservation Lands. Implement monitoring as described in Section 3.3, Preserve Monitoring Program, and employ appropriate remedial measures when deficiencies are identified.

**Compliance Requirement/Threshold:** The Fencing and Signage Plan will be implemented immediately upon recordation of conservation easements associated with the Conservation Lands. All permanent impacts to occupied

Gaviota tarplant habitat during O&M will be mitigated at a 3:1 ratio. Temporary impacts to occupied Gaviota tarplant habitat will be mitigated as permanent impacts unless monitoring demonstrates full recovery of Gaviota tarplant occurrences in the temporarily occupied areas.

### 3.2 Management Thresholds

Quantitative management thresholds were set in coordination with USFWS and CDFW. Thresholds represent measurable declines in Gaviota tarplant distribution (areal extent) and abundance (absolute cover or density), and number of individuals. Observed declines meeting the identified thresholds trigger implementation of appropriate remedial actions in a programmatic approach, beginning with efforts to assess the cause(s) of the observed decline. Remedial actions may include, but are not limited to, additional study focused on the cause of decline, focused invasive plant species control, habitat enhancement, habitat management, exclusion fence repair or addition, Gaviota tarplant seeding, and/or modifications to grazing management. Long-term management thresholds may be revised, with the approval of the TAC, after the first 10 years of preserve management to incorporate additional ecological knowledge gained through initial studies and monitoring.

Management thresholds include:

- A 10-percentage-point decline in abundance of Gaviota tarplant within occupied habitat compared to baseline, assessed over a minimum of two monitoring intervals, which would indicate a continued trend.
- A 10-percentage-point decline in areal extent of Gaviota tarplant assessed over a single monitoring interval.
- A 10-percentage-point increase in frequency of occurrence and/or percent cover of factors proven to negatively impact Gaviota tarplant distribution, which may include certain non-native plant species, or unnatural disturbances.

### 3.3 Preserve Monitoring Program

Preserve monitoring will occur on a rolling basis, with qualitative compliance monitoring visits occurring every year and biological monitoring visits occurring once every 3 years during an average or above average rain year. If no such years occur, monitoring will occur at the end of the 3-year waiting period. No two biological monitoring visits will be held within 2 years of each other, unless the preceding monitoring year was triggered without the required climatic parameters. Table 3 indicates several possible monitoring schedules based on the monitoring parameters.

**Table 3. Possible Monitoring Scenarios Based on Climate**

Year	3-Year Monitoring Windows	Scenario 1	Scenario 2	Scenario 3
1			X	
2		X		
3				X
4		X		
5			X	
6				X
7		X		
8			X	
9				X

**Table 3. Possible Monitoring Scenarios Based on Climate**

Year	3-Year Monitoring Windows	Scenario 1	Scenario 2	Scenario 3
10			X	
11				X
12		X		
13				X
14		X	X	
15				

Preserve monitoring falls into two categories, (1) compliance and (2) biological monitoring. Preserve monitoring will be performed at the Applicant’s expense for the first 6 years after dedication of the Conservation Lands, with the Lands Manager taking over in perpetuity after completion of the initial 6-year period. This delay is built into the Preserve management schedule to allow the endowment to generate funds. Initial monitoring will be overseen by an Interim Preserve Manager, approved by the USFWS and CFDW. Compliance monitoring will include, at a minimum, compliance with the goals and objectives of the Preserve Management Plan, which includes compliance with the Fencing and Signage Plan. Compliance monitoring is required on an annual basis. Biological monitoring of occupied Gaviota tarplant habitat will follow the methods described in Section 3.3.2 Quantitative Monitoring. Vegetation mapping within the Conservation Lands will be updated every 10 years.

### 3.3.1 Qualitative Monitoring

Qualitative assessments of the Conservation Lands will be conducted twice a year to assess overall site conditions and remedial recommendations. The purposes of the monitoring visits will be to document weed problems; document stages of growth, flowering, and seed production of Gaviota tarplant within the Conservation Lands; monitor soil stability; and monitor the general condition of the Conservation Lands. Specifically, qualitative monitoring will include the following:

- **Monitoring weed problems and thatch build-up.** Monitor the presence and level of weed problems on site with reference to the specific results of the Habitat Characterization Study. Identify and map occurrences of noxious weeds and perennial invasive plant species. Make appropriate and timely weed control recommendations. Document levels of thatch build-up in the Conservation Lands.
- **Monitoring the stages of Gaviota tarplant growth, flowering, and seed production.** Monitor the life-cycle stages of Gaviota tarplant during qualitative monitoring visits in order to schedule timely quantitative monitoring, if applicable. Record phenology stage of Gaviota tarplant during each qualitative monitoring visit.
- **Monitoring soil stability, evident hydrology, and resistance to erosion.** Monitor the potential development of soil gaps and/or depressions that may form as a result of erosion or soil settling. If problems are detected and judged to be detrimental to the success of the program, provide remedial recommendations to repair any observed damage and to prevent future damage.
- **Photo-documenting conditions on site.** Take representative photographs from fixed points within the Conservation Lands; photographs to be taken from fixed viewpoints allowing year-by-year comparison during the monitoring period.
- **Monitoring general site conditions.** Observe the general status of fencing, signage, perimeter control (trespass), and litter. Provide recommendations for maintenance needs immediately upon identification of issues.

### 3.3.2 Quantitative Monitoring

Quantitative monitoring for Gaviota tarplant within the Conservation Lands will occur during the peak blooming season for Gaviota tarplant (approximately July–August) once in every 3 years. Quantitative field data will be used to study variability in the Gaviota tarplant populations within the Conservation Lands, to evaluate the effectiveness of prior enhancement and restoration activities, and to assess the need for additional maintenance action within the Conservation Lands.

Quantitative monitoring will begin in the first year of dedication of Conservation Lands, and will utilize 5x5-meter plots. Quantitative monitoring will take a subsampling approach, where occupied Gaviota tarplant habitat will be split into a grid with 200-meter by 200-meter cells. One third of these grid cells will be randomly selected for monitoring during all quantitative monitoring years. The first year of monitoring will be considered a pilot study, and parameters described below, as well as the subsampling approach, may be modified pending the results of the pilot study. The number of monitoring plots may be adjusted pending a power analysis, and should target statistical power that will allow assessment of the management thresholds. Any potential modifications to the quantitative monitoring protocol would be made in collaboration with the TAC. The expression of Gaviota tarplant is known to vary greatly from year to year (USFWS 2011). Quantitative monitoring will provide consistent data on the abundance of Gaviota tarplant within occupied habitat within the Conservation Lands.

#### 3.3.2.1 Gaviota Tarplant Abundance

Gaviota tarplant abundance will be measured within 5x5-meter plots, sited within occupied Gaviota tarplant habitat, using visual cover estimations. Cardboard cutouts will be used to illustrate 1%, 2%, 5%, and 10% of the 5x5-meter plot as an aid for field staff. Gaviota tarplant abundance will be measured as density and percent absolute cover. Analysis of the two parameters will capture the meaningful variability between larger plants that produce more seed heads and smaller plants that produce fewer seed heads. Gaviota tarplant phenology stage will also be recorded for each plot. The abundance monitoring protocol may be adjusted after three quantitative monitoring surveys have been completed, to include only one parameter rather than both density and cover, though any changes would be subject to approval by the TAC.

#### 3.3.2.2 Gaviota Tarplant Population Extent and Recruitment

The 2019 areal extent data will be used as a baseline for this parameter since it is the most recent areal extent information available. Monitoring biologists will map Gaviota tarplant recruitment by updating the areal extent mapping within the randomly assigned subset of the Conservation Lands. The 2019 monitoring protocol will be followed for all future mapping, provided in Appendix C, which was drafted using rare plant statistical monitoring best practices.

As outlined in the 2019 monitoring protocol (Appendix C), biologists will provide 100% visual coverage of suitable habitat within the identified subset of Conservation Lands and map polygons of Gaviota tarplant when encountered using a GPS with sub-meter accuracy. Polygons will be delineated prior to mapping with pin flags utilizing a 5 meter nearest neighbor rule, and depending on the size and density of the mapped polygon, biologists will employ either a census method or a sub-sampling method to provide a count of individuals within the mapped polygon. The census method simply involves counting and recording the number of individuals within a mapped polygon when feasible. The sub-sampling method is for polygons too large or too dense to count, and involves establishing a baseline transect along the longest axis of the polygon, with perpendicular transects established off of the baseline transect assigned

at random but consistent intervals. Along each perpendicular transect, a 1 x 5 meter quadrat will be established, also at a randomly assigned but consistent interval, and individuals rooted within the 1 x 5 meter quadrat will be counted and recorded. To maintain independence between the sampling units, a minimum of three quadrats will be sampled within each polygon with a minimum distance of 5 meters between quadrats.

Areal extent mapping results will be compared to previous survey results to quantify changes in location and extent of Gaviota tarplant within the sampling location. This parameter will provide data on annual variability within the areal extent that has not been collected before for the Tranquillon Mountain/Sudden Peak occurrences.

### 3.3.2.3 Associated Species Abundance

Abundance of all species present within quantitative monitoring plots will be measured using visual cover estimates. Non-native annual grass cover will be measured by clade to facilitate more accurate visual assessments unless differential effects of non-native annual grass species are identified in the Habitat Characterization Study. Cardboard cutouts will be used to illustrate 1%, 2%, 5%, and 10% of the 5x5-meter plot as an aid for field staff.

### 3.3.2.4 Residual Dry Matter

Non-Gaviota tarplant residual dry matter will be collected and weighed within the quantitative monitoring plots to quantify standing biomass. Residual dry matter measurements will follow industry best practices, as described in Bartolome et al. (2002), but will exclude collection of standing or fallen Gaviota tarplant biomass. This parameter will provide an assessment of non-Gaviota tarplant biomass accumulation between years, and allow for an evaluation of possible correlations between Gaviota tarplant cover and non-Gaviota tarplant residual dry matter. This information may also become valuable to inform continued grazing operations within the Conserved Lands.

As outlined in Bartolome et al. (2002), residual dry matter will be measured with the clipping plot technique, which shall be conducted in the late fall prior to the first significant rain event. Clipping plot quadrats, 1 square foot in size, will be placed within the quantitative monitoring plots, and all summer annual plant species, including any tree leaf litter, will be removed from the plot with the remaining plant material clipped as close to the ground as able without disturbing the soil surface. The clipped plant material shall be rapidly collected excluding to the greatest extent possible any remaining soil, and the dry clipped material shall be weighted (Bartolome et al. 2002). Results will be evaluated based on Table 1-3 in Bartolome et al. (2002), which outlines minimum residual dry matter guidelines.

## 3.4 Reporting Requirements

Annual reports will be produced that relay the results of annual qualitative and quantitative monitoring, and document all maintenance activities occurring within the Conservation Lands in that year. Annual reports will be compiled and submitted to the County, CDFW, and USFWS on or before February 1 of each year. In addition to annual qualitative and quantitative monitoring results, and a description of all maintenance activities occurring within the Conservation Lands, annual reports include the following items:

- Relevant weather conditions and detailed annual rainfall data.
- A discussion of any problems encountered during the previous year related to maintenance, monitoring, or trespassing.
- Recommendations for remedial measures to correct observed problems or deficiencies.

- Representative photos of occupied Gaviota tarplant habitat within the Conservation Lands.
- Maps indicating the spatial component of observations reported in the narrative portion of the report.
- A report on any temporary impacts to occupied Gaviota tarplant habitat and the mitigation approach to address these impacts.
- Mapping and narrative description of any issues causing non-compliance with the Fencing and Signage Plan, including how any non-compliant issues were remedied.
- Mapping and narrative description of expansion in area of any non-native species negatively correlated with Gaviota tarplant abundance.
- A work plan for any remedial measures planned.

### 3.5 Prohibited Land Uses

All private roads within the Conservation Lands will be gated with secure entry points to limit access. Due to the existing and anticipated controlled access and security within the Conservation Lands, security will primarily be a matter of education for all individuals able to access the sites about the importance of protecting the natural resources within the Conservation Lands. All through traffic will be required to stay on roads. Signage will be installed at all access points into the Conservation Lands to ensure individuals entering the Conservation Lands are aware of the sensitivity of the area. The Fencing and Signage Plan (Appendix B) is focused on minimizing the potential adverse effects associated with prohibited land uses within the Conservation Lands. Land uses and activities within the Conservation Lands will be limited to those described as allowable uses in the conservation easement, which include existing homes, personal uses, historical ranching and agricultural activities, and facilities maintenance.

### 3.6 Ranching and Facility Maintenance

Ranching and facility maintenance primarily includes elements that support cattle grazing operations. Current cattle grazing operations are expected to continue within the Conservation Lands, and within adjacent non-preserve open space lands. Appropriate management of ranching activities will initially focus on preservation of ecological processes that have allowed the Tranquillon Mountain/Sudden Peak Gaviota tarplant population to be among the largest Gaviota tarplant populations known to science, along with preservation of other natural resources and minimization of fuel loads within Conservation Lands. Facility maintenance will also include maintenance of utility components within the Conservation Lands. The Grazing Management Plan is focused on minimizing the potential adverse effects of ranching and facility maintenance (Appendix A).

### 3.7 Adaptive Management Program

For the purposes of this Mitigation Plan, adaptive management is defined as a flexible, iterative approach to the long-term management of the Conservation Lands that is directed over time by the results of ongoing monitoring activities and the direct observation of ecological stressors producing observable adverse results within the Conservation Lands. An adaptive management approach acknowledges uncertainties in our understanding of ecosystems, continually incorporates the knowledge gained from management back into our understanding of ecosystems, and modifies management activities to incorporate knowledge gained from monitoring data. Adaptive management will include the utilization of monitoring data gathered in the field prior to, during, and after management activities to assess the functions and values of the Conservation Lands. Monitoring is key to effective

adaptive management to ensure that the decisions regarding future management are based on accurate assessments of the status of the resources being managed. Following an unexpected event or an outcome that has adverse effects on the ability of the Conservation Lands to support Gaviota tarplant, monitoring data will be used to drive management considerations for repair of the damaged areas.

The natural annual variability inherent in Gaviota tarplant populations requires a flexible, programmatic, adaptive management approach. For example, natural variability in the preserved population can interfere with detection of the effects of non-natural adverse effects. Monitoring will be tied directly to management actions, such that management actions can be evaluated for their effects, with the understanding that natural variability is anticipated to dampen the signal of such effects. A repeating process of periodic review, short-term adjustment, and long-range planning will be a fundamental element of the Adaptive Management Program.

If adjustments to monitoring and management activities are recommended by the Lands Manager, based upon monitoring data or changes in the best available science, the Lands Manager will propose changes in writing and these proposed changes will be subject to review and approval by the TAC. Major adjustments to management will be based on multiple years of monitoring data and upon the entire catalog of knowledge on Gaviota tarplant, and information gained through the monitoring period.

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# 4 Implementation Schedule

Implementation of the activities described in this Mitigation Plan will be split into two distinct time periods. Preserve monitoring will be performed at the Applicant’s expense under the direction of an Interim Preserve Manager, approved by the USFWS and CDFW. This delay is built into the Preserve management schedule to allow the endowment to generate funds. After the initial 6-year period the Lands Manager will take over in perpetuity.

The implementation schedule provided herein includes a timetable of procedural steps to be executed during this Mitigation Plan’s implementation. The Mitigation Plan is focused on access control to the Conservation Lands, Gaviota tarplant monitoring, Argentine ant monitoring, Gaviota tarplant seed collection, and information gathering through a Habitat Characterization Study, genetic study, and environmental DNA analysis. The mitigation approach also includes hand seeding into designated Gaviota tarplant restoration locations and adaptive management of the Conservation Lands. Annual reporting throughout the program will ensure prompt communication of results to the County, CDFW, and USFWS. A general schedule is outlined in Table 4.

**Table 4. Gaviota Tarplant Task Implementation Schedule**

Year	Task	Seasonality	Stage of the Program
1	Implement Habitat Characterization Study	Fall or Winter	Prior to project impacts
1	Collect all Gaviota tarplant seed from direct impact area	Fall or Winter	Prior to project impacts
1	Record conservation easement on Conservation Lands	None required	Prior to project impacts
1	Ensure compliance with the Fencing and Signage Plan	At recordation of Conservation Easement	Ongoing as needed to provide adequate site protection
1	Begin Argentine ant monitoring	None required	Immediately subsequent to initiation of project construction activities
1-5	Conduct eDNA monitoring, maintain insect database	None required	First five years with potential to extend as needed.
1-10	Conduct Genetic Study	None required	First ten years of the program
1-10	Conduct two conservation focused seed-collection events	Fall or appropriate time based on Gaviota tarplant phenology	Two seed collection events will occur during the 5-year maintenance and monitoring period
1-10	Conduct Gaviota tarplant restoration	Fall	First ten years of the program
All years	Implement Annual Monitoring Program	July - September	Annually
All Years	Submit annual monitoring report	On, or prior to, February 1st of each year	Submit annual report in each year of initial 5-year maintenance and monitoring period

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# 5 Funding

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**THIS IS A PLACE HOLDER. FUNDING AMOUNTS WERE NOT CALCULATED SINCE THE MITIGATION APPROACH IS NOT FINAL.** The endowment amount will be established following the completion of a project-specific Property Analysis Record (PAR) to calculate the costs of in perpetuity land management. The PAR will take into account all of the management activities and components of the Gaviota tarplant mitigation plan necessary to fulfill the requirements of the conservation easement(s), which are currently in review and development.

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