Appendix C-9

Pre-Construction Botanical Surveys

Pre-Construction Botanical Surveys for the Strauss Wind Energy Project

Prepared for:

Strauss Wind, LLC
5901 Priestly Drive, Suite 300
Carlsbad, California 92008
Contact: Daniel Duke, Vice President – Development

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
Contact: Megan Enright

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
CDFW	California Department of Fish and Wildlife
County	County of Santa Barbara
DSEIR	Draft Supplemental Environmental Impact Report
ESRI	Environmental Systems Research Institute
MM	Mitigation Measure
Project	Strauss Wind Energy Project

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1 Introduction

In April 2019, the County of Santa Barbara (County) circulated the Draft Supplemental Environmental Impact Report (DSEIR) for the Strauss Wind Energy Project (Project). The DSEIR included requirements to conduct pre-construction surveys for special-status plants in accordance with Mitigation Measure (MM) BIO-5 and MM BIO-6. During 2018, Dudek conducted special-status plant species surveys of the proposed impact area and 100-foot buffer of the impact area, and this information was included in the DSEIR. The 2019 surveys focused on areas that were not previously surveyed within the impact area or within 100 feet of the impact area. Additionally, potential mitigation areas were surveyed to ensure that active mitigation, such as native grasslands restoration, would not impact a special-status plant species. The 2019 survey area for Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) was more expansive, in order to provide a better understanding of the extent of the population in the Project area. The purpose of this report is to provide the County the methods and results of the special-status plant species surveys and to meet the survey requirements of MM BIO-5 and BIO-6.

Because the 2018 and 2019 surveys for special-status plants, except Gaviota tarplant, were generally conducted in different areas of the Project area, the cumulative results of both 2018 and 2019 surveys are provided herein. The Gaviota tarplant surveys covered areas previously surveyed; therefore, the 2019 survey results are presented in this report.

1.1 Project Location

The majority of the Project area, which includes the Project boundary (2,971 acres) and off-site transmission line corridor, 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 Conception, Land Grant boundaries. The Project area is bounded by Vandenberg Air Force Base on the south and west sides and private property on the north and east sides (Figure 1, Project Location). The Project area lies within the Tranquillon Mountain, Lompoc Hills, and Lompoc U.S. Geological Survey 7.5-minute quadrangles.

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2 Methods

Prior to conducting surveys, the location of documented special-status plant species near the Project area and that have potential to occur on site were identified through a query of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CDFW 2019a). Additional data sources were also referenced, including the California Native Plant Society's online Inventory of Rare and Endangered Plants (CNPS 2019), and the online database Calflora: Information about California Plants for Education, Research and Conservation (Calflora 2019). Additional literature reviewed includes previous on-site biological reports, in particular:

- Special-Status Plant Surveys on the Pacific Gas and Electric Lompoc Wind Energy Transmission Line Project (Garcia and Associates 2011)
- Lompoc Wind Energy Project Biological Resources (Olson and Rindlaub 2006)
- Strauss Wind Energy Project Biological Resources Technical Report (Sapphos 2018).

2.1 Spring Floristic Surveys for Special-Status Plants

Dudek biologists conducted spring floristic surveys for special-status plant species from May 1 through June 7, 2018 (Dudek 2018a), and June 1 through June 13, 2019 (Table 1). The 2018 spring survey area is shown in Figure 3A through 3J in the Biological Resources Technical Report Addendum No. 1 for the Strauss Wind Energy Project (Dudek 2018a); the 2018 survey dates are also included in this addendum. The 2019 surveys were within a 1,219-acre survey area (Figure 2, 2019 Spring Floristic Survey and Horkelia Cuneata Survey Area). Based on the literature review, Dudek identified special-status plant species that occurred, or that could occur, within or in the vicinity of the survey area. For the purposes of this report, special-status plant species are those plants listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service under the Federal Endangered Species Act; those listed or proposed for listing as rare, threatened, or endangered by the CDFW under the California Endangered Species Act; or plants that have a California Rare Plant Rank of 1, 2, 3, or 4 in the CDFW's Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2019b).

Dudek biologists, all of whom were familiar with the target special-status plant species and general flora of coastal Santa Barbara County, conducted the spring floristic surveys in accordance with the U.S. Fish and Wildlife Service, CDFW, and California Native Plant Society guidelines (CDFG 2009; CNPS 2001; Cypher 2002). Teams of one to seven botanists surveyed the survey area for special-status plant species by walking through vegetation together, spaced apart approximately 10 to 30 meters (33 to 98 feet), depending on topography and vegetative cover. The botanists meandered along transects to ensure the entire survey area was completely surveyed. During the surveys, when a special-status species was observed, the occurrence was mapped using Environmental Systems Research Institute (ESRI) Collector with Trimble R2 or SXBlue with sub-meter accuracy.

Native and naturalized plant species encountered during the surveys were identified and recorded. Latin and common names for plant species with a California Rare Plant Rank (formerly California Native Plant Society List) follow the California Native Plant Society On-Line Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2019). For plant species without a California Rare Plant Rank, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2019) and common names follow the California Natural Community list (CDFW 2018) or the U.S. Department of Agriculture Natural Resources Conservation Service Plants Database (USDA 2019). The cumulative list of plant identified during both 2018 and 2019 surveys is included as Appendix A.

Table 1. Survey Dates and Times, Personnel, and Conditions for 2019 Spring Floristic Surveys

Survey Date	Personnel	Time	Survey Conditions
2019-06-03	Danielle Mullen, Eilleen Salas, Heather Moine, Mackenzie Forgey, Paul Keating	8:05 a.m.–4:19 p.m.	55°F–80°F; 0%–100% cloud cover; 0–4 mph winds
2019-06-04	Danielle Mullen, Heather Moine, Mackenzie Forgey, Paul Keating	7:50 a.m.–3:45 p.m.	60°F–73°F; 0%–20% cloud cover; 0–5 mph winds
2019-06-05	Danielle Mullen, Heather Moine, Mackenzie Forgey, Paul Keating, Russell Sweet, Shana Carey	8:15 a.m.–3:55 p.m.	65°F–80°F; 0%–10% cloud cover; 0–5 mph winds
2019-06-06	Danielle Mullen, Eilleen Salas, Heather Moine, Mackenzie Forgey, Paul Keating, Russell Sweet, Shana Carey	9:00 a.m.–4:30 p.m.	60°F–70°F; 80%–100% cloud cover; 0–8 mph winds
2019-06-07	Danielle Mullen, Eilleen Salas, Russell Sweet	7:50 a.m.–3:07 p.m.	55°F–64°F; 0%–100% cloud cover; 4–16 mph winds
2019-06-10	Cody Schaaf, Danielle Mullen, Heather Moine, Paul Keating, Russell Sweet, Tracy Park	8:24 a.m.–4:34 p.m.	72°F–88°F; 0%–50% cloud cover; 0–5 mph winds
2019-06-11	Cody Schaaf, Danielle Mullen, Heather Moine, Mackenzie Forgey, Paul Keating, Russell Sweet, Tracy Park	8:00 a.m.–3:45 p.m.	73°F–90°F; 20%–80% cloud cover; 0–3 mph winds
2019-06-12	Cody Schaaf, Russell Sweet	8:00 a.m.–4:15 p.m.	56°F–74°F; 0%–100% cloud cover; 1–3 mph winds
2019-06-13	Cody Schaaf, Mackenzie Forgey, Olivia Koziel, Paul Keating	9:00 AM a.m.–3:00 p.m.	60°F–67°F; 0%–100% cloud cover; 1–5 mph winds

2.2 Summer Floristic Surveys for Special-Status Plants

Dudek biologists conducted summer floristic surveys for special-status plant species from July 18 through August 15, 2018 (Dudek 2018b), and July 1 through July 31, 2019 (Table 2). The 2018 summer survey area is shown in Figure 6A through 6K in the Biological Resources Technical Report Addendum No. 2 for the Strauss Wind Energy Project (Dudek 2018b); the 2018 survey dates are also provided in the addendum. The summer 2019 surveys were within a 2,573-acre survey area (Figure 3, 2019 Gaviota Tarplant Survey Area). Summer floristic surveys for special-status plant species followed the same methods described in Section 2.1, Spring Floristic Surveys for Special-Status Plants. Survey dates and times, personnel, and conditions for the Gaviota tarplant surveys are included in Table 2, and the methods are described in Section 2.3, Gaviota Tarplant Survey Methods.

Table 2. Survey Dates and Times, Personnel, and Conditions for 2019 Summer Floristic and Gaviota Tarplant Surveys

Survey Date	Personnel	Time	Survey Conditions	Survey Type
2019-07-01	Heather Moine, Russell Sweet, Shana Carey	8:20 a.m.–4:18 p.m.	60°F–66°F; 0%–20% cloud cover; 1–10 mph winds	Gaviota Tarplant, Summer Floristic

Table 2. Survey Dates and Times, Personnel, and Conditions for 2019 Summer Floristic and Gaviota Tarplant Surveys

Survey Date	Personnel	Time	Survey Conditions	Survey Type
2019-07-02	Eilleen Salas, Russell Sweet, Shana Carey	8:56 a.m.–4:08 p.m.	62°F–63°F; 0%–10% cloud cover; 1–20 mph winds	Gaviota Tarplant, Summer Floristic
2019-07-03	Eilleen Salas, Russell Sweet	8:45 a.m.–4:15 p.m.	61°F–67°F; 0%–30% cloud cover; 0–10 mph winds	Gaviota Tarplant, Summer Floristic
2019-07-08	Amy Hammond, Dilip Mahto, Heather Moine, Jesse Ridenour, Mackenzie Forgey, Randi Busse, Russell Sweet	8:46 a.m.–4:39 p.m.	53°F–66°F; 10%–100% cloud cover; 0–10 mph winds	Gaviota Tarplant, Summer Floristic
2019-07-09	Amy Hammond, Dilip Mahto, Heather Moine, Jesse Ridenour, Mackenzie Forgey, Rachael Smith, Randi Busse, Russell Sweet	7:51 a.m.–4:42 p.m.	61°F–64°F; 0%–100% cloud cover; 0–10 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-10	Amy Hammond, Dilip Mahto, Jesse Ridenour, Mackenzie Forgey, Paul Keating, Rachael Smith, Randi Busse, Russell Sweet, Shana Carey, Tracy Park	8:15 a.m.–4:16 p.m.	62°F–77°F; 0% cloud cover; 0–10 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-11	Amy Hammond, Dilip Mahto, Jesse Ridenour, Paul Keating, Rachael Smith, Randi Busse, Shana Carey, Tracy Park	8:13 a.m.–4:00 p.m.	62°F–70°F; 0% cloud cover; 0–4 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-12	Amy Hammond, Dilip Mahto, Jesse Ridenour, Paul Keating, Rachael Smith, Shana Carey, Tracy Park	7:51 a.m.–1:58 p.m.	61°F–68°F; 0% cloud cover; 1–4 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-15	Alexa Marcon, Amy Hammond, Heather Moine, Jake Marcon, Jesse Ridenour, Kim Parsons, Michelle Leis, Russell Sweet	8:09 a.m.–4:32 p.m.	77°F–80°F; 0% cloud cover; 1–5 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-16	Amy Hammond, Cody Schaaf, Jesse Ridenour, Kim Parsons, Mackenzie Forgey, Michelle Leis	8:05 a.m.–4:10 p.m.	57°F–62°F; 0%–100% cloud cover; 1–20 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-17	Amy Hammond, Cody Schaaf, Jesse Ridenour, Kim Parsons, Mackenzie Forgey, Michelle Leis, Russell Sweet, Tracy Park	7:39 a.m.–5:36 PM	57°F–66°F; 50%–100% cloud cover; 1–5 mph wind	Gaviota Tarplant, Summer Floristic

Table 2. Survey Dates and Times, Personnel, and Conditions for 2019 Summer Floristic and Gaviota Tarplant Surveys

Survey Date	Personnel	Time	Survey Conditions	Survey Type
2019-07-18	Amy Hammond, Cody Schaaf, Heather Moine, Jesse Ridenour, Kim Parsons, Mackenzie Forgey, Michelle Leis, Pedro Garcia, Russell Sweet, Tracy Park	7:50 a.m.–4:40 p.m.	60°F–75°F; 0%–100% cloud cover; 1–11 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-19	Amy Hammond, Mackenzie Forgey, Michelle Leis, Pedro Garcia, Tracy Park	7:49 a.m.–4:34 p.m.	58°F–66°F; 0%–100% cloud cover; 0–7 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-22	Alex Chaney, Amy Hammond, Carolyn Somvilay, Cody Schaaf, Danielle Mullen, Dilip Mahto, Heather Moine, Jesse Ridenour, Kim Parsons, Lilli Martin, Mackenzie Forgey, Sheldon Leiker, Susan Carlson, Tanya Baxter	8:30 a.m.–4:49 p.m.	62°F–83°F; 0%–10% cloud cover; 0–7 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-23	Alex Chaney, Amy Hammond, Carolyn Somvilay, Cody Schaaf, Danielle Mullen, Dilip Mahto, Elizabeth Geisler, Jesse Ridenour, Kim Parsons, Lilli Martin, Mackenzie Forgey, Randi Busse, Ryan Lefler, Sheldon Leiker, Susan Carlson, Tanya Baxter	8:19 a.m.–4:38 p.m.	61°F–84°F; 10%–70% cloud cover; 0–5 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-24	Alex Chaney, Amy Hammond, Carolyn Somvilay, Cody Schaaf, Danielle Mullen, Dilip Mahto, Elizabeth Geisler, Heather Moine, Jesse Ridenour, Kim Parsons, Lilli Martin, Mackenzie Forgey, Olivia Koziel, Paul Keating, Ryan Lefler, Shana Carey, Sheldon Leiker, Susan Carlson, Tanya Baxter, Tracy Park	8:15 a.m.–4:08 p.m.	60°F–85°F; 0%–10% cloud cover; 0–5 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-25	Alex Chaney, Carolyn Somvilay, Cody Schaaf, Danielle Mullen, Dilip Mahto, Elizabeth Geisler, Jesse Ridenour, Kim Parsons, Lilli Martin, Paul Keating, Russell Sweet, Ryan Lefler, Shana Carey, Sheldon Leiker, Susan Carlson, Tanya Baxter	7:21 a.m.–3:53 p.m.	61°F–80°F; 10%–50% cloud cover; 1–5 mph wind	Gaviota Tarplant, Summer Floristic

Table 2. Survey Dates and Times, Personnel, and Conditions for 2019 Summer Floristic and Gaviota Tarplant Surveys

Survey Date	Personnel	Time	Survey Conditions	Survey Type
2019-07-26	Alex Chaney, Carolyn Somvilay, Danielle Mullen, Dilip Mahto, Jesse Ridenour, Kim Parsons, Lilli Martin, Paul Keating, Russell Sweet, Susan Carlson, Tanya Baxter	7:21 a.m.–2:32 p.m.	59°F–73°F; 0%–20% cloud cover; 0–5 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-29	Danielle Mullen, Jesse Ridenour, Olivia Koziel, Rachael Smith, Russell Sweet, Ryan Lefler, Shana Carey, Tracy Park	9:15 a.m.–4:15 p.m.	57°F–68°F; 30%–100% cloud cover; 1–5 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-30	Danielle Mullen, Jesse Ridenour, Olivia Koziel, Rachael Smith, Russell Sweet, Ryan Lefler, Shana Carey, Tracy Park	7:53 a.m.–4:44 p.m.	51°F–65°F; 30%–100% cloud cover; 1–10 mph wind	Gaviota Tarplant, Summer Floristic
2019-07-31	Olivia Koziel, Rachael Smith, Tracy Park	8:37 a.m.–5:30 p.m.	51°F–63°F; 30%–100% cloud cover; 1–12 mph wind	Gaviota Tarplant, Summer Floristic

2.3 Gaviota Tarplant Survey Methods

Prior to finalizing the 2019 survey methods for Gaviota tarplant, John Willoughby (of John Willoughby Ecological Consulting) was consulted due to his extensive experience developing monitoring protocols for rare plants. Additionally, U.S. Fish and Wildlife Service and CDFW were informed and approved of the methods.

Dudek biologists provided 100% visual coverage of the survey area in teams of two or more. When suspected Gaviota tarplant individual(s) were encountered, teams keyed/identified the plant using The Jepson Manual: Vascular Plants of California, Second Edition. If positive identification of Gaviota tarplant was confirmed, biologists began delineating the polygon with a 5-meter mapping rule using pin flags, meaning all individuals within 5 meters of each other are aggregated into a single polygon, and those farther than 5 meters start a new polygon or are mapped singly. Pin flags were placed approximately 0.25 meters away from the target Gaviota tarplant individual to the outside of the polygon, ensuring all heads (canopy) were included within the polygon. Once an entire polygon was delineated with pin flags, the polygon was assigned a unique identifier and mapped using ESRI Collector with Trimble R2 or SXBlue with sub-meter accuracy by following the pin flag boundary. After delineating the polygon using the GPS unit, the biologists decided which approach, of the two described below, was most appropriate for providing the number of individuals in each polygon.

Census Method

For polygons of Gaviota tarplant where a complete census was feasible, the number of individuals within the polygon was counted and recorded in ESRI Collector.

Subsampling Method

For polygons that were either too large or too dense for the complete census method to be viable, the total number and density of Gaviota tarplant individuals was calculated using a restricted random subsampling approach. Field staff first established a baseline transect along the long axis of the polygon. Perpendicular transects were established from the baseline transect at a randomly assigned but consistent interval. The random values for perpendicular transect placement were generated using a random number generator. The same random value was used consistently to site all perpendicular transects within the polygon. Along each perpendicular transect, a 1-meter by 5-meter quadrat was established at a randomly assigned, consistent interval. Random values for quadrat placement were generated using a random number generator. The same random value was used consistently for placement of all quadrats within the polygon. The number of individuals of Gaviota tarplant rooted within the 1-meter by 5-meter quadrat was counted and recorded. A minimum of three quadrats were sampled within each polygon, with a minimum distance of 5 meters between quadrats. This method maintains independence between sampling units, and ensures sampling without replacement.

Since all polygons were sampled independently and treated as separate strata statistically, the number of quadrats and size of the quadrats increased if the field team believed variability would not be adequately captured by the described subsampling methodology. Size and number of quadrats were not reduced. If a polygon was not large enough to fit a 1-meter by 5-meter quadrat, the polygon was quantified using the census method.

Additional Data Collection

Although the primary objective of this survey was to quantify Gaviota tarplant extent and density in 2019, when feasible, additional field data was collected to increase understanding of the habitat types where Gaviota tarplant occurs. Additional data collected at each polygon included the following:

- Gaviota tarplant heads: percent vegetative, percent flowering, percent fruiting
- Associated plant species
- Disturbance (e.g., gopher mounding, cattle tracks, game trails, minor surface erosion, road shoulders)
- Slope shape (convex, concave)
- Slope position (top of slope, mid slope, toe of slope)

A voucher specimen from each California Natural Diversity Database occurrence was collected. Additionally, at the end of each day, biologists noted the pollinators that were observed on Gaviota tarplant during the field day. Pin flags were removed once all data collection was complete.

From July 1 through July 31, 2019, Dudek biologists conducted Gaviota tarplant surveys (Table 2) within a 2,573-acre survey area (Figure 3).

2.4 *Horkelia Cuneata* Assessment

Dudek biologists conducted a *Horkelia cuneata* assessment on June 6 and August 16 and 17, 2018 (Dudek 2018b), and July 29 through 31, 2019 (Table 3) within an 1,219-acre survey area (Figure 2). The 2018 Horkelia cuneata survey area is shown in Figure 5A through 5D in the Biological Resources Technical Report Addendum No. 2 for the Strauss Wind Energy Project (Dudek 2018b); the 2018 survey dates are also provided in this addendum.

Table 3. Survey Dates and Times, Personnel, and Conditions for 2019 *Horkelia Cuneata* Assessment

Survey Date	Personnel	Time	Survey Conditions
2019-07-29	Heather Moine, Mackenzie Forgey, Tanya Baxter	9:15 a.m.–4:15 p.m.	57°F–68°F; 30%–100% cloud cover; 1–5 mph winds
2019-07-30	Heather Moine, Mackenzie Forgey, Tanya Baxter	7:53 a.m.–4:44 p.m.	51°F–65°F; 30%–100% cloud cover; 1–10 mph winds
2019-07-31	Danielle Mullen, Heather Moine, Jesse Ridenour, Mackenzie Forgey, Russell Sweet, Ryan Lefler, Tanya Baxter	8:37 a.m.–5:30 p.m.	51°F–63°F; 30%–100% cloud cover; 1–12 mph winds

Wedgeleaf horkelia (*Horkelia cuneata*) is known to have three varieties: (1) wedgeleaf horkelia (*Horkelia cuneata* var. *cuneata*), (2) mesa horkelia (*Horkelia cuneata* var. *puberula*), and (3) Kellogg's horkelia (*Horkelia cuneata* var. *sericea*). Two of the varieties—mesa horkelia (*Horkelia cuneata* var. *puberula*) and Kellogg's horkelia (*Horkelia cuneata* var. *sericea*)—have a California Rare Plant Rank of 1B.1, and one variety wedgeleaf horkelia (*Horkelia cuneata* var. *cuneata*) is common. The populations observed within the survey area had overlapping identification characteristics among the three varieties.

Due to the mixed populations of *Horkelia cuneata*, Dudek reached out to Barbara Ertter, who authored the Jepson Manual *Horkelia cuneata* treatment; discussed this species with botanists familiar with Santa Barbara County flora; and studied specimens at the Santa Barbara Botanic Garden herbarium. Ms. Ertter responded by forwarding an article (Ertter 1997) in which she uses "*Horkelia cuneata* as a prime example of why you shouldn't expect every plant (or population) you encounter to fit cleanly into one named unit or another." The article explains:

> Furthermore, oversimplification and obfuscation of actual diversity can undermine conservation efforts. When everything from borderline intermediates to extremes are dumped into a single undifferentiated identity, the threats to actual diversity are harder to recognize. One of my current projects, for example, involves the *Horkelia cuneata* cline in California. The northern extreme, subspecies sericea in the San Francisco Bay Area, is markedly different from the southern extreme, subspecies puberula in the Los Angeles Basin, easily representing sufficient diversity to qualify as a separate species. However, a complete clinal integration occurs in between, with ssp. sericea grading into ssp. cuneata grading into ssp. puberula, with characteristics of all three occurring in various combinations in Santa Barbara County. When all representative material, however intermediate, is forced into one of the recognized subspecies, all three appear to be about equally common and not particularly threatened, at least globally. When one examines the cline as a cline, however, one is quickly struck by the fact that the extremes around San Francisco and Los Angeles are in danger of disappearing, taking with them a major component of the diversity contained within the species. In fact, without these extremes, there would be no reason to recognize subspecies at all; the variation represented by the intermediates alone would not justify taxonomic recognition.

The article goes on to state:

> Once we acknowledge that "gray" should be an acceptable answer, then we can put our efforts into coming up with appropriate management strategies. For *Horkelia cuneata* I am suggesting a sliding scale, such that the more representative a population is of one of the endangered extremes, the more protection it merits. The principles of fuzzy logic are of potential relevance in this regard (e.g., McNeill and Freiberger, 1993).

Dudek botanists also discussed *Horkelia cuneata* with Dieter Wilkin and Katherine Rindlaub, both of whom have experience with this species in Santa Barbara County. They both shared experiences about the difficulties with *Horkelia cuneata*, specifically identifying each of the different varieties because of overlapping and mixed identification characteristics.

Dudek Botanist Heather Moine visited the Santa Barbara Botanic Garden herbarium to study specimens. During her visit, she noted particular characteristics of each variety. She also came across many specimens with such text included as subsp. *puberula* varying toward subsp. *cuneata*, subsp. *sericea* varying toward subsp. *cuneata*, intermediate ssp. *cuneata* and ssp. *puberula*, *intermediate* ssp. *cuneata* and ssp. *sericea*, and *Horkelia cuneata* x *puberula* intermediate.

Since multiple sources were confirming the difficulties with identifying *Horkelia cuneata* varieties, Dudek performed a *Horkelia cuneata* assessment of the observed populations to document the composition of the different varieties of this species. The outer boundary of each *Horkelia cuneata* population was delineated using ESRI Collector with Trimble R2 or SXBlue with sub-meter accuracy and the number of individuals recorded. Within each polygon, a subset of individuals was assessed for the Jepson identification key characteristics including: glandular hairs, inflorescence openness, hairiness of the hypanthium inner rim, filament base width, orientation of hairs, and visibility of glands. Due to the variation of each of these characteristics, each was given a score of 1, 2, or 3 depending on observations. After the field assessment, the scores of each characteristic was assessed and a variety was assigned to each individual. The results of the subset were calculated for the total population count and the number of each resulting variety was recorded for each population.

3 Results

3.1 Spring and Summer Floristic Survey Results

Based on 2018 and 2019 spring and summer floristic surveys, a total of 312 species of native and naturalized plant species, 193 native (62%) and 119 non-native (38%), were recorded on the site (Appendix A). Special-status plant species recorded on the site include Southern California black walnut (*Juglans californica*), ocellated Humboldt lily (*Lilium humboldtii* ssp. *ocellatum*), south coast branching phacelia (*Phacelia ramosissima* var. *austrolitoralis*), and black-flowered figwort (*Scrophularia atrata*) (Table 4 and Figure 4, 2018 and 2019 Other Special-Status Plants). Additional special-status plant species observed—Gaviota tarplant, mesa horkelia, and Kellogg's horkelia—are discussed in Section 3.2, Gaviota Tarplant Survey Results, and Section 3.3, *Horkelia Cuneata* Survey Results.

Table 4. Other Special-Status Plant Species Survey Results

Common Name	Scientific Name	CNPS CRPR	2018	2019	Total
Acreage					
black-flowered figwort	*Scrophularia atrata*	1B.2	0.2	0.2	0.4
Southern California black walnut	*Juglans californica*	4.2	0.1		0.1
ocellated Humboldt lily	*Lilium humboldtii* ssp. *ocellatum*	4.2	0.0	0.8	0.8
south coast branching phacelia	*Phacelia ramosissima* var. *austrolitoralis*	3.2	0.0	0.2	0.2
		Total	**0.3**	**1.2**	**1.5**
Individuals					
black-flowered figwort	*Scrophularia atrata*	1B.2	1,135	400	1,535
Southern California black walnut	*Juglans californica*	4.2	5		5
ocellated Humboldt lily	*Lilium humboldtii* ssp. *ocellatum*	4.2	6	75	81
south coast branching phacelia	*Phacelia ramosissima* var. *austrolitoralis*	3.2	64	258	322
		Grand Total	**1,210**	**733**	**1,943**

Notes: CNPS = California Native Plant Society; CRPR = California Rare Plant Rank.
CRPR: California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
3: Plants about which more information is needed – A Review List
4: Plants of Limited Distribution – A Watch List
Threat Rank
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)

3.2 Gaviota Tarplant Survey Results

Figure 5, 2019 Gaviota Tarplant Survey Results, shows the 2019 Gaviota tarplant survey results. In total, 56.6 acres of habitat occupied by Gaviota tarplant and 6,039,777 individuals were identified.

3.3 *Horkelia Cuneata* Survey Results

The 2018 and 2019 assessment resulted in polygons containing one to three varieties of *Horkelia cuneata*: (1) wedgeleaf horkelia (*Horkelia cuneata* var. *cuneata*), (2) mesa horkelia (*Horkelia cuneata* var. *puberula*), and (3) Kellogg's horkelia (*Horkelia cuneata* var. *sericea*). Results of the 2018 and 2019 surveys are provided in Table 5 and Figure 6, 2018 and 2019 Horkelia Cuneata Survey Results. A breakdown the acreages and number of individuals of each *Horkelia cuneata* polygon by observation identification and variety is provided in Appendix B.

Table 5. Horkelia Cuneata Survey Results

Scientific Name	Common Name	CNPS CRPR	Acres	Individuals
Horkelia cuneata var. *cuneata*	wedgeleaf horkelia	None	14.8	119,215
Horkelia cuneata var. *puberula*	mesa horkelia	1B.1	4.1	27,859
Horkelia cuneata var. *sericea*	Kellogg's horkelia	1B.1	11.1	78,123
		Total*	**29.9**	**225,198**

Notes: CNPS = California Native Plant Society; CRPR = California Rare Plant Rank.
* Numbers may be off due to rounding
CRPR: California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
Threat Rank
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)

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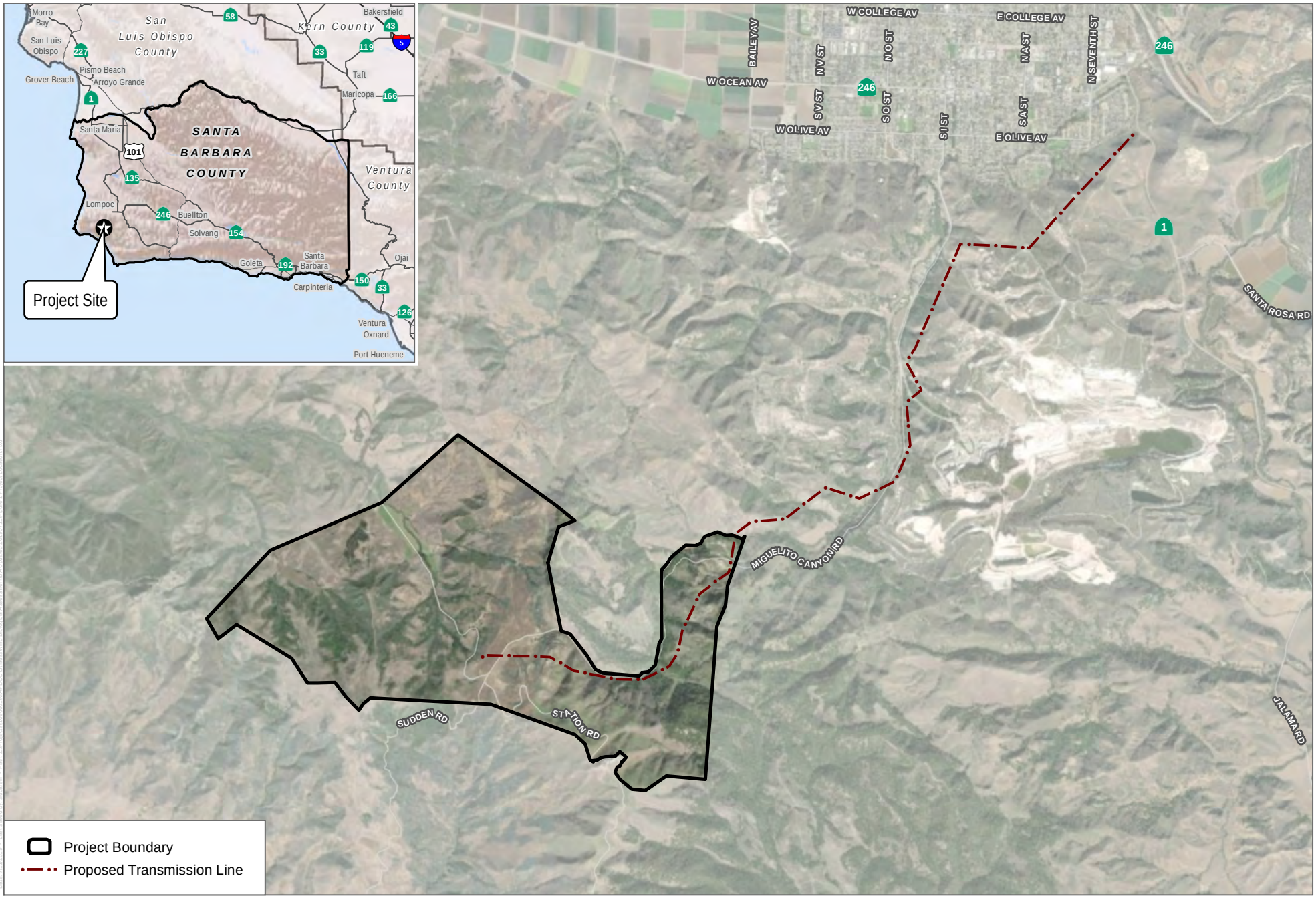

SOURCE: DigitalGlobe 2017

DUDEK

FIGURE 1

Project Location

Strauss Wind Energy Project

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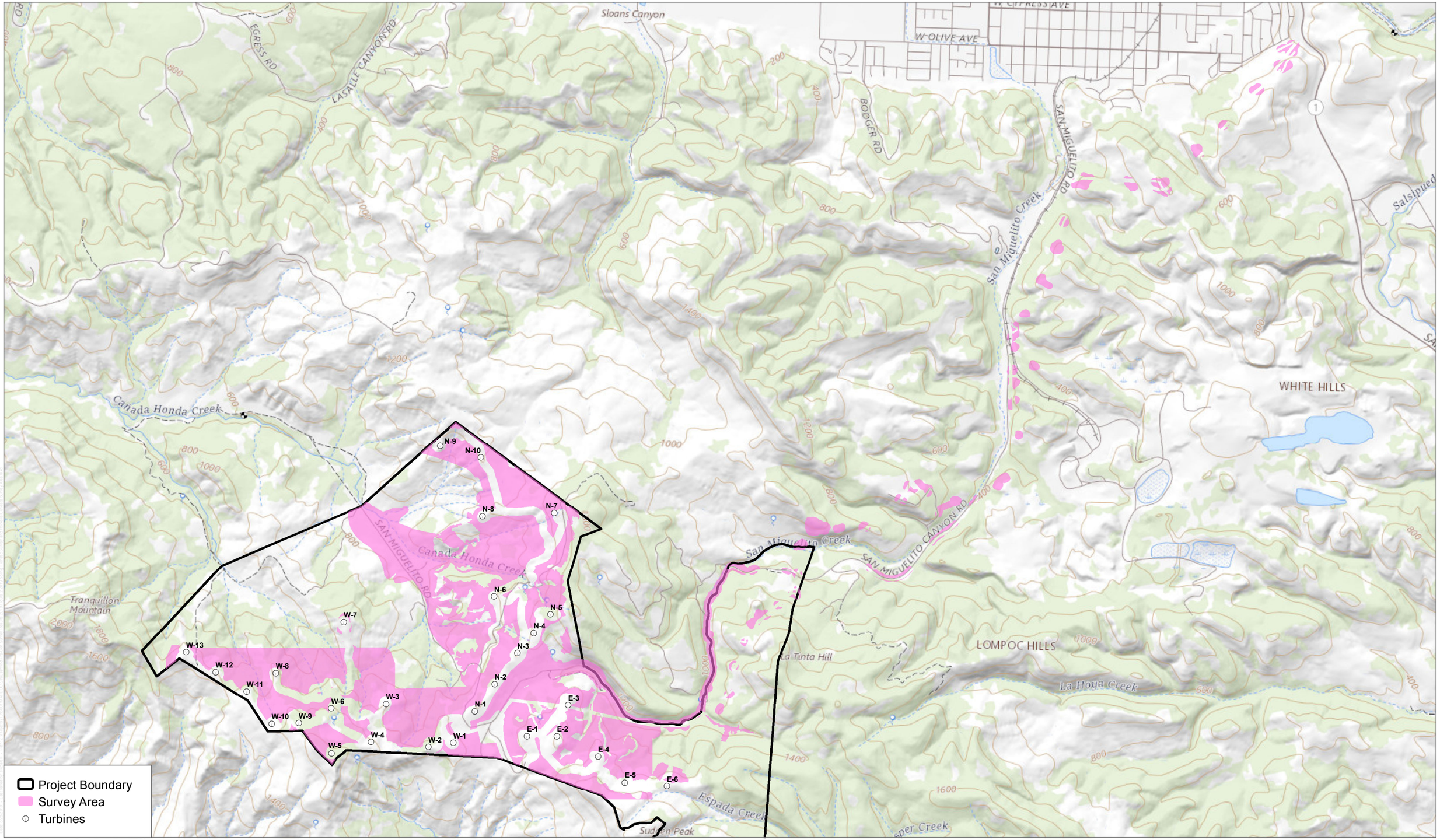

SOURCE: USGS National Map 2019

DUDEK

0 1,400 2,800 Feet

FIGURE 2

2019 Spring Floristic Survey and Horkelia Cuneata Survey Area

Strauss Wind Energy Project

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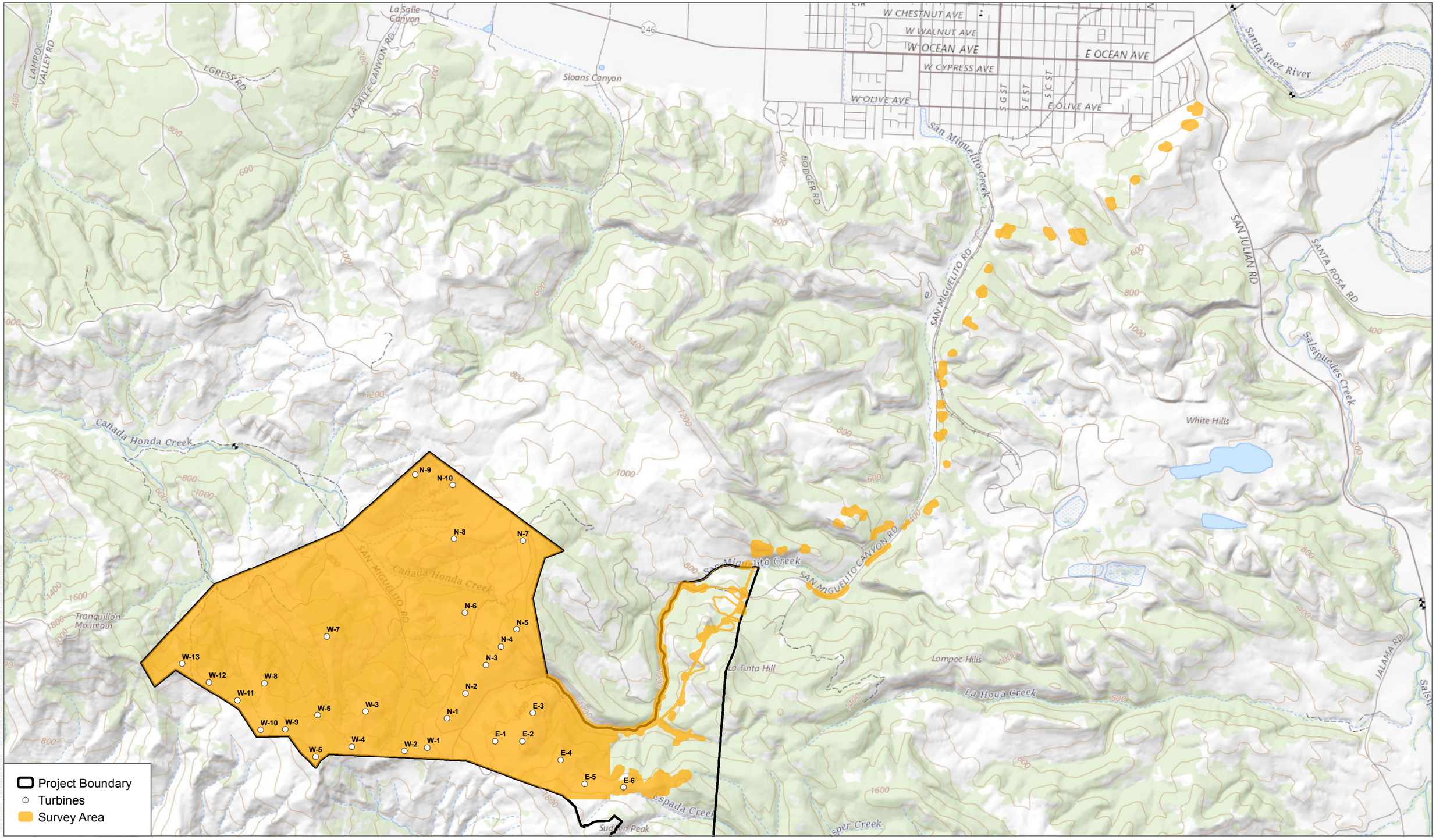

SOURCE: USGS National Map 2019

DUDEK

0 1,500 3,000 Feet

FIGURE 3

2019 Gaviota Tarplant Survey Area

Strauss Wind Energy Project

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Project Boundary
Turbines

Special-Status Plants 2018
California black walnut
black-flowered figwort
ocellated Humboldt lily
south coast branching phacelia

Special-Status Plants 2019
California black walnut
black-flowered figwort
ocellated Humboldt lily
south coast branching phacelia

W OCEAN AVE
W MAPLE AVE
W LAUREL AVE
W CHESTNUT AVE
W CYPRESS AVE
W OLIVE AVE
E OCEAN AVE
Sloans Canyon
BODGER RD
SAN MIGUELITO RD
San Miguelito Creek
SAN MIGUELITO CANYON RD
Santa Ynez River
SWEENEY RD
Salsipuedes Creek
SAN JULIAN RD
WHITE HILLS
LOMPOC HILLS
La Tinta Hill
La Hoya Creek
Canada Honda Creek

N-1
N-2
N-3
N-4
N-5
N-6
N-7
N-8
N-9
N-10
W-1
W-3
W-4
W-6
W-7
W-8
W-9
W-10
W-11
W-12
E-1
E-2
E-3

SOURCE: USGS National Map 2019

DUDEK

0 1,400 2,800 Feet

FIGURE 4

2018 and 2019 Other Special-Status Plants

Strauss Wind Energy Project

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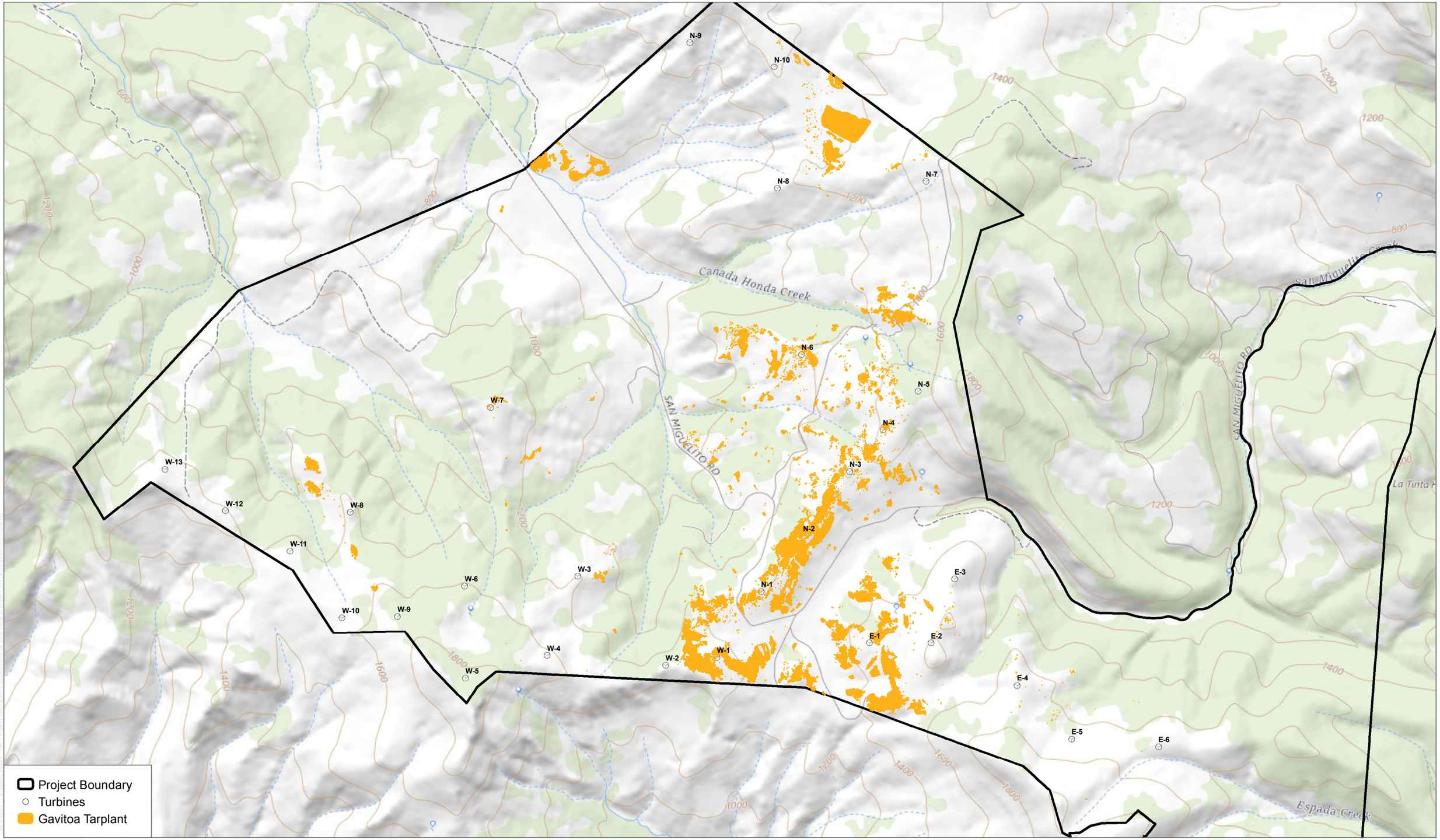

SOURCE: USGS National Map 2019

DUDEK

0 650 1,300 Feet

FIGURE 5

2019 Gaviota Tarplant Survey Results

Strauss Wind Energy Project

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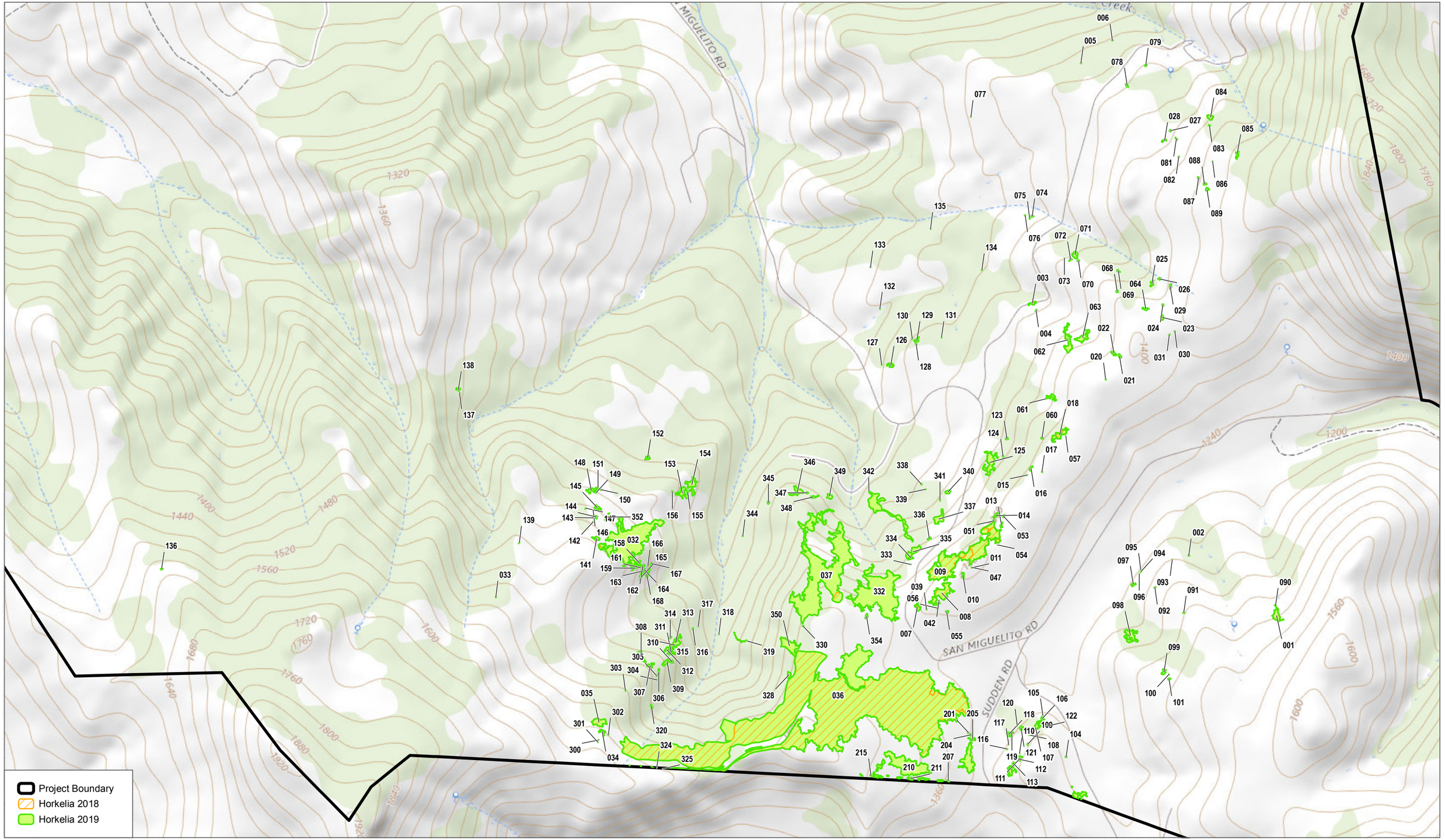

SOURCE: DigitalGlobe 2016

DUDEK

0 325 650 Feet

FIGURE 6

2018 and 2019 Horkelia Cuneata Survey Results

Strauss Wind Energy Project

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Appendix A

Plant Species Observed by Dudek in 2018 and 2019

Plant Species

EUDICOTS

VASCULAR SPECIES

ADOXACEAE—MUSKROOT FAMILY

Sambucus nigra ssp. *caerulea*—blue elderberry

AIZOACEAE—FIG-MARIGOLD FAMILY

* *Carpobrotus edulis*—hottentot fig

AMARANTHACEAE—AMARANTH FAMILY

Amaranthus blitoides—mat amaranth

ANACARDIACEAE—SUMAC OR CASHEW FAMILY

* *Schinus molle*—Peruvian peppertree

* *Schinus terebinthifolius*—Brazilian peppertree

Toxicodendron diversilobum—poison oak

APIACEAE—CARROT FAMILY

* *Conium maculatum*—poison hemlock

Daucus pusillus—American wild carrot

* *Foeniculum vulgare*—fennel

Lomatium dasycarpum ssp. *dasycarpum*—woollyfruit desertparsley

Sanicula arguta—sharptooth blacksnakeroot

Sanicula bipinnata—poison sanicle

Sanicula crassicaulis—Pacific blacksnakeroot

Sanicula laciniata—coastal blacksnakeroot

* *Torilis nodosa*—knotted hedgeparsley

Yabea microcarpa—false carrot

APOCYNACEAE—DOGBANE FAMILY

* *Nerium oleander*—oleander

* *Vinca major*—bigleaf periwinkle

ARALIACEAE—GINSENG FAMILY

* *Hedera helix*—English ivy

ASTERACEAE—SUNFLOWER FAMILY

Achillea millefolium—common yarrow
Achyrachaena mollis—blow wives
Agoseris grandiflora var. *grandiflora*—bigflower agoseris
Agoseris heterophylla var. *heterophylla*—annual agoseris
Ambrosia psilostachya—western ragweed
* *Anthemis cotula*—stinking chamomile
Artemisia californica—California sagebrush
Artemisia douglasiana—Douglas' sagewort
Baccharis glutinosa—saltmarsh baccharis
Baccharis pilularis—coyote brush
Baccharis salicifolia—mulefat
* *Carduus pycnocephalus* ssp. *pycnocephalus*—Italian plumeless thistle
* *Centaurea calcitrapa*—red star-thistle
* *Centaurea melitensis*—Maltese star-thistle
* *Centaurea solstitialis*—yellow star-thistle
Cirsium occidentale var. *occidentale*—cobwebby thistle
* *Cirsium vulgare*—bull thistle
Corethrogyne filaginifolia—sand-aster
* *Cotula coronopifolia*—brass buttons
* *Cynara cardunculus*—cardoon
Deinandra fasciculata—clustered tarweed
Deinandra increscens ssp. *villosa*—Gaviota tarplant
* *Delairea odorata*—Cape-ivy
Erigeron canadensis—Canadian horseweed
Eriophyllum confertiflorum var. *confertiflorum*—golden-yarrow
Gamochaeta ustulata—featherweed
* *Gazania linearis*—treasureflower
Grindelia camporum—Great Valley gumweed
Hazardia squarrosa—sawtooth golden bush
* *Hedypnois rhagadioloides*—crete weed
* *Helminthotheca echioides*—bristly oxtongue
Heterotheca grandiflora—telegraphweed
* *Hypochaeris glabra*—smooth cat's ear
* *Hypochaeris radicata*—hairy cat's ear
Isocoma menziesii var. *vernonioides*—Menzies' goldenbush
* *Lactuca serriola*—prickly lettuce
Lasthenia californica ssp. *californica*—California goldfields
Layia platyglossa—coastal tidytips
* *Logfia gallica*—narrowleaf cottonrose

Madia gracilis—grassy tarweed
Madia sativa—coast tarweed
Matricaria discoidea—disc mayweed
Microseris douglasii ssp. *tenella*—Douglas' silverpuffs
Pseudognaphalium beneolens—Wright's cudweed
Pseudognaphalium biolettii—two-color rabbit-tobacco
Pseudognaphalium californicum—ladies' tobacco
* *Pseudognaphalium luteoalbum*—Jersey cudweed
Pseudognaphalium microcephalum—Wright's cudweed
Pseudognaphalium ramosissimum—pink cudweed
Psilocarphus tenellus—slender woollyheads
* *Silybum marianum*—blessed milkthistle
Solidago velutina ssp. *californica*—threenerve goldenrod
* *Sonchus arvensis*—field sowthistle
* *Sonchus asper*—spiny sowthistle
* *Sonchus oleraceus*—common sowthistle
Stephanomeria elata—Santa Barbara wirelettuce
Stephanomeria virgata ssp. *pleurocarpa*—wand wirelettuce
Symphyotrichum lanceolatum var. *hesperium*—white panicle aster
* *Taraxacum officinale*—common dandelion
* *Tragopogon porrifolius*—salsify
Uropappus lindleyi—Lindley's silverpuffs

BETULACEAE—BIRCH FAMILY
Alnus rhombifolia—white alder

BORAGINACEAE—BORAGE FAMILY
Amsinckia intermedia—common fiddleneck
Amsinckia menziesii—Menzies' fiddleneck
Amsinckia tessellata—bristly fiddleneck
Heliotropium curassavicum—salt heliotrope
Phacelia imbricata—imbricate phacelia
Phacelia minor—wild canterbury bells
Phacelia ramosissima var. *austrolitoralis*—south coast branching phacelia
Pholistoma auritum—blue fiestaflower
Plagiobothrys canescens var. *canescens*—valley popcornflower

BRASSICACEAE—MUSTARD FAMILY

* *Brassica nigra*—black mustard
* *Brassica rapa*—field mustard
* *Capsella bursa-pastoris*—shepherd's purse
Erysimum capitatum var. *capitatum*—sanddune wallflower
* *Hirschfeldia incana*—shortpod mustard
Lepidium nitidum—shining pepperweed
Lepidium virginicum ssp. *menziesii*—intermediate pepperweed
Nasturtium officinale—watercress
* *Raphanus sativus*—cultivated radish
* *Sisymbrium irio*—London rocket

CAPRIFOLIACEAE—HONEYSUCKLE FAMILY

Lonicera subspicata var. *denudata*—Santa Barbara honeysuckle
Symphoricarpos albus var. *laevigatus*—common snowberry
Symphoricarpos mollis—creeping snowberry

CARYOPHYLLACEAE—PINK FAMILY

* *Cerastium glomeratum*—sticky chickweed
* *Polycarpon tetraphyllum*—fourleaf manyseed
* *Silene gallica*—common catchfly
* *Spergula arvensis*—corn spurry
* *Stellaria media*—common chickweed

CHENOPODIACEAE—GOOSEFOOT FAMILY

* *Atriplex prostrata*—fat hen
* *Atriplex semibaccata*—Australian saltbush
* *Chenopodium album*—lambsquarters
Chenopodium californicum—California goosefoot
* *Chenopodium murale*—nettleleaf goosefoot
* *Salsola tragus*—prickly Russian thistle

CONVOLVULACEAE—MORNING-GLORY FAMILY

Calystegia macrostegia ssp. *cyclostegia*—island false bindweed
Calystegia macrostegia ssp. *macrostegia*—island false bindweed
* *Convolvulus arvensis*—field bindweed

CRASSULACEAE—STONECROP FAMILY

Crassula connata—sand pygmyweed
Dudleya caespitosa—sealettuce
Dudleya lanceolata—lanceleaf liveforever

CUCURBITACEAE—GOURD FAMILY

Marah fabacea—California man-root

DIPSACACEAE—TEASEL FAMILY

* *Dipsacus sativus*—Indian teasel

ERICACEAE—HEATH FAMILY

Arbutus menziesii—madrone

Vaccinium ovatum—California huckleberry

EUPHORBIACEAE—SPURGE FAMILY

Croton setiger—dove weed

FABACEAE—LEGUME FAMILY

Acmispon americanus var. *americanus*—American bird's-foot trefoil

Acmispon glaber—deer weed

Acmispon maritimus—coastal bird's-foot trefoil

Acmispon strigosus—strigose bird's-foot trefoil

Astragalus curtipes—Morro milkvetch

Astragalus curvicarpus—curvepod milkvetch

Astragalus didymocarpus var. *didymocarpus*—dwarf white milkvetch

Lathyrus vestitus var. *vestitus*—Pacific pea

* *Lavandula stoechas*—French lavender

* *Lotus corniculatus*—bird's-foot trefoil

Lupinus albifrons—silver bush lupine

Lupinus bicolor—miniature lupine

Lupinus microcarpus—valley lupine

Lupinus nanus—sky lupine

Lupinus succulentus—hollowleaf annual lupine

* *Medicago lupulina*—black medick

* *Medicago polymorpha*—burclover

* *Melilotus albus*—yellow sweetclover

* *Melilotus indicus*—annual yellow sweetclover

Trifolium albopurpureum—rancheria clover

* *Trifolium campestre*—field clover

Trifolium ciliolatum—foothill clover

Trifolium gracilentum—pinpoint clover

* *Trifolium hirtum*—rose clover

* *Trifolium incarnatum*—crimson clover

Trifolium microcephalum—smallhead clover

Trifolium willdenovii—tomcat clover

Vicia americana ssp. *americana*—American vetch
* *Vicia benghalensis*—purple vetch

FAGACEAE—OAK FAMILY

Notholithocarpus densiflorus var. *densiflorus*—tanoak
Quercus agrifolia—coast live oak

GERANIACEAE—GERANIUM FAMILY

* *Erodium botrys*—longbeak stork's bill
* *Erodium cicutarium*—redstem stork's bill
* *Erodium moschatum*—musky stork's bill
* *Geranium dissectum*—cutleaf geranium

GROSSULARIACEAE—GOOSEBERRY FAMILY

Ribes malvaceum—chaparral currant
Ribes menziesii—canyon gooseberry
Ribes speciosum—fuchsiaflower gooseberry

JUGLANDACEAE—WALNUT FAMILY

Juglans californica—Southern California black walnut

LAMIACEAE—MINT FAMILY

Clinopodium douglasii—yerba buena
* *Lamium amplexicaule*—henbit deadnettle
* *Marrubium vulgare*—horehound
Salvia leucophylla—purple sage
Salvia mellifera—black sage
Salvia spathacea—hummingbird sage
Stachys bullata—California hedgenettle

MALVACEAE—MALLOW FAMILY

Malacothamnus fasciculatus—Mendocino bushmallow
* *Malva parviflora*—cheeseweed mallow
Sidalcea malviflora ssp. *californica*—California checkerbloom

MONTIACEAE—MONTIA FAMILY

Calandrinia menziesii—red maids
Claytonia perfoliata ssp. *perfoliata*—miner's lettuce

MYRICACEAE—WAX MYRTLE FAMILY

Morella californica—wax myrtle

MYRSINACEAE—MYRSINE FAMILY

* *Lysimachia arvensis*—scarlet pimpernel

MYRTACEAE—MYRTLE FAMILY

* *Eucalyptus camaldulensis*—river redgum

* *Eucalyptus globulus*—Tasmanian bluegum

OLEACEAE—OLIVE FAMILY

* *Olea europaea*—olive

ONAGRACEAE—EVENING PRIMROSE FAMILY

Camissoniopsis cheiranthifolia—beach suncup

Camissoniopsis micrantha—miniature suncup

Clarkia bottae—Botta's clarkia

Clarkia purpurea ssp. *quadrivulnera*—winecup clarkia

Clarkia unguiculata—elegant clarkia

Epilobium canum ssp. *canum*—hummingbird trumpet

OROBANCHACEAE—BROOM-RAPE FAMILY

Castilleja affinis ssp. *affinis*—coast Indian paintbrush

Castilleja densiflora ssp. *densiflora*—denseflower Indian paintbrush

Castilleja exserta ssp. *exserta*—exserted Indian paintbrush

PAEONIACEAE—PEONY FAMILY

Paeonia californica—California peony

PAPAVERACEAE—POPPY FAMILY

Eschscholzia californica—California poppy

* *Papaver rhoeas*—corn poppy

Platystemon californicus—creamcups

Romneya trichocalyx—bristly Matilija poppy

PHRYMACEAE—LOPSEED FAMILY

Diplacus aurantiacus—bush monkeyflower

Erythranthe guttata—common monkey flower

PLANTAGINACEAE—PLANTAIN FAMILY

Collinsia heterophylla—purple Chinese houses

* *Plantago coronopus*—buckhorn plantain

Plantago erecta—dwarf plantain

* *Plantago lanceolata*—narrowleaf plantain

* *Veronica anagallis-aquatica*—water speedwell

PLATANACEAE—PLANE TREE, SYCAMORE FAMILY

Platanus racemosa—California sycamore

POLEMONIACEAE—PHLOX FAMILY

Navarretia atractyloides—hollyleaf pincushionplant

POLYGONACEAE—BUCKWHEAT FAMILY

Eriogonum elongatum var. *elongatum*—longstem buckwheat
Eriogonum fasciculatum—California buckwheat
Eriogonum parvifolium—seacliff buckwheat
Lastarriaea coriacea—leather spineflower
* *Polygonum aviculare* ssp. *depressum*—prostrate knotweed
* *Rumex acetosella*—common sheep sorrel
* *Rumex crispus*—curly dock
* *Rumex pulcher*—fiddle dock

PRIMULACEAE—PRIMROSE FAMILY

Primula clevelandii var. *insularis*—no common name

RANUNCULACEAE—BUTTERCUP FAMILY

Clematis ligusticifolia—western white clematis
Ranunculus californicus—California buttercup
Thalictrum fendleri—Fendler's meadow-rue

RHAMNACEAE—BUCKTHORN FAMILY

Ceanothus megacarpus—bigpod ceanothus
Frangula californica—California coffee berry
Rhamnus crocea—redberry buckthorn

ROSACEAE—ROSE FAMILY

Drymocallis glandulosa var. *glandulosa*—sticky cinquefoil
Fragaria vesca—woodland strawberry
Heteromeles arbutifolia—toyon
Horkelia cuneata var. *cuneata*—wedgeleaf horkelia
Horkelia cuneata var. *puberula*—mesa horkelia
Horkelia cuneata var. *sericea*—Kellogg's horkelia
Rosa californica—California rose
Rubus parviflorus—thimbleberry
Rubus ursinus—California blackberry

RUBIACEAE—MADDER FAMILY

Galium angustifolium ssp. *angustifolium*—narrowleaf bedstraw
Galium aparine—stickywilly
Galium nuttallii—climbing bedstraw
Galium porrigens—graceful bedstraw

SALICACEAE—WILLOW FAMILY

Salix exigua—sandbar willow
Salix laevigata—red willow
Salix lasiolepis—arroyo willow

SAPINDACEAE—SOAPBERRY FAMILY

Acer negundo—box-elder

SCROPHULARIACEAE—FIGWORT FAMILY

* *Myoporum laetum*—myoporum
Scrophularia atrata—black-flowered figwort
Scrophularia californica—California figwort
* *Verbascum* sp.—mullein

SOLANACEAE—NIGHTSHADE FAMILY

* *Nicotiana glauca*—tree tobacco
* *Physalis philadelphica*—Mexican groundcherry
Solanum douglasii—greenspot nightshade
Solanum xanti—chaparral nightshade

TROPAEOLACEAE—NASTURTIUM FAMILY

* *Tropaeolum majus*—nasturtium

URTICACEAE—NETTLE FAMILY

Urtica dioica ssp. *holosericea*—stinging nettle
* *Urtica urens*—dwarf nettle

VERBENACEAE—VERVAIN FAMILY

Verbena lasiostachys—western vervain

VIOLACEAE—VIOLET FAMILY

Viola pedunculata—Johnny-jump-up

FERNS AND FERN ALLIES

VASCULAR SPECIES

DENNSTAEDTIACEAE—BRACKEN FAMILY

Pteridium aquilinum var. *pubescens*—hairy brackenfern

DRYOPTERIDACEAE—WOOD FERN FAMILY

Dryopteris arguta—coastal woodfern

EQUISETACEAE—HORSETAIL FAMILY

Equisetum telmateia—giant horsetail

POLYPODIACEAE—POLYPODY FAMILY

Polypodium californicum—California polypody

SELAGINELLACEAE—SPIKE-MOSS FAMILY

Selaginella bigelovii—bushy spikemoss

GYMNOSPERMS AND GNETOPHYTES

VASCULAR SPECIES

CUPRESSACEAE—CYPRESS FAMILY

Hesperocyparis macrocarpa—Monterey cypress

PINACEAE—PINE FAMILY

Pinus radiata—Monterey pine

MONOCOTS

VASCULAR SPECIES

AGAVACEAE—AGAVE FAMILY

Chlorogalum pomeridianum var. *pomeridianum*—wavyleaf soap plant

ASPHODELACEAE—ASPHODEL FAMILY

* *Asphodelus fistulosus*—onionweed

IRIDACEAE—IRIS FAMILY

Sisyrinchium bellum—western blue-eyed grass

JUNCACEAE—RUSH FAMILY

Juncus bufonius—toad rush

Juncus patens—western rush

Juncus phaeocephalus—brownhead rush

LILIACEAE—LILY FAMILY

Calochortus albus—white fairy-lantern
Fritillaria biflora—chocolate lily
Lilium humboldtii ssp. *ocellatum*—ocellated Humboldt lily

ORCHIDACEAE—ORCHID FAMILY

Piperia elegans—elegant piperia

POACEAE—GRASS FAMILY

Agrostis pallens—seashore bentgrass
* *Agrostis stolonifera*—creeping bentgrass
* *Aira caryophyllea*—silver hairgrass
* *Arundo donax*—giant reed
* *Avena barbata*—slender oat
* *Avena fatua*—wild oat
* *Avena sativa*—common oat
* *Brachypodium distachyon*—purple false brome
* *Briza minor*—little quakinggrass
Bromus carinatus—California brome
* *Bromus catharticus*—rescuegrass
* *Bromus diandrus*—ripgut brome
* *Bromus hordeaceus*—soft brome
* *Bromus madritensis*—compact brome
* *Cortaderia jubata*—purple pampas grass
* *Cynodon dactylon*—Bermudagrass
* *Cynosurus echinatus*—annual dogtails
Distichlis spicata—salt grass
* *Ehrharta calycina*—perennial veldtgrass
* *Ehrharta erecta*—panic veldtgrass
Elymus condensatus—giant wild rye
Elymus glaucus ssp. glaucus—blue wildrye
Elymus triticoides—creeping ryegrass
* *Festuca bromoides*—brome fescue
* *Festuca myuros*—rat-tail fescue
* *Festuca perennis*—perennial rye grass
* Gastridium phleoides—nit grass
Hordeum brachyantherum—meadow barley
* *Hordeum marinum* ssp. *gussoneanum*—Mediterranean barley
* *Hordeum murinum*—mouse barley
* *Lamarckia aurea*—goldentop grass

Melica imperfecta—smallflower melicgrass
* *Pennisetum clandestinum*—kikuyugrass
* *Phalaris aquatica*—Harding grass
* *Phalaris minor*—littleseed canarygrass
* *Poa annua*—annual bluegrass
* *Polypogon interruptus*—ditch rabbitsfoot grass
* *Polypogon monspeliensis*—annual rabbitsfoot grass
* *Schismus barbatus*—common Mediterranean grass
Stipa cernua—nodding needlegrass
Stipa lepida—foothill needlegrass
* *Stipa miliacea*—no common name
Stipa pulchra—purple needlegrass
* *Triticum aestivum*—common wheat

THEMIDACEAE—BRODIAEA FAMILY

Brodiaea jolonensis—chaparral brodiaea
Dichelostemma capitatum—bluedicks

* signifies introduced (non-native) species

Appendix B

Horkelia Cuneata Acreage and Individuals by Polygon

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
1	0.033	0.038	0.000	0.072	93	107	0	200
2	0.001	0.000	0.000	0.001	10	7	0	17
3	0.009	0.006	0.000	0.015	48	32	0	80
4	0.001	0.000	0.000	0.001	11	5	0	16
5	0.000	0.000	0.000	0.000	9	0	3	12
6	0.000	0.000	0.000	0.000	4	0	0	4
7	0.015	0.003	0.010	0.028	143	32	96	271
8	0.087	0.087	0.062	0.237	297	297	212	807
9	0.724	0.276	0.310	1.310	1453	553	623	2629
10	0.002	0.002	0.006	0.010	12	12	37	62
11	0.000	0.000	0.000	0.000	1	0	0	1
13	0.004	0.002	0.000	0.006	36	15	0	51
14	0.010	0.002	0.000	0.012	165	27	0	192
15	0.000	0.000	0.000	0.000	0	0	1	1
16	0.003	0.000	0.003	0.006	41	0	41	82
17	0.000	0.000	0.000	0.000	1	0	0	1
18	0.064	0.011	0.011	0.085	428	71	71	571
20	0.000	0.000	0.000	0.000	1	0	0	1
21	0.006	0.002	0.000	0.008	23	8	0	30
22	0.006	0.003	0.003	0.013	18	9	9	35
23	0.009	0.004	0.000	0.013	29	11	0	40
24	0.001	0.001	0.000	0.003	9	9	0	18
25	0.008	0.002	0.002	0.012	22	6	6	33
26	0.002	0.001	0.000	0.003	13	7	0	20
27	0.002	0.001	0.000	0.003	26	9	0	35
28	0.007	0.000	0.000	0.007	12	0	0	12

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
29	0.004	0.000	0.004	0.007	15	0	15	30
30	0.000	0.000	0.000	0.000	9	0	0	9
31	0.000	0.000	0.000	0.000	8	0	0	8
32	1.031	0.142	0.320	1.493	40272	5555	12498	58325
33	0.000	0.000	0.000	0.000	1	0	0	1
34	0.018	0.000	0.000	0.018	15	0	0	15
35	0.077	0.000	0.019	0.097	256	0	64	320
36	9.030	2.257	7.224	18.511	56671	14168	45337	116176
37	0.985	0.448	1.522	2.954	9946	4521	15371	29838
39	0.000	0.000	0.000	0.001	6	3	0	9
42	0.000	0.000	0.000	0.000	0	0	1	1
47	0.000	0.000	0.000	0.000	0	0	1	1
51	0.001	0.000	0.001	0.002	3	0	3	6
53	0.001	0.000	0.002	0.004	3	0	7	10
54	0.000	0.000	0.000	0.000	1	0	0	1
55	0.000	0.002	0.003	0.005	0	6	12	18
56	0.001	0.000	0.000	0.001	2	0	0	2
57	0.000	0.000	0.000	0.000	0	0	2	2
60	0.000	0.001	0.002	0.003	0	5	11	16
61	0.016	0.016	0.000	0.032	22	22	0	43
62	0.113	0.000	0.000	0.113	261	0	0	261
63	0.064	0.000	0.013	0.077	228	0	46	274
64	0.008	0.004	0.000	0.012	11	6	0	17
68	0.001	0.000	0.002	0.004	2	0	3	5
69	0.001	0.001	0.001	0.004	6	6	6	17
70	0.002	0.000	0.000	0.002	8	0	0	8

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
71	0.012	0.012	0.006	0.031	12	12	6	31
72	0.002	0.003	0.000	0.005	5	10	0	15
73	0.000	0.000	0.000	0.000	3	0	0	3
74	0.002	0.002	0.000	0.004	16	16	0	31
75	0.000	0.001	0.000	0.001	4	9	0	13
76	0.000	0.001	0.000	0.001	0	5	0	5
77	0.000	0.000	0.000	0.000	1	0	0	1
78	0.004	0.001	0.000	0.005	9	3	0	12
79	0.002	0.001	0.000	0.003	19	10	0	29
81	0.000	0.003	0.000	0.003	0	8	0	8
82	0.001	0.000	0.000	0.001	3	0	0	3
83	0.001	0.001	0.000	0.001	2	2	0	3
84	0.000	0.025	0.000	0.025	0	32	0	32
85	0.005	0.011	0.000	0.016	6	11	0	17
86	0.000	0.000	0.000	0.000	1	0	0	1
87	0.001	0.001	0.000	0.002	3	3	0	6
88	0.003	0.003	0.000	0.007	3	3	0	6
89	0.000	0.009	0.000	0.009	0	12	0	12
90	0.002	0.001	0.001	0.003	25	8	8	42
91	0.001	0.000	0.000	0.001	14	9	0	23
92	0.001	0.000	0.000	0.001	10	0	0	10
93	0.000	0.000	0.000	0.000	0	1	0	1
94	0.000	0.000	0.000	0.000	2	0	0	2
95	0.000	0.000	0.000	0.000	4	0	0	4
96	0.000	0.000	0.000	0.000	3	0	0	3
97	0.008	0.000	0.000	0.008	33	0	0	33

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
98	0.063	0.000	0.050	0.113	167	0	133	300
99	0.008	0.003	0.005	0.016	41	14	27	81
100	0.000	0.000	0.000	0.000	1	0	0	1
101	0.003	0.000	0.000	0.003	23	0	0	23
102	0.039	0.000	0.023	0.062	94	0	56	150
103	0.001	0.000	0.000	0.001	6	0	0	6
104	0.001	0.000	0.000	0.001	4	0	0	4
105	0.000	0.000	0.000	0.000	3	0	0	3
106	0.005	0.000	0.000	0.005	24	0	0	24
107	0.045	0.011	0.000	0.056	108	27	0	135
108	0.001	0.000	0.000	0.001	5	0	0	5
109	0.001	0.000	0.000	0.001	6	0	0	6
110	0.000	0.000	0.000	0.000	2	0	0	2
111	0.009	0.000	0.000	0.009	22	0	0	22
112	0.004	0.000	0.000	0.004	18	0	0	18
113	0.002	0.000	0.000	0.002	5	0	0	5
114	0.031	0.000	0.010	0.042	31	0	10	41
115	0.003	0.000	0.001	0.004	9	0	3	12
116	0.001	0.000	0.000	0.001	4	0	0	4
117	0.000	0.000	0.000	0.000	1	0	0	1
118	0.016	0.000	0.000	0.016	22	0	0	22
119	0.001	0.002	0.000	0.003	4	8	0	12
120	0.000	0.000	0.000	0.000	1	2	0	3
121	0.011	0.000	0.000	0.011	18	0	0	18
122	0.008	0.000	0.000	0.008	15	0	0	15
123	0.002	0.002	0.002	0.005	10	10	10	30

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
124	0.002	0.000	0.000	0.002	15	0	0	15
125	0.109	0.055	0.000	0.164	200	100	0	300
126	0.016	0.000	0.000	0.016	35	0	0	35
127	0.000	0.000	0.000	0.000	2	0	0	2
128	0.001	0.000	0.001	0.001	3	0	3	5
129	0.006	0.003	0.003	0.011	12	6	6	24
130	0.000	0.000	0.000	0.001	3	3	0	6
131	0.000	0.000	0.000	0.000	2	0	0	2
132	0.000	0.000	0.000	0.000	0	3	0	3
133	0.000	0.000	0.000	0.000	1	1	0	1
134	0.000	0.000	0.000	0.000	5	0	0	5
135	0.000	0.000	0.000	0.000	2	0	2	3
136	0.001	0.000	0.000	0.002	24	8	0	32
137	0.000	0.000	0.000	0.000	0	3	0	3
138	0.006	0.001	0.000	0.007	29	7	0	36
139	0.000	0.000	0.000	0.000	13	6	6	25
141	0.013	0.003	0.003	0.020	50	13	13	75
142	0.000	0.000	0.000	0.000	5	0	0	5
143	0.000	0.000	0.000	0.000	15	0	0	15
144	0.007	0.000	0.000	0.007	35	0	0	35
145	0.018	0.000	0.000	0.018	110	0	0	110
146	0.000	0.000	0.000	0.000	1	0	0	1
147	0.000	0.001	0.000	0.001	0	7	0	7
148	0.020	0.010	0.000	0.031	100	50	0	150
149	0.000	0.000	0.000	0.000	2	0	0	2
150	0.000	0.000	0.000	0.000	0	0	1	1

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
151	0.000	0.000	0.000	0.000	3	1	0	4
152	0.013	0.000	0.000	0.013	15	0	0	15
153	0.057	0.013	0.000	0.070	237	53	0	290
154	0.089	0.000	0.000	0.089	310	0	0	310
155	0.001	0.000	0.001	0.002	13	0	7	20
156	0.001	0.000	0.000	0.001	4	0	0	4
158	0.004	0.000	0.000	0.004	37	0	0	37
159	0.005	0.002	0.000	0.006	83	28	0	110
161	0.000	0.000	0.000	0.000	15	0	0	15
162	0.005	0.000	0.000	0.005	81	0	0	81
163	0.008	0.000	0.000	0.008	114	0	0	114
164	0.001	0.000	0.000	0.001	25	0	0	25
165	0.004	0.000	0.001	0.006	43	0	14	57
166	0.000	0.000	0.000	0.000	6	0	2	8
167	0.001	0.000	0.000	0.001	32	11	0	42
168	0.018	0.006	0.000	0.024	92	31	0	123
201	0.001	0.001	0.000	0.001	1	0	0	1
204	0.002	0.000	0.000	0.002	4	0	0	4
205	0.008	0.000	0.003	0.010	17	0	6	23
206	0.039	0.000	0.193	0.232	1	0	4	5
207	0.000	0.000	0.002	0.002	0	0	250	250
208	0.000	0.000	0.010	0.010	0	0	35	35
209	0.000	0.007	0.011	0.018	0	22	33	55
210	0.085	0.000	0.510	0.595	143	0	857	1000
211	0.000	0.000	0.012	0.012	0	0	17	17
212	0.000	0.002	0.005	0.007	0	3	5	8

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
213	0.001	0.000	0.001	0.002	3	0	3	5
214	0.005	0.000	0.020	0.025	5	0	20	25
215	0.001	0.000	0.001	0.002	2	0	2	4
216	0.000	0.000	0.003	0.003	0	0	2	2
300	0.000	0.000	0.000	0.000	0	1	0	1
301	0.000	0.000	0.000	0.000	0	3	0	3
302	0.001	0.000	0.000	0.001	3	0	0	3
303	0.000	0.000	0.000	0.000	0	2	0	2
304	0.000	0.000	0.000	0.000	0	1	0	1
305	0.000	0.000	0.000	0.000	0	2	0	2
306	0.003	0.000	0.003	0.005	15	0	15	30
307	0.005	0.011	0.005	0.021	21	43	21	85
308	0.023	0.018	0.006	0.047	250	188	63	500
309	0.024	0.000	0.005	0.029	542	0	108	650
310	0.001	0.001	0.000	0.001	5	5	0	10
311	0.013	0.006	0.000	0.019	133	67	0	200
312	0.012	0.004	0.000	0.015	135	45	0	180
313	0.027	0.027	0.009	0.063	163	163	54	380
314	0.001	0.001	0.000	0.002	25	25	0	50
315	0.000	0.000	0.000	0.001	3	3	0	5
316	0.001	0.000	0.000	0.001	3	0	0	3
317	0.000	0.000	0.000	0.000	1	0	0	1
318	0.000	0.000	0.000	0.000	0	1	0	1
319	0.000	0.002	0.002	0.004	0	5	5	10
320	0.005	0.000	0.000	0.005	15	0	0	15
321	0.000	0.000	0.000	0.000	1	0	0	1

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
322	0.001	0.000	0.000	0.001	1	0	0	1
323	0.001	0.001	0.000	0.002	6	6	0	12
324	0.000	0.000	0.000	0.000	0	0	4	4
325	0.000	0.000	0.000	0.000	0	0	5	5
326	0.040	0.008	0.000	0.048	833	167	0	1000
328	0.020	0.000	0.000	0.020	57	0	0	57
330	0.000	0.000	0.000	0.001	3	0	3	5
332	1.051	0.117	0.467	1.635	3214	357	1429	5000
333	0.000	0.000	0.000	0.000	2	2	0	3
334	0.004	0.004	0.000	0.009	4	4	0	8
335	0.021	0.043	0.021	0.086	10	20	10	40
336	0.003	0.000	0.003	0.006	2	0	2	4
337	0.040	0.000	0.040	0.081	18	0	18	35
338	0.000	0.000	0.000	0.000	1	1	1	2
339	0.000	0.000	0.000	0.000	1	1	1	3
340	0.006	0.006	0.006	0.018	3	3	3	9
341	0.000	0.000	0.000	0.001	2	2	2	5
342	0.230	0.057	0.057	0.345	233	58	58	350
344	0.000	0.000	0.000	0.000	0	0	1	1
345	0.000	0.003	0.003	0.006	0	24	24	48
346	0.000	0.032	0.032	0.064	0	225	225	450
347	0.000	0.003	0.000	0.003	0	34	0	34
348	0.005	0.005	0.000	0.010	17	17	0	34
349	0.011	0.000	0.011	0.022	23	0	23	45
350	0.000	0.190	0.000	0.190	0	300	0	300
352	0.012	0.004	0.000	0.015	30	10	0	40

Observation ID	Wedgeleaf Horkelia (Acres)	Mesa Horkelia (Acres)	Kellogg's horkelia (Acres)	Total Existing Polygon Acres	Wedgeleaf Horkelia (Individuals)	Mesa Horkelia (Individuals)	Kellogg's horkelia (Individuals)	Total Number Of Individuals
353	0.011	0.000	0.028	0.039	11	0	29	40
354	0.005	0.001	0.002	0.008	13	1	6	20
Total	**14.783**	**4.0571**	**11.103**	**29.943**	**119,215**	**27,859**	**78,123**	**225,198**

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