Third Annual Monitoring Report

Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

Environmental Impact Report Mitigation Measure Nos. Bio-D and Bio-E

California Department of Fish and Wildlife Streambed Alteration Agreement No. 1600-2008-0173-R5

Prepared for

Maria Lee, P.E.
Los Angeles County Public Works
Stormwater Engineering Division
900 South Fremont Avenue
Alhambra, California 91802
T: 626.458.6126

Prepared by

Richard B. Lewis, III
Psomas
225 South Lake Avenue, Suite 1000
Pasadena, California 91101
T: 626.351.2000

May 2019

TABLE OF CONTENTS

TABLES

EXHIBITS

ATTACHMENTS

Attachment

ATTACHMENT A
MITIGATION PROGRAM BACKGROUND

Section **Page**

TABLES

1.0 INTRODUCTION

This is the third Annual Monitoring Report for the Los Angeles County Public Works' (Public Works') Oak Woodland Habitat Revegetation/Mitigation Program (OWHRMP) for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project (BonTerra Psomas 2014). This report provides a summary of Year Three (April/May 2017 to April/May 2018) performance as part of the required mitigation program in compliance with the Project's permits and the approved OWHRMP. A detailed discussion of the mitigation program background (e.g., project impacts and required mitigation, responsible parties, performance standards, site preparation and installation) is provided in Attachment A. The mitigation site location is shown in Exhibits 1, 2, and 3. Site photographs are provided in Attachment B.

2.0 HABITAT MAINTENANCE – YEAR THREE

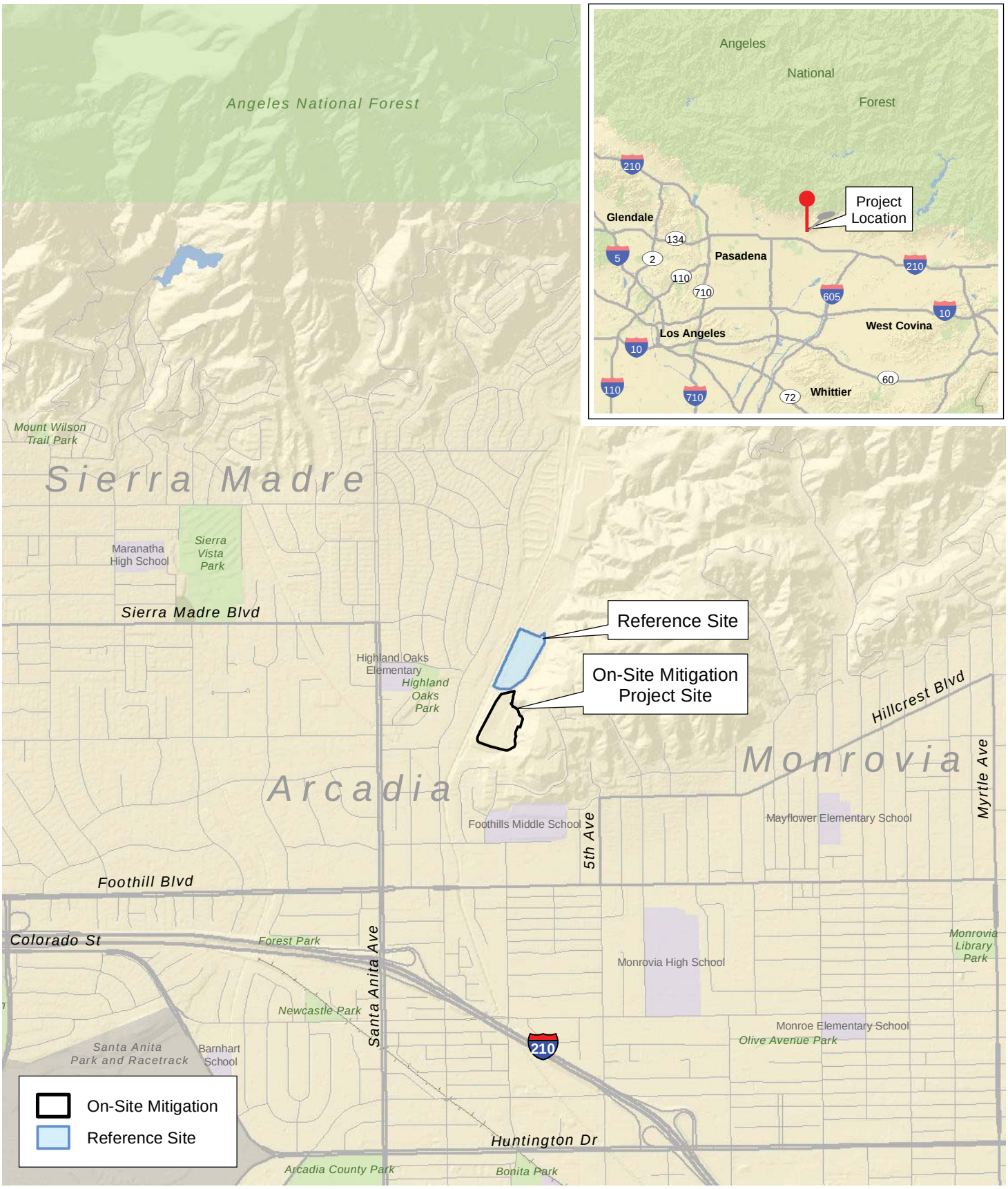
Mitigation installation was completed in December 2014, and the seven-year to ten-year mitigation maintenance clock began on January 1, 2015. Nakae & Associates, Inc. (Nakae) performs maintenance tasks on the mitigation site in compliance with the terms of the OWHRMP. Maintenance of the 8.0-acre site is very complex due to the innovative restoration methods being employed on the site (e.g., coarse woody debris [CWD] placement); the temporary exclusion of large mammals (e.g., keeping gates closed and locked at all times), the presence of an abundance of native and non-native plant species, the rapid colonization by wildlife species, the operational issues associated with the structural integrity of the Lower Sediment Placement Site (SPS; e.g., drainage facilities), tasks related to adjacent land uses (e.g., vector control, quiet entry protocols), and other issues.

Nakae also performs maintenance tasks in the Weed Abatement Buffer Areas (Buffer Areas) (7.01 acres, in total) that surround the mitigation site, as shown on Exhibit 3. An additional Buffer Area totaling 0.37 acre will be added to the maintenance program in fall 2018.

The highest priority for mitigation site performance is the growth and survival of planted oaks. Nakae performs judicious watering and careful maintenance. As the growing branch tips of the oaks rose above deer browsing height, Nakae removed the upper 4 feet of caging to enable the trees to assume a natural, spreading form. The lower 2 feet of temporary caging has been left in place as a longer-term rodent deterrent.

Non-native plant species are promptly treated and removed when observed during regular maintenance activities. To the extent practicable, Nakae removes weeds prior to seed production/dispersal to avoid re-infestation of the site. Herbicide use is minimized in favor of hand-pulling of weeds whenever possible. Only glyphosate-based herbicides that are approved for use in aquatic habitat areas (e.g., Roundup Custom®) by the United States Environmental Protection Agency (USEPA) are used on the mitigation site.

Nakae is monitoring some minor erosion on the off-site slopes to the east of the mitigation site (i.e., Weed Abatement Area No. 1); however, no significant erosion is present on the mitigation site, and no problematic trespassing or trash deposition has occurred in the vicinity. Nakae is maintaining the concrete down-drains and V-ditches to ensure they are clear of sediment and debris to facilitate the County's ongoing inspection of the Lower SPS' integrity. Overhead irrigation on the oak woodland (OW) site was discontinued in December 2015, and the bubblers on the OW site were not operated from October 2016 to late February 2018. Due to acute drought between March 2017 and February 2018, the oak bubbler system was reactivated in spring 2018 to simulate late seasonal rain events. No irrigation has been applied to the coastal sage scrub (CSS) planting areas (SPS slopes) since June 9, 2015. The future application of irrigation will depend



D:\Projects\COLADPW\J254\MXD\3AMR\ex_ProjectVicinity_20180822.mxd

Project Vicinity

Exhibit 1

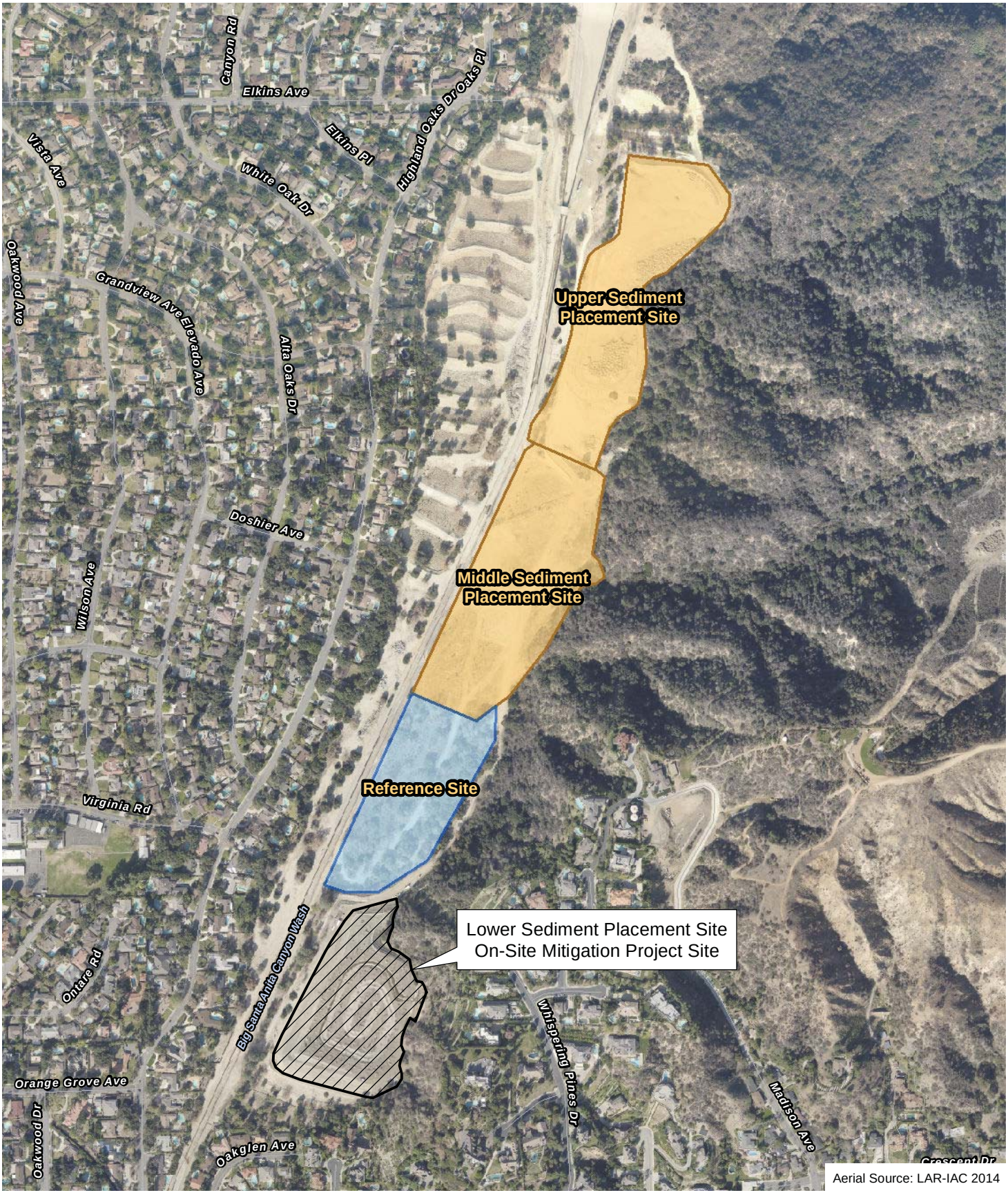
Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

N
W E
S

2,000 1,000 0 2,000
Feet

PSOMAS

(Rev: 8-23-2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\ex1_ProjectVicinity.pdf



Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J254\MXD\3AMR\ex_SedimentPlacement_20180822.mxd

Sediment Placement Site Locations

Exhibit 2

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

N
W E
S

600 300 0 600
Feet

PSOMAS

(Rev: 8-23-2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\ex2_SedimentPlacement.pdf

Drainages (1.63 Acres)
Defensible Space Vegetation Requirement (Approximate)*
Government-Owned Land
Parcel Boundary
Oak Woodland Mitigation (5.50 Acres)
Coastal Sage Scrub Revegetation (2.50 Acres)
Photo Station

Weed Abatement Buffer Areas:

Area 1 (0.78 Acre; to East Property Line)
Area 2 (2.32 Acres)
Area 3a (1.72 Acres)
Area 3b (0.45 Acre)
Area 4 (1.74 Acres)

Waypoints

Start Waypoint
End Waypoint

Transects and Quadrats

Transect
Quadrat Diagonal
Quadrat Boundary

Santa Anita Channel

cssQ1_B
cssQ1_A
cssT1_A
cssT1_B
Photo Station 1
cssQ2_B
cssT2_A
cssQ2_A
cssT3_B
cssT3_A
Photo Station 3
cssT2_B
Photo Station 4
oakT1_B
oakT1_A
oakT4_A
oakQ1_B
oakQ1_A
oakT4_B
Photo Station 5
oakT3_A
oakT3_B
oakQ2_A
oakT2_A
oakQ3_B
oakQ2_B
oakQ3_A
Photo Station 6
oakT2_B
cssT4_A
oakQ5_B
cssT4_B
oakQ5_A
oakQ4_B
oakQ4_A
cssQ3_A
oakT5_B
cssQ3_B
cssT6_A
cssT6_B
oakT5_A
oakT6_B
oakT6_A
oakQ6_B
Photo Station 8
cssT5_A
cssT5_B
oakQ6_A
Photo Station 7
Photo Station 9
Oakglen Ave

*Defensible Space Vegetation Requirement is 100-ft. per City of Arcadia

Aerial Source: LAR-IAC 2014

D:\Projects\COLADPW\J254\MXD\3AMR\ex_MitigationSite_20190501.mxd

Mitigation/Revegetation Sites and Weed Abatement Buffer Areas

Exhibit 3

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

N W E S
125 62.5 0 125 Feet

PSOMAS

(Rev: 05-01-2019 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\ex3_MitigationSite.pdf

on the adaptation of native plant species to growth conditions including the amount and frequency of future precipitation during the seven-to-ten-year maintenance period.

Supplemental planting and seeding tasks were performed in Year Three, as described in Attachment A-4.3. A total of 213 supplemental container plants and cuttings (12 species) were installed in February 2018, including California fuchsia (*Epilobium canum* ssp. *canum*; one plant), southern bunch leaf beardtongue (*Penstemon heterophyllus* var. *australis;* 5 plants) California polypody (*Polypodium californicum*—a native fern; 65 plants), hillside gooseberry (*Ribes californicum*; 65 plants), California rose (*Rosa californica*; 60 plants), and foothill needle grass (*Stipa lepida*; 17 plants). The southern bunch leaf beardtongue plants (a locally rare species in the subwatershed) were propagated by Rancho Santa Ana Botanic Garden (RSABG) from a trace quantity of cuttings that were carefully collected by Psomas on the Monrovia site in 2017. A total of 4 pounds of oak acorns were installed in fall 2018, as described in Section 3.4.5.

Psomas Biologists perform nesting bird surveys associated with maintenance tasks performed by Nakae during the nesting bird season, which is defined in project permits and authorizations as February 1 to September 15. When sensitive biological resources are observed (e.g., nesting birds), these environmentally sensitive areas (ESAs) are marked in the field via flagging tape and/or signage. The biologist then remains on site as needed to coordinate maintenance tasks in the vicinity of these resources (to avoid adverse impacts) and to assist Nakae with native and non-native plant species identification.

Public Works, Psomas, and Nakae periodically coordinate with representatives of the San Gabriel Valley Vector Control District (SGVVCD) to discuss ongoing, potential mosquito vector issues associated with the drainage channels on the site. The SGVVCD typically performs vector control via the application of *Bacillus thuringiensis* (BTi), a bacterial/biological control material. SGVVCD applied a volatile mineral oil to control more mature mosquito larvae following a few past inspections (to maintain compliance with public health and safety codes); however, since project initiation, Public Works and Psomas have requested that SGVVCD use only BTi on the site (rather than other materials, to the extent practicable) to minimize adverse impacts on mitigation habitat (e.g., impacts to arthropod species diversity and abundance). Nakae regularly removes vegetation from the central portion of each drainage channel (i.e., an area approximately 3 feet in width) to facilitate inspection and treatment tasks, per SGVVCD requirements. In addition, except for a small number of volunteer willows and sycamore trees, woody vegetation is removed from the cross-section of the drainages to similarly facilitate SGVVCD access. The narrow berm between the drainages is kept nearly 100 percent unvegetated to provide a footpath for perpetual access by Public Works and SGVVCD personnel.

3.0 PERFORMANCE MONITORING – YEAR THREE

Mitigation monitoring tasks in Year Three (April/May 2017 to April/June 2018) included both qualitative and quantitative assessments of mitigation performance. Qualitative surveys include an assessment of native plant species growth, reproduction, or mortality; pest problems; irrigation system performance; invasive weed species establishment; and wildlife species use (resident and migrant species). The quantitative survey methodology was prepared in coordination with the California Department of Fish and Wildlife (CDFW) and is described in detail in the OWHRMP (e.g., the quadrat sampling area constitutes at least 2.0 percent of the combined OW- and CSS-vegetated habitat areas on the mitigation site) and summarized in the following subsections. Nesting bird surveys were performed in association with mitigation maintenance tasks, and a summary of all wildlife observations on the site is provided below. The vegetation coverage and diversity values as well as the results of the oak tree assessment are discussed in Section 3.4 below.

In coordination with Public Works, a total of 0.18 acre of currently unvegetated area (access road and concrete drainages) was removed from the oak woodland mitigation site and replaced with a portion of Buffer Area 2. The substituted oak woodland polygon (formerly a part of Buffer Area 2) includes a total of 12 coast live oak (*Quercus agrifolia* var. *agrifolia*) seedlings that were provided with protective cages in 2013 during the site preparation phase.

Geographic Information Systems (GIS) was used to generate random point-intercept transect locations and random vegetation quadrat locations for the measurement of native vegetation conditions (foliar cover and species diversity [richness]) on the mitigation site. Psomas Botanists Allison Rudalevige and Katie Gallagher and Psomas Biologists Cristhian Mace and Sarah Thomas performed the quantitative vegetation surveys on April 17, 18, and 20; and June 1, 2018. Ms. Mace and Ms. Thomas are qualified to perform nesting bird surveys (as described in the OWHRMP, which states that individual transects or quadrats would be moved to alternate random locations as needed to avoid impacts to nesting birds). Quantitative surveys were performed during the nesting bird season, which is defined as February 1 to September 15 in project permits and Environmental Impact Report (EIR) mitigation measures.

The quantitative surveys were performed in the spring (rather than exactly two years after the start of the ten-year maintenance period on January 1, 2015) in order to sample the vegetation during the period when most plant species are actively growing and most detectable.

3.1 TRANSECTS

A total of six 100-foot point intercept transects (1.0-foot intercepts) were performed on the OW mitigation site, and a total of six 50-foot point-intercept transects (1.0-foot intercepts) were performed on the CSS mitigation site. Species incidence was recorded at each transect intercept as either native or non-native species, “both”, or “no plant”, and ground coverage was recorded at each intercept as either bare soil, rock/cobble, leaf litter, fine woody debris, coarse woody debris, or ‘other’ (e.g., concrete V-ditch). The transect data were compiled to yield the percent native and non-native class cover and ground coverage (by category).

3.2 QUADRATS

A total of nine 20-foot by 40-foot quadrats were performed to assess plant species density and diversity, including six locations on the OW mitigation site and three locations on the CSS mitigation site. The total quadrat sampling areas were 4,800 square feet (sf) on the OW mitigation site and 2,400 sf on the CSS mitigation site, for a total quadrat sampling area of 7,200 sf. The quadrats were created using measuring tapes, wire flags, and flagging tape. The location of all transects and quadrats are shown on Exhibit 3. One of the nine quadrats (OW quadrat no. 2) was delayed from mid-April 2018 to June 1, 2018, to avoid adverse impacts to nesting birds in the vicinity. Vegetation characteristics were independently evaluated via quadrats for the two mitigation habitat types present on site (i.e., OW and CSS) using the following characteristics (metrics): plant species richness (number of species sampled); density of native trees (all species); density of native shrubs (all species); density, relative density, coverage, relative coverage, frequency, and relative frequency of each plant species; and the Shannon Diversity Index (see Section A-6.1.1) was computed to yield the species diversity for each habitat type. This index represents the sampled abundance and evenness of species in the study area. The vegetation diversity values are discussed in Section 3.4, Results, below. The metrics, equations, and variables used to derive these values are provided in Table A-10.

3.3 OAK TREE ASSESSMENT

During the Year One oak evaluation in 2015, the oak planting locations were recorded using a hand-held global positioning system (GPS) device, and each location (cage) was marked with a pre-numbered metal tag. Psomas Certified Arborist Trevor Bristle (International Society of Arboriculture Certificate Number WE-10233A) and Psomas Biologist Cristhian Mace surveyed the mitigation site on April 16 and 28, 2018, to evaluate a total of 320 of the 415 oak trees (i.e., the caged oak locations) and to characterize their growth and health in Year Three (Mr. Bristle and Ms. Mace are qualified to perform nesting bird surveys). Mr. Bristle completed the remaining 95 oak evaluations on subsequent site visits (June 1, June 15, and July 3, 2018), in locations where nesting bird activity had prevented access on earlier dates. A total of four planted oak species are present on the mitigation site: coast live oak (*Quercus agrifolia* var. *agrifolia*), canyon live oak (*Quercus chrysolepis*), San Gabriel oak (*Quercus durata* var. *gabrielensis*), and Engelmann oak (*Quercus engelmannii*). No minimum size threshold was observed for the tree survey (i.e., data were collected for all oak individuals, regardless of size). The following data were collected during the evaluation: diameter at breast height (or at a lower, representative height), tree height, and canopy width.

3.4 RESULTS

The plant species density and diversity results (e.g., richness, abundance) based on survey quadrats are discussed below, and a detailed table of density and diversity data (quadrats) and computations is provided in Attachment C, and detailed percent coverage data (transects) is provided in Attachment D.

3.4.1 Native Plant Density

A summary of Year Three native shrub/subshrub and herb density is provided in Table 1 and includes an extrapolated estimate of the number of plants per acre. A total of 202 native shrubs/subshrubs were sampled in quadrats (4,800 sf, total) on the OW site, and 330 native shrubs/subshrubs were sampled in quadrats (2,400 sf, total) on the CSS site. A total of 2,400 native herb plants were estimated to occur in quadrats on the OW site, and 966 native herb plants were estimated to occur in quadrats on the CSS site. The number of native shrubs (sampled) and herbs (estimated) on the mitigation site in Year Three vastly exceeds the density of native shrubs/herbs on the reference site (2013 survey); however, it is important to note that (1) the reference site surveys were conducted in mid-July (when some native annual and perennial grasses/herbs may have already become desiccated and therefore were not sampled on quadrats/transects), and (b) 2013 was a year of sub-average rainfall, which may have influenced the expression of the native herbaceous flora. According to the terms of the OWRHMP, the reference site would have been surveyed again in Year Three (April/May 2018) concurrent with the quantitative surveys on the mitigation site, for comparative assessment with mitigation performance. However, in May 2018 the CDFW authorized Public Works to discontinue the requirement for surveys of the reference site for the duration of the mitigation program.

TABLE 1
NATIVE PLANT DENSITY – YEAR THREE (2018)

Habitat Type	Plant Category	Sampling Area	Native Plant Density[a]	
			Per 4,800 sf (All Quadrats Combined)	Per 1.0 Acre
Oak Woodland	Shrubs/ Subshrubs	Reference Site (2013)[b]	42 (1 per 114.3 sf)	381
		Mitigation Site (2018)	**202 (1 per 23.8 sf)**	**1,833**
	Herbs	Reference Site (2013)[b]	7 (1 per 686 sf)	64
		Mitigation Site (2018)	**2,400 (1 per 2.0 sf)**	**21,780**
Habitat Type	**Plant Category**	**Sampling Area**	**Per 2,400 sf (All Quadrats Combined)**	**Per 1.0 Acre**
Coastal Sage Scrub	Shrubs/ Subshrubs	Reference Site (2013)	34 (1 per 70.6 sf)	617
		Mitigation Site (2018)	**330 (1 per 7.3 sf)**	**5,990**
	Herbs	Reference Site (2013)	21 (1 per 114.3 sf)	381
		Mitigation Site (2018)	**966 (1 per 2.5 sf)**	**17,533**

sf: square feet
[a] Includes seedlings
[b] CS/CLORF = California Sycamore/Coast Live Oak Riparian Forest; see Exhibit 2 for reference site location.

The OW and CSS mitigation sites were designed to exhibit a mosaic of understory vegetation types with a moderate to high density of shrubs in some areas. By design, the CSS site exhibits a higher density of shrubs than the OW site, and the OW site exhibits large polygons of herbaceous/meadow vegetation with plantings of oak and scattered shrubs. The high density of native herbs on the mitigation sites reflects the establishment of a high quality, native vegetative understory on the sites in comparison to the reference sites.

3.4.2 Native Plant Frequency

A summary of Year Three native plant frequency is provided in Table 2. Herbaceous species were well represented across all quadrats and transects, despite ongoing drought.

TABLE 2
NATIVE PLANT FREQUENCY – YEAR THREE (2018)

No. Quadrats (20 feet by 40 feet)	Sampled Plant Species[a]
Oak Woodland Mitigation Site (6 Quadrats)	
6 of 6	*Clarkia purpurea* var. *quadrivulnera, Heterotheca grandiflora, Phacelia distans*
5 of 6	*Acmispon glaber* var. *glaber, Epilobium ciliatum* ssp. *ciliatum, Eriogonum fasciculatum* var. *foliolosum, Malosma laurina, Pseudognaphalium stramineum, Quercus agrifolia* var. *agrifolia, Solanum americanum*
4 of 6	*Artemisia californica, Artemisia douglasiana, Phacelia minor, Sambucus nigra* ssp. *caerulea*
3 of 6	*Baccharis salicifolia* ssp. *salicifolia, Camissoniopsis hirtella, Cyperus eragrostis, Helianthus annuus, Leptochloa fusca, Lupinus hirsutissimus, Rhus ovata, Stipa lepida*
2 of 6	*Brickellia californica, Mimulus aurantiacus* var. *pubescens, Opuntia* sp.*, Pellaea andromedifolia, Plantago erecta, Pseudognaphalium californicum, Quercus engelmannii, Salvia mellifera*
1 of 6	18 species
Coastal Sage Scrub Mitigation Site (3 Quadrats)	
3 of 3	*Acmispon glaber* var. *glaber, Artemisia californica, Clarkia purpurea* var. *quadrivulnera, Eriogonum fasciculatum* var. *foliolosum, Phacelia distans, Pseudognaphalium stramineum, Salvia mellifera, Solanum americanum*
2 of 3	*Eriogonum elongatum, Hesperoyucca whipplei, Heterotheca grandiflora, Opuntia* sp., *Phacelia minor, Plantago erecta, Rhus ovata*
1 of 3	23 species
[a] For categories with more than 8 plant species, only the quantity of species is listed.	

3.4.3 Vegetation Percent Coverage

A summary of Year Three vegetation percent coverage is provided in Tables 3 and 4. The detailed computations of vegetation percent coverage are provided in Attachments C and D.

TABLE 3
VEGETATION PERCENT COVERAGE: OAK WOODLAND – YEAR THREE (2018)

Plant Species	Year Three Results (*Final Standard Currently Met or Exceeded)			Minimum Coverage Per Vegetation Class/Year			
	Q	T	Average	3	5	7	10
Native							
Trees (4 Species)							
Quercus agrifolia var. *agrifolia* [a]	1.71	3.17	2.44*	0.5	1	1.5	2
Quercus engelmannii [a]	0.08	0.00	0.04*				
Salix gooddingii	0.00	1.17	0.58				
Sambucus nigra ssp. *caerulea*	2.25	1.17	1.71				
Subtotal – Trees	***4.04***	***5.50***	***4.77***				
Large Shrubs (6 Species)							
Baccharis salicifolia ssp. *salicifolia*	0.42	5.50	2.96				
Ceanothus oliganthus	0.08	0.00	0.04				
Frangula californica ssp. *californica*	0.04	0.00	0.02				
Heteromeles arbutifolia	0.17	0.67	0.42				
Malosma laurina	0.54	2.83	1.69				
Rhus ovata	2.00	0.00	1.00				
Subtotal – Large Shrubs	***3.25***	***9.00***	***6.13****	3	4	5	5
Medium Shrubs (7 Species)							
Artemisia californica	3.54	5.83	4.69				
Brickellia californica	0.38	0.50	0.44				
Eriogonum fasciculatum var. *foliolosum*	3.92	5.67	4.79				
Mimulus aurantiacus var. *pubescens*	0.25	0.00	0.13				
Ribes aureum var. *gracillimum*	0.00	0.83	0.42				
Rubus ursinus	0.08	0.00	0.04				
Salvia mellifera	0.75	0.67	0.71				
Subtotal – Medium Shrubs	***8.92***	***13.50***	***11.21***	14	16	18	18
Subshrubs (2 Species)							
Acmispon glaber var. *glaber*	5.67	10.17	7.92				
Keckiella cordifolia	0.04	1.00	0.52				
Subtotal – Subshrubs	***5.71***	***11.17***	***8.44****	3	4	5	5
Succulents (2 Species)							
Hesperoyucca whipplei [b]	0.04	0.00	0.02				
Opuntia sp.	0.42	0.00	0.21				
Subtotal – Succulents	***0.46***	***0.00***	***0.23***	0.5	1	2	2
Herbs (32 Species)							
Acmispon sp.	0.00	0.50	0.25				
Acmispon strigosus	0.04	0.00	0.02				
Amsinckia intermedia	0.04	0.00	0.02				
Artemisia douglasiana	4.50	7.67	6.08				
Camissoniopsis hirtella	0.13	0.00	0.06				
Clarkia purpurea var. *quadrivulnera*	0.71	9.17	4.94				
Cyperus eragrostis	0.25	0.00	0.13				
Elymus condensatus	0.04	1.50	0.77				
Epilobium brachycarpum	0.00	0.17	0.08				
Epilobium ciliatum ssp. *ciliatum*	0.88	0.00	0.44				
Eulobus californicus	0.00	0.83	0.42				
Helianthus annuus	0.63	0.83	0.73				
Heterotheca grandiflora	0.42	1.33	0.88				
Juncus rugulosus	0.04	0.00	0.02				
Leptochloa fusca	1.42	1.17	1.29				
Lupinus hirsutissimus	0.13	0.00	0.06				
Lupinus succulentus	0.00	0.17	0.08				
Lupinus truncatus	0.04	0.33	0.19				
Malacothrix saxatilis	0.04	0.00	0.02				
Melica imperfecta	0.17	1.67	0.92				
Penstemon spectabilis var. *spectabilis*	0.04	0.17	0.10				
Persicaria lapathifolia	0.04	0.00	0.02				
Phacelia distans	9.67	20.50	15.08				
Phacelia minor	0.17	0.67	0.42				
Phacelia ramosissima	0.00	3.00	1.50				
Plantago erecta	0.08	0.00	0.04				
Pseudognaphalium bioletti	0.04	0.00	0.02				
Pseudognaphalium californicum	0.08	0.00	0.04				
Pseudognaphalium canescens	0.04	0.00	0.02				
Pseudognaphalium stramineum	0.88	2.50	1.69				
Salvia columbariae	0.00	0.33	0.17				
Solanum americanum	0.92	1.33	1.13				
Stipa lepida	0.50	2.33	1.42				
Subtotal – Herbs	***21.92***	***56.17***	***39.04****	25	30	30	30
Ferns (2 Species)							
Pellaea andromedifolia	0.08	0.00	0.04				
Polypodium californicum	0.04	0.00	0.02				
Subtotal – Ferns	***0.13***	***0.00***	***0.06***				

TABLE 3
VEGETATION PERCENT COVERAGE: OAK WOODLAND – YEAR THREE (2018)

Plant Species	Year Three Results (*Final Standard Currently Met or Exceeded)			Minimum Coverage Per Vegetation Class/Year			
	Q	T	Average	3	5	7	10
Non-Native							
Bromus diandrus	0.13	0.83	0.48				
Bromus madritensis ssp. *rubens*	0.33	1.83	1.08				
Chenopodium album	0.04	0.00	0.02				
Cotula australis	0.08	1.00	0.54				
Dysphania botrys	0.08	0.00	0.04				
Erodium botrys	0.17	0.00	0.08				
Erodium cicutarium	0.13	0.00	0.06				
Euphorbia maculata	0.17	0.00	0.08				
Euphorbia spathulata	0.13	0.00	0.06				
Festuca myuros	4.04	3.67	3.85				
Gamochaeta pensylvanica	0.21	0.00	0.10				
Hirschfeldia incana	0.08	0.00	0.04				
Hordeum murinum	0.04	0.00	0.02				
Hypochaeris glabra	0.08	0.00	0.04				
Lepidium didymum	0.04	0.00	0.02				
Logfia gallica	0.08	0.00	0.04				
Lysimachia arvensis	0.00	0.83	0.42				
Malva parviflora	0.04	0.00	0.02				
Melilotus sp.	0.00	0.50	0.25				
Poa annua	0.88	0.00	0.44				
Polycarpon tetraphyllum var. *tetraphyllum*	0.04	0.00	0.02				
Polygonum aviculare	0.00	0.00	0.00				
Polypogon monspeliensis	0.08	0.00	0.04				
Polypogon viridis	0.00	0.17	0.08				
Pseudognaphalium luteoalbum	0.04	0.00	0.02				
Schismus sp.	0.08	0.00	0.04				
Senecio vulgaris	0.29	0.00	0.15				
Sonchus oleraceus	0.25	0.33	0.29				
Veronica arvensis	0.54	0.00	0.27				
Subtotal – Non-Native	***8.08***	***9.17***	***8.63***				
Absolute Percent Coverage							
Total Absolute Native Species Coverage	**44.42**	**95.33**	**69.88**				
Total Absolute Non-Native Species Coverage	**8.08**	**9.17**	**8.63**				
Total Absolute Coverage (All)	**52.50**	**104.50**	**78.50**				
Class Percent Coverage							
Native		63.33					
Non-Native		3.33					
Both		5.17					
No Plant		28.17					
Summary							
Total Native Class Coverage		**68.50**		55	75	75	75
Total Non-Native Class Coverage[c]		**8.50**		5.0[c]	5.0[c]	5.0[c]	5.0[c]
Total Unvegetated		**28.17**					
Ground Coverage (No Performance Standard)							
Bare Soil	26.38	17.83	**22.10**				
Boulder/Rock/Cobble	11.33	7.50	**9.42**				
Leaf Litter	45.75	39.83	**42.79**				
Fine Woody Debris	7.00	28.67	**17.83**				
Coarse Woody Debris	1.54	4.67	**3.10**				
Moss	6.83	1.17	**4.00**				
PVC Pipe	1.17	0.33	**0.75**				

Q: Quadrats (estimated coverage [mean]); T: Transects (measured coverage [mean]); PVC: polyvinyl chloride

[a] The minimum percent coverage standard for trees pertains only to oak tree species (combined value).

[b] Species is listed as a 'succulent' with respect to performance standards, although botanically it is a 'fibrous shrub'.

[c] The ongoing maximum allowed coverage of non-native plant species is 5 percent.

Note: Totals may not add due to rounding.

TABLE 4
VEGETATION PERCENT COVERAGE: COASTAL SAGE SCRUB – YEAR THREE (2018)

Plant Species	Year Three Results (*Final Standard Currently Met or Exceeded)			Minimum Coverage Per Vegetation Class/Year			
	Q	T	Average	3	5	7	10
Native							
Trees (2 Species)							
Quercus engelmannii	0.17	0.00	0.08				
Sambucus nigra ssp. *caerulea*	0.17	0.00	0.08				
Subtotal – Trees	***0.33***	***0.00***	***0.17***				
Large Shrubs (4 Species)							
Cercocarpus betuloides var. *betuloides*	0.17	0.00	0.08				
Malosma laurina	0.17	2.00	1.08				
Rhamnus ilicifolia	0.08	0.00	0.04				
Rhus ovata	0.83	0.67	0.75				
Subtotal – Large Shrubs	***1.25***	***2.67***	***1.96***	2	3	4	5
Medium Shrubs (6 Species)							
Artemisia californica	16.00	13.67	14.83				
Brickellia californica	0.08	0.00	0.04				
Eriogonum fasciculatum var. *foliolosum*	4.67	32.00	18.33				
Mimulus aurantiacus var. *pubescens*	0.42	0.00	0.21				
Salvia apiana	0.00	1.00	0.50				
Salvia mellifera	14.00	4.00	9.00				
Subtotal – Medium Shrubs	***35.17***	***50.67***	***42.92***	24	28	35	50
Subshrubs (2 Species)							
Acmispon glaber var. *glaber*	10.67	34.67	22.67				
Keckiella cordifolia	0.08	0.00	0.04				
Subtotal – Subshrubs	***10.75***	***34.67***	***22.71****	2	3	4	5
Succulents (2 Species)							
Hesperoyucca whipplei[a]	0.33	0.33	0.33				
Opuntia sp.	2.33	0.67	1.50				
Subtotal – Succulents	***2.67***	***1.00***	***1.83***	0.5	1	2	2
Herbs (25 Species)							
Camissoniopsis hirtella	0.08	0.00	0.04				
Cardamine oligosperma	0.08	0.00	0.04				
Chaenactis glabriuscula	0.08	0.00	0.04				
Clarkia purpurea var. *quadrivulnera*	2.17	3.33	2.75				
Cryptantha intermedia	0.08	0.00	0.04				
Datura wrightii	8.33	0.00	4.17				
Elymus condensatus	0.33	0.00	0.17				
Eriogonum elongatum	0.67	3.00	1.83				
Eucrypta chrysantemifolia	0.08	0.00	0.04				
Eulobus californicus	0.08	1.00	0.54				
Galium aparine	0.08	0.00	0.04				
Galium porrigens	0.17	0.00	0.08				
Heterotheca grandiflora	0.42	0.00	0.21				
Heterotheca sessiliflora	0.08	0.00	0.04				
Logfia filaginiodes	0.08	0.00	0.04				
Lupinus hirsutissimus	0.08	0.00	0.04				
Melica imperfecta	0.00	0.67	0.33				
Penstemon spectabilis var. *spectabilis*	0.17	0.00	0.08				
Phacelia cicutaria	0.00	0.33	0.17				
Phacelia distans	0.83	0.00	0.42				
Phacelia minor	0.17	1.00	0.58				
Plantago erecta	0.17	0.00	0.08				
Pseudognaphalium stramineum	1.25	2.33	1.79				
Solanum americanum	0.58	0.00	0.29				
Stipa lepida	0.00	0.33	0.17				
Subtotal – Herbs	***16.08***	***12.00***	***14.04***	8	10	15	15
Non-Native							
Anthriscus caucalis	0.08	0.00	0.04				
Bromus diandrus	0.17	0.33	0.25				
Bromus madritensis ssp. *rubens*	0.58	0.00	0.29				
Centaurea melitensis	0.08	0.00	0.04				
Chenopodium album	0.08	0.00	0.04				
Erodium cicutarium	0.08	0.00	0.04				
Euphorbia spathulata	0.08	0.00	0.04				
Festuca myuros	8.50	5.00	6.75				
Festuca perenne	0.08	0.00	0.04				
Gamochaeta pensylvanica	0.08	0.00	0.04				
Hirschfeldia incana	0.17	0.00	0.08				
Hypochaeris glabra	0.17	0.00	0.08				
Senecio vulgaris	0.25	0.33	0.29				
Sonchus asper	0.08	0.33	0.21				
Sonchus oleraceus	0.75	0.67	0.71				
Stellaria media	0.08	0.00	0.04				
Subtotal – Non-Native	***11.33***	***6.67***	***9.00***				

TABLE 4
VEGETATION PERCENT COVERAGE: COASTAL SAGE SCRUB – YEAR THREE (2018)

Plant Species	Year Three Results (*Final Standard Currently Met or Exceeded)			Minimum Coverage Per Vegetation Class/Year			
	Q	T	Average	3	5	7	10
Absolute Percent Coverage							
Total Absolute Native Species Coverage	**66.42**	**101.00**	**83.63**				
Total Absolute Non-Native Species Coverage	**11.33**	**6.67**	**9.00**				
Total Absolute Coverage (All)	**77.75**	**107.67**	**92.63**				
Class Percent Coverage							
Native		76.00					
Non-Native		3.33					
Both		3.00					
No Plant		17.67					
Summary							
Total Native Class Coverage		**79.00***		55	75	75	75
Total Non-Native Class Coverage[b]		**6.33**		5.0[b]	5.0[b]	5.0[b]	5.0[b]
Total Unvegetated		**17.67**					
Ground Coverage (No Performance Standard)							
Bare Soil	75.33	14.33	**44.83**				
Boulder/Rock/Cobble	1.67	4.00	**2.83**				
Leaf Litter	3.33	13.33	**8.33**				
Fine Woody Debris	11.67	64.67	**38.17**				
Coarse Woody Debris	0.17	0.67	**0.42**				
Moss	4.67	0.00	**2.33**				
PVC Pipe	0.50	0.67	**0.58**				
Straw Wattle	2.67	2.33	**2.50**				

Q: Quadrats (estimated cover [mean]); T: Transects (measured cover [mean]); PVC: polyvinyl chloride

[a] Species is listed as a 'succulent' with respect to performance standards, although botanically it is a 'fibrous shrub'.

[b] The ongoing maximum allowed coverage of non-native plant species is 5%

Note: Totals may not add due to rounding.

For all vegetation performance categories shown in Tables 3 and 4, the mean value of listed quadrat and transect results is used, except for native and non-native class coverage, which includes transect data only. This is because the quadrat data do not reflect native vs. non-native species areal coincidence (class coverage), and the point intercept transect data do not necessarily reflect individual plant occurrences (i.e., a single plant [large tree, shrub] may be intersected multiple times on a single transect). Photos of all quadrat and transect locations are provided in Attachment B.

As measured via transects, the native class coverage is 68.50 percent on the OW mitigation site and 79.00 percent on the CSS mitigation site; the non-native class coverage is 8.50 percent on the OW mitigation site and 6.33 percent on the CSS mitigation site. The non-native absolute coverage was estimated to be 8.08 percent on the OW site and 11.33 percent on the CSS site, via quadrats. The final (Year Ten) performance standard is 75 percent native coverage (OW and CSS); therefore, the OW site is somewhat below this standard, and the CSS site already exceeds program requirements. Due to the late onset of seasonal rains (March) in the 2017-2018 rainy season, there was a short-term increase in weed coverage in mid-spring. Also, due to restricted access for maintenance (by Nakae) to the ESAs (multiple nesting bird locations established by Psomas' Biologists, some weeds in these no-entry areas unavoidably mature and disperse seed each year, increasing nearby weed germination and growth in subsequent months/years. For the reasons described above, the mitigation sites (OW and CSS) were slightly above the maximum allowed non-native plant coverage of 5 percent. The non-native weedy grasses and broadleaf herbs (that were sampled) were in the process of being removed by Nakae at the time of the third annual survey.

The absolute coverage of all tree species sampled via quadrats/transects is 4.77 percent on the OW mitigation site, of which oak tree species constitute 2.48 percent coverage. The estimated total canopy area of oak tree species resulting from the oak tree assessment was 3.91 percent. As described in Section 3.4.5, the value of 3.91 percent is being used to assess compliance with performance standards. The OW site has already met the final (Year Ten) performance standard of 2 percent minimum coverage of oak tree species.

The absolute coverage of large shrubs (eight sampled species combined OW and CSS [all categories below]) is 6.13 percent on the OW mitigation site, and 1.96 percent on the CSS mitigation site. The absolute coverage of medium shrubs (eight species) is 11.21 percent on the OW mitigation site, and 42.92 percent on the CSS mitigation site. The absolute coverage of subshrubs (two species) is 8.44 percent on the OW mitigation site, and 22.71 percent on the CSS mitigation site. The absolute coverage of succulents (two species) is 0.23 percent on the OW mitigation site, and 1.83 percent on the CSS mitigation site (this category includes Whipple's chaparral yucca, which is actually a fibrous shrub; two cactus species are present: seaside prickly-pear [*Opuntia littoralis*] and Vasey's prickly-pear [*Opuntia ×vaseyi*]). The absolute coverage of native grasses/herbs (32 species) is 39.04 percent on the OW mitigation site, and 14.04 percent on the CSS mitigation site. Ferns were sampled on the site for the first time in Year Three, comprising 0.06 percent coverage on the OW site. Year Three performance meets or exceeds performance standards for many of these vegetation categories.

Coarse woody debris (CWD) was sampled at 3.10 percent coverage, and rock/cobble (boulders) was sampled at 9.42 percent coverage, on the OW mitigation site. Beneficial decay processes, including the growth of fungi (several species), have been observed in the CWD assemblages, and wildlife species are intensively colonizing these habitat features. These decay processes naturally occur in woodland habitats as a part of biological resource nutrient cycles. It is important to note that, without the installation of the salvaged woody material, such processes would not otherwise occur on an oak habitat creation/restoration site for hundreds of years.

3.4.4 Native Plant Diversity

A total of 69 native plant species and 34 non-native plant species were sampled by quadrats and/or transects performed on the OW and CSS mitigation sites. The mitigation program has exceeded the final (Year Ten) performance standards for native species richness; that is, 24 species on the OW mitigation site (55 species sampled in Year Three) and 18 species on the CSS site (41 species sampled in Year Three), as listed in Tables 3 and 4. A total of 142 native plant species have been observed on the 8.0-acre mitigation site; that is, approximately 50 percent of these plant species were sampled on quadrats and/or transects in Year Three. Therefore, both the sampled and actual vegetative richness on the site far exceed performance standards.

As described in Attachment A-6.1.1, the reference sites exhibited vanishingly low values of 'H' (Shannon Diversity Index) in 2013, due to the high degree of invasion by non-native grasses that is typical of natural habitats in the region. Due to effective weed control and the establishment of highly diverse vegetative coverage, the mitigation sites are expected to continue to exhibit significantly higher diversity than the reference site. A summary of the Year Three values of 'H' on the mitigation sites is listed in Table 5.

TABLE 5
SHANNON DIVERSITY INDEX – YEAR THREE (2018)

Habitat Type	Sampling Area	Number of Plant Species[a]		Shannon Diversity Index = H[a] (*Final Standard Currently Met or Exceeded)	
		Native	Non-Native	Result	Potential[b]
Oak Woodland	Reference Site (2013)[c]	18	11	0.01	3.37
	Mitigation Site (2018)	**48**	**25**	**1.13**	**4.29**
Coastal Sage Scrub	Reference Site (2013)	19	6	0.03	3.22
	Mitigation Site (2018)	**37**	**16**	**2.31**	**3.97**

[a] Based on quadrat data.
[b] Based on the number of plant species (native + non-native) sampled.
[c] CS/CLORF = California Sycamore/Coast Live Oak Riparian Forest; see Exhibit 2 for reference site location.

3.4.5 Oak Performance

A total of 394 living oak plants occur in planting cages, and only these caged/tagged oaks were evaluated during the survey. Numerous additional planted and volunteer oaks (>100 saplings/seedlings) occur on the mitigation site, comprising a substantial contingency. The mean trunk diameter for all measured oak species in Year Three is 0.92 inch. Based on the individual caged oak assessments, the total canopy area for all oak species is 9,400.00 square feet. The total canopy area for oak tree species *only* (excluding San Gabriel Oak, a shrub species) is 9,374.48 square feet (or 3.91 percent coverage of oak tree species on the 5.5-acre oak mitigation site) as derived from estimated canopy diameter data, where $A = \pi r^2$ (A = area; π = 3.1416; r = radius). This value (3.91 percent) is higher than the mean oak coverage value (2.48 percent) obtained during project quadrats and transects on the OW site. Because it is based on the individual evaluation of all caged oak tree species, the value of 3.91 is considered a more accurate representation of oak tree coverage (versus the quadrat/transect data) in assessing compliance with the performance standard. The estimated mean height of all oak species is 6.80 feet in Year Three, and a total of 64 of the planted oaks exceed 10 feet in height.

A total of 363 oak plants were proposed in the OWHRMP, and there is an 80-percent survival performance criterion (per CDFW) based on that quantity of oaks (i.e., there shall be a minimum of 290 surviving oaks at the end of the seven-year to ten-year maintenance period). Therefore,

Year Three oak survival performance far exceeds 100 percent versus the initial planting quantity specified in the OWHRMP. A summary of the size distribution of the assessed oak species is provided in Table 6, and all collected tree data is provided in Attachment E.

The overall health of each oak plant (*Quercus* spp.) was rated on a scale of 1 to 5 as described in Table 6 (per the OWHRMP). The health of almost all oaks in Year Three is very good with a mean health rating of 3.90. Living oak trees occur in 394 of the 411 cages; however, as noted above, numerous other living oak plants occur on the mitigation site. Some thinning of oak plants was performed in July 2018 toward achieving the best density of oak species on the mitigation site. The thinning tasks were performed by Nakae under the direction of Psomas' Certified Arborist, following the performance of a nesting bird survey. The OWHRMP specified that acorns would be collected and planted on the mitigation site annually for the first five years of the maintenance program. However, as noted in the second Annual Monitoring Report, acorn production in the local subwatershed was observed to be very low in fall 2016, so no acorn collection was performed in Year Two to allow for oak regeneration (of the pre-existing stands) and to retain wildlife forage values. Locally collected acorns were collected in fall 2017, including approximately 1 pound of coast live oak acorns, and approximately 3 pounds of Engelmann oak acorns. As noted in Attachment A-3.1, the Engelmann oak acorns were obtained from public rights-of-way in developed areas in the local subwatershed (i.e., from roadway gutters) when observed beneath massive 'heritage' trees of this species (i.e., specimens assumed to be naturally occurring). The acorns were carefully stored, following the guidelines of the University of California Integrated Hardwood Range Management Program (McCreary 2005), until planting on the mitigation site in January 2018.

TABLE 6
OAK SIZE DISTRIBUTION AND COVERAGE – YEAR THREE (2018)

Oak Species[a]	No. of Plants[a]/Diameter Class (inches)[b]							Total	Mean Diameter (inches)[a]	Mean Height (feet)[a]	Approx. Canopy Area (square feet)[c]		Mean Health Rating[d]
	<0.25	0.25 – 0.49	0.50	0.75	1.0 – 2.0	2.25 – 3.5	4.5				Mean	Total	
coast live oak (*Quercus agrifolia var. agrifolia*)	9	37	47	59	168	17	1	**338**	1.01	7.36	26.89	9,091.01	3.92
canyon live oak (*Quercus chyrolepis*[e])	0	1	0	0	0	0	0	**1**	0.10	0.50	0.05	0.05	4.00
San Gabriel oak (*Quercus durata* var. *gabrielensis*)	7	3	0	0	0	0	0	**10**	0.23	3.30	2.55	25.53	3.70
Engelmann oak (*Quercus engelmannii*)	22	11	4	3	5	0	0	**45**	0.37	3.52	6.32	284.42	3.82
All *Quercus* spp.	**38**	**52**	**51**	**62**	**173**	**17**	**1**	**394**	**0.92**	**6.80**	**23.86**	**9,400.00**	**3.90**

[a] Includes only the oaks occurring inside planting cages (numerous other planted/volunteer oaks occur on the mitigation site).
[b] Sum of the 2 largest trunks. The diameter at breast height (dbh, stem/trunk diameter) is measured at 4.5 feet above ground level (or at a lower, representative height).
[c] Based on estimated tree canopy diameter, where $A = \pi r^2$ (A = area; π = 3.1416; r = radius).
[d] Health ratings: 5 = Excellent; 4 = Very Good; 3 = Moderate; 2 = Poor; 1 = Obvious Decline.
[e] Only small seedlings (< 1 foot in height) of *Q. chrysolepis* were observed on the site in 2018 (acorns planted in fall 2015).

3.4.6 Wildlife Species

Hundreds of vertebrate wildlife species and even more numerous species of arthropods/insects, use OW habitats in California (Tietje et al. 2005). A greater abundance and diversity of these species are found in woodlands that include a high density of CWD (snags, downed wood, brush piles) that provide nesting/perching/shelter opportunities and the beneficial decay processes associated with these habitat features. The mitigation site was designed to incorporate a large volume of rock and woody material and a large variety of native plant species to immediately provide high wildlife value. The 8.0-acre mitigation site contains a range of habitat conditions, from dry slopes to moist north-facing slopes and created streambeds, offering varied resources for wildlife.

Psomas employs a range of wildlife specialists (e.g., herpetologists, ornithologists) who work alongside the vegetation specialists (e.g., arborists, botanists) and the licensed restoration contractor (Nakae), contributing their hundreds of years of combined field experience and unique expertise to the design and long-term monitoring of the habitat creation site (e.g., the selection and landscape configuration of optimal salvaged native tree trunks to be used for the placed snags and the arrangement of boulders to resemble archaic outcrops resulting from natural geological processes). As noted above, nesting bird surveys are conducted in association with maintenance activities performed during the nesting bird season, and biological resources are monitored/protected in compliance with the CDFW Streambed Alteration Agreement (SAA) and EIR Mitigation Measures. Wildlife observations are recorded on a year-round basis during supplemental planting and seeding tasks, qualitative monitoring inspections, and annual quantitative surveys (quadrats/transects and oak evaluations).

A total of ten species of native birds have been observed nesting on the mitigation site to date, including killdeer (*Charadrius vociferous*), mourning dove (*Zenaida macroura*), acorn woodpecker (*Melanerpes formicivorus*), bushtit (*Psaltriparus minimus*), house wren (*Troglodytes aedon*), Bewick's wren (*Thyromanes bewickii*), northern mockingbird (*Mimus polyglottos*), common yellowthroat (*Geothlypis trichas*), rufous-crowned sparrow (*Aimophila ruficeps*), and California towhee (*Melozone crissalis*). Acorn woodpeckers have nested in cavities in the placed snags for five consecutive years (2014 through 2018), and woodpeckers are also caching acorns on site in several of the snags. California ground squirrels (*Otospermophilus beecheyi*), rock wrens (*Salpinctes obsoletus*), native reptiles (including striped racer [*Masticophis lateralis*], a snake species), raptors, and other wildlife species are increasingly colonizing the created boulder and woody debris piles and perching on the installed snags. Baja California treefrogs (*Pseudacris hypochondriaca*) have been observed breeding in the created streambeds. A total of 104 native vertebrate wildlife species (85 native bird species) have been observed on the mitigation site, in addition to numerous native invertebrate species (e.g., blue mud wasp [*Chalybion* sp.], green lynx spider [*Peucetia viridans*], variegated meadowhawk [*Sympetrum corruptum*]) since mitigation installation began in September 2013. Herbicide use is minimized to the extent practicable in favor of non-chemical methods of pest and weed control. Several plywood boards ('artificial cover') were placed on the site in 2014 to facilitate the ongoing detection of reptiles and other wildlife species on the site.

Psomas operates several 'camera traps' (motion-activated video cameras) at various locations on the mitigation site to provide 24-hour wildlife observation data. Public Works installed the camera traps on a voluntary basis to enhance wildlife values and monitoring on the site. Large mammals including mountain lion (*Puma concolor*), southern mule deer (*Odocoileus hemionus*), and black bear (*Ursus americanus*), have been observed using the two drinker tanks that were installed at the northeast of the Lower SPS. The camera traps have enabled the detection of previously unobserved wildlife species on the mitigation site such as bobcat (*Lynx rufus*) and

common gray fox (*Urocyon cinereoargenteus*). The compendia of all native plant and wildlife species observed on the site are provided in Attachments F and G.

4.0 CONCLUSION

As of July 2018 (3.5 years after the completion of mitigation installation), the OW and CSS sites already support an excellent diversity of plant species and are developing varied vegetation structure (vertical stratification) and coverage (horizontal/mosaic). A total of 142 native plant species have been observed on the site, including trees, shrubs, subshrubs, vines, succulents, herbs, grasses, ferns, spike-moss, and emergent plant species. Oak tree seedling/sapling survival far exceeds 100 percent (compared to the quantities specified in the OWHRMP) due to the initial planting of oaks and additional germination of seeded and volunteer oaks on the site. Many of the oak saplings now exceed 10 feet in height, and the oaks exhibit overall good health (despite ongoing hot/dry weather conditions), as determined by a Certified Arborist. The sampled vegetation coverage and diversity already meet or exceed most of the final (Year Ten) performance standards. Overhead irrigation on the OW site was discontinued in December 2015, and the bubblers on the OW site were not operated from October 2016 to late February 2018. Due to acute drought between March 2017 and February 2018, the oak bubbler system was reactivated in spring 2018 to simulate late seasonal rain events. No irrigation has been applied to the CSS planting areas (SPS slopes) since June 2015.

Wildlife species diversity and abundance is exceptionally high (including 104 native vertebrate species) at the 3.5-year mark, not only due to vegetative coverage and diversity, but also due to the large volume of coarse woody debris (including placed natural snags) and boulder assemblages that were installed on the site in 2013. Numerous species of birds have nested on the site, including five consecutive years in which acorn woodpeckers have nested in cavities in the placed snags. Wildlife species are increasingly colonizing the naturalistic debris piles on the site. Native arthropods are increasingly observed on the site, including a variety of bees, beetles, butterflies, and other insect species. Wildlife use of the mitigation site to date has exceeded all expectations of the project team.

The temporary exclosure fence will remain in place until the planted oaks (and other vegetation) are sufficiently established to withstand herbivory and trampling by large mammals (deer and bears). Public Works and its consultants/contractors will continue to assertively maintain and monitor the habitat creation site in compliance with project permits and authorizations.

5.0 REFERENCES

Baldwin, B.G., D.H. Goldman, D.J Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (Eds.). 2012. *The Jepson Manual: Vascular Plants of California* (Second ed.). Berkeley, CA: University of California Press.

Bernhardt, E.A. and E.J. Swiecki. 2001. *Ecological Importance of California Oak Woodlands*. Vacaville, CA: Phytosphere Research. http://www.phytosphere.com/restoringoakwoodlands/ oakrestoration.htm.

BonTerra Consulting (BonTerra). 2013 (as revised in September 2016). *Reference Site Survey Report – Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project.* Pasadena, CA: BonTerra Psomas.

———. 2010. (September 10, as revised October 27). *Results of Special Status Plant Surveys for the Santa Anita Reservoir Middle Sediment Placement Site, Los Angeles County, California* (a Letter Report sent to the County of Los Angeles Department of Public Works, Water Resources Division). Pasadena, CA: BonTerra Consulting.

———. 2009 (November 2). *Results of Special Status Plant Surveys for the Santa Anita Reservoir Sediment Placement Site, Los Angeles County, California* (a Letter Report sent to the County of Los Angeles Department of Public Works, Water Resources Division). Pasadena, CA: BonTerra Consulting.

BonTerra Psomas. 2016 (October, as revised in February 2017). *First Annual Monitoring Report, Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project.* Pasadena, CA: BonTerra Psomas.

———. 2014 (as revised through September 2016). *Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project.* Pasadena, CA: BonTerra Psomas.

Costello, L.R., K.S. Jones, D.D. McCreary. 2005. Irrigation Effects on the Growth of Newly Planted Oaks (*Quercus* spp.). *Journal of Arboriculture* 31(2): 83–88. Champaign, IL: International Society of Arboriculture.

Los Angeles, County of Department of Public Works. 2011. *Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project: Compaction Analysis at Lower Sediment Placement Site, Arcadia, California*. Alhambra, CA.

———. 2009 (May). *Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project Final Environmental Impact Report*. Alhambra, CA: LACDPW.

Jepson Flora Project 2014 (v. 2.0). *Jepson eFlora*. Berkeley, CA: Regents of the University of California. http://ucjeps.berkeley.edu/IJM.html.

McCreary, D.D. *Oak Tree Care.* University of California Integrated Hardwood Range Management Program. http://ucanr.edu/blogs/slomggarden/blogfiles/13336.pdf.

McCreary, D.D. and B.A. McPherson. 2005. The Biology of Oak Resources. *A Planner's Guide to Oak Woodlands* (G.A. Giusti, D.D. McCreary, and R.B. Standiford, Eds). Oakland, CA: University of California. Agriculture and Natural Resources.

Psomas. 2017 (August). *Second Annual Monitoring Report, Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project.* Pasadena, CA: Psomas.

Rissman, A.R, S.E. Reed, C. Hughes, and R. Reiner. 2008. Monitoring Understory Composition of Blue Oak Woodlands on Conservation Easements (pp. 589–602). *Proceedings of the Sixth Symposium on Oak Woodlands: Today's Challenges, Tomorrow's Opportunities* (A. Merenlender, D. McCreary, and K. Purcell, Tech. Eds). Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station: 589-602.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. *A Manual of California Vegetation (Second Edition)*. Sacramento, CA: CNPS.

Soil & Plant Laboratory, Inc. 2013. *Comprehensive Soil Analysis*. Anaheim, CA: Soil & Plant Laboratory.

Tietje, W.D., M.A. Hardy, and C.C. Yim. 2015. Coarse Woody Debris Metrics in a California Woodland (pp 61–72). *Proceedings of the Seventh California Oaks Symposium: Managing Oak Woodlands in a Dynamic World* (Standiford, R.B.; Purcell, K., Tech. coords; PSW-GTR-251). Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station.

Tietje, W.D., K. Purcell, and S. Drill. 2005. Oak Woodlands as Wildlife Habitat. *A Planner's Guide to Oak Woodlands* (Publication 3490) (G.A. Giusti, D.D. McCreary, and R.B. Standiford, Eds). Oakland, CA: University of California, Agriculture and Natural Resources.

Tietje, W.D., K.L. Waddell, J.K. Vreeland, and C.L. Bolsinger. 2002. *Coarse Woody Debris in Oak Woodlands of California.* Western Journal of Applied Forestry, 17:139-146.

Young, T.P, and R.E. Evans. 2005. Initial Mortality and Root and Shoot Growth of Valley Oak Seedlings Outplanted as Seeds and as Container Stock Under Different Irrigation Regimes. *Native Plants Journal* 6(1): 83–90. Madison, WI: University of Wisconsin–Madison, Office of the Vice Chancellor for Research and Graduate Education.

ATTACHMENT A

MITIGATION PROGRAM BACKGROUND

A-1.0 SEDIMENT REMOVAL PROJECT DESCRIPTION

The Santa Anita Dam Riser Modification and Sediment Removal Project (Project) involved the removal of sediment from the Santa Anita Dam and Reservoir and the construction of a riser on the dam's lowest outlet. The sediment removed by the Project was placed on the Middle and the Lower areas of the Santa Anita Sediment Placement Site (Middle SPS and Lower SPS, respectively) located downstream in the City of Arcadia (Exhibits 1 and 2). The Lower SPS was already partially constructed (i.e., it had previously placed sediment) at the time of Project implementation, and the sediment placed on the Lower SPS by the Project filled the Lower SPS up to its designed capacity (closure) in 2012. Residential development is located to the east, west, and south of the Lower SPS; and natural open space areas (extending into the Angeles National Forest) are located to the north of the SPS.

A-1.1 IMPACT AND MITIGATION SUMMARY

A-1.1.1 Project Impacts

The Project included the removal of approximately 11 acres of native vegetation on the Middle SPS in preparation for sediment placement activities. The vegetation impacted on the Middle SPS included California sycamore/coast live oak riparian forest (CS/CLORF) and coastal sage scrub (CSS) habitat. In addition, approximately 0.5 acre of planted vegetation was removed along the eastern edge of the Lower SPS. The Project impacted a total of 177 coast live oaks (*Quercus agrifolia* var. *agrifolia*), one scrub oak (*Quercus berberidifolia*), and one Engelmann oak (*Quercus engelmannii*). A summary of Project impacts and required mitigation is provided in Table A-1.

TABLE A-1
PROJECT IMPACTS AND REQUIRED MITIGATION

Vegetation Type	Project Impacts	Required Mitigation[a]
Oak woodland and sage scrub	11 acres (approximate)	On-site habitat creation at the current 8.0-acre Lower SPS, including 5.5 acres of oak woodland creation and 2.5 acres of sage scrub revegetation.
		Permanent protection of 6.9 acres of high-quality, mature sycamore woodland and alluvial scrub habitat located off site at the Big Tujunga Mitigation Bank.[b]
		Purchase and permanent preservation of 4.9 acres of mature oak woodland habitat located in an adjacent, off-site tributary to the Project site.[b]

SPS: Sediment Placement Site; CDFW: California Department of Fish and Wildlife

[a] Specified in the CDFW Streambed Alteration Agreement No. 1600-2008-0173-R5.
[b] The detailed terms and conditions, as well as the current status of the off-site components of the mitigation program are not addressed in this document.

A-1.1.2 Project Mitigation

The creation of oak woodland (OW) (5.5 acres) and sage scrub habitat (CSS revegetation, 2.5 acres) is required by Mitigation Measures BIO-D and BIO-E in Public Works' 2009 *Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project Final Environmental Impact Report* and by the Streambed Alteration Agreement (SAA, No. 1600-2008-0173-R5), which was granted by the California Department of Fish and Wildlife (CDFW) in 2009.

A total of 8.0 acres of habitat is being created on the Lower SPS as a component of the Project's mitigation requirements (Exhibit 3). The overall mitigation program also includes (1) the permanent

protection of 6.9 acres of high-quality, mature sycamore woodland and alluvial scrub habitat at Public Works Big Tujunga Wash Mitigation Area site (off site) and (2) the purchase and permanent preservation of 4.9 acres of mature OW habitat located in an adjacent, off-site tributary to the Project site. The detailed terms and conditions of the mitigation program's off-site components are addressed in the CDFW Agreement. Note that the Annual Monitoring Report for the Oak Woodland Habitat Revegetation/Mitigation Program only addresses the current status of the 8.0 acres of habitat being created in the Lower SPS, and it does not address current conditions in either of the off-site mitigation components. The conditions of the Big Tujunga Wash Mitigation Area component are discussed in Public Works' annual reports for that site, copies of which Public Works annually provides to CDFW. The conditions of the off-site tributary property are discussed in Public Works' triennial reports to CDFW for the site.

Mitigation project implementation tasks are summarized herein and include preliminary mitigation tasks, plant materials procurement/installation. Long-term maintenance and monitoring tasks are addressed in the foregoing third Annual Monitoring Report for the Oak Woodland Habitat Revegetation/Mitigation Program (to which Attachment A pertains).

A-1.1.3 Responsible Parties

Successful mitigation program implementation involves the cooperative efforts of Public Workand its team of consultants/contractors/vendors. Public Works also coordinates with the CDFW and the City of Arcadia to inform them of the status of mitigation activities and the need for any adaptive management actions. Public Works retained Psomas (Restoration Ecologist) to prepare the OWHRMP document in 2009 (including the performance of reference site surveys), to participate in community outreach efforts related to the OWHRMP, to provide biological monitoring and documentation services, and to implement the mitigation program. Psomas retained the following subcontractors/vendors: (1) S&S Seeds, Inc. (S&S) to collect site-specific native seeds (including oak acorns) and cuttings (e.g., cactus pads) in the Santa Anita Wash/Rio Hondo Subwatershed (started in 2011); (2) El Nativo Growers (ENG) and Rancho Santa Ana Botanic Garden (RSABG) to collect ferns and rare oaks and to propagate native container plants (started in 2012); (3) Cornerstone Studios, Inc. (Landscape Architect) to prepare irrigation plans and photo simulations for the mitigation site (2013); (4) Nakae & Associates, Inc. (Nakae) to perform mitigation site preparation, installation, and long-term maintenance tasks; and (5) Leatherman BioConsulting, Inc. to provide supplemental botanical surveys and monitoring. A list of responsible parties is provided in Table A-2.

TABLE A-2
RESPONSIBLE PARTIES

Task/Role	Responsible Parties			
	Entity/Company	**Contact/Email**	**Address**	**Phone Number**
Project Applicant	Los Angeles County Public Works	Maria Lee, P.E. MarLee@dpw.county.la.gov	900 S Fremont Ave Alhambra, CA 91802	626.458.6126
Environmental Impact Report	EDAW, Inc. (AECOM) for Los Angeles County Public Works	Fareeha Kibriya Fareeha.Kibriya@aecom.com	999 Town and Country Rd Orange, CA 92868	714.567.2400
Section 1600 Permitting; Mitigation Program Review/Approval	CDFW	Steve Gibson Steve.Gibson@wildlife.ca.gov	4665 Lampson Ave, Ste C Los Alamitos, California 90720	562.342.2106
Mitigation Program Review/Approval	City of Arcadia Public Works Services Department	Tom Tait TTait@ci.arcadia.ca.us	P.O. Box 60021 Arcadia, California 91066-6021	626.305.1386
Vector Control: Inspection/Treatment	San Gabriel Valley Vector Control District	Benjamin Waswa BWaswa@sgvmosquito.org	1145 N Azusa Canyon Rd West Covina, CA 91790	626.814.9466
Off-Site Seed Collection Access (Right-of-Entry Permit Grantors; Voluntary)	City of Monrovia Department of Community Services	Eugene Suk (Park Naturalist) ESuk@ci.monrovia.ca.us	119 W Palm Ave Monrovia, CA 91016	626.255.6799
	City of Sierra Madre Community Services Department	Ryan Baker RBaker@cityofsierramadre.com	232 W Sierra Madre Blvd Sierra Madre, CA 91024	626.355.5278
General Contractor (Sediment Placement/Grading)	Quest Construction	Coley Frerck cjf@qvsw.com	1903 W Parkside Ln, Ste 100 Phoenix, AZ 85027	623.581.9700
Mitigation Planning; Biological Surveys and Long-Term Performance Monitoring	Psomas (Restoration Ecologist)	Richard B. Lewis III, ENV SP Richard.Lewis@Psomas.com	225 S Lake Ave, Ste 1000 Pasadena, CA 91101	626.351.2000
Preparation of Irrigation Plans and Photo Simulations	Cornerstone Studios, Inc. (Landscape Architect)	Don Wilson, ASLA Don@CSStudios.com	106 W 4th St, 5th Fl Santa Ana, CA 92701	714.973.2200
Propagation of Native Plant Species	El Nativo Growers (Nursery)	Rebecca Nash RNash@ElNativoGrowers.com	200 S Peckham Rd Azusa, CA 91702	626.969.8449
Supplemental Botanical Surveys and Monitoring	Leatherman BioConsulting, Inc.	Sandy Leatherman SandyLeatherman@aol.com	4848 Lakeview Ave, Ste 100E Yorba Linda, CA 92886	714.701.0863
Mitigation Site Preparation, Installation, and Long-Term Maintenance	Nakae & Associates, Inc. (Restoration Contractor)	Kevin Kirchner OCStaff@Nakae.com	11159 Jeffrey Rd Irvine, CA 92602	949.786.0405
Collection/Propagation of Ferns, Rare Oaks, and Other Native Plant Species	Rancho Santa Ana Botanic Garden	Naomi Fraga, PhD NFraga@RSABG.org	1500 N College Ave Claremont, CA 91711	909.625.8767
Native Seed and Cuttings Collection	S&S Seeds, Inc.	Jody Miller JodyMiller@ssseeds.com	6155 Carpinteria Ave Carpinteria, CA 93013	805.684.0436

A-2.0 PRELIMINARY MITIGATION TASKS

A-2.1 FINAL GRADING

Final grading of the Lower SPS included the placement of approximately 30 feet of sediment over the pre-existing condition. Public Works' Lower SPS grading plan included dual, spiraling drainage channels on the top of the fill to convey off-site inflows from the eastern slopes to a relocated outlet tower. The drainage design optimizes the retention and percolation of these inflows. Final grading was completed by Quest Construction (Public Works' General Contractor) in October 2012. The final/closure elevation of the Lower SPS deck area is approximately 650 feet above sea level. Site photographs are provided in Attachment B.

A-2.2 PROTECTION OF EXISTING RESOURCES

The Lower SPS is a permanent receptor site with drainage facilities subject to Public Works' ongoing inspection and maintenance to ensure the structural integrity of the SPS and to maintain proper storm water conveyance through the site. In addition to these operational issues, the resource protection measures described below were addressed, specific to the habitat creation program.

A-2.2.1 Biological Resources

Psomas (Public Works' Restoration Ecologist) installed flagging to indicate sensitive habitat areas and other resources (e.g., native vegetation along the eastern edge of the Lower SPS; pre-existing native tree/shrub seedlings in the planting area) to be protected during mitigation implementation, which started in September 2013.

A-2.2.2 Hazardous Materials

Nakae (Psomas' Restoration Contractor) ensured that no foreign material and/or liquid such as oil, gasoline, or other petroleum products was deposited on the mitigation site or in off-site staging areas. Best management practices were employed and included drip protection beneath vehicles and equipment as well as daily removal of all trash and debris (including micro-trash).

A-2.2.3 Fire Prevention/Safety

Due to the flammable native scrub vegetation in immediate off-site areas, Nakae incorporated fire prevention measures for all activities on site. Psomas installed project-specific combination locks on gates at multiple points of entry to the Santa Anita facility in order to facilitate emergency entry/egress as needed. Public Works' grading plan included a service road along the east edge of the deck planting area; this narrow alignment has been kept clear of ground-level vegetation to enable emergency vehicular access to the manufactured slope and other off-site areas (e.g., private residences, fuel modification zones) to the east of the site. The canopies of mature, planted oak trees will eventually extend above the narrow road.

A-2.2.4 Erosion Control

Nakae installed erosion-control measures in September 2013, including (1) fully biodegradable straw wattles on slope areas and (2) check dams (constructed of sand bags) in the spiraling drainages. Nakae also removed sediment from all concrete down drains and V-ditches within and adjacent to the planting area to facilitate proper site drainage prior to mitigation implementation.

A-2.3 SOIL TESTING/TREATMENTS

The planting areas on the Lower SPS consist of placed fill materials. Prior to the placement of the final 30 feet of sediment, Public Works performed a compaction analysis in 2011. The analysis indicated that soil compaction on the pre-existing sediment pile ranged from 78 percent to 85 percent within the first 35 feet (below ground surface) and from 89 to 90 percent within the 35- to 53-foot range. Boring activities also indicated that ground water was located at approximately 50 feet below the ground surface (i.e., approximately 80 feet below the final deck elevation) (Public Works 2011). To improve habitat establishment conditions, the final 30 feet of sediment was placed with construction equipment but was not compacted beyond the placement efforts, resulting in a degree of compaction not exceeding 80 percent in the upper 30 feet of fill.

Following the final sediment placement, surface soil samples ('bucket samples') were obtained in three locations on the 8.0-acre planting site, including both deck (top of fill) and slope areas. As anticipated, the soil tests did not indicate any seriously problematic chemical or physical properties requiring the use of amendments to enable native plant growth on the mitigation site (Soil & Plant Laboratory, Inc., 2013). The OWHRMP specified that Public Works would carefully conserve a large volume of mulched native vegetation associated with the clearing of the Middle SPS. In September 2013, Nakae, under the direction of Psomas, incorporated this material (ripped via heavy machinery) into the Lower SPS deck area to a minimum depth of 2 feet to improve soil fertility. Urea was applied at a rate of 175 pounds per acre, concurrent with the mulch, to effect nitrogen balance/availability upon the beneficial decay of the organic material. The added soil organics factor in complex subterranean biotic processes.

The final soil surfaces were left uneven/roughened to improve plant and seed establishment conditions (e.g., to provide microhabitats for seedling germination/growth).

A-2.4 SUBSTRATE ENHANCEMENTS

Oak woodlands in Southern California, including OW mitigation/restoration sites, are typically deficient in coarse woody debris (CWD)—i.e., the vegetative debris that accumulates in mature woodlands upon the growth and decay of oaks and associated woody plant species (Tietje et al. 2002, 2015). Prior to Project initiation, the Restoration Ecologist flagged numerous native trees (coast live oak and western sycamore [*Platanus racemosa*]) and native shrubs on the Middle SPS for salvage and re-use as CWD on the Lower SPS mitigation site. Public Works directed Quest Construction to carefully remove these materials (native tree trunks, branches, brush piles), which were later stockpiled on the deck of the Lower SPS upon the completion of sediment placement tasks. As directed by Psomas, several of the native trees were removed with large, intact trunks (approximately 20 to 30 feet) attached to a large mass of root tissue (ballast) to be placed as natural 'snags' in excavated pits on the mitigation site. Psomas also flagged numerous large boulders and rock piles associated with the Project (i.e., coarse materials isolated from removed sediment) for placement on the Lower SPS mitigation site. Breakage and other boulder damage (e.g., spray painting) was avoided during collection and transport. Large-sized boulders were preferentially used in order to create assemblages with larger internal/interstitial gaps to provide niches for a diversity of wildlife species.

Nakae, in coordination with Psomas, installed many tons of CWD and boulder materials in September and October 2013 using a variety of heavy equipment (e.g., excavators, bulldozers, grapples). These preliminary construction tasks included (1) installation of a total of 14 natural snags throughout the deck area in excavated pits up to one-third of their length that were stabilized via backfilling and machine recompaction, (2) placement of numerous large tree trunks (prone) and native brush piles, and (3) placement of numerous assemblages of boulders that were carefully arranged to provide internal gaps/niches for wildlife. Soil was 'heeled-up' against

some of these features, especially on east and north aspects, to provide niches for the growth of specialty plants such as lance-leaved dudleya (*Dudleya lanceolata*). Many of the assemblages incorporate both CWD and rock materials, with smaller branches placed erect amid the boulders to provide perching opportunities for bird species, and buckets of oak twigs and leaf litter dumped into rock crevices for the benefit of detritivores (e.g., native termites) in the pile interiors.

Moreover, these materials were placed in a naturalistic manner to mimic a primeval, streamside woodland. The goal of including such substrate enhancements is to immediately provide habitat features (e.g., fallen logs, brush piles, snags) and associated wildlife functions/values (including beneficial decay processes) that would not otherwise exist on an OW habitat creation site for hundreds of years (i.e., until planted trees have grown, senesced, died, and begun to disarticulate).

A-2.5 HABITAT FENCING AND SIGNAGE

As described in the OWHRMP, a temporary, 8-foot-high fence (exclosure) was constructed at the perimeter of the deck portion of the 5.5-acre OW mitigation site to exclude large mammals, thereby reducing herbivory and trampling damage during the initial oak establishment phase. The fence was constructed using wood posts and smooth, horizontal wire (no barbed wire). The horizontal wires were spaced 6 inches apart in the lower 5-foot portion of the fence to enable smaller mammals to enter the planting area. A total of four locking gates were installed in the fence to provide access for maintenance and monitoring. Ongoing site maintenance includes Nakae, in coordination with Psomas, performing occasional modifications of the fencing to maintain wildlife exclusion (and wildlife safety). Two ‘drinker’ tanks were installed near the northeast corner of the mitigation site (outside the exclosure) to provide alternative water resources for wildlife excluded from the 5.5-acre deck area by the fencing.

Psomas designed and Nakae fabricated/installed a total of 12 interpretive signs around the mitigation site to explain the goals of the OWHRMP. The signage describes the native habitats being created on the site, engages readers’ assistance in avoiding site damage and reporting concerns to the authorities, and cites the penalties for trespassing under municipal ordinances.

A-2.6 IRRIGATION SYSTEM INSTALLATION

Cornerstone Studios, Inc. (Psomas’ Landscape Architect) designed and Nakae installed a temporary irrigation system on the 8.0-acre mitigation site in 2013, which includes overhead spray components (site-wide) and a separately valved system of individual bubblers at each oak planting location. Irrigation system installation included the construction of a new water meter by the City of Arcadia Public Works Services Department (PWSD) near the intersection of Highland Oaks Drive and East Woodland Avenue. Nakae installed a new gate valve in the same box as the PWSD meter, and a new backflow preventer device (caged) was installed in the same general location. Water is delivered to the Lower SPS via a 4-inch mainline that extends north from the point of connection along the alignment of the Santa Anita Channel.

A-2.7 INTERIM WEED ABATEMENT

Interim weed abatement was performed on the mitigation site between the completion of sediment placement in 2012 and mitigation implementation in September 2013. Interim weed-abatement tasks included the hand-pulling of weed species prior to seed dispersal to reduce future weed occurrence in the planting areas. Nakae also removed/treated weeds during the performance of preliminary mitigation tasks. Only glyphosate-based herbicides that are approved by the U.S. Environmental Protection Agency (USEPA) for use in aquatic habitat areas (e.g., Roundup Custom®) are used on the mitigation site. As described below, voluntary weed-abatement buffer

areas (surrounding the habitat creation area) were also established at the time of mitigation installation.

A-2.8 WEED ABATEMENT BUFFER AREAS

Voluntary weed-abatement buffer areas (Buffer Areas) were established around the perimeter of the 8.0-acre mitigation site by Nakae and Psomas to avoid the proliferation of weeds in adjacent areas to reduce the contamination of the mitigation site by weed seeds (Exhibit 3). Buffer Area 1 (0.78 acre) extends up the slope to the eastern property boundary, and Buffer Area 2 (2.32 acres) includes the slopes (1 level) south and west of the mitigation site. Additional Buffer Areas (3a [1.72 acres], 3b [0.45 acre], and 4 [1.74 acres]) were established in July 2016 (Year Two) to further protect the mitigation site from weed contamination. A number of invasive/non-native, ornamental tree species such as Shamel ash (*Fraxinus uhdei*) were removed from Buffer Areas 3a and 4 (outside the nesting bird season). Some of the ornamental trees were treated via the slash/paint (herbicide) method in order to retain the snags for wildlife value. A total of 7.01 acres of adjacent land are now under voluntary weed control to benefit mitigation site performance. An additional Buffer Area totaling 0.37 acre will be added to the maintenance program in fall 2018.

Protective wire cages were installed around approximately 50 volunteer coast live oak seedlings in Buffer Area 2 to reduce deer herbivory impacts, which were observed to be severe at that time. Since mitigation implementation in 2013, several of these oaks have exhibited good growth due to the protective caging. In addition, as the result of ongoing weed control, a large number of volunteer shrub and herb seedlings have arisen in Buffer Areas 1 and 2, such that the Buffer Areas provide valuable ancillary habitat for wildlife present on the mitigation site.

More than 20 mature, non-native Mexican fan palms (*Washingtonia robusta*) and other invasive perennial plant species were voluntarily removed by Public Works from an off-site manufactured slope (not part of Buffer Areas) to the east of the mitigation site. These plants were removed to improve mitigation site performance by eliminating a significant source of off-site weed seeds. Public Works secured rights-of-entry from several private landowners, and Nakae removed this exotic vegetation in 2014, in coordination with Psomas.

A summary of weed abatement activities in buffers and adjacent areas (on site and off site) is provided in Table A-3.

TABLE A-3
BUFFER/ADJACENT WEED ABATEMENT AREAS

Buffer Area No.	Area (Acres)	Dates		Description
		Start	End	
1	0.78	September 2013	Ongoing	Removal of all annual/perennial weeds.
2	2.32	September 2013	Ongoing	
3a	1.72	July 2016	Ongoing	Removal of non-native trees (some pine trees [*Pinus* sp.] retained). Removal of annual/perennial weeds.
3b	0.45	July 2016	Ongoing	
4	1.74	July 2016	Twice per year	Removal of all annual/perennial weeds.
5	0.37	September 2018	Ongoing	Removal of all annual/perennial weeds.
Total	**7.38**			
East Slope (Off Site)		October 2014	October 2014	One-time removal of invasive fan palms and other non-native/perennial plant species.

A-3.0 NATIVE PLANT MATERIALS

The OWHRMP specifies that all mitigation plant materials (seeds, cuttings, container plants) shall be of local origin (i.e., from the Santa Anita Wash/Rio Hondo Subwatershed). Seed production for a range of plant species varies from year to year; in addition, prior to January/February 2017 the mitigation program was being implemented in a period of extended, marked drought, which had suppressed the growth, flowering, and fruit/seed production for many plant species. Therefore, in order to obtain seed materials of adequate quantity and diversity, S&S started local seed collection tasks in June 2011 (2.5 years prior to mitigation installation) in coordination with Psomas. Seed collection in 2011 was limited to the Public Works' Santa Anita property; however, Public Works subsequently secured access to off-site open space areas in the Cities of Arcadia, Monrovia, and Sierra Madre for more extensive, ongoing seed collection. In particular, S&S and Psomas have coordinated extensively with City of Monrovia park rangers on seed collection for several key plant species within the City's approximate 1,400-acre Hillside Wilderness Preserve.

Container plants of numerous species have been propagated to date by ENG and RSABG. Psomas performs regular inspections of nursery plants to assess plant habit and health. Numerous plants are 'de-potted' during each inspection, to assess root development (i.e., root-to-shoot ratio, circling/pot-bound roots). Both ENG (Azusa) and RSABG's (Claremont) facilities are located in the vicinity of the Arcadia site, which may benefit the planting stock in adapting to the local climate.

S&S and/or Psomas also collected root/stem cuttings of local native plant species for the propagation of container plants (e.g., California fuchsia and puckered hedgenettle [*Stachys bullata*]) or for immediate translocation/planting on the mitigation site (e.g., basket rush [*Juncus textilis*] and California blackberry [*Rubus ursinu*s]).

A total of 114 native plant species (seed and/or cuttings) have been collected to date in the local subwatershed; this represents a diversity of installed plant species that is nearly four times greater than the diversity of the conceptual plant/seed palettes (31 plant species) that were listed in the OWHRMP. Most of these seeds/cuttings are being collected on an opportunistic basis during the extensive scouting activities that are performed in the subwatershed. In some cases, only trace amounts of seed have been collected (e.g., < 0.01 pound of torn catchfly [*Silene laciniata*]) due to scarce plant occurrences and/or drought-related low seed productivity in the region. The amounts of harvested seed are limited to avoid over-collection that would impact source plant regeneration (as noted for the ferns and rare oak species described below). It is important to establish these locally scarce plants on the habitat creation site—even in trace quantities—for the unique ecosystem services these species provide. Seed was collected from as many individual plants (and individual plant populations) as practicable for each species to optimize genetic diversity. The container plants, cuttings, and seed species and quantities installed to date on the mitigation site are summarized in Tables A-4 through A-6.

TABLE A-4
INSTALLED CONTAINER PLANTS AND CUTTINGS
(JANUARY 2014 – FEBRUARY 2018)

Container Plants and Cuttings Species		Container Plants and Cuttings Quantities					
				Supplemental			
Scientific Name	**Common Name**	**Phase I (Jan/Feb 2014)**	**Phase II (Dec 2014)**	**2015/2016**	**2017**	**2018**	**Total**
Acmispon glaber var. *glaber*	glabrous deerweed	400	0	0	**0**	**0**	**400**
Acourtia microcephala (cuttings)	small-headed acourtia	0	10	0	**0**	**0**	**10**
Artemisia californica	California sagebrush	1,050	0	0	**0**	**0**	**1,050**
Artemisia douglasiana (cuttings)	mugwort	10	0	0	**0**	**0**	**10**
Artemisia douglasiana	mugwort	0	100	0	**0**	**0**	**100**
Asclepias californica (cuttings)	California milkweed	0	10	0	**0**	**0**	**10**
Aspidotis californica	California lace fern	0	0	6	**0**	**0**	**6**
Asclepias fascicularis[a]	narrow-leaf milkweed	0	0	0	**0**	**0**	**0**
Ceanothus leucodermis	chaparral whitethorn	0	75	0	**0**	**0**	**75**
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain-mahogany	0	50	0	**0**	**0**	**50**
Clematis lasiantha	chaparral clematis	0	200	0	**0**	**0**	**200**
Dryopteris arguta	sharp-toothed wood fern	0	5	24	**12**	**0**	**41**
Dudleya lanceolata	lance-leaved dudleya	0	0	32	**0**	**0**	**32**
Elymus condensatus	giant wild-rye	0	80	0	**0**	**0**	**80**
Epilobium canum ssp. *canum*	California fuchsia	0	0	46	**1**	**1**	**48**
Eriodictyon crassifolium	thick-leaved yerba santa	0	0	5	**0**	**0**	**5**
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat	750	0	0	**0**	**0**	**750**
Frangula californica ssp. *californica*	California coffee berry	0	100	0	**0**	**0**	**100**
Hesperoyucca whipplei	Whipple's chaparral yucca	150	100	0	**0**	**0**	**250**
Heteromeles arbutifolia	toyon	55	0	0	**0**	**0**	**55**
Juncus rugulosus	wrinkled rush	0	0	0	**155**	**0**	**155**
Juncus textilis (containers and cuttings)	basket rush	10	0	0	**71**	**0**	**81**
Keckiella cordifolia	heart-leaved bush penstemon	0	271	0	**0**	**0**	**271**
Lonicera subspicata var. *denudata*	naked partially-spiked honeysuckle	0	20	0	**0**	**0**	**20**
Malosma laurina	laurel sumac	40	0	0	**0**	**0**	**40**
Melica imperfecta	little California melica	150	125	0	**0**	**0**	**275**
Mimulus aurantiacus var. *pubescens*	hairy bush monkeyflower	425	0	0	**0**	**0**	**425**
Opuntia ×vaseyi	Vasey's prickly-pear	200	100	0	**0**	**0**	**300**
Paeonia californica[c]	California peony	0	0	0	**8**	**0**	**8**
Pellaea andromedifolia (cuttings)	coffee fern	5	0	0	**0**	**0**	**5**
Pellaea andromedifolia	coffee fern	0	20	128	**11**	**0**	**159**
Pellaea mucronata var. *mucronata*	bird's-foot fern	0	5	60	**15**	**0**	**80**
Penstemon heterophyllus var. *australis*[d]	southern bunch leaf beardtongue	0	0	0	**0**	**5**	**5**
Penstemon spectabilis var. *spectabilis*	spectacular beardtongue	75	5	0	**0**	**0**	**80**
Pentagramma triangularis[c]	goldback fern	0	0	0	**2**	**0**	**2**
Polypodium californicum	California polypody	0	20	91	**71**	**65**	**247**
Prunus ilicifolia ssp. *ilicifolia*	holly-leaved cherry	0	50	0	**0**	**0**	**50**
Pseudognaphalium californicum	California cudweed	460	0	0	**0**	**0**	**460**
Quercus agrifolia var. *agrifolia*[b]	coast live oak	358	0	0	**0**	**0**	**358**
Quercus agrifolia var. *agrifolia*[c]	coast live oak	0	24	0	**0**	**0**	**24**
Quercus engelmannii	Engelmann oak	0	57	0	**0**	**0**	**57**
Quercus durata var. *gabrielensis*	San Gabriel oak	0	25	0	**0**	**0**	**25**
Rhamnus ilicifolia	hollyleaf redberry	0	31	0	**0**	**0**	**31**
Rhus aromatica (cuttings)	skunk bush	10	0	0	**0**	**0**	**10**
Rhus ovata	sugar bush	55	0	0	**0**	**0**	**55**
Ribes aureum var. *gracillimum*	graceful golden currant	100	275	0	**0**	**0**	**375**
Ribes californicum	hillside gooseberry	0	0	29	**2**	**65**	**96**
Rosa californica[c]	California rose	0	0	0	**3**	**60**	**63**
Rubus ursinus (cuttings)	California blackberry	10	0	0	**0**	**0**	**10**
Salvia apiana	white sage	250	150	0	**0**	**0**	**400**
Salvia mellifera	black sage	400	0	0	**0**	**0**	**400**
Sambucus nigra ssp. *caerulea*	blue elderberry	0	55	0	**0**	**0**	**55**
Selaginella bigelovii	Bigelow's spike-moss	0	10	0	**0**	**0**	**10**
Stachys bullata	puckered hedgenettle	0	0	135	**0**	**0**	**135**
Stipa lepida	foothill needle grass	0	0	641	**218**	**17**	**867**
Total (52 Native Container Plant/Cuttings Species)		**4,963**	**1,973**	**1,197**	**569**	**213**	**8,896**

[a] Seed for this species has yet to be obtained in the Santa Anita Wash/Rio Hondo Sub-Watershed for propagation.
[b] Initial oak planting locations established via direct sown acorns/seedlings.
[c] Supplemental planting of oaks in "T4" (deep 1-gallon) size.

TABLE A-5
SEED SPECIES COLLECTED/INSTALLED (JANUARY 2014 – JANUARY 2018)

Scientific Name	Common Name	Pounds Collected	Seed Quantities (Collection Started in 2011)				Total Pounds Installed
			Sage Scrub Seed Mixes/Aspect		Hand-Seeding		
			South/West (2.0 acres)	North (0.54 acre)	Oak Woodland	Sage Scrub	
Initial/Conceptual OWHRMP Seed Species (11 Total) Collected by S&S Seeds in the Santa Anita Wash/Rio Hondo Subwatershed and Used for Initial Hydroseeding and Hand-Seeding in January 2014 and December 2014							
Acmispon glaber var. *glaber*	glabrous deerweed	43.82	12.00	2.00	8.00	2.40	**24.40**
Artemisia californica	California sagebrush	81.78	8.00	2.00	—	—	**10.00**
Camissoniopsis hirtella	pubescent camissoniopsis	0.20	—	0.10	0.05	0.05	**0.20**
Eriogonum fasciculatum var. *foliolosum*	California buckwheat	81.95	20.00	5.00	—	—	**25.00**
Hesperoyucca whipplei	Whipple's chaparral yucca	42.34	1.00	—	—	2.00	**3.00**
Mimulus aurantiacus var. *pubescens*	soft orange monkeyflower	19.88	0.50	2.00	2.00	1.00	**5.50**
Phacelia cicutaria	cicuta-leaved phacelia	0.56	0.26	0.10	0.10	0.10	**0.56**
Pseudognaphalium californicum	California cudweed	5.54	1.00	1.00	2.00	1.34	**5.34**
Quercus agrifolia var. *agrifolia*	coast live oak	16.92	—	—	1.92	—	**1.92**
Salvia mellifera	black sage	13.14	1.00	1.00	1.00	—	**3.00**
Sambucus nigra ssp. *caerulea*	blue elderberry	6.07	—	—	1.00	0.50	**1.50**
Other Seed Species (27 Total) Collected to Date by S&S Seeds in the Santa Anita Wash/Rio Hondo Subwatershed (applied in 2014 and/or 2015)							
Acer macrophyllum	big-leaf maple	1.96	—	—	1.96	—	**1.96**
Artemisia douglasiana	mugwort	8.64	—	—	3.00	—	**3.00**
Ceanothus leucodermis	chaparral whitethorn	0.52	0.20	0.10	—	—	**0.30**
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain-mahogany	4.92	1.00	0.50	—	—	**1.50**
Chaenactis glabruiscula var. *glabruiscula*	yellow pincushion	0.92	0.25	0.10	0.10	0.47	**0.92**
Clarkia purpurea ssp. *quadrivulnera*	four-spot	0.20	0.05	0.05	0.05	0.05	**0.20**
Clematis lasiantha	chaparral clematis	4.30	0.80	0.20	1.00	0.25	**2.25**
Datura wrightii	Wright's jimsonweed	0.56	0.20	0.16	0.10	0.10	**0.56**
Eulobus californicus	California eulobus	0.82	—	—	0.41	0.41	**0.82**
Heteromeles arbutifolia	toyon	5.78	—	—	1.00	—	**1.00**
Lepidospartum squamatum	scaly scale-broom	14.56	—	—	1.00	—	**1.00**
Lupinus hirsutissimus	stinging lupine	11.90	—	—	9.90	2.00	**11.90**
Malacothrix saxatilis	rocky malacothrix	2.22	—	—	1.11	1.11	**2.22**
Oenothera elata ssp. *hirsutissima*	hairy tall evening primrose	0.04	—	—	0.04	—	**0.04**
Penstemon spectabilis var. *spectabilis*	spectacular beardtongue	5.52	—	—	2.00	3.52	**5.52**
Phacelia distans	distant phacelia	0.96	—	—	0.96	—	**0.96**
Phacelia minor	wild Canterbury bells	18.36	—	—	10.15	8.21	**18.36**
Phacelia ramosissima	branching phacelia	2.40	—	—	2.40	—	**2.40**
Prunus ilicifolia ssp. *ilicifolia*	holly-leaved cherry	9.20	—	—	4.00	—	**4.00**
Pseudognaphalium stramineum	straw-colored cudweed	3.20	1.00	0.20	1.00	1.00	**3.20**
Quercus agrifolia var. *agrifolia* (2015)	coast live oak	10.00	—	—	10.00	—	**10.00**
Rhamnus ilicifolia	hollyleaf redberry	2.64	—	—	1.89	0.50	**2.39**
Rhus ovata	sugar bush	7.35	—	—	1.00	—	**1.00**
Solanum douglasii	Douglas' nightshade	0.02	—	—	0.02	—	**0.02**
Stachys bullata	puckered hedgenettle	0.01	—	—	0.01	—	**0.01**
Stipa lepida	foothill needle grass	0.16	—	—	0.03	0.03	**0.06**
Umbellularia californica	California bay	4.44	—	—	3.00	—	**3.00**
	Total (38 Native Seed Species)	**431.84**	**47.26**	**14.51**	**672.20**	**25.04**	**159.01**

TABLE A-5
SEED SPECIES COLLECTED/INSTALLED (JANUARY 2014 – JANUARY 2018)

Seed Species (73 Total) Collected to Date by Psomas in the Santa Anita Wash/Rio Hondo Subwatershed (Small Quantities, <1.0 Pound Collected per Species, Except as Noted) and Installed on the Mitigation Sites in 2014, 2015, 2016, and/or 2017		
Acer macrophyllum (big-leaf maple), *Acourtia microcephala* (small-headed acourtia), *Adenostoma fasciculatum* var. *fasciculatum* (chamise), *Alnus rhombifolia* (white alder), *Amorpha californica* (California false indigo), *Arctostaphylos glauca* (big berry manzanita), *Brickellia californica* (California brickellbush), *Brickellia nevinii* (Nevin's brickellbush), *Castilleja applegatei* (Applegate's paintbrush), *Ceanothus leucodermis* (chaparral whitethorn), *Ceanothus oliganthus* (few-flowered California-lilac), *Cercocarpus betuloides* var. *betuloides* (birch-leaf mountain-mahogany), *Cirsium occidentale* var. *californicum* (California thistle), *Clarkia dudleyana* (Dudley's clarkia), *Clematis lasiantha* (chaparral clematis), *Corethrogyne filaginifolia* (filago-leaved sand-aster), *Datura wrightii* (Wright's jimsonweed), *Delphinium cardinale* (cardinal larkspur), *Dudleya lanceolata* (lance-leaved dudleya), *Elymus condensatus* (giant wild-rye), *Epilobium canum* ssp. *canum* (California fuchsia), *Ericameria parishii* var. *parishii* (Parish's goldenbush), *Erigeron foliosus* var. *foliosus* (leafy fleabane), *Eriodictyon crassifolium* (thick-leaved yerba santa), *Eriogonum elongatum* var. *elongatum* (long-stem wild buckwheat), *Eriophyllum confertiflorum* var. *confertiflorum* (golden-yarrow), *Frangula californica* ssp. *californica* (California coffee berry), *Galium angustifolium* ssp. *angustifolium* (narrow-leaved bedstraw), *Hazardia squarrosa* var. *grindelioides* (grindelia-like saw-toothed goldenbush), *Hesperoyucca whipplei* (Whipple's chaparral yucca), *Heteromeles arbutifolia* (toyon), *Heterotheca grandiflora* (telegraph weed), *Holodiscus discolor* (oceanspray), *Juncus rugulosus* (wrinkled rush), *Juncus textilis* (basket rush), *Keckiella cordifolia* (heart-leaved bush penstemon), *Lathyrus vestitus* (covered sweet pea), *Lepidospartum squamatum* (scaly scale-broom), *Linanthus californicus* (prickly phlox), *Lonicera subspicata* var. *denudata* (naked partially-spiked honeysuckle), *Lupinus concinnus* (bajada lupine), *Lupinus longifolius* (long-leaved lupine), *Lupinus truncatus* (cut leaf lupine), *Malacothrix saxatilis* (rocky malacothrix), *Marah macrocarpa* (chilicothe), *Melica imperfecta* (little California melica), *Mentzelia laevicaulis* (smooth-stemmed blazing star), *Mimulus aurantiacus* var. *pubescens* (soft orange monkeyflower), red monkeyflower (*Mimulus cardinalis*), *Mirabilis laevis* var. *crassifolia* (wishbone bush), *Paeonia californica* (California peony), *Penstemon spectabilis* var. *spectabilis* (spectacular beardtongue), *Phacelia cicutaria* (cicuta-leaved phacelia), *Phacelia ramosissima* (branching phacelia), *Pseudognaphalium bioletti* (Bioletti's cudweed), *Pseudognaphalium californicum* (California cudweed), *Pseudognaphalium canescens* (hairy cudweed), bigcone Douglas-fir (*Pseudotsuga macrocarpa*), *Quercus agrifolia* var. *agrifolia* (coast live oak; 3.0 lb), *Quercus chrysolepis* (canyon live oak; 1.0 lb), San Gabriel oak (*Quercus durata* var. *gabrielensis*), *Quercus engelmannii* (Engelmann oak; 8.0 lb), *Rhus ovata* (sugar bush), *Ribes aureum* var. *gracillimum* (graceful golden currant), *Salvia apiana* (white sage), *Salvia mellifera* (black sage), *Senecio flaccidus* var. *douglasii* (Douglas' threadleaf ragwort), *Silene laciniata* (torn catchfly), *Solidago velutina* (velvety goldenrod), *Stephanomeria cichoriacea* (silver rock-lettuce), *Stipa coronata* (crested needle grass), *Symphoricarpos* cf. *mollis* (creeping snowberry), *Umbellularia californica* (California bay).		
Cuttings Species (24 Total) and Rare Oak Acorns (2 Species) Collected to Date by Psomas, Rancho Santa Ana Botanic Garden, and S&S Seeds in the Santa Anita Wash/Rio Hondo Subwatershed		
Scientific Name	**Common Name**	**Notes**
Acourtia microcephala	small-headed acourtia	Direct planting on mitigation site.
Artemisia douglasiana	mugwort	Direct planting on mitigation site.
Asclepias californica	California milkweed	For container plant propagation and direct planting on mitigation site.
Aspidotis californica	California lace fern	Rhizome cuttings for container plant propagation and direct planting on mitigation site.
Chlorogalum pomeridianum	afternoon soap plant	Direct planting on mitigation site.
Dryopteris arguta	sharp-toothed wood fern	Rhizome cuttings for container plant propagation (only).
Dudleya lanceolata	lance-leaved dudleya	For container plant propagation and direct planting on mitigation site.
Epilobium canum ssp. *canum*	California fuchsia	Container plant propagation (only).
Juncus rugulosus	wrinkled rush	Container plant propagation (only).
Juncus textilis	basket rush	Container plant propagation and direct planting on mitigation site.
Paeonia californica	California peony	Container plant propagation and direct planting on mitigation site.
Pellaea andromedifolia	coffee fern	Rhizome cuttings for container plant propagation and direct planting on mitigation site.
Pellaea mucronata var. *mucronata*	bird's-foot fern	Rhizome cuttings for container plant propagation (only).
Pentagramma triangularis	goldback fern	Container plant propagation (only).
Penstemon heterophyllus var. *australis*	southern bunch leaf beardtongue	Container plant propagation (only).
Polypodium californicum	California polypody	Rhizome cuttings for container plant propagation (only).
Quercus durata var. *gabrielensis*	San Gabriel oak	Container plant propagation (only)
Quercus engelmannii	Engelmann oak	Container plant propagation and direct planting on mitigation site.
Rhamnus crocea	spiny redberry	Container plant propagation (only).
Rhus aromatica	skunk bush	Direct planting on mitigation site.
Ribes californicum	hillside gooseberry	Container plant propagation (only).
Ribes malvaceum	leaf-shaped currant	Container plant propagation (only).
Rosa californica	California rose	Container plant propagation (only).
Rubus ursinus	California blackberry	Direct planting on mitigation site.
Selaginella bigelovii	Bigelow's spike-moss	Direct planting on mitigation site.
Stachys bullata	puckered hedgenettle	For container plant propagation and direct planting on mitigation site.
OWHRMP: Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project; S&S: S&S Seeds; lb: pound.		

TABLE A-6
SUPPLEMENTAL SEED SPECIES (2015 – 2018)

Plant Species[a]		Quantity (Pounds)		
Botanical Name	**Common Name**	**Dec. 2015**	**Dec. 2016**	**Jan. 2018**
Acer macrophyllum	big-leaf maple	0.10	---	---
Castilleja applegatei[b]	Applegate's Indian paintbrush	trace	trace	---
Clarkia dudleyana[b]	Dudleya's clarkia	trace	---	---
Clematis lasiantha	chaparral clematis	0.25	---	---
Delphinium cardinale[b]	cardinal larkspur	trace	---	---
Dudleya lanceolata[b]	lance-leaved dudleya	trace	---	---
Epilobium canum ssp. *canum*[b]	California fuchsia	trace	---	---
Erigeron foliosus var. *foliosus*[b]	leafy daisy	trace	trace	---
Eriophyllum confertiflorum var. *confertiflorum*[b]	golden-yarrow	trace	trace	---
Eulobus californicus	California eulobus	0.82	---	---
Hazardia squarrosa var. *grindelioides*	grindelia-like saw-toothed goldenbush	trace	---	---
Holodiscus discolor	oceanspray	trace	trace	---
Lathyrus vestitus[b]	covered sweet pea	trace	---	---
Lonicera subspicata var. *johnstonii*	Johnston's honeysuckle	trace	0.05	---
Lupinus concinnus	bajada lupine	trace	---	---
Lupinus hirsutissimus	stinging lupine	3.41	---	---
Lupinus longifolius	long-leaved lupine	trace	---	---
Lupinus truncatus	cut leaf lupine	trace	---	---
Malacothrix saxatilis	rocky malacothrix	2.22	---	---
Marah macrocarpa	chilicothe	trace	---	---
Mentzelia laevicaulis	smooth-stemmed blazing star	trace	---	---
Mimulus cardinalis	red monkeyflower	---	trace	---
Penstemon spectabilis var. *spectabilis*	spectacular beardtongue	5.52	4.00	---
Phacelia minor	wild Canterbury bells	12.21	---	---
Rhamnus crocea	spiny redberry	---	0.05	---
Rhamnus ilicifolia	hollyleaf redberry	---	0.05	---
Quercus agrifolia var. *agrifolia* (acorns)	coast live oak	10.00	---	1.00
Quercus chrysolepis (acorns)	canyon live oak	1.00	---	---
Quercus durata var. *gabrielensis* (acorns)	San Gabriel oak	0.10	---	---
Quercus engelmannii (acorns)	Engelmann oak	5.00	---	3.00
Silene laciniata[b]	torn catchfly	trace	trace	---
Solidago velutina	velvety goldenrod	trace	---	---
Stephanomeria cichoriacea[b]	silver rock-lettuce	trace	trace	---
Stipa lepida	foothill needle grass	0.06	---	---
Total		**40.69**	**4.15**	**4.00**

Trace: < 0.05 pounds of seed.

[a] All seed species were collected in the Santa Anita Wash/Rio Hondo Sub-Watershed.

[b] These herbaceous seed species (mixed) were carefully scratched into soil along the north and east edges of numerous boulder and woody debris assemblages in fall 2015 and 2016 (as listed).

A-3.1 OAK SPECIES

Acorns of four species of native oaks—coast live oak, canyon live oak (*Quercus chrysolepis*), San Gabriel oak (*Quercus durata* var. *gabrielensis*), and Engelmann oak—were collected in the local subwatershed. Coast live oak acorns were collected from a minimum of 50 individual trees to adequately incorporate the genetic diversity of the local tree population in the created woodland habitat. San Gabriel oak and Engelmann oak are rare plant species (i.e., both have a California Rare Plant Rank [CRPR] of 4.2, 'Plants of limited distribution – a watch list'); therefore, acorns of these species were judiciously collected by RSABG and the Restoration Ecologist to avoid over-collection from the source plants. Some Engelmann oak acorns were also obtained from public rights-of-way in developed areas in the local subwatershed (i.e., from roadway gutters) when observed beneath massive 'heritage' trees of this species (i.e., specimens assumed to be naturally occurring). Canyon live oak acorns were obtained from trees found at relatively low elevations in the subwatershed. Oak acorns were collected and stored for direct seeding on the site and were also propagated as container plants (seedlings [in 'liners'] and 'T4' [deep 1-gallon] sizes). A substantial volume of natural oak leaf litter (e.g., leaves, twigs, acorns/caps) was carefully conserved and separately stockpiled during relocation of the salvaged CWD to be applied as a preferred mulch to the numerous oak planting locations on the mitigation site.

A-3.2 SHRUBS/SUBSHRUBS

A large variety of shrub/subshrub propagules were collected in the subwatershed, including species adapted to grow in moist/shady woodland understory conditions (i.e., hillside gooseberry [*Ribes californicum*]) and species adapted to survive in hot/dry, south-facing or west-facing slope conditions (e.g., white sage [*Salvia apiana*]). Large, evergreen shrub species such as laurel sumac (*Malosma laurina*) and sugar bush (*Rhus ovata*) were propagated in limited numbers and excluded from the applied seed mixes in order to avoid excessive coverage of these species on the mitigation site (i.e., to avoid the creation of chaparral habitat [rather than OW or CSS], which would be contrary to program goals). Vining subshrubs such as chaparral clematis (*Clematis lasiantha*) and heart-leaved bush penstemon (*Keckiella cordifolia*) were propagated for planting in association with large shrubs (or CWD) into which they can beneficially clamber.

A-3.3 CACTUS AND YUCCA

S&S, in coordination with Psomas, collected a total of 300 cuttings (pads) of Vasey's prickly-pear (*Opuntia ×vaseyi*) from the Middle SPS in June 2013 and 300 cuttings in March 2018. The cactus pads were selected from a minimum of ten separate cactus patches (in 2013 and again in 2018) and were delivered to ENG for propagation (2013 only). No more than ten pads were collected from any individual plant to avoid adversely impacting the plants' overall structure and value for wildlife. Container plants and seeds of Whipple's chaparral yucca (*Hesperoyucca whipplei*), a fibrous shrub, were installed with the cactus in designated patches of spiniferous vegetation—exclusive of woody shrub species—to diversify the mosaic of subhabitats to be created on the mitigation site.

A-3.4 ANNUAL/PERENNIAL HERBS

A great variety of native grass and herb propagules was also collected in the subwatershed. Upland woodland and scrub habitat creation/restoration sites are often deficient in native herbaceous (non-woody) species coverage and/or diversity. The herbaceous component (e.g., wildflowers, grasses) of California OW habitats has been altered (Rissman et al. 2008) as the result of various anthropogenic impacts such as physical disturbance (grading), grazing, altered fire regimes, altered soil hydrology, agricultural land uses, and the deliberate or accidental introduction of invasive plant species. As with woody plants, each herbaceous plant species (e.g.,

California eulobus [*Eulobus californicus*] and little California melica [*Melica imperfecta*]) supports a unique suite of arthropods (e.g., bees, beetles, butterflies) that use these plants for nectar (with important pollination effects); feed on the plants' leaves/roots/stems (various life stages, including larvae); or prey upon other associated fauna. Each of these smaller organisms makes a unique contribution to a complex food web in a natural habitat. Portions of the OW and CSS planting areas have been designated for herbaceous vegetation only (i.e., shrub species were excluded); these native grass/herb meadows are expected to support an increasing diversity of arthropods. The seeds of several native herb species that prefer mesic/shaded niches were combined into a specialized, supplemental seed mix (a total of 60 small packets) that was scratched into crevices on the north and east aspects of the CWD and boulder assemblages in fall 2015.

A-3.5 FERN SPECIES

RSABG, in coordination with the Restoration Ecologist, collected rhizomes (roots) from six species of native ferns (e.g., coffee fern [*Pellaea andromedifolia*]) in the local subwatershed, starting in 2013. The rhizomes were collected from multiple, geographically separated populations of ferns of each species to optimize the genetic diversity of the collection. RSABG propagated the collected rhizomes into 5-gallon 'stock plants' (for long-term nursery culture), from which several hundred smaller plants are being derived for planting on the mitigation site. By the use of multiple collection sites and by the culture of stock plants, hundreds of nursery plants with varied genetics are being created with minimized impact on wild plant populations. It would not normally be feasible to include ferns in a revegetation palette for a barren/exposed planting area such as the Lower SPS; however, due to the ample substrate enhancements provided for this program (CWD, boulder assemblages), sheltered niches were immediately available for targeted installation of ferns and other plants with particular light/moisture preferences (e.g., Dudley's clarkia [*Clarkia dudleyana*], a native wildflower) as observed in nearby habitats in the San Gabriel Mountain foothills.

A-3.6 RIPARIAN SPECIES

The spiraling drainages on the site convey both storm flows and nuisance flows (e.g., irrigation of fuel modification zones), from the adjacent slopes and residences. A variety of volunteer riparian plant species (e.g., lovegrass flatsedge [*Cyperus eragrostis*], fringed willowherb [*Epilobium ciliatum* ssp. *ciliatum*]) became established in the drainages during the preliminary mitigation phase (2012–2013), and continued into the installation and long-term maintenance phases of the program. These volunteer riparian plant species were preserved on the site and were augmented via the collection and planting of other riparian plant species (e.g., wrinkled rush [*Juncus rugulosus*], hairy tall evening primrose [*Oenothera elata* ssp. *hirsutissima*]) via seed or cuttings. The 8.0-acre habitat creation site (and associated weed abatement buffer areas) exhibits a wide range of aspects, hydrologic conditions, and microtopographic features that provide opportunities for high botanical diversity.

A-4.0 MITIGATION INSTALLATION

Nakae performed mitigation site installation tasks (planting and seeding) in two phases, as summarized below. Mitigation installation was completed in late December 2014, and the long-term maintenance period started on January 1, 2015.

- **Phase 1 Installation (January/February 2014)**
  - 4,963 container plants and cuttings (21 species)
  - 135 pounds of native seed (hydroseeded and/or hand-seeded)
- **Phase 2 Installation (December 2014)**
  - 1,973 container plants and cuttings (27 species)
  - 25 pounds of native seed (hand-seeded only)

A-4.1 CONTAINER PLANTING (2014)

A-4.1.1 Oak Species

A total of 464 oaks (*Quercus* spp.) were installed via container planting on the 5.5-acre oak woodland mitigation site. Native oaks were also established via direct-seeding of acorns (multiple oak species). Oaks that are established via the direct seeding of acorns develop deep taproots that allow better access to soil moisture for the developing seedlings (McCreary and McPhierson 2005; Young and Evans 2005) versus container-planted oaks. The oak planting locations were staked by the Restoration Ecologist. The majority of the selected planting sites (411 caged locations) occur along an east or north aspect immediately adjacent to CWD/boulder assemblages in order to provide (1) protection from hot afternoon sun, (2) some protection from drying winds, and (3) access to persistent soil moisture (beneath the assemblages) for the developing oak roots. Nakae used a machine auger (Dingo™) to create the oak planting holes, which were pre-watered prior to planting/seeding. A minimum of ten acorns were installed in each coast live oak planting location, along with one small coast live oak seedling. Mycorrhizal inoculum (AM-120™) was included in the backfilled soil at each location, along with one unit of fertilizer (Bio Pak 16-6-8™). The acorns were planted within the top 1 inch of soil, then covered with 1 to 2 inches of salvaged oak leaf litter. Protective caging (above ground only) was installed around each oak planting site, as follows: (1) 6-foot-high by 20-inch-wide chicken wire cylinders anchored with T-posts for planting sites within the 8-foot wildlife exclosure and (2) approximately 4-foot-high by 6-foot-wide caging (steel wire mesh) for oaks planted outside the exclosure. Shade cloth (70 percent) was wrapped around the tops and southwest aspect of each cage (180 degrees of coverage), for added protection from afternoon sun and herbivory by deer. All container plants were installed within 24 hours after delivery on the site to avoid plant decline during prolonged on-site storage.

A-4.1.2 Non-Oak Species

For both installation phases, Psomas marked the container planting locations using color-coded wire flags for each plant species. The planting area layouts roughly follow the conceptual planting plans provided in the OWHRMP (i.e., naturalistic/non-linear). Slope species were located according to their preferred aspects (e.g., soft orange monkeyflower [*Mimulus aurantiacus* var. *pubescens*] on north-facing versus south-/west-facing slopes). A number of polygons were flagged and planted with cactus and yucca (spiniferous plants) and/or herbaceous species only, as described above. All planting holes were pre-watered, and mycorrhizae and fertilizer packets were installed at each location, as described above. The overall goals of the planting design were

to create a habitat mosaic on the mitigation site and to take advantage of niche habitat opportunities for plant species with special requirements. Also, a number of California sagebrush plants (*Artemisia californica*, a relatively fast-growing shrub) were installed on the southwest aspect of some of the planted oaks to function as temporary 'nurse plants' to enhance wind protection and shading for the developing oak seedlings. The initial container shrub/subshrub planting density (Phases 1 and 2) was approximately 600 plants per acre on the combined CSS and OW mitigation sites.

A-4.2 SEED APPLICATION (2014)

Seed species were installed via hydroseeding and/or hand-broadcasting. The seeds of native grass species were installed only via hand-broadcasting. All seed mixes were stored in a dark, cool place and not allowed to become damp prior to application. All of the seed mix labels were retained by Nakae and provided to Psomas. A granular form of mycorrhizal inoculum (AM-120™) was added to the hydroseed mixes at a rate of 60 pounds per acre. An agriculturally suitable marking dye was also included in the hydroseed mix. Slope stabilization was provided by Flexterra™ Flexible Growth Medium, applied at a rate of 3,500 pounds per acre in the hydroseeding process. As described above, Psomas flagged a number of polygons on the CSS and OW sites for the establishment of spiniferous plants (cactus/yucca) or strictly herbaceous (non-woody) plant species via planting and/or seeding.

A-4.3 SUPPLEMENTAL PLANTING AND SEEDING (2015 THROUGH 2018)

Psomas coordinated/monitored the collection and propagation of supplemental seed and cutting materials with RSABG and S&S in 2015 and 2016, including field collections from open space areas in the Cities of Monrovia and Sierra Madre (Public Works secured access to Sierra Madre open space areas for seed/plant collection in 2014). Supplemental planting and seeding occurred in December 2015, February 2016, January 2017, and February 2018. The 213 supplemental container plants and cuttings (12 species) installed in February 2018 included California fuchsia (one plant), southern bunch leaf beardtongue (*Penstemon heterophyllus* var. *australis;* 5 plants) California polypody (a native fern; 65 plants), hillside gooseberry (65 plants), California rose (*Rosa californica*; 60 plants), and foothill needle grass (*Stipa lepida*; 17 plants). The southern bunch leaf beardtongue plants (a locally rare species in the subwatershed) were propagated by RSABG from a trace quantity of cuttings that were carefully collected by Psomas on the Monrovia site in 2017.

Supplemental seeding of oak acorns (20.1 pounds, total) occurred on the OW site in October 2015 and January 2018 to provide additional contingency plants to further assist in compliance with mitigation performance standards. Approximately 25 pounds of non-oak seeds (27 species) of primarily herbaceous plants (such as wild Canterbury bells [*Phacelia minor*] and rocky malacothrix [*Malacothrix saxatilis*]) were installed by hand (hand sown, then scratched in with metal rakes) on the OW and CSS mitigation sites in fall 2015 (1) to improve vegetative coverage and diversity and (2) to further establish a rich seed bank of native herbaceous species in the topsoil. In the event of wildfire or other site disturbance, the recovery of damaged areas could be expedited through the expression of this native seed bank. A total of 60 packets of mixed, locally collected, herbaceous plant species (e.g., silver rock-lettuce [*Stephanomeria cichoriacea*]) were also prepared and installed among the numerous boulder and woody debris assemblages on the site in fall 2015. Several of the plant species from the packets have already germinated and bloomed in these niches, including Dudley's clarkia and cardinal larkspur (*Delphinium cardinale*). A total of 4.15 pounds of native seed (11 species—mostly herbs) was installed in fall 2016, and a total of 2.0 pounds of seed of spectacular beardtongue (*Penstemon spectabilis* var. *spectabilis*) was sown on the mitigation site and in adjacent weed-control buffer areas in fall 2016.

Additional planting and seeding will occur in future years of the maintenance and monitoring period, with an emphasis on the introduction of new plant species to the mitigation site—especially along the spiraling drainages. The native plant species currently being propagated by RSABG for this mitigation program include California fuchsia, wrinkled rush, basket rush, southern bunch leaf beardtongue, hillside gooseberry, California rose, foothill needle grass, and five species of native ferns.

A-5.0 MITIGATION PERFORMANCE STANDARDS

Project mitigation performance standards were prepared in coordination with the CDFW and incorporate the terms and conditions of EIR mitigation measures BIO-D/BIO-E and the CDFW SAA. A summary of mitigation performance standards is provided in Tables A-7 and A-8.

TABLE A-7
OAK WOODLAND PERFORMANCE STANDARDS

Year	Native Percent Coverage (Minimum)							Non-Native Percent Coverage[e]	Native Vegetation Diversity[f]	Oak Tree Survival (Percent)[g]
		Shrubs[a]								
	Trees[a]	Large[b]	Medium[c]	Subshrubs[d]	Succulents[a]	Herbs[a]	Total[e]			
1							**25.0**	< 5		80
2							**40.0**	< 5		80
3	0.5	3.0	14.0	3.0	0.5	25.0	**55.0**	< 5	15	80
4							**65.0**	< 5		80
5	1.0	4.0	16.0	4.0	1.0	30.0	**75.0**	< 5	18	80
6							**75.0**	< 5		80
7	1.5	5.0	18.0	5.0	2.0	30.0	**75.0**	< 5	20	80
8							**75.0**	< 5		80
9							**75.0**	< 5		80
10	2.0	5.0	18.0	5.0	2.0	30.0	**75.0**	< 5	24	80

[a] Absolute Coverage
[b] Large evergreen shrubs such as toyon (*Heteromeles arbutifolia*).
[c] Includes medium shrubs (evergreen or deciduous) such as graceful golden currant (*Ribes aureum* ssp. *gracillimum*).
[d] Includes subshrubs and vining shrubs (evergreen or deciduous) such as California blackberry (*Rubus ursinus*).
[e] Class Coverage
[f] Number of Species. Statistical diversity (Shannon Diversity Index) will also be compared to the measured values on the reference site in 2013.
[g] Relative to the initial planting quantities specified in the OWHRMP.

TABLE A-8
COASTAL SAGE SCRUB PERFORMANCE STANDARDS

Year	Native Percent Coverage (Minimum)						Non-Native Percent Coverage[e]	Native Vegetation Diversity[f]
	Shrubs[a]							
	Large[b]	Medium[c]	Subshrubs[d]	Succulents[a]	Herbs[a]	Total[e]		
1						**25.0**	< 5	
2						**40.0**	< 5	
3	2.0	24.0	2.0	0.5	8.0	**55.0**	< 5	10
4						**65.0**	< 5	
5	3.0	28.0	3.0	1.0	10.0	**75.0**	< 5	12
6						**75.0**	< 5	
7	4.0	35.0	4.0	2.0	15.0	**75.0**	< 5	15
8						**75.0**	< 5	
9						**75.0**	< 5	
10	5.0	50.0	5.0	2.0	15.0	**75.0**	< 5	18

[a] Absolute Coverage
[b] Large evergreen shrubs such as sugar bush (*Rhus ovata*).
[c] Includes medium shrubs (evergreen or deciduous) such as leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*).
[d] Includes subshrubs and vining shrubs (evergreen or deciduous) such as chaparral virgin's bower (*Clematis lasiantha*).
[e] Class Coverage
[f] Number of Species. Statistical diversity (Shannon Diversity Index) will also be compared to the measured values on the reference site in 2013.

A-6.0 OAK TREE SURVIVAL AND GROWTH

As noted in Table A-7, the performance standard for survival of planted oaks is 80 percent, relative to the initial planting quantity of oaks specified in the OWHRMP. Therefore, the survival standard for coast live oaks is 287 trees (initial quantity per OWHRMP: 358 trees) and the survival standard for Engelmann oaks is 4 trees (initial quantity per OWHRMP: 5 trees). A greater quantity and diversity of oak species has been planted on the mitigation site to date than was specified in the OWHRMP, including a total of 411 caged planting locations and numerous additional planted and volunteer oak seedlings.

A minimum 2-percent canopy coverage for oak tree species is required at the end of the seven-year to ten-year maintenance period. The planted oaks must be self-sufficient for a period of two years without supplemental irrigation to be eligible for sign off.

As described in the OWHRMP, the oak trees installed on the mitigation site are regularly assessed by a qualified Arborist. Criteria for assessing tree health include visual evidence of vigor, such as the amount of foliage; leaf color and size; presence and length of new shoot growth; presence of branch or twig dieback; severity of insect infestation; the presence of disease, heart rot, fire damage, or mechanical damage; the amount of new growth; the appearance of bark; and the presence of and rate of callous development over wounds. Structural integrity will also be evaluated with respect to branch attachment, branch placement, presence of decay, presence of exposed roots due to soil erosion, and stability. The health of each tree will be recorded on a scale of 1 to 5 based on the criteria presented in Table A-9.

TABLE A-9
OAK TREE HEALTH RATING CRITERIA

Rating	Criteria
5	Tree in excellent health with abundant foliage, new leaf growth, and shoot elongation; no signs of herbivory, insect infestation, disease, fungus growth, or limb/trunk damage.
4	Tree in very good health with ample green foliage and new leaf growth; minor signs of drought stress, herbivory, insect infestation, decreased shoot growth, or loss of vigor.
3	Tree in moderate health with limited or uneven new leaf growth; moderate signs of drought stress; noticeable insect activity; decay on branches; noticeable herbivory damage.
2	Tree in poor health with existing leaves yellowing; limited/stunted new leaf growth; decreased shoot growth from previous year; dark-colored cracks or abnormalities on trunk; presence of fungus; observable decay on trunk or major limbs; sap bleeding from trunk; significant insect infestation; extensive herbivory; thinning canopy.
1	Tree in obvious decline with existing leaves yellowing and no new leaf growth; extensive limb or trunk damage; large cracks or other decay on trunk; bleeding sap; dieback of more than 30% of the canopy; a general lack of vigor.

A-6.1 VEGETATION COVERAGE AND DIVERSITY

As detailed in Tables A-7 and A-8, the OWHRMP includes performance standards for both vegetation coverage (i.e., the percent of the mitigation site that is covered by various classes of plant species [e.g., large shrubs]) and vegetation diversity—i.e., plant species richness (number of species present) and diversity (statistical). Vegetation coverage performance is assessed on an annual basis via the performance of vegetation transects (point-intercept) and quadrats, as described below. The vegetation coverage standards reflect the goal of creating a mosaic of habitat areas with substantial structural diversity. Based on these sampling methods, the various vegetation diversity metrics that are used are outlined in Table A-10.

TABLE A-10
VEGETATION DIVERSITY METRICS

Metric	Equation	Variables
Density of Species 'i' (D_i)	$D_i = n_i / A$	n_i = total individuals of species 'i'
		A = total area sampled
Relative Density for Species 'i' (RD_i)	$RD_i = N_i / \Sigma n$	n_i = number of individuals of species 'i'
		Σn = total number of individuals of all species (plots)
Coverage for Species 'i' (C_i)	$C_i = a_i / A$	a_i = total area covered for species 'i'
		A = total area sampled
Relative Coverage of Species 'i' (RC_i)	$RC_i = C_i / \Sigma C$	C_i = coverage for species 'i'
		ΣC = sum of coverage for all species
Frequency of Species 'i' (f_i)	$f_i = j_i / k$	j_i = number of plots containing species 'i'
		k = total number of plots
Relative Frequency of Species 'i' (RF_i)	$RF_i = f_i / \Sigma f$	f_i = frequency of species 'i'
		Σf = sum of frequencies of all species
Shannon Diversity Index (H')	$H = -\sum_{i=1}^{R} p_i \log p_i$	R = total number of species encountered
		p_i = species 'i' as a proportion of R

A-6.1.1 Shannon Diversity Index

A diversity index provides a more comprehensive indication of the vegetative composition beyond 'richness', which is simply the number of plant species observed to be present (either via quantitative surveys [e.g., transects, quadrats] or qualitative observation) in a habitat area. The Shannon Diversity Index accounts for plant species' relative abundance (i.e., commonness or scarcity) and 'evenness' (i.e., how evenly the individuals in the plant community are distributed over the landscape) in a habitat area, as expressed in the following equation (H = the Shannon Diversity Index).

$$H = -\sum_{i=1}^{R} (p_i \log p_i)$$

For the present application, p_i is the proportion of individuals of species 'i' relative to the total number of all individual plants (all species); 'R' is the number of plant species encountered; and $\sum$ is the sum from species 1 to species R. The highest potential value of 'H' (for a particular study area with 'R' number of species) occurs when all species are equally abundant in the sampling area (e.g., Species 1: 10 individuals; Species 2: 10 individuals … Species R: 10 individuals).

Higher values of 'H' represent more diverse biological communities. To illustrate, a weed-free orange grove with no other types of fruit trees present would have an 'H' value of 0, as 'p_i' would equal 1 (one type of fruit tree) and would be multiplied by 'log 1' which equals 0. Whatever method of sampling/counting the grove's composition, whatever numbers of samples are obtained, or in whatever locations, the same value (zero) of 'H' would result due to the singularity of fruit tree type throughout the grove. By contrast, if numerous different kinds of fruit trees are present—evenly distributed throughout the grove—then the 'H' value would be high, because each sample (in every location) would contain a diversity of fruit tree types; and the sum of the '$p_i \log p_i$' values would increase with each new species of fruit tree uniformly added to the grove's mix of trees.

A vegetation survey was performed on the Middle SPS reference site (see Exhibit 2) in 2013, and the survey results were included in the 2013 *Reference Site Survey Report – Oak Woodland Habitat Revegetation/Mitigation Program for the Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project* ("Reference Site Report"; BonTerra 2013), which was appended to the OWHRMP. The Reference Site Report and the OWHRMP have been revised (BonTerra Psomas 2016) to reflect a comparative recomputation of the value of 'H' on the reference site in 2013, based on the original field data. As shown in Table A-11, the values of 'H' on the reference site (derived from quadrat data) reflect the impact of the dense coverage of ripgut grass (*Bromus diandrus*) on statistical diversity (i.e., with ripgut grass included in the computations, the value of 'H' approaches zero), whereas in excluding ripgut grass, the reference sites would exhibit low (CSS) to moderate (California sycamore/coast live oak riparian forest) diversity. These results are relevant for OWHRMP performance because (1) despite the presence of numerous heritage oak and sycamore trees, the statistical diversity of the reference site in 2013 was vanishingly low due to its nearly monotypic, weedy understory; and (2) the absence of a 'carpet' of weedy herbs on the mitigation site is expected to result in significantly higher diversity than the measured values on the reference site.

It is important to note that the Shannon Diversity Index does not necessarily indicate the ecological health of a study area, as there is no differentiation between native and non-native species (e.g., a study area with an abundance of diverse, evenly occurring weedy plant species would present a high value of 'H' but provide relatively poor ecosystem services compared to native vegetation).

TABLE A-11
SHANNON DIVERSITY INDEX – REFERENCE SITE (2013)

Habitat Type	Ripgut Brome Included in Computation[a]	Number of Plant Species[b]		Shannon Diversity Index = H[b]	
		Native	Non-Native	Result	Potential[c]
CS/CLORF[d]	**Yes**	**18**	**11**	**0.01**	**3.37**
	No	18	10	2.47	3.33
CSS[e]	**Yes**	**19**	**6**	**0.03**	**3.22**
	No	19	5	0.77	3.18

[a] Ripgut grass (*Bromus diandrus*—a non-native, invasive grass species) constituted a dense understory and was disproportionately represented on the CSS and CS/CLORF reference sites (BonTerra 2013) in terms of both percent coverage and numbers of individual plants. For example, on Quadrat No. C-01 (CSS), the estimated number of individual *Bromus diandrus* plants was 155,000, while the total number of individual plants on Quadrat No. C-01 (all species combined) was 155,586 (i.e., 99.6 percent of all plants combined).
[b] Based on quadrat data.
[c] Based on the number of plant species (native + non-native) sampled.
[d] CS/CLORF: California sycamore/coast live oak riparian forest.
[e] CSS: coastal sage scrub.

A-6.2 MITIGATION REMEDIAL PROCEDURES

If the performance standards are not met, remedial measures shall be implemented based on site observations and survey results, as summarized in Tables A-12 and A-13.

TABLE A-12
OAK WOODLAND MITIGATION REMEDIAL PROCEDURES

Performance Standard	Non-Compliance	Potential Remedial Measures
25%, 40%, 55%, 65%, and 75% coverage of native species at Years 1, 2, 3, 4, and 5, respectively, and 75% for Years 6 through 10, and native plant coverage goals for growth forms as listed in Table A-7.	>5% deviation below specified coverage throughout 10% or more of the entire site (i.e., if 10% or more of the site is 5% below the coverage standard, the entire site will be considered non-compliant).	Reseeding and replanting with appropriate plant species and quantities, irrigation system adjustments, and/or additional weed control shall be recommended, as needed, to facilitate <5% deviation below specified cover throughout 10% or more of the entire site, and 5% maximum weed coverage.
5% maximum coverage of non-native plant species.		
80% survival of oak trees	Less than 80% survival.	Replanting, irrigation system adjustments, and/or additional weed control shall be recommended, as needed, to facilitate 80% survival of oak trees.
Minimum native plant species richness of 15, 18, 20, and 24 species at Years 3, 5, 7, and 10, respectively.	Plant species richness below the established minimum number of species for Years 3, 5, 7, and 10.	Planting and/or seeding with additional native plant species of local origin.
Shannon Diversity Index ('H') comparable to 2013 reference site values.	Values of 'H' below 2013 reference site values.	Enhancement measures to improve vegetative diversity (e.g., planting/seeding).

TABLE A-13
COASTAL SAGE SCRUB MITIGATION REMEDIAL PROCEDURES

Performance Standard	Non-Compliance	Potential Remedial Measures
25%, 40%, 55%, 65%, and 75% coverage of native species at Years 1, 2, 3, 4, and 5, respectively, and 75% for Years 6 through 10, and native plant coverage goals for growth forms as listed in Table A-8.	>5% deviation below specified coverage throughout 10% or more of the entire site (i.e., if 10% or more of the site is 5% below the coverage standard, the entire site will be considered non-compliant).	Reseeding and replanting with appropriate plant species and quantities, irrigation system adjustments, and/or additional weed control shall be recommended, as needed, to facilitate <5% deviation below specified coverage throughout 10% or more of the entire site, and 5% maximum weed coverage.
5% maximum coverage of non-native plant species.		
Minimum native plant species diversity of 10, 12, 15, and 18 species at Years 3, 5, 7, and 10, respectively.	Plant species richness below the established minimum number of species for Years 3, 5, 7, and 10.	Planting and/or seeding with additional native plant species of local origin.
Shannon Diversity Index ('H') comparable to 2013 reference site values.	Values of 'H' below 2013 reference site values.	Enhancement measures to improve vegetative diversity (e.g., planting/seeding).

A-6.3 MITIGATION SIGN OFF

When the final (Year Ten) performance standards have been achieved, and if at least seven years of maintenance have been completed, Public Works will meet on site with the CDFW, the City of Arcadia, and the Restoration Ecologist to verify the successful establishment of OW (developing) and CSS habitats. Upon its approval of the mitigation program, the CDFW will prepare a memorandum to confirm the completion of the program and the cessation of required maintenance and monitoring tasks. If the mitigation project does not meet performance standards in a timely manner and remedial measures to achieve project compliance are not feasible, an alternate mitigation program shall be identified by Public Works in coordination with the CDFW and the City of Arcadia. Alternate mitigation measures may include habitat creation/restoration at an alternate site(s), participation in an approved mitigation bank, or any other appropriate measure approved by Public Works. The selection of an alternate mitigation site will include the evaluation of geographic location (e.g., the Santa Anita Canyon vicinity), land ownership, elevation, slope steepness, aspect, soils, proximity to existing preserved native habitat, weed conditions, and other ecological and logistical factors. The planning and implementation of the alternate mitigation program will be the responsibility of Public Works.

ATTACHMENT B

SITE PHOTOGRAPHS

October 2013. The Lower Sediment Placement Site (SPS) following soil improvements (decompaction and incorporation of large volume of salvaged mulch) and the placement of salvaged natural snags, boulders, and coarse woody debris.

March 2018. Ephemeral flows occur in the designed spiraling drainages that convey off-site/on-site flows to an outlet tower in the center of the Lower SPS.

May 2018. A small number of native volunteer riparian trees (sycamore and willow, background) have been retained on the site to provide contrasting habitat values for wildlife species. An established meadow of native grasses and herbs, a planted coast live oak, and placed brush piles, are visible in the foreground.

March 2018. Weathering (placed) natural snags occur amid developing oak trees, native shrubs, patches of designated spiniferous or herbaceous understory habitat, and placed boulder and coarse woody debris assemblages, all of which contribute to high biological diversity on the site.

May 2018. Native herbs flourish along the dual drainages, including mugwort, deerweed, sprangletop, rushes and sedges, and other native plant species. Several blue elderberry trees (left in photo) were planted along the drainages.

February 2018. The coastal sage scrub (CSS) mitigation site (slopes) was installed as a mosaic of woody scrub and native spiniferous species (cacti, yucca). The cactus/yucca areas were seeded with a diverse mix of native herbs/grasses and are maintained to exclude woody shrubs to retain vegetative diversity.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-1

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

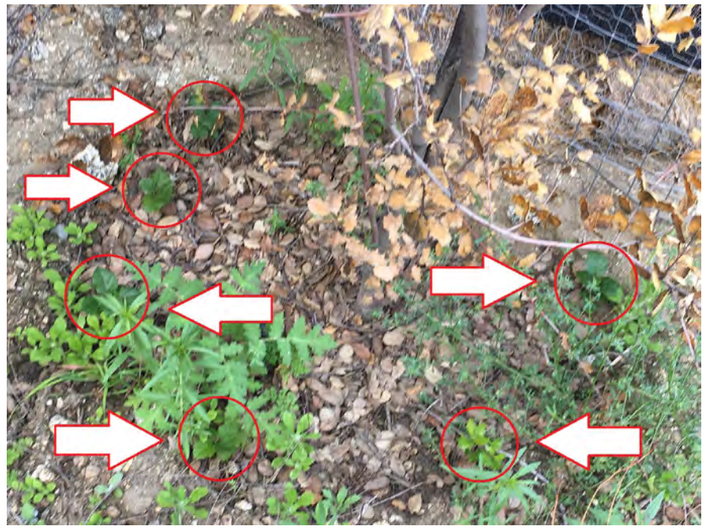
PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

July 2018. A healthy planted coast live oak surrounded by planted and seeded native shrubs, herbs, and coarse woody debris.

January 2018. Healthy, green leaves on a planted coast live oak, eleven months after the preceding rainy season (drought) ceased in February 2017. Overhead irrigation on the oak woodland mitigation site was discontinued in December 2015, and the bubblers on the OW site were not operated from October 2016 to February 2018.

January 2018. Due to acute drought between March 2017 and February 2018, the oak bubbler system was reactivated in spring 2018 to simulate late seasonal rain events.



April 2018. There has been low mortality of planted oaks on the mitigation site. In several of the locations where the initially planted oaks have died, there is a cohort of oak seedlings to replace the dead oak, as shown in this photograph (six new seedlings).

July 2018. The Restoration Contractor (Nakae & Associates, Inc.) removed surplus oak plants at several of the oak planting locations in summer 2018, to improve growing conditions for the retained oak sapling (one) at each location. The oaks to be retained or removed were evaluated and identified by Psomas' Certified Arborist.

August 2018. This photograph shows a portion of the Middle Sediment Placement Site (SPS) in mid-summer 2018. Many of the large coast live oak trees on the Middle SPS exhibit marked drought stress, with extensive browning of leaves and leaf drop.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-2

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

February 2018. A new seedling of graceful golden currant, a native shrub. Numerous planted individuals of this species produced an abundant fruit crop on the mitigation site in Year Two and Year Three.

May 2018. Native shrubs (orange monkeyflower and black sage) in bloom on the coastal sage scrub (CSS) mitigation site. The scrub habitat is well established, and no irrigation has been applied to the CSS mitigation site since June 2015.

February 2018. A resprouted cardinal larkspur, a native perennial wildflower that was established on the mitigation site from trace collections of seed obtained in the local subwatershed.

May 2018. Lush growth of spectacular beardtongue, a native perennial wildflower that was installed via container plants and seed mixes.

March 2018. A dense carpet of seedlings of four-spot, an annual native wildflower that has re-seeded onto the site for multiple years.

May 2018. Inflorescense of Vasey's prickly-pear, a native succulent that was established on the mitigation site from locally collected cuttings (pads).

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-3

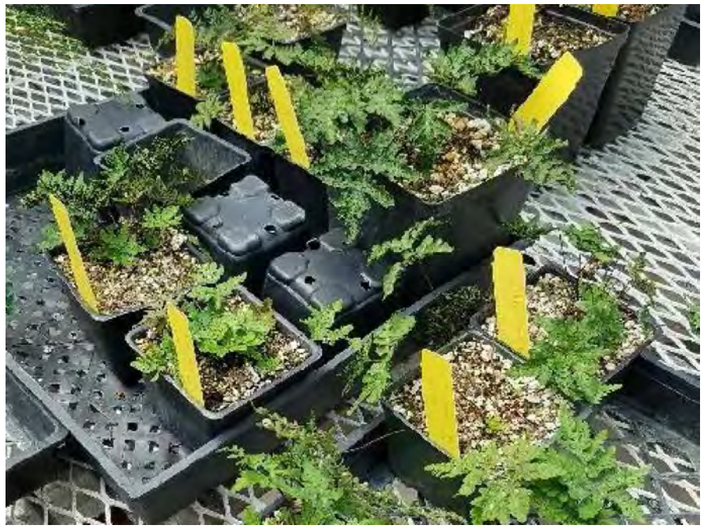
Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

March 2018. Robert Noll of S&S Seeds, Inc. (Noll Seed Company) collecting native fern rhizomes on the City of Monrovia's Hillside Wilderness Preserve. The collections were performed under the supervision of a Psomas Botanist and City Park Rangers. Los Angeles County Public Works negotiated access for plants/seeds.

March 2018. Native fern stems with roots (rhizomes) collected for propagation. The fern collections were performed in a manner that preserved the 'donor plants'--i.e., only a portion of any single plant was harvested.



July 2018. The field collections of fern plant materials were delivered to Rancho Santa Ana Botanic Garden for propagation. The fern species shown in this photograph is goldback fern.

April 2018. Re-growth of coffee fern plants that were installed in a previous year of the maintenance program. It is notable that fern re-growth was observed in several locations on the site in Year Three, despite ongoing drought conditions.

February 2018. The Restoration Contractor (Nakae & Associates, Inc.) installed new fern plants in suitable niches (e.g., tucked beneath the northern exposures of placed boulders) that were selected by Psomas' Restoration Ecologist.

April 2018. Numerous fern plants of several different species occur on the mitigation site. The California polypody plants shown in this photograph exhibit reproductive structures (sporangia).

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-4

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

May 2018. A San Diegan tiger whiptail (a State of California Species of Special Concern) on the oak woodland mitigation site. An increasing diversity of reptiles has been observed on the oak woodland and coastal sage scrub mitigation sites.

March 2018. A great blue heron is perched atop a placed natural snag (in the background) on the oak woodland habitat creation site. Healthy planted oaks are visible in the foreground.

August 2018. A Cooper's hawk perched on a snag. A total of 104 vertebrate wildlife species, and numerous invertebrates (e.g., bees, beetles, butterflies), have been observed on the formerly barren mitigation site since 2013.

May 2018. The rufous-crowned sparrow is a native songbird that was observed nesting on the mitigation site for the first time in Year Three. A total of 10 native bird species have been observed nesting on the site since 2013.

July 2018. Mourning dove nestlings in a nest that is located in a planted coast live oak tree on the mitigation site. A preliminary nesting bird survey is conducted prior to all maintenance tasks that are performed during the nesting bird season (defined as February 1 to September 15 in project permits) to avoid adverse impacts to sensitive biological resources.

July 2018. Psomas operates motion-activated wildlife cameras ('camera traps') in several locations on and adjacent to the mitigation site. The camera traps enable detection of a wider variety of wildlife species than can be recorded by Psomas' field observations, and the species data is useful in determining suitable maintenance practices on the habitat area.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-5

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

April 2018. A California ground squirrel is perched on the exclosure fence. Healthy planted oaks are visible in the foreground.

June 2018. A California ground squirrel captured via a camera trap that was temporarily positioned within a boulder assemblage that was created on the mitigation site. Note: the 2015 date on the image (video capture) is incorrect.

May 2018. A mountain lion detected via camera trap along the eastern boundary of the mitigation site.

May 2018. A common gray fox detected via camera trap on the oak woodland mitigation site. These small mammals are regular nocturnal visitors to the mitigation site. The presence of a diversity of predators on the mitigation site indicates the establishment of good habitat conditions.

April 2018. An adult black bear, detected via camera trap. Although native to the State of California, the black bear was introduced to the San Gabriel Mountains (SGM) by the California Department of Fish and Wildlife in 1933 following the local (SGM) extirpation of the now-extinct California subspecies of the grizzly bear in 1894.

June 2018. An adult deer with a juvenile deer. The temporary exclosure fence (left in photograph) at the perimeter of the oak woodland mitigation site is meant to protect the young planted oaks until they are large enough to withstand herbivory by deer.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-6

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

March 2018. Robert Noll of S&S Seeds, Inc. (Noll Seed Company) collecting cuttings (pads) of native Vasey's prickly-pear on the Middle Sediment Placement Site (SPS)(the reference site). The cactus collection was performed under the supervision of Psomas' Restoration Ecologist.

March 2018. A stockpile of harvested cactus pads 'scabbing off' prior to planting. A limited number of pads were collected from any single plant, to preserve the habitat value of the 'donor plants'.

February 2018. Native container plants (California rose and hillside gooseberry) that were propagated by Rancho Santa Ana Botanic Garden from locally-collected cuttings.

February 2018. The Restoration Contractor (Nakae & Associates, Inc.) is performing supplemental plant installation under the supervision of Psomas' Restoration Ecologist.

March 2018. A newly installed California rose plant on the oak woodland mitigation site. Some native mulch was added to the planting hole to protect the small plant from excessive sunlight and to preserve soil moisture.

February 2018. A newly installed California polypody (fern) plant in a carefully-selected niche on the north side of salvaged coarse woody debris.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-7

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

May 2018. Excellent native habitat is being established in portions of the Buffer Areas, including a variety of native shrubs and herbaceous species (e.g., numerous individuals of spectacular beardtongue that was seeded onto this slope). The coast live oak to the left in the photo shows the benefit of protective caging. Buffer Area 2 is shown in this photograph.

June 2018. A total of 50 volunteer coast live oak seedlings in Buffer Area 2 were provided with protective cages during the mitigation site preparation phase in 2013. The seedlings were previously stunted due to heavy herbivory; however, several of these seedlings now exhibit excellent growth as a result of the protective caging.

February 2018. In the foreground are two large non-native ash trees that were girdled and treated with herbicide by the Restoration Contractor (Nakae & Associates, Inc.) under the supervision of Psomas' Restoration Ecologist. The resulting snags are heavily used by native birds including acorn woodpeckers.

August 2018. Weed removal in the Buffer Areas reduces fire fuel material surrounding the mitigation site and reduces the risk of fire spreading from adjacent natural open space areas (left/background) onto the mitigation site. This photo shows Buffer Area 3b along the north edge of the Lower SPS.

February 2018. Buffer Area 4 is located along the south edge of the mitigation site. Weed control in this area also reduces fire fuel adjacent to residential properties in the City of Arcadia.

March 2018. An increasing number of volunteer native plants occur in the Buffer Areas, including these seedlings of California eulobus. Also visible in this photograph are a few weed seedlings. Weed removal is performed prior to seed set to the extent practicable, to avoid ongoing re-infestation of the mitigation site and the Buffer Areas.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-8

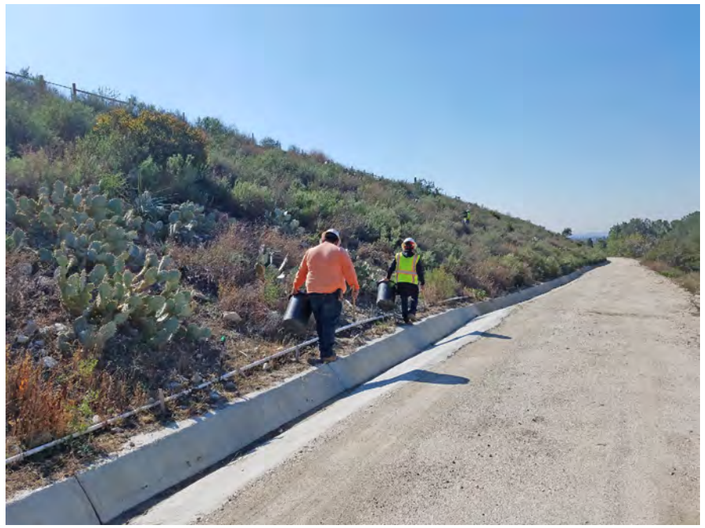
Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

February 2018. The Restoration Contractor (Nakae & Associates, Inc.) is enlarging the basins of supplemental container plants along the drainages in preparation for hand watering tasks.

February 2018. The Restoration Contractor conducts thorough weeding and other maintenance tasks on portions of the mitigation site during the nesting bird season, following the performance of nesting bird surveys by Psomas' Biologists.



February 2018. Maintenance tasks include the inspection of concrete drainage structures, and the removal of sediment and debris to maintain the integrity of storm flows through the Lower Sediment Placement Site (SPS).

March 2018. The central berm between the drainages is kept unvegetated to facilitate access by Los Angeles County Public Works (e.g., to assess storm flow conveyance) and the Psomas team (maintenance/monitoring). The canopies of planted oaks will eventually extend over the drainages.

March 2018. Thorough hand weed removal is being performed in Buffer Area 3a along the south edge of the Lower SPS.

April 2018. Several full 'mantas' of hand-pulled weeds, ready for loading onto the Restoration Contractor's vehicles. All green waste is transported off site to a green waste facility.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-9

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

August 2013. Photo Station No. 1.

November 2013. Photo Station No. 3.

September 2013. Photo Station No. 5.

August 2018. Photo Station No. 1.

February 2018. Photo Station No. 3.

February 2018. Photo Station No. 5.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-10

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

September 2013. Photo Station No. 2.

August 2018. Photo Station No. 2.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_pano_20190828.mxd

Site Photographs

Attachment B-11

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/28/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

January 2013. Photo Station No. 4.

August 2018. Photo Station No. 4. The habitat creation site in mid-summer 2018 exhibits normal seasonal desiccation/dormancy of many native shrub and perennial herbaceous species. Planted oaks, visible at the left and right edges of the photograph, remain healthy with green leaves.

D:\Projects\CO LADPW\J254\IMXD\3AMR\ex_photos_pano_20180828.mxd

Site Photographs

Attachment B-12

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

July 2013. Photo Station No. 6.

January 2014. Photo Station No. 8.

August 2009. Photo Station No. 9.

July 2018. Photo Station No. 6

February 2018. Photo Station No. 8.

August 2018. Photo Station No. 9.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-13

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/28/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

January 2013. Photo Station No. 7.

August 2018. Photo Station No. 7. The habitat creation site in mid-summer 2018 exhibits normal seasonal desiccation/dormancy of many native shrub and perennial herbaceous species. Planted oaks, visible in the left-center and the right edge of the photograph, remain healthy with green leaves.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_pano_20180828.mxd

Site Photographs

Attachment B-14

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/29/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

April 2018. Oak woodland Transect No. 1.

April 2018. Oak woodland Transect No. 2.

April 2018. Oak woodland Transect No. 3.

April 2018. Oak woodland Transect No. 4.

April 2018. Oak woodland Transect No. 5.

April 2018. Oak woodland Transect No. 6.

D:\Projects\CoLADPW\J254\MXD\3AMR\rev_photos_att15_16_20180928.mxd

Site Photographs

Attachment B-15

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

April 2018. Coastal sage scrub Transect No. 1.

April 2018. Coastal sage scrub Transect No. 2.

April 2018. Coastal sage scrub Transect No. 3.

April 2018. Coastal sage scrub Transect No. 4.

April 2018. Coastal sage scrub Transect No. 5.

April 2018. Coastal sage scrub Transect No. 6.

D:\Projects\CoLADPW\J254\MXD\3AMR\rev_photos_att15_16_20180928.mxd

Site Photographs

Attachment B-16

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/28/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

April 2018. Oak woodland Quadrat No. 1.

June 2018. Oak woodland Quadrat No. 2.

April 2018. Oak woodland Quadrat No. 3.

April 2018. Oak woodland Quadrat No. 4.

April 2018. Oak woodland Quadrat No. 5.

April 2018. Oak woodland Quadrat No. 6.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-17

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/28/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243))\Graphics\3AMR\

April 2018. Coastal sage scrub Quadrat No. 1.

April 2018. Coastal sage scrub Quadrat No. 2.

April 2018. Coastal sage scrub Quadrat No. 3.

July 2013. The oak woodland reference site (Middle SPS). Although the reference site contains numerous mature coast live oak and western sycamore trees, the understory vegetation is predominantly weedy (e.g., ripgut brome [grass]).

January 2011. The coastal sage scrub reference site (Middle SPS) exhibits patches of native scrub and a dense understory of weedy grasses and herbs.

October 2012. The Middle SPS reference site contains some natural boulders and coarse woody debris, which are beneficial habitat features that are being re-created on the Lower SPS mitigation site.

D:\Projects\CoLADPW\J254\MXD\3AMR\ex_photos_20180828.mxd

Site Photographs

Attachment B-18

Third Annual Monitoring Report: Oak Woodland Habitat Revegetation/Mitigation Program
Santa Anita Dam Riser Modification and Reservoir Sediment Removal Project

PSOMAS

(Rev: 08/28/2018 MMD) R:\Projects\CoLADPW (DPW)\J254 (prvsly 243)\Graphics\3AMR\

ATTACHMENT C

YEAR THREE QUADRAT DATA (2018)

TABLE C-1
COASTAL SAGE SCRUB QUADRAT DATA – YEAR THREE (2018)

Vascular Plant Species	Habit	Coverage				No. of Individual Plants											
		CSS-Q1	CSS-Q2	CSS-Q3	Mean	CSS-Q1	CSS-Q2	CSS-Q3	D_i	RD_i	C_i	RC_i	f_i	Rf_i	p_i	$p_i \log p_i$	H'	Potential H'
Native																		
Acmispon glaber var. *glaber*	subshrub	10.00	7.00	15.00	**10.67**	10	75	60	0.060417	0.053883	0.106667	0.137487	1.000000	0.034884	0.053883	-0.157390	**2.31**	**3.97**
Artemisia californica	medium	30.00	3.00	15.00	**16.00**	20	9	26	0.022917	0.020438	0.160000	0.206230	1.000000	0.034884	0.020438	-0.079513		
Brickellia californica	medium	0.25	0.00	0.00	**0.08**	1	0	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Camissoniopsis hirtella	herb	0.25	0.00	0.00	**0.08**	15	0	0	0.006250	0.005574	0.000833	0.001074	0.333333	0.011628	0.005574	-0.028928		
Cardamine oligosperma	herb	0.25	0.00	0.00	**0.08**	3	0	0	0.001250	0.001115	0.000833	0.001074	0.333333	0.011628	0.001115	-0.007580		
Cercocarpus betuloides	large	0.50	0.00	0.00	**0.17**	1	0	0	0.000417	0.000372	0.001667	0.002148	0.333333	0.011628	0.000372	-0.002935		
Chaenactis glabriuscula	herb	0.00	0.00	0.25	**0.08**	0	0	9	0.003750	0.003344	0.000833	0.001074	0.333333	0.011628	0.003344	-0.019065		
Clarkia purpurea var. *quadrivulnera*	herb	0.50	5.00	1.00	**2.17**	50	150	30	0.095833	0.085470	0.021667	0.027927	1.000000	0.034884	0.085470	-0.210221		
Cryptantha intermedia	herb	0.00	0.25	0.00	**0.08**	0	40	0	0.016667	0.014864	0.000833	0.001074	0.333333	0.011628	0.014864	-0.062561		
Datura wrightii	herb	0.00	0.00	25.00	**8.33**	0	0	7	0.002917	0.002601	0.083333	0.107411	0.333333	0.011628	0.002601	-0.015482		
Elymus condensatus	herb	1.00	0.00	0.00	**0.33**	1	0	0	0.000417	0.000372	0.003333	0.004296	0.333333	0.011628	0.000372	-0.002935		
Eriogonum elongatum	herb	0.00	1.50	0.50	**0.67**	0	21	1	0.009167	0.008175	0.006667	0.008593	0.666667	0.023256	0.008175	-0.039296		
Eriogonum fasciculatum var. *foliolosum*	medium	5.00	6.00	3.00	**4.67**	5	25	10	0.016667	0.014864	0.046667	0.060150	1.000000	0.034884	0.014864	-0.062561		
Eucrypta chrysanthemifolia	herb	0.25	0.00	0.00	**0.08**	1	0	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Eulobus californica	herb	0.00	0.00	0.25	**0.08**	0	0	3	0.001250	0.001115	0.000833	0.001074	0.333333	0.011628	0.001115	-0.007580		
Galium aparine	herb	0.00	0.00	0.25	**0.08**	0	0	2	0.000833	0.000743	0.000833	0.001074	0.333333	0.011628	0.000743	-0.005355		
Galium porrigens	herb	0.50	0.00	0.00	**0.17**	100	0	0	0.041667	0.037161	0.001667	0.002148	0.333333	0.011628	0.037161	-0.122352		
Hesperoyucca whipplei	succulent	0.00	0.50	0.50	**0.33**	0	4	5	0.003750	0.003344	0.003333	0.004296	0.666667	0.023256	0.003344	-0.019065		
Heterotheca grandiflora	herb	0.00	0.25	1.00	**0.42**	0	7	9	0.006667	0.005946	0.004167	0.005371	0.666667	0.023256	0.005946	-0.030472		
Heterotheca sessiliflora	herb	0.00	0.25	0.00	**0.08**	0	1	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Keckiella cordifolia	medium	0.25	0.00	0.00	**0.08**	1	0	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Logfia filaginoides	herb	0.00	0.25	0.00	**0.08**	13	0	0	0.005417	0.004831	0.000833	0.001074	0.333333	0.011628	0.004831	-0.025762		
Lupinus hirsutissimus	herb	0.00	0.25	0.00	**0.08**	0	1	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Malosma laurina	large	0.00	0.50	0.00	**0.17**	0	2	0	0.000833	0.000743	0.001667	0.002148	0.333333	0.011628	0.000743	-0.005355		
Mimulus aurantiacus	medium	1.25	0.00	0.00	**0.42**	51	0	0	0.021250	0.018952	0.004167	0.005371	0.333333	0.011628	0.018952	-0.075161		
Opuntia sp.	succulent	0.00	1.00	6.00	**2.33**	0	1	4	0.002083	0.001858	0.023333	0.030075	0.666667	0.023256	0.001858	-0.011684		
Penstemon spectabilis var. *spectabilis*	herb	0.00	0.00	0.50	**0.17**	0	0	27	0.011250	0.010033	0.001667	0.002148	0.333333	0.011628	0.010033	-0.046172		
Phacelia distans	herb	0.25	0.25	2.00	**0.83**	5	1	30	0.015000	0.013378	0.008333	0.010741	1.000000	0.034884	0.013378	-0.057714		
Phacelia minor	herb	0.00	0.25	0.25	**0.17**	0	8	1	0.003750	0.003344	0.001667	0.002148	0.666667	0.023256	0.003344	-0.019065		
Plantago erecta	herb	0.00	0.25	0.25	**0.17**	0	2	1	0.001250	0.001115	0.001667	0.002148	0.666667	0.023256	0.001115	-0.007580		
Pseudognaphalium stramineum	herb	0.50	3.00	0.25	**1.25**	100	300	22	0.175833	0.156819	0.012500	0.016112	1.000000	0.034884	0.156819	-0.290533		
Quercus engelmanni	tree	0.50	0.00	0.00	**0.17**	1	0	0	0.000417	0.000372	0.001667	0.002148	0.333333	0.011628	0.000372	-0.002935		
Rhamnus ilicifolia	large	0.00	0.25	0.00	**0.08**	0	1	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Rhus ovata	large	0.50	0.00	2.00	**0.83**	1	0	1	0.000833	0.000743	0.008333	0.010741	0.666667	0.023256	0.000743	-0.005355		
Salvia mellifera	medium	40.00	1.50	0.50	**14.00**	15	11	4	0.012500	0.011148	0.140000	0.180451	1.000000	0.034884	0.011148	-0.050128		
Sambucus nigra ssp. *caerulea*	tree	0.50	0.00	0.00	**0.17**	1	0	0	0.000417	0.000372	0.001667	0.002148	0.333333	0.011628	0.000372	-0.002935		
Solanum americanum	herb	1.00	0.25	0.50	**0.58**	1	2	2	0.002083	0.001858	0.005833	0.007519	1.000000	0.034884	0.001858	-0.011684		

TABLE C-1
COASTAL SAGE SCRUB QUADRAT DATA – YEAR THREE (2018)

Vascular Plant Species	Habit	Coverage			Mean	No. of Individual Plants			D_i	RD_i	C_i	RC_i	f_i	Rf_i	p_i	$p_i \log p_i$	H'	Potential H'
		CSS-Q1	CSS-Q2	CSS-Q3		CSS-Q1	CSS-Q2	CSS-Q3										
Non-native																		
Anthriscus caucalis		0.25	0.00	0.00	**0.08**	8	0	0	0.003333	0.002973	0.000833	0.001074	0.333333	0.011628	0.002973	-0.017297		
Bromus diandrus		0.25	0.25	0.00	**0.17**	2	1	0	0.001250	0.001115	0.001667	0.002148	0.666667	0.023256	0.001115	-0.007580		
Bromus madritensis ssp. *rubens*		0.50	1.00	0.25	**0.58**	70	20	6	0.040000	0.035674	0.005833	0.007519	1.000000	0.034884	0.035674	-0.118914		
Centaurea melitensis		0.00	0.00	0.25	**0.08**	0	0	1	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Chenopodium album		0.00	0.00	0.25	**0.08**	0	0	4	0.001667	0.001486	0.000833	0.001074	0.333333	0.011628	0.001486	-0.009679		
Erodium cicutarium		0.00	0.25	0.00	**0.08**	0	1	0	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Euphorbia spathulata		0.00	0.00	0.25	**0.08**	0	0	5	0.002083	0.001858	0.000833	0.001074	0.333333	0.011628	0.001858	-0.011684		
Festuca myuros		0.50	25.00	0.00	**8.50**	100	1000	0	0.458333	0.408770	0.085000	0.109560	0.666667	0.023256	0.408770	-0.365687		
Festuca perenne		0.00	0.00	0.25	**0.08**	0	0	10	0.004167	0.003716	0.000833	0.001074	0.333333	0.011628	0.003716	-0.020792		
Gamochaeta pensylvanica		0.00	0.25	0.00	**0.08**	0	20	0	0.008333	0.007432	0.000833	0.001074	0.333333	0.011628	0.007432	-0.036432		
Hirschfeldia incana		0.25	0.25	0.00	**0.17**	1	1	0	0.000833	0.000743	0.001667	0.002148	0.666667	0.023256	0.000743	-0.005355		
Hypochaeris glabra		0.25	0.25	0.00	**0.17**	1	25	0	0.010833	0.009662	0.001667	0.002148	0.666667	0.023256	0.009662	-0.044827		
Senecio vulgaris		0.25	0.25	0.25	**0.25**	4	15	2	0.008750	0.007804	0.002500	0.003222	1.000000	0.034884	0.007804	-0.037873		
Sonchus asper		0.00	0.25	0.00	**0.08**	0	20	0	0.008333	0.007432	0.000833	0.001074	0.333333	0.011628	0.007432	-0.036432		
Sonchus oleraceus		0.25	1.00	1.00	**0.75**	3	50	9	0.025833	0.023040	0.007500	0.009667	1.000000	0.034884	0.023040	-0.086872		
Stellaria media		0.00	0.00	0.25	**0.08**	0	0	1	0.000417	0.000372	0.000833	0.001074	0.333333	0.011628	0.000372	-0.002935		
Absolute Coverage																		
Total Absolute Native Species Coverage		93.25	31.50	74.00	**66.25**													
Total Absolute Non-Native Species Coverage		2.50	28.75	2.75	**11.33**													
Total Absolute Coverage (All)		95.75	60.25	76.75	**77.58**													
Ground Coverage																		
Leaf Litter		5.00	3.00	2.00	**3.33**													
Fine Woody Debris		20.00	5.00	10.00	**11.67**													
Coarse Woody Debris		0.00	0.25	0.25	**0.17**													
Rock/Cobble/Gravel		2.00	2.00	1.00	**1.67**													
Bare Soil		65.00	77.75	83.25	**75.33**													
Open Water		0.00	0.00	0.00	**0.00**													
V-Ditch		0.00	0.00	0.00	**0.00**													
PVC pipe		0.00	1.00	0.50	**0.50**													
Straw wattle		5.00	1.00	2.00	**2.67**													
Moss		3.00	10.00	1.00	**4.67**													

TABLE C-2
OAK WOODLAND QUADRAT DATA – YEAR THREE (2018)

Vascular Plant Species	Habit	Coverage						Mean	No. of Individual Plants						D_i	RD_i	C_i	RC_i	f_i	Rf_i	p_i	$p_i \log p_i$	H'	Potential H'
		OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6		OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6										
Native																								
Acmispon glaber var. *glaber*	subshrub	9.00	1.50	23.00	0.25	0.25	0.00	**5.67**	28	66	26	2	1		0.025625	0.006348	0.056667	0.107937	0.833333	0.026738	0.006348	-0.032117	**1.13**	**4.29**
Acmispon strigosus	herb	0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						1	0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Amsinckia intermedia	herb	0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						5	0.001042	0.000258	0.000417	0.000794	0.166667	0.005348	0.000258	-0.002132		
Artemisia californica	medium	0.00	5.00	0.00	15.00	0.75	0.50	**3.54**		4		14	1	2	0.004375	0.001084	0.035417	0.067460	0.666667	0.021390	0.001084	-0.007399		
Artemisia douglasiana	herb	1.00	9.00	7.00	10.00	0.00	0.00	**4.50**	2	3	9	5			0.003958	0.000981	0.045000	0.085714	0.666667	0.021390	0.000981	-0.006792		
Baccharis salicifolia ssp. *salicifolia*	large	0.00	0.50	1.00	1.00	0.00	0.00	**0.42**		1	1	1			0.000625	0.000155	0.004167	0.007937	0.500000	0.016043	0.000155	-0.001358		
Brickellia californica	medium	0.00	2.00	0.00	0.25	0.00	0.00	**0.38**		3		1			0.000833	0.000206	0.003750	0.007143	0.333333	0.010695	0.000206	-0.001752		
Camissoniopsis hirtella	herb	0.25	0.00	0.25	0.00	0.25	0.00	**0.13**	1		10		5		0.003333	0.000826	0.001250	0.002381	0.500000	0.016043	0.000826	-0.005862		
Ceanothus oliganthus	large	0.00	0.00	0.00	0.00	0.50	0.00	**0.08**					1		0.000208	0.000052	0.000833	0.001587	0.166667	0.005348	0.000052	-0.000509		
Clarkia purpurea var. *quadrivulnera*	herb	1.00	0.25	1.00	0.25	0.75	1.00	**0.71**	200	30	150	50	125	100	0.136458	0.033802	0.007083	0.013492	1.000000	0.032086	0.033802	-0.114496		
Cyperus eragrostis	herb	1.00	0.25	0.25	0.00	0.00	0.00	**0.25**	26	2	2				0.006250	0.001548	0.002500	0.004762	0.500000	0.016043	0.001548	-0.010018		
Elymus condensatus	herb	0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						1	0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Epilobium ciliatum ssp. *ciliatum*	herb	4.00	0.25	0.50	0.25	0.25	0.00	**0.88**	43	1	100	45	40		0.047708	0.011818	0.008750	0.016667	0.833333	0.026738	0.011818	-0.052449		
Eriogonum fasciculatum var. *foliolosum*	medium	0.00	3.00	10.00	5.00	3.00	2.50	**3.92**		6	2	8	3	5	0.005000	0.001239	0.039167	0.074603	0.833333	0.026738	0.001239	-0.008291		
Frangula californica	large	0.00	0.25	0.00	0.00	0.00	0.00	**0.04**		1					0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Helianthus annuus	herb	3.00	0.00	0.50	0.00	0.25	0.00	**0.63**	6		6		2		0.002917	0.000722	0.006250	0.011905	0.500000	0.016043	0.000722	-0.005226		
Hesperoyucca whipplei	succulent	0.00	0.00	0.00	0.00	0.25	0.00	**0.04**					2		0.000417	0.000103	0.000417	0.000794	0.166667	0.005348	0.000103	-0.000947		
Heteromeles arbutifolia	large	1.00	0.00	0.00	0.00	0.00	0.00	**0.17**	1						0.000208	0.000052	0.001667	0.003175	0.166667	0.005348	0.000052	-0.000509		
Heterotheca grandiflora	herb	0.25	0.25	0.25	0.25	0.50	1.00	**0.42**	4	15	1	15	45	60	0.029167	0.007225	0.004167	0.007937	1.000000	0.032086	0.007225	-0.035620		
Juncus rugulosus	herb	0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	1						0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Keckiella cordifolia	subshrub	0.00	0.00	0.25	0.00	0.00	0.00	**0.04**			1				0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Leptochloa fusca	herb	8.00	0.25	0.25	0.00	0.00	0.00	**1.42**	18	2	1				0.004375	0.001084	0.014167	0.026984	0.500000	0.016043	0.001084	-0.007399		
Lupinus hirsutissimus	herb	0.00	0.00	0.00	0.25	0.25	0.25	**0.13**				3	1	2	0.001250	0.000310	0.001250	0.002381	0.500000	0.016043	0.000310	-0.002502		
Lupinus truncatus	herb	0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						2	0.000417	0.000103	0.000417	0.000794	0.166667	0.005348	0.000103	-0.000947		
Malosma laurina	large	0.25	0.00	0.50	0.25	0.25	2.00	**0.54**	2		1	1	1	1	0.001250	0.000310	0.005417	0.010317	0.833333	0.026738	0.000310	-0.002502		
Malacothrix saxatilis	herb	0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	1						0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Melica imperfecta	herb	0.00	0.00	0.00	0.00	1.00	0.00	**0.17**					4		0.000833	0.000206	0.001667	0.003175	0.166667	0.005348	0.000206	-0.001752		
Mimulus aurantiacus var. *pubescens*	medium	0.50	0.00	1.00	0.00	0.00	0.00	**0.25**	2		1				0.000625	0.000155	0.002500	0.004762	0.333333	0.010695	0.000155	-0.001358		
Opuntia sp.	succulent	0.00	0.00	0.00	0.00	1.50	1.00	**0.42**					4	4	0.001667	0.000413	0.004167	0.007937	0.333333	0.010695	0.000413	-0.003217		
Pellaea andromedifolia	fern	0.00	0.00	0.25	0.00	0.25	0.00	**0.08**			3		1		0.000833	0.000206	0.000833	0.001587	0.333333	0.010695	0.000206	-0.001752		
Penstemon spectabilis var. *spectabilis*	herb	0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	1						0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Persicaria lapathifolia	herb	0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	1						0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Phacelia distans	herb	3.00	2.00	3.00	5.00	25.00	20.00	**9.67**	25	16	35	50	140	200	0.097083	0.024049	0.096667	0.184127	1.000000	0.032086	0.024049	-0.089645		
Phacelia minor	herb	0.00	0.00	0.25	0.25	0.25	0.25	**0.17**			1	1	4	3	0.001875	0.000464	0.001667	0.003175	0.666667	0.021390	0.000464	-0.003565		
Plantago erecta	herb	0.25	0.25	0.00	0.00	0.00	0.00	**0.08**	9	1					0.002083	0.000516	0.000833	0.001587	0.333333	0.010695	0.000516	-0.003906		
Polypodium californica	fern	0.00	0.00	0.00	0.00	0.25	0.00	**0.04**					1		0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Pseudognaphalium bioletti	herb	0.00	0.25	0.00	0.00	0.00	0.00	**0.04**		21					0.004375	0.001084	0.000417	0.000794	0.166667	0.005348	0.001084	-0.007399		
Pseudognaphalium californicum	herb	0.00	0.00	0.25	0.00	0.25	0.00	**0.08**			2		4		0.001250	0.000310	0.000833	0.001587	0.333333	0.010695	0.000310	-0.002502		
Pseudognaphalium canescens	herb	0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						2	0.000417	0.000103	0.000417	0.000794	0.166667	0.005348	0.000103	-0.000947		

TABLE C-2
OAK WOODLAND QUADRAT DATA – YEAR THREE (2018)

Vascular Plant Species	Habit	Coverage						Mean	No. of Individual Plants						D_i	RD_i	C_i	RC_i	f_i	Rf_i	p_i	$p_i \log p_i$	H'	Potential H'
		OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6		OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6										
Pseudognaphalium stramineum	herb	3.00	0.25	0.25	0.25	1.50	0.00	**0.88**	300	30	125	30	175		0.137500	0.034060	0.008750	0.016667	0.833333	0.026738	0.034060	-0.115111		
Quercus agrifolia var. *agrifolia*	tree	0.00	2.00	2.00	3.00	3.00	0.25	**1.71**		2	1	2	3	2	0.002083	0.000516	0.017083	0.032540	0.833333	0.026738	0.000516	-0.003906		
Quercus engelmannii	tree	0.00	0.00	0.00	0.00	0.25	0.25	**0.08**					1	1	0.000417	0.000103	0.000833	0.001587	0.333333	0.010695	0.000103	-0.000947		
Rhus ovata	large	2.00	0.00	8.00	2.00	0.00	0.00	**2.00**	1		1	1			0.000625	0.000155	0.020000	0.038095	0.500000	0.016043	0.000155	-0.001358		
Rubus ursinus	medium	0.50	0.00	0.00	0.00	0.00	0.00	**0.08**	1						0.000208	0.000052	0.000833	0.001587	0.166667	0.005348	0.000052	-0.000509		
Salvia mellifera	medium	0.00	1.50	0.00	3.00	0.00	0.00	**0.75**		2		8			0.002083	0.000516	0.007500	0.014286	0.333333	0.010695	0.000516	-0.003906		
Sambucus nigra ssp. *caerulea*	tree	1.00	1.00	10.00	0.00	1.50	0.00	**2.25**	1	1	3		1		0.001250	0.000310	0.022500	0.042857	0.666667	0.021390	0.000310	-0.002502		
Solanum americanum	herb	0.00	0.00	2.00	1.50	1.50	0.50	**0.92**		0.5	23	10	15	3	0.010729	0.002658	0.009167	0.017460	0.833333	0.026738	0.002658	-0.015761		
Stipa lepida	herb	0.00	0.00	0.00	0.50	1.00	1.50	**0.50**				9	6	7	0.004583	0.001135	0.005000	0.009524	0.500000	0.016043	0.001135	-0.007699		
Non-native																								
Bromus diandrus		0.00	0.00	0.25	0.25	0.25	0.00	**0.13**			3	2	2		0.001458	0.000361	0.001250	0.002381	0.500000	0.016043	0.000361	-0.002863		
Bromus madritensis ssp. *rubens*		0.25	0.25	0.75	0.25	0.25	0.25	**0.33**	6	2	50	5	5	35	0.021458	0.005315	0.003333	0.006349	1.000000	0.032086	0.005315	-0.027838		
Chenopodium album		0.00	0.25	0.00	0.00	0.00	0.00	**0.04**		2					0.000417	0.000103	0.000417	0.000794	0.166667	0.005348	0.000103	-0.000947		
Cotula australis		0.25	0.25	0.00	0.00	0.00	0.00	**0.08**	5	16					0.004375	0.001084	0.000833	0.001587	0.333333	0.010695	0.001084	-0.007399		
Dysphania botrys		0.00	0.25	0.25	0.00	0.00	0.00	**0.08**		1	30				0.006458	0.001600	0.000833	0.001587	0.333333	0.010695	0.001600	-0.010299		
Erodium botrys		0.00	0.00	0.00	0.00	0.00	1.00	**0.17**						100	0.020833	0.005161	0.001667	0.003175	0.166667	0.005348	0.005161	-0.027179		
Erodium cicutarium		0.00	0.00	0.50	0.25	0.00	0.00	**0.13**			30	1			0.006458	0.001600	0.001250	0.002381	0.333333	0.010695	0.001600	-0.010299		
Euphorbia maculata		0.00	0.25	0.50	0.00	0.25	0.00	**0.17**		10	5		11		0.005417	0.001342	0.001667	0.003175	0.500000	0.016043	0.001342	-0.008874		
Euphorbia spathulata		0.00	0.00	0.50	0.00	0.25	0.00	**0.13**			5		11		0.003333	0.000826	0.001250	0.002381	0.333333	0.010695	0.000826	-0.005862		
Festuca myuros		0.00	3.00	1.00	0.00	10.25	10.00	**4.04**		150	90		10000	5000	3.175000	0.786479	0.040417	0.076984	0.666667	0.021390	0.786479	-0.188904		
Gamochaeta pensylvanica		0.25	0.25	0.25	0.25	0.25	0.00	**0.21**	10	23	12	20	25		0.018750	0.004645	0.002083	0.003968	0.833333	0.026738	0.004645	-0.024951		
Hirschfeldia incana		0.00	0.00	0.00	0.00	0.25	0.25	**0.08**					1	1	0.000417	0.000103	0.000833	0.001587	0.333333	0.010695	0.000103	-0.000947		
Hordeum murinum		0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						1	0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Hypochaeris glabra		0.00	0.00	0.00	0.00	0.25	0.25	**0.08**					3	30	0.006875	0.001703	0.000833	0.001587	0.333333	0.010695	0.001703	-0.010857		
Lepidium didymum		0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	4						0.000833	0.000206	0.000417	0.000794	0.166667	0.005348	0.000206	-0.001752		
Logfia gallica		0.00	0.25	0.00	0.00	0.00	0.25	**0.08**		1				1	0.000417	0.000103	0.000833	0.001587	0.333333	0.010695	0.000103	-0.000947		
Malva parviflora		0.00	0.00	0.00	0.00	0.00	0.25	**0.04**						1	0.000208	0.000052	0.000417	0.000794	0.166667	0.005348	0.000052	-0.000509		
Poa annua		5.00	0.00	0.25	0.00	0.00	0.00	**0.88**	300		5				0.063542	0.015740	0.008750	0.016667	0.333333	0.010695	0.015740	-0.065345		
Polycarpon tetraphyllum var. *tetraphyllum*		0.25	0.00	0.00	0.00	0.00	0.00	**0.04**	10						0.002083	0.000516	0.000417	0.000794	0.166667	0.005348	0.000516	-0.003906		
Polypogon monspeliensis		0.25	0.25	0.00	0.00	0.00	0.00	**0.08**	8	14					0.004583	0.001135	0.000833	0.001587	0.333333	0.010695	0.001135	-0.007699		
Pseudognaphalium luteoalbum		0.00	0.25	0.00	0.00	0.00	0.00	**0.04**		34					0.007083	0.001755	0.000417	0.000794	0.166667	0.005348	0.001755	-0.011134		
Schismus sp.		0.00	0.00	0.00	0.50	0.00	0.00	**0.08**				50			0.010417	0.002580	0.000833	0.001587	0.166667	0.005348	0.002580	-0.015378		
Senecio vulgaris		0.25	0.25	0.50	0.25	0.25	0.25	**0.29**	7	1	7	5	4	4	0.005833	0.001445	0.002917	0.005556	1.000000	0.032086	0.001445	-0.009450		
Sonchus oleraceus		0.25	0.25	0.50	0.00	0.25	0.25	**0.25**	3	6	8		30	40	0.018125	0.004490	0.002500	0.004762	0.833333	0.026738	0.004490	-0.024271		
Veronica arvensis		0.25	0.00	3.00	0.00	0.00	0.00	**0.54**	2		500				0.104583	0.025906	0.005417	0.010317	0.333333	0.010695	0.025906	-0.094643		
Absolute Coverage																								
Total Absolute Native Species Coverage		40.00	29.75	71.75	48.25	44.50	32.25	**44.42**																
Total Absolute Non-Native Species Coverage		7.25	5.75	8.25	1.75	12.50	13.00	**8.08**																
Total Absolute Coverage (All)		47.25	35.50	80.00	50.00	57.00	45.25	**52.50**																

TABLE C-2
OAK WOODLAND QUADRAT DATA – YEAR THREE (2018)

Vascular Plant Species	Habit	Coverage							No. of Individual Plants															
		OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6	Mean	OW-Q1	OW-Q2	OW-Q3	OW-Q4	OW-Q5	OW-Q6	D_i	RD_i	C_i	RC_i	f_i	Rf_i	p_i	$p_i \log p_i$	H'	Potential H'
Ground Coverage																								
Leaf Litter		10.00	70.00	40.00	40.00	47.50	67.00	**45.75**																
Fine Woody Debris		1.00	2.00	4.00	15.00	5.00	15.00	**7.00**																
Coarse Woody Debris or Snags		2.00	0.25	3.00	2.00	1.00	1.00	**1.54**																
Rock/Cobble/Gravel		2.00	10.00	3.00	10.00	33.00	10.00	**11.33**																
Bare Soil		74.00	16.75	39.00	16.50	7.00	5.00	**26.38**																
PVC pipe		1.00	1.00	1.00	1.50	1.50	1.00	**1.17**																
Moss		10.00	0.00	10.00	15.00	5.00	1.00	**6.83**																

ATTACHMENT D

YEAR THREE TRANSECT DATA (2018)

TABLE D-1
COASTAL SAGE SCRUB TRANSECT DATA – YEAR THREE (2018)

Plant Species	Habit	Transect Number (50-ft Transects): Hits/Coverage (Percent)												Mean Coverage (Percent)	C_i	RC_i
		T-C1		T-C2		T-C3		T-C4		T-C5		T-C6				
		Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage			
Native																
Acmispon glaber var. *glaber*	subshrub		0.00	1	2.00	22	44.00	26	52.00	13	26.00	42	84.00	**34.67**	0.346667	0.321981
Artemisia californica	medium	10	20.00	2	4.00	11	22.00	11	22.00	7	14.00		0.00	**13.67**	0.136667	0.126935
Clarkia purpurea var. *quadrivulnera*	herb	6	12.00	4	8.00		0.00		0.00		0.00		0.00	**3.33**	0.033333	0.030960
Eriogonum elongatum	herb		0.00	9	18.00		0.00		0.00		0.00		0.00	**3.00**	0.030000	0.027864
Eriogonum fasciculatum var. *foliolosum*	medium	31	62.00	9	18.00	26	52.00	14	28.00	16	32.00		0.00	**32.00**	0.320000	0.297214
Eulobus californicus	herb		0.00		0.00		0.00		0.00		0.00	3	6.00	**1.00**	0.010000	0.009288
Hesperoyucca whipplei	succulent		0.00		0.00		0.00		0.00		0.00	1	2.00	**0.33**	0.003333	0.003096
Malosma laurina	large		0.00		0.00		0.00	6	12.00		0.00		0.00	**2.00**	0.020000	0.018576
Melica imperfecta	herb		0.00	2	4.00		0.00		0.00		0.00		0.00	**0.67**	0.006667	0.006192
Opuntia vaseyi	succulent		0.00		0.00		0.00		0.00		0.00	2	4.00	**0.67**	0.006667	0.006192
Phacelia cicutaria	herb		0.00		0.00		0.00	1	2.00		0.00		0.00	**0.33**	0.003333	0.003096
Phacelia minor	herb		0.00	1	2.00		0.00		0.00	2	4.00		0.00	**1.00**	0.010000	0.009288
Pseudognaphalium stramineum	herb	5	10.00	2	4.00		0.00		0.00		0.00		0.00	**2.33**	0.023333	0.021672
Rhus ovata	large		0.00		0.00		0.00		0.00	2	4.00		0.00	**0.67**	0.006667	0.006192
Salvia apiana	medium		0.00		0.00		0.00		0.00		0.00	3	6.00	**1.00**	0.010000	0.009288
Salvia mellifera	medium	9	18.00		0.00	2	4.00		0.00	1	2.00		0.00	**4.00**	0.040000	0.037152
Stipa lepida	herb		0.00	1	2.00		0.00		0.00		0.00		0.00	**0.33**	0.003333	0.003096
Non-Native																
Bromus diandrus			0.00		0.00		0.00	1	2.00		0.00		0.00	**0.33**	0.003333	0.003096
Festuca myuros		5	10.00	9	18.00		0.00	1	2.00		0.00		0.00	**5.00**	0.050000	0.046440
Senecio vulgaris		1	2.00		0.00		0.00		0.00		0.00		0.00	**0.33**	0.003333	0.003096
Sonchus asper		1	2.00		0.00		0.00		0.00		0.00		0.00	**0.33**	0.003333	0.003096
Sonchus oleraceus			0.00	2	4.00		0.00		0.00		0.00		0.00	**0.67**	0.006667	0.006192
Absolute Percent Coverage																
Total Absolute Native Species Coverage		61	122.00	31	62.00	61	122.00	58	116.00	41	82.00	51	102.00	**101.00**		
Total Absolute Non-Native Species Coverage		7	14.00	11	22.00	0	0.00	2	4.00	0	0.00	0	0.00	**6.67**		
Total Absolute Coverage (All)		68	136.00	42	84.00	61	122.00	60	120.00	41	82.00	51	102.00	**107.67**		
Class Percent Coverage																
Native		41	82.00	20	40.00	45	90.00	43	86.00	33	66.00	46	92.00	**76.00**		
Non-Native		3	6.00	6	12.00		0.00	1	2.00		0.00		0.00	**3.33**		
Both		4	8.00	4	8.00		0.00	1	2.00		0.00		0.00	**3.00**		
No Plant		2	4.00	20	40.00	5	10.00	5	10.00	17	34.00	4	8.00	**17.67**		
Summary																
Total Native Class Coverage		45.00	90.00	24.00	48.00	45.00	90.00	44.00	88.00	33.00	66.00	46.00	92.00	**79.00**		
Total Non-Native Class Coverage		7	14.00	10	20.00	0	0.00	2	4.00	0	0.00	0	0.00	**6.33**		
Total Unvegetated		2	4.00	20	40.00	5	10.00	5	10.00	17	34.00	4	8.00	**17.67**		
Ground Cover																
Bare Soil		4	8.00	9	18.00	3	6.00	10	20.00	11	22.00	6	12.00	**14.33**		
Rock/Cobble			0.00	10	20.00	1	2.00		0.00	1	2.00		0.00	**4.00**		
Leaf Litter		13	26.00	14	28.00	2	4.00	1	2.00	5	10.00	5	10.00	**13.33**		
Fine Woody Debris (<1" diameter)		32	64.00	13	26.00	44	88.00	37	74.00	32	64.00	36	72.00	**64.67**		
Coarse Woody Debris (>1" diameter)			0.00	1	2.00		0.00		0.00	1	2.00		0.00	**0.67**		
Other: Straw Wattle		1	2.00	2	4.00		0.00	1	2.00		0.00	3	6.00	**2.33**		
Other: PVC Pipe			0.00	1	2.00		0.00	1	2.00		0.00		0.00	**0.67**		

TABLE D-2
OAK WOODLAND TRANSECT DATA – YEAR THREE (2018)

Plant Species	Habit	Transect Number (100-ft Transects; Hits = Percent Coverage)							C_i	RC_i
		T-O1	T-O2	T-O3	T-O4	T-O5	T-O6	Mean Coverage (Percent)		
Native										
Acmispon glaber var. *glaber*	subshrub	18	1	4	36		2	**10.17**	0.101667	0.097289
Acmispon sp. (vegetative)	herb			3				**0.50**	0.005000	0.004785
Artemisia californica	medium	12				7	16	**5.83**	0.058333	0.055821
Artemisia douglasiana	herb	26	13	4		1	2	**7.67**	0.076667	0.073365
Baccharis salicifolia ssp. *salicifolia*	large	3	29	1				**5.50**	0.055000	0.052632
Brickellia californica	medium						3	**0.50**	0.005000	0.004785
Clarkia purpurea var. *quadrivulnera*	herb		31	16	1	2	5	**9.17**	0.091667	0.087719
Elymus condensatus	herb					9		**1.50**	0.015000	0.014354
Epilobium brachycarpum	herb	1						**0.17**	0.001667	0.001595
Eriogonum fasciculatum var. *foliolosum*	medium	16		9		9		**5.67**	0.056667	0.054226
Eulobus californica	herb				5			**0.83**	0.008333	0.007974
Helianthus annuus	herb				1		4	**0.83**	0.008333	0.007974
Heteromeles arbutifolia	large	3	1					**0.67**	0.006667	0.006380
Heterotheca grandiflora	herb				8			**1.33**	0.013333	0.012759
Keckiella cordifolia	subshrub	6						**1.00**	0.010000	0.009569
Leptochloa fusca	herb			4			3	**1.17**	0.011667	0.011164
Lupinus succulentus	herb				1			**0.17**	0.001667	0.001595
Lupinus truncatus	herb					2		**0.33**	0.003333	0.003190
Malosma laurina	large	12		5				**2.83**	0.028333	0.027113
Melica imperfecta	herb		5				5	**1.67**	0.016667	0.015949
Penstemon spectabilis var. *spectabilis*	herb		1					**0.17**	0.001667	0.001595
Phacelia distans	herb	7	18	7		51	40	**20.50**	0.205000	0.196172
Phacelia minor	herb				3	1		**0.67**	0.006667	0.006380
Phacelia ramosissima	herb				18			**3.00**	0.030000	0.028708
Pseudognaphalium stramineum	herb	3	3	7		2		**2.50**	0.025000	0.023923
Quercus agrifolia var. *agrifolia*	tree	3	10	2	1		3	**3.17**	0.031667	0.030303
Ribes aureum	medium			5				**0.83**	0.008333	0.007974
Salix gooddingii	tree		7					**1.17**	0.011667	0.011164
Salvia columbariae	herb				2			**0.33**	0.003333	0.003190
Salvia mellifera	medium			4				**0.67**	0.006667	0.006380
Sambucus nigra ssp. *caerulea*	tree						7	**1.17**	0.011667	0.011164
Solanum cf. *douglasii*	herb	2		6				**1.33**	0.013333	0.012759
Stipa lepida	herb	6				8		**2.33**	0.023333	0.022329
Non-Native										
cf. *Polypogon viridis*			1					**0.17**	0.001667	0.001595
Bromus diandrus			1	1			3	**0.83**	0.008333	0.007974
Bromus madritensis ssp. *rubens*		2	8			1		**1.83**	0.018333	0.017544
Cotula australis		1	3	1		1		**1.00**	0.010000	0.009569
Festuca myuros		1	3	1		5	12	**3.67**	0.036667	0.035088
Lysimachia arvensis				5				**0.83**	0.008333	0.007974
Melilotus sp. (vegetative)			3					**0.50**	0.005000	0.004785
Sonchus oleraceus						2		**0.33**	0.003333	0.003190
Absolute Percent Coverage										
Total Absolute Native Species Coverage		118.00	119.00	77.00	76.00	92.00	90.00	**95.33**		
Total Absolute Non-Native Species Coverage		4.00	19.00	8.00	0.00	9.00	15.00	**9.17**		
Total Absolute Coverage (All)		122.00	138.00	85.00	76.00	101.00	105.00	**104.50**		
Class Percent Coverage										
Native		79.00	70.00	55.00	55.00	65.00	56.00	**63.33**		
Non-Native		2.00	5.00	5.00	0.00	4.00	4.00	**3.33**		
Both		2.00	12.00	1.00	0.00	5.00	11.00	**5.17**		
No Plant		17.00	13.00	39.00	45.00	26.00	29.00	**28.17**		
Summary										
Total Native Class Coverage		81.00	82.00	56.00	55.00	70.00	67.00	**68.50**		
Total Non-Native Class Coverage		4.00	17.00	6.00	0.00	9.00	15.00	**8.50**		
Total Unvegetated		17.00	13.00	39.00	45.00	26.00	29.00	**28.17**		
Ground Cover										
Bare Soil		15.00	10.00	22.00	44.00	1.00	15.00	**17.83**		
Boulder/Rock/Cobble		1.00	2.00	7.00	3.00	19.00	13.00	**7.50**		
Leaf Litter		33.00	31.00	42.00	50.00	49.00	34.00	**39.83**		
Fine Woody Debris		48.00	45.00	25.00	3.00	22.00	29.00	**28.67**		
Coarse Woody Debris		2.00	12.00	1.00	0.00	9.00	4.00	**4.67**		
Other: moss		1.00		1.00			5.00	**1.17**		
Other: PVC pipe				2.00				**0.33**		

ATTACHMENT E

OAK TREE ASSESSMENT DATA – YEAR THREE (2018)

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
1	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	4.00	4	2
2	coast live oak	*Quercus agrifolia var. agrifolia*	1	0.15	0.00	0.15	0.5	0.3	0.05	4	2
3	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	6.0	28.27	4	1
4	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	3.0	7.07	4	0.5
5	San Gabriel oak	*Quercus durata* var. *gabrielensis*	1	0.25	0.00	0.25	4.0	2.0	3.14	5	1
6	San Gabriel oak	*Quercus durata* var. *gabrielensis*	2	0.15	0.15	0.30	3.0	2.0	3.14	4	1
7	coast live oak	*Quercus agrifolia* var. *agrifolia*	3	0.75	0.75	1.50	8.0	6.0	28.27	4	3
8	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	2
9	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	3
10	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	5.0	4.0	12.57	4	2
11	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	0.5
12	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.50	0.50	2.00	8.0	7.0	38.48	4	2
13	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	7.0	6.0	28.27	4	2
14	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	3
15	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	1
16	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	7.0	38.48	4	1
17	Engelmann oak	*Quercus engelmannii*	2	0.15	0.15	0.30	2.0	2.0	3.14	4	3
18	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	2
19	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	4.0	12.57	4	1
20	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	9.0	4.0	12.57	4	2
21	San Gabriel oak	*Quercus durata* var. *gabrielensis*	1	0.25	0.00	0.25	4.5	2.0	3.14	4	0
22	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.15	0.40	6.0	4.0	12.57	4	2
23	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	10.0	8.0	50.27	4	1
24	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	2.0	1.0	0.79	4	0
25	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	12.0	8.0	50.27	4	3
26	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	9.0	6.0	28.27	4	4
27	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	6.0	28.27	3	1
28	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	6.0	28.27	4	2

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
29	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	9.0	6.0	28.27	4	3
30	San Gabriel oak	*Quercus durata* var. *gabrielensis*	1	0.15	0.00	0.15	3.0	1.0	0.79	4	4
31	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	2.50	2.00	4.50	10.0	10.0	78.54	4	3
32	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.75	0.00	1.75	11.0	6.0	28.27	4	1
33	canyon live oak	*Quercus chrysolepis*	1	0.10	0.00	0.10	0.50	0.25	0.05	4	1
34	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	5.0	19.64	4	3
35	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	6.0	28.27	4	2
36	No Plant										
37	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	2.5	2.0	3.14	4	1
38	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	10.0	5.0	19.64	4	2
39	Engelmann oak	*Quercus engelmannii*	2	0.10	0.10	0.20	1.0	1.0	0.79	3	3
40	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	4.0	12.57	4	7
41	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	3.0	7.07	4	2
42	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	7.0	38.48	4	2
43	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	10.0	78.54	4	5
44	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	2
45	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	11.0	8.0	50.27	4	4
46	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	3	0
47	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.50	1.50	7.0	6.0	28.27	4	5
48	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	8.0	50.27	4	3
49	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	8.0	6.0	28.27	4	2
50	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	5.0	3.0	7.07	4	2
51	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.50	1.00	2.50	8.0	8.0	50.27	4	2
52	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	6.0	28.27	4	2
53	coast live oak	*Quercus agrifolia* var. *agrifolia*	3	1.00	0.75	1.75	8.0	6.0	28.27	4	3
54	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	7.0	38.48	4	3
55	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	0.50	1.75	8.0	5.0	19.64	4	3
56	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	3.0	7.07	4	3

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
57	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	8.0	10.0	78.54	4	5
58	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	2
59	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	2.0	1.0	0.79	4	2
60	Engelmann oak	*Quercus engelmannii*	1	1.00	0.00	1.00	10.0	4.0	12.57	4	3
61	Engelmann oak	*Quercus engelmannii*	1	0.75	0.00	0.75	6.0	3.0	7.07	4	2
62	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	3.0	7.07	4	5
63	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	3
64	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	3.00	0.00	3.00	11.0	8.0	50.27	4	2
65	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	10.0	6.0	28.27	4	2
66	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.0	2.0	3.14	4	1
67	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	5.0	19.64	4	3
68	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	3.0	7.07	4	4
69	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	4.0	12.57	4	1
70	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	1.00	2.00	8.0	4.0	12.57	4	1
71	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	3.0	7.07	4	0
72	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	4	3
73	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	2
74	coast live oak	*Quercus agrifolia* var. *agrifolia*	3	1.50	1.00	2.50	10.0	10.0	78.54	4	1
75	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	10.0	4.0	12.57	4	1
76	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	5
77	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	8.0	4.0	12.57	3	2
78	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	10.0	8.0	50.27	4	3
79	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	3.0	7.07	4	2
80	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	1
81	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.15	0.40	5.0	4.0	12.57	4	3
82	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	3.0	7.07	4	2
83	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	3.0	7.07	3	1
84	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	4.0	12.57	4	3

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
85	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	0.25	1.50	10.0	6.0	28.27	4	5
86	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	8.0	6.0	28.27	4	6
87	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	5.0	4.0	12.57	4	4
88	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	4
89	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	8.0	50.27	4	3
90	Engelmann oak	*Quercus engelmannii*	2	0.75	0.25	1.00	6.0	4.0	12.57	4	3
91	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	7.0	2.0	3.14	4	3
92	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	2.50	1.00	3.50	15.0	8.0	50.27	4	4
93	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	1
94	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.25	0.50	5.0	4.0	12.57	3	2
95	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	2
96	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	9.0	5.0	19.64	4	4
97	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	3.0	2.0	3.14	4	3
98	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	2
99	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	3.0	7.07	4	3
100	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	4.0	2.0	3.14	3	3
101	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	1.0	0.79	4	1
102	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	10.0	78.54	4	2
103	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	2.0	3.14	4	1
104	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	10.0	10.0	78.54	4	2
105	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	3.0	7.07	4	3
106	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	6.0	28.27	4	2
107	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	8.0	6.0	28.27	4	4
108	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	6.0	28.27	4	1
109	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	8.0	7.0	38.48	4	3
110	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.75	1.75	7.0	5.0	19.64	4	1
111	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	1.5	0.5	0.20	3	1
112	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	8.0	4.0	12.57	3	1
113	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	3

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
114	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.75	0.00	1.75	8.0	10.0	78.54	4	5
115	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	3
116	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	6.0	5.0	19.64	4	2
117	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	1
118	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	2
119	Engelmann oak	*Quercus engelmannii*	1	0.25	0.00	0.25	4.0	2.0	3.14	4	1
120	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	7.0	7.0	38.48	4	2
121	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	1.00	2.25	8.0	6.0	28.27	4	3
122	Engelmann oak	*Quercus engelmannii*	1	0.75	0.00	0.75	7.0	3.0	7.07	4	1
123	Engelmann oak	*Quercus engelmannii*	1	0.50	0.00	0.50	5.0	6.0	28.27	4	1
124	Engelmann oak	*Quercus engelmannii*	1	0.50	0.00	0.50	4.0	5.0	19.64	4	2
125	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.50	1.25	8.0	8.0	50.27	4	5
126	No Plant										
127	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	10.0	8.0	50.27	4	2
128	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	12.0	6.0	28.27	4	6
129	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	6.0	28.27	4	2
130	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	4.0	12.57	4	3
131	Engelmann oak	*Quercus engelmannii*	1	0.50	0.00	0.50	4.0	3.0	7.07	4	3
132	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	1.00	2.00	8.0	7.0	38.48	4	8
133	coast live oak	*Quercus agrifolia* var. *agrifolia*	4	1.00	1.00	2.00	8.0	10.0	78.54	4	6
134	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	6.0	28.27	4	5
135	No Plant										
136	No Plant										
137	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	7.0	8.0	50.27	4	5
138	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	6.0	6.0	28.27	4	2
139	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	3.0	7.07	3	1
140	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	3.0	7.07	4	3
141	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	9.0	8.0	50.27	4	2
142	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.50	1.50	8.0	6.0	28.27	4	4

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
143	Engelmann oak	*Quercus engelmannii*	1	0.25	0.00	0.25	6.0	2.0	3.14	4	6
144	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	3.0	7.07	4	3
145	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.25	0.50	6.0	4.0	12.57	4	1
146	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	4.0	12.57	4	1
147	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.10	0.00	0.10	0.3	0.10	0.01	1	0
148	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	6.0	5.0	19.64	4	3
149	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	6.0	28.27	4	2
150	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	4	5
151	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.0	1.5	1.77	4	4
152	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	1
153	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	7.0	6.0	28.27	4	3
154	No Plant										
155	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	3.0	3.0	7.07	4	1
156	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	6.0	28.27	3	1
157	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	1
158	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	9.0	4.0	12.57	4	5
159	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	7.0	10.0	78.54	4	2
160	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	4
161	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	3.0	7.07	4	0
162	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	3
163	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	6
164	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	6.0	4.0	12.57	4	2
165	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	10.0	8.0	50.27	4	3
166	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	6.0	6.0	28.27	4	3
167	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	4.0	8.0	50.27	4	4
168	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	7.0	3.0	7.07	4	2
169	No Plant										
170	No Plant										
171	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	6.0	28.27	4	2

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
172	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	6.0	28.27	4	2
173	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	0.75	2.00	10.0	6.0	28.27	4	3
174	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	6.0	28.27	4	2
175	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	6.0	4.0	12.57	4	5
176	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	4	3
177	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	10.0	8.0	50.27	4	4
178	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.50	1.25	7.0	5.0	19.64	4	3
179	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	4	3
180	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.0	2.0	3.14	4	3
181	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	6.0	28.27	4	3
182	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	8.0	50.27	4	4
183	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	11.0	8.0	50.27	4	3
184	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	2.0	0.5	0.20	4	2
185	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	4.0	12.57	4	1
186	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	4.0	12.57	3	1
187	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	4	2
188	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	11.0	8.0	50.27	4	2
189	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	0.75	2.00	12.0	10.0	78.54	4	6
190	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	2
191	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	8.0	7.0	38.48	4	0
192	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	5.0	19.64	4	1
193	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	3.0	7.07	4	3
194	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	4	2
195	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	0.5	0.3	0.05	4	4
196	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	4	1
197	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	7.0	38.48	4	3
198	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	5.0	19.64	4	2
199	coast live oak	*Quercus agrifolia* var. *agrifolia*	3	0.50	0.25	0.75	4.0	4.0	12.57	4	3
200	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	8.0	6.0	28.27	4	1

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
201	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	3
202	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	10.0	12.0	113.10	4	2
203	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	6.0	28.27	4	3
204	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	8.0	8.0	50.27	4	2
205	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	7.0	38.48	4	1
206	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	12.0	6.0	28.27	4	1
207	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	6.0	8.0	50.27	4	1
208	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	10.0	78.54	4	5
209	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	8.0	50.27	4	1
210	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	7.0	6.0	28.27	4	3
211	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	1.00	2.25	10.0	8.0	50.27	4	3
212	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	7.0	38.48	4	3
213	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	3	0
214	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.50	1.25	6.5	3.0	7.07	4	2
215	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	3.0	7.07	4	3
216	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	8.0	50.27	4	4
217	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	4.0	12.57	4	3
218	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	5.0	4.0	12.57	4	4
219	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	6.0	28.27	4	1
220	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	6.0	28.27	4	2
221	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.75	1.75	8.0	10.0	78.54	4	3
222	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	6.0	6.0	28.27	4	5
223	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	2
224	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	3
225	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	4.0	4.0	12.57	4	4
226	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	5.0	3.0	7.07	4	3
227	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	4	4
228	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	1.0	0.79	4	1
229	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	1.0	0.79	4	1

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
230	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	5.0	19.64	4	5
231	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	2.0	3.14	4	2
232	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	4.0	5.0	19.64	4	5
233	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	2.0	3.14	4	2
234	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	6.0	2.0	3.14	4	2
235	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	4.0	1.0	0.79	4	1
236	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	3.0	7.07	4	3
237	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	7.0	2.0	3.14	4	2
238	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	11.0	3.0	7.07	4	3
239	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	1.00	2.00	9.0	3.0	7.07	4	3
240	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	2.00	1.00	3.00	10.0	3.0	7.07	4	3
241	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	6.0	3.0	7.07	4	3
242	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	1.0	0.79	4	1
243	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	7.0	2.0	3.14	4	2
244	Engelmann oak	*Quercus engelmannii*	1	0.50	0.00	0.50	8.0	2.0	3.14	4	2
245	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.50	1.50	8.0	1.0	0.79	3	1
246	coast live oak	*Quercus agrifolia* var. *agrifolia*	3	0.75	0.50	1.25	7.0	3.0	7.07	4	3
247	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	2.0	3.14	3	2
248	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	1.00	2.00	8.0	3.0	7.07	4	3
249	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.15	0.65	6.0	1.0	0.79	4	1
250	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	1.0	0.79	4	1
251	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	1.0	0.79	4	1
252	No Plant										
253	No Plant										
254	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	3
255	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	8.0	50.27	4	3
256	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	5.0	19.64	4	3
257	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	4
258	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	9.0	10.0	78.54	4	3

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
259	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	12.0	8.0	50.27	4	2
260	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	6.0	4.0	12.57	4	3
261	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	6.0	4.0	12.57	4	2
262	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	5
263	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	8
264	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	8.0	6.0	28.27	4	3
265	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	9.0	8.0	50.27	4	6
266	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	6.0	2.0	3.14	4	1
267	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	12.0	8.0	50.27	4	3
268	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	0.50	1.75	7.0	8.0	50.27	4	4
269	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	8.0	50.27	4	6
270	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	6.0	5.0	19.64	4	3
271	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	10.0	78.54	4	4
272	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	1
273	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	4.0	4.0	12.57	4	1
274	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	6.0	3.0	7.07	4	2
275	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	5.0	19.64	4	3
276	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.75	1.75	8.0	8.0	50.27	4	2
277	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	4
278	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	4.0	12.57	4	2
279	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	6.0	6.0	28.27	4	3
280	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	4.0	2.0	3.14	4	1
281	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.25	1.00	6.0	8.0	50.27	4	1
282	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	3.0	7.07	4	2
283	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	4	2
284	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	6.0	28.27	4	3
285	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.25	0.50	6.0	3.5	9.62	4	2
286	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	8.0	50.27	4	1
287	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	4	4

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
288	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	6.0	28.27	4	3
289	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	6.0	5.0	19.64	4	3
290	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	8.0	50.27	4	1
291	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	0.3	0.3	0.05	4	1
292	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	6.0	28.27	4	3
293	San Gabriel oak	*Quercus durata var. gabrielensis*	1	0.15	0.00	0.15	1.0	1.00	0.79	1	0
294	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	5.0	2.0	3.14	4	1
295	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	6.0	28.27	4	4
296	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	7.0	38.48	4	5
297	San Gabriel oak	*Quercus durata var. gabrielensis*	5	0.15	0.15	0.30	4.0	3.0	7.07	4	6
298	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	6.0	28.27	4	4
299	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	8.0	50.27	4	3
300	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	6.0	4.0	12.57	4	4
301	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.25	1.25	7.0	8.0	50.27	4	4
302	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	6.0	28.27	4	6
303	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	5.0	19.64	4	3
304	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	8.0	4.0	12.57	4	2
305	Engelmann oak	*Quercus engelmannii*	1	0.10	0.00	0.10	1.0	0.1	0.01	2	1
306	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	3
307	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	7
308	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	4
309	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	3
310	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	4.0	12.57	4	4
311	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	5.0	19.64	4	4
312	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	8.0	8.0	50.27	4	5
313	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.0	1.0	0.79	4	1
314	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	7.0	5.0	19.64	4	6
315	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	4.0	12.57	4	4

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
316	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	7.0	6.0	28.27	4	3
317	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	8.0	5.0	19.64	4	2
318	No Plant										
319	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	10.0	8.0	50.27	4	1
320	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	10.0	6.0	28.27	4	4
321	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	7.0	38.48	4	4
322	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	6.0	28.27	4	4
323	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	5.0	19.64	4	3
324	No Plant										
325	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	6.0	28.27	4	3
326	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	5.0	19.64	4	2
327	Engelmann oak	*Quercus engelmannii*	1	0.25	0.00	0.25	6.0	2.0	3.14	4	3
328	No Plant										
329	coast live oak	*Quercus agrifolia* var. *agrifolia*	4	0.25	0.25	0.50	6.0	5.0	19.64	4	2
330	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	10.0	6.0	28.27	4	2
331	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	3.00	0.00	3.00	11.0	8.0	50.27	4	4
332	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	6.0	3.0	7.07	4	1
333	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	9.0	8.0	50.27	4	3
334	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	15.0	10.0	78.54	4	5
335	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	8.0	10.0	78.54	4	4
336	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	10.0	8.0	50.27	4	5
337	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.0	2.0	3.14	4	4
338	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	9.0	10.0	78.54	4	4
339	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	9.0	6.0	28.27	4	5
340	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	7.0	4.0	12.57	4	5
341	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	4.0	2.0	3.14	4	5
342	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.75	1.50	10.0	10.0	78.54	4	6
343	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	8.0	50.27	4	6
344	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	5.0	3.0	7.07	4	4

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
345	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.00	0.75	8.0	5.0	19.64	4	8
346	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	3.0	4.0	12.57	4	2
347	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.50	0.00	2.50	10.0	6.0	28.27	4	6
348	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.0	2.0	3.14	4	1
349	Engelmann oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	10.0	10.0	78.54	4	5
350	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.0	1.5	1.77	3	1
351	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.50	0.00	1.50	8.0	10.0	78.54	4	1
352	Engelmann oak	*Quercus engelmannii*	3	0.10	0.10	0.20	1.5	1.0	0.79	4	3
353	Engelmann oak	*Quercus engelmannii*	1	0.75	0.00	0.75	6.0	5.0	19.64	4	2
354	Engelmann oak	*Quercus engelmannii*	2	0.10	0.10	0.20	2.0	1.0	0.79	4	0
355	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.00	0.50	1.50	6.0	5.0	19.64	4	3
356	Engelmann oak	*Quercus engelmannii*	2	0.50	0.50	1.00	6.0	4.0	12.57	4	2
357	coast live oak	*Quercus agrifolia* var. *agrifolia*	4	1.25	0.75	2.00	8.0	10.0	78.54	4	3
358	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	6.0	4.0	12.57	4	6
359	No Plant										
360	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.0	2.0	3.14	4	1
361	No Plant										
362	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	2.0	2.0	3.14	4	1
363	Engelmann oak	*Quercus engelmannii*	1	0.10	0.00	0.10	0.5	0.3	0.05	4	1
364	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.15	0.00	0.15	2.0	1.5	1.77	4	4
365	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	2.0	1.0	0.79	4	0
366	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	2.0	3.0	7.07	3	1
367	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.5	3.0	7.07	1	0
368	Engelmann oak	*Quercus engelmannii*	1	1.00	0.00	1.00	0.5	1.0	0.79	4	1
369	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	7.0	3.0	7.07	4	2
370	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	3.0	3.0	7.07	3	1
371	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	5.0	3.0	7.07	3	6
372	Engelmann oak	*Quercus engelmannii*	2	0.10	0.10	0.20	0.5	0.5	0.20	4	0
373	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.10	0.00	0.10	0.25	0.25	0.05	4	1

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
374	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	12.0	8.0	50.27	4	2
375	San Gabriel oak	*Quercus durata var. gabrielensis*	4	0.10	0.10	0.20	1.5	1.5	1.77	4	1
376	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	1.0	1.0	0.79	4	1
377	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	8.0	10.0	78.54	4	2
378	San Gabriel oak	*Quercus durata var. gabrielensis*	1	0.25	0.00	0.25	6.0	1.5	1.77	3	2
379	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	7.0	6.0	28.27	3	4
380	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	8.0	4.0	12.57	3	1
381	Engelmann oak	*Quercus engelmannii*	1	0.10	0.00	0.10	0.3	0.25	0.05	4	1
382	No Plant										
383	Engelmann oak	*Quercus engelmannii*	4	0.15	0.15	0.30	3.0	2.0	3.14	4	0
384	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	2.00	0.00	2.00	10.0	6.0	28.27	3	4
385	Engelmann oak	*Quercus engelmannii*	1	0.15	0.00	0.15	3.0	1.5	1.77	4	8
386	No Plant										
387	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.15	0.40	1.5	1.0	0.79	4	2
388	Engelmann oak	*Quercus engelmannii*	1	0.10	0.00	0.10	0.3	0.3	0.05	4	0
389	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.75	0.75	1.50	9.0	8.0	50.27	4	6
390	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	1.25	1.00	2.25	11.0	10.0	78.54	4	5
391	San Gabriel oak	*Quercus durata var. gabrielensis*	2	0.15	0.15	0.30	4.0	2.0	3.14	4	4
392	Engelmann oak	*Quercus engelmannii*	2	0.10	0.10	0.20	0.3	0.3	0.05	4	1
393	Engelmann oak	*Quercus engelmannii*	2	0.25	0.15	0.40	4.0	3.0	7.07	4	3
394	coast live oak	*Quercus agrifolia* var. *agrifolia*	10	0.75	0.50	1.25	8.0	8.0	50.27	3	5
395	No Plant										
396	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	7.0	4.0	12.57	3	4
397	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	8.0	3.0	7.07	4	3
398	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.50	1.00	6.0	5.0	19.64	4	1
399	San Gabriel oak	*Quercus durata* var. *gabrielensis*	1	0.15	0.00	0.15	2.0	1.0	0.79	4	2
400	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.0	2.5	4.91	4	1
401	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	2.0	1.5	1.77	3	0

TABLE E-1
OAK TREE EVALUATION DATA – YEAR THREE (2018)

Tree #	Tree Species		# Main Trunks	Diameter			Height (ft)	Canopy Diameter (ft)	Canopy Area (sf)	Health Rating	Average Shoot Elongation (in)
	Common Name	Scientific Name		1st Trunk	2nd Trunk	Sum of Two Trunks					
402	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	1.0	1.0	0.79	4	0
403	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	3.0	2.5	4.91	2	0
404	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	2.0	2.0	3.14	4	1
405	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.25	0.00	1.25	7.0	4.0	12.57	4	4
410	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.50	0.00	0.50	3.0	2.5	4.91	4	4
411	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.50	0.25	0.75	4.0	3.0	7.07	4	3
412	coast live oak	*Quercus agrifolia* var. *agrifolia*	2	0.25	0.25	0.50	2.5	1.5	1.77	4	3
413	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.75	0.00	0.75	4.0	4.0	12.57	4	6
414	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	0.25	0.00	0.25	3.5	3.0	7.07	4	3
415	coast live oak	*Quercus agrifolia* var. *agrifolia*	1	1.00	0.00	1.00	5.0	6.0	28.27	4	4
					Total	**360.85**	**2680.50**	**1921.95**	**9,400.00**	**1,538.00**	
					Mean	**0.92**	**6.80**	**4.88**	**23.86**	**3.90**	
Total: Tree species only (excluding *Quercus durata* var. *gabrielensis*, a shrub species)									**9,374.48**		
Mean: Tree species only									**24.41**		

ATTACHMENT F

NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		
LYCOPHYTES			
SELAGINELLACEAE–SPIKE-MOSS FAMILY			
Selaginella bigelovii	Bigelow's spike-moss		
FERNS			
DRYOPTERIDACEAE–WOOD FERN FAMILY			
Dryopteris arguta	sharp-toothed wood fern		
POLYPODIACEAE–POLYPODY FAMILY			
Polypodium californicum	California polypody		
PTERIDACEAE–BRAKE FAMILY			
Aspidotis californica	California lace fern		
Pellaea andromedifolia	coffee fern		
Pellaea mucronata var. *mucronata*	bird's-foot fern		
Pentagramma triangularis	goldback fern		
CERATOPHYLLALES			
CERATOPHYLLACEAE–HORNWORT FAMILY			
Ceratophyllum demersum	submerged hortwort		OBL
EUDICOTS			
ADOXACEAE–MUSKROOT FAMILY			
Sambucus nigra ssp. *caerulea*	blue elderberry		FAC
ANACARDIACEAE–SUMAC FAMILY			
Malosma laurina	laurel sumac		
Rhus aromatica	skunk bush		FACU
Rhus ovata	sugar bush		
Toxicodendron diversilobum	western poison oak		FACU
APOCYNACEAE–DOGBANE FAMILY			
Asclepias californica	California milkweed		
ASTERACEAE–SUNFLOWER FAMILY			
Acourtia microcephala	small-headed acourtia		
Ambrosia acanthicarpa	annual bur-sage		
Artemisia californica	California sagebrush		
Artemisia douglasiana	mugwort		FAC
Baccharis pilularis ssp. *consanguinea*	coyote brush		
Baccharis salicifolia ssp. *salicifolia*	mule fat		FAC
Brickellia californica	California brickellbush		FACU
Chaenactis glabriuscula var. *glabriuscula*	yellow pincushion		
Cirsium occidentale	cobwebby thistle		
Corethrogyne filaginifolia	filago-leaved sand-aster		
Deinandra fasciculata	fascicled tarplant		FACU
Encelia californica	California encelia		
Ericameria nauseosa	rubber rabbitbrush		
Ericameria parishii var. *parishii*	Parish's goldenbush		
Erigeron canadensis	horseweed		FACU
Eriophyllum confertiflorum var. *confertiflorum*	golden-yarrow		

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		
Hazardia squarrosa var. *grindelioides*	grindelia-like saw-toothed goldenbush		
Helianthus annuus	annual sunflower		FACU
Heterotheca grandiflora	telegraph weed		
Heterotheca sessiliflora ssp. *fastigiata*	upright sessileflower goldenaster		
Lasthenia gracilis	common goldfields		
Lepidospartum squamatum	scaly scale-broom		FACU
Logfia filaginoides	California cottonrose		
Malacothrix saxatilis	rocky malacothrix		
Pseudognaphalium biolettii	Bioletti's cudweed		
Pseudognaphalium californicum	California cudweed		
Pseudognaphalium canescens	hairy cudweed		FACU
Pseudognaphalium stramineum	straw-colored cudweed		FAC
Senecio flaccidus var. *douglasii*	Douglas' threadleaf ragwort		
BORAGINACEAE–BORAGE FAMILY			
Cryptantha intermedia var. *intermedia*	intermediate cryptantha		
Eriodictyon crassifolium	thick-leaved yerba santa		
Eriodictyon parryi	poodle-dog bush		
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	chrysanthemum-leaved eucrypta		
Phacelia cicutaria	cicuta-leaved phacelia		
Phacelia distans	distant phacelia		OBL
Phacelia minor	wild Canterbury bells		
Phacelia ramosissima	branching phacelia		FACU
BRASSICACEAE–MUSTARD FAMILY			
Cardamine oligosperma	few-flowered bitter-cress		FAC
CACTACEAE–CACTUS FAMILY			
Opuntia ×vaseyi	Vasey's prickly-pear		
Opuntia littoralis	seaside prickly pear		
CAPRIFOLIACEAE–HONEYSUCKLE FAMILY			
Lonicera subspicata var. *denudata*	naked partially-spiked honeysuckle		
CARYOPHYLLACEAE–PINK FAMILY			
Silene laciniata	torn catchfly		
CONVOLVULACEAE–MORNING-GLORY FAMILY			
Calystegia macrostegia	large-bracted morning-glory		
CRASSULACEAE–STONECROP FAMILY			
Dudleya lanceolata	lance-leaved dudleya		
CUCURBITACEAE–GOURD FAMILY			
Marah macrocarpa	chilicothe		
EUPHORBIACEAE–SPURGE FAMILY			
Euphorbia polycarpa	smallseed sandmat		

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		
FABACEAE–LEGUME FAMILY			
Acmispon brachycarpus	short fruit deervetch		
Acmispon glaber var. *glaber*	glabrous deerweed		
Acmispon maritimus var. *maritimus*	coastal deervetch		
Acmispon strigosus	strigose deervetch		
Lupinus concinnus	bajada lupine		
Lupinus hirsutissimus	stinging lupine		
Lupinus longifolius	long-leaved lupine		
Lupinus succulentus	arroyo lupine		
Lupinus truncatus	cut leaf lupine		
FAGACEAE–OAK FAMILY			
Quercus agrifolia var. *agrifolia*	coast live oak		
Quercus chrysolepis	canyon live oak		
Quercus durata var. *gabrielensis*	San Gabriel oak	CRPR 4.2	
Quercus engelmannii	Engelmann oak	CRPR 4.2	
GROSSULARIACEAE–GOOSEBERRY FAMILY			
Ribes aureum var. *gracillimum*	graceful golden currant		FAC
Ribes californicum	hillside gooseberry		
LAMIACEAE–MINT FAMILY			
Salvia apiana	white sage		
Salvia columbariae	chia		
Salvia mellifera	black sage		
Stachys bullata	puckered hedgenettle		
LOASACEAE–BLAZING STAR FAMILY			
Mentzelia laevicaulis	smooth-stemmed blazing star		
LYTHRACEAE–LOOSESTRIFE FAMILY			
Ammannia coccinea	scarlet ammania		OBL
NYCTAGINACEAE–FOUR O'CLOCK FAMILY			
Mirabilis laevis var. *crassifolia*	wishbone bush		
ONAGRACEAE–EVENING PRIMROSE FAMILY			
Camissoniopsis hirtella	pubescent camissoniopsis		
Clarkia dudleyana	Dudley's clarkia		
Clarkia purpurea ssp. *quadrivulnera*	four-spot		
Epilobium brachycarpum	tall annual willowherb		
Epilobium canum ssp. *canum*	California fuchsia		
Epilobium ciliatum ssp. *ciliatum*	fringed willowherb		FACW
Eulobus californicus	California eulobus		
Oenothera elata ssp. *hirsutissima*	hairy tall evening primrose		FACW
OXALIDACEAE–OXALIS FAMILY			
Oxalis californica	California wood-sorrel		

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		
PAPAVERACEAE–POPPY FAMILY			
Eschscholzia californica	California poppy		
PHRYMACEAE–LOPSEED FAMILY			
Mimulus aurantiacus var. *pubescens*	orange monkeyflower		FACU
Mimulus cardinalis	red monkeyflower		FACW
Mimulus guttatus	red-dotted monkeyflower		OBL
Mimulus pilosus	downy monkeyflower		
PLANTAGINACEAE–PLANTAIN FAMILY			
Keckiella cordifolia	heart-leaved bush penstemon		
Penstemon heterophyllus var. *australis*	southern bunch leaf beardtongue		
Penstemon spectabilis var. *spectabilis*	spectacular beardtongue		
Penstemon spectabilis var. *subviscosus*	glandular spectacular beardtongue		
PLATANACEAE–SYCAMORE FAMILY			
Platanus racemosa	western sycamore		FAC
POLEMONIACEAE–PHLOX FAMILY			
Linanthus californicus	prickly phlox		
POLYGONACEAE–BUCKWHEAT FAMILY			
Eriogonum elongatum var. *elongatum*	long-stem wild buckwheat		
Eriogonum fasciculatum var. *foliolosum*	leafy California buckwheat		
Persicaria lapathifolia	willow weed		FACW
RANUNCULACEAE–BUTTERCUP FAMILY			
Clematis lasiantha	chaparral clematis		
Delphinium cardinale	cardinal larkspur		
RHAMNACEAE–BUCKTHORN FAMILY			
Ceanothus leucodermis	chaparral whitethorn		
Ceanothus oliganthus	few-flowered California-lilac		
Frangula californica ssp. *californica*	California coffee berry		
Rhamnus crocea	spiny redberry		
Rhamnus ilicifolia	hollyleaf redberry		
ROSACEAE–ROSE FAMILY			
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain-mahogany		
Heteromeles arbutifolia	toyon		
Prunus ilicifolia ssp. *ilicifolia*	holly-leaved cherry		
Rosa californica	California rose		FAC
Rubus ursinus	California blackberry		FAC
RUBIACEAE–COFFEE FAMILY			
Galium angustifolium ssp. *angustifolium*	narrow-leaved bedstraw		
Galium aparine	goose grass		FACU
SALICACEAE–WILLOW FAMILY			
Populus fremontii ssp. *fremontii*	Fremont cottonwood		FAC
Salix exigua var. *hindsiana*	Hinds' willow		FACW
Salix gooddingii	Goodding's black willow		FACW
Salix laevigata	red willow		FACW

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		
Salix lasiolepis	arroyo willow		FACW
SOLANACEAE–NIGHTSHADE FAMILY			
Datura wrightii	Wright's jimsonweed		
Solanum americanum	American nightshade		FACU
Solanum douglasii	Douglas' nightshade		FAC
Solanum xanti	Xantus' nightshade		
URTICACEAE–NETTLE FAMILY			
Urtica dioica ssp. *holosericea*	hoary nettle		FAC
VERBENACEAE–VERVAIN FAMILY			
Verbena lasiostachys	woolly-flowered vervain		FAC
MONOCOTS			
AGAVACEAE–AGAVE FAMILY			
Hesperoyucca whipplei	Whipple's chaparral yucca		
CYPERACEAE–SEDGE FAMILY			
Cyperus eragrostis	lovegrass flatsedge		FACW
JUNCACEAE–RUSH FAMILY			
Juncus rugulosus	wrinkled rush		OBL
Juncus textilis	basket rush		FACW
Juncus xiphioides	iris-leaved rush		OBL
POACEAE–GRASS FAMILY			
Elymus condensatus	giant wild-rye		FACU
Eragrostis mexicana ssp. *virescens*	Chilean love grass		FACU
Festuca microstachys	small fescue		
Leptochloa fusca	sprangletop		
Melica imperfecta	little California melica		
Stipa coronata	crested needle grass		
Stipa lepida	foothill needle grass		
TYPHACEAE–CATTAIL FAMILY			
Typha domingensis	southern cattail		OBL

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; Cal-IPC: California Invasive Plant Council

LEGEND:

* = Non-native species
cf. = appears similar to, species cannot be confirmed 100% due to phenological condition

Special Status:

Federal (USFWS):
FE = Endangered
FT = Threatened

State (CDFW):
SE = Endangered
ST = Threatened
SR = Rare

CRPR – California Rare Plant Rank

1A. Presumed extirpated in California and either rare or extinct elsewhere
1B. Rare, Threatened, or Endangered in California and elsewhere
2A. Presumed extirpated in California, but more common elsewhere
2B. Rare, Threatened, or Endangered in California, but more common elsewhere
3. Plants about which we need more information - a review list
4. Plants of limited distribution - a watch list

ATTACHMENT F
NATIVE PLANT COMPENDIUM (SEPTEMBER 2013 – JULY 2018)

Species (142 Native Plant Species)		Special Status	Wetland Rank
Scientific Name	**Common Name**		

Threat Code Extensions

None – Plants lacking any threat information
.1 Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
.2 Moderately threatened in California (20–80% of occurrences threatened/moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)
Special status designations updated on 12/21/2014

Wetlands Designations (National Wetland Plant List [NWPL]: U. S. Army Corps of Engineers, 2016):

FACU	Plants that are not wetland dependent. They are non-wetland plants by habitat preference.
FAC	These plants can occur in wetlands or non-wetlands. They can grow in hydric, mesic, or xeric habitats.
FACW	Plants dependent on and that predominantly occur with hydric soils, standing water, or seasonally high water tables in wet habitats
OBL	Wetland-dependent plants that require standing water or seasonally saturated soils near the surface.

ATTACHMENT G

VERTEBRATE WILDLIFE COMPENDIA (SEPTEMBER 2013 TO JULY 2018)

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
AMPHIBIANS									
***AMPHIBIA*–AMPHIBIANS**									
HYLIDAE–TREEFROGS									
Pseudacris hypochondriaca	Baja California treefrog				X	X	X	X	X
Subtotal: Native Amphibian Species			**0**	**0**	**1**	**1**	**1**	**1**	**1**
***LEPIDOSAURIA*–LIZARDS AND SNAKES**									
PHRYNOSOMATIDAE–SPINY LIZARDS									
Sceloporus occidentalis	western fence lizard		X	X	X	X	X	X	X
Uta stansburiana	common side-blotched lizard		X	X	X	X	X	X	X
TEIIDAE–WHIPTAIL LIZARDS									
Aspidoscelis tigris stejnegeri	San Diegan tiger whiptail	SSC	X	X	X	X	X	X	X
ANGUIDAE–ALLIGATOR LIZARDS									
Elgaria multicarinata	southern alligator lizard							X	X
COLUBRIDAE–COLUBRID SNAKES									
Masticophis lateralis	striped racer			X	X	X			X
Mastocophis flagellum	red coachwhip					X			X
Pituophis catenifer	gophersnake					X			X
VIPERIDAE–VIPERS AND PITVIPERS									
Crotalus oreganus	western rattlesnake				X	X		X	X
Subtotal: Native Reptile Species			**3**	**4**	**5**	**7**	**3**	**5**	**8**
BIRDS									
***AVES*–BIRDS**									
ANATIDAE–SWAN, GOOSE, AND DUCK FAMILY									
Branta canadensis	Canada goose				X		X		X
ODONTOPHORIDAE–NEW WORLD QUAIL FAMILY									
Callipepla californica	California quail			X	X	X	X	X	X
ARDEIDAE–HERONS									
Ardea herodias	great blue heron				X		X		X

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
CATHARTIDAE–NEW WORLD VULTURES									
Cathartes aura	turkey vulture			X	X	X	X	X	X
PANIONIDAE–OSPREY									
Pandion haliaetus	osprey							X	X
ACCIPITRIDAE–HAWKS, KITES, EAGLES, AND ALLIES									
Accipiter cooperii	Cooper's hawk		X	X	X	X	X	X	X
Buteo jamaicensis	red-tailed hawk		X	X	X	X	X	X	X
CHARADRIIDAE–PLOVERS									
Charadrius vociferus	killdeer		X	X[a]	X	X		X	X
COLUMBIDAE–PIGEONS AND DOVES									
Patagoienas fasciata	band-tailed pigeon				X	X	X	X	X
Zenaida macroura	mourning dove		X	X	X	X	X	X[a]	X
APODIDAE–SWIFTS									
Aeronautes saxatalis	white-throated swift			X	X	X	X	X	X
TROCHILIDAE–HUMMINGBIRDS									
Archilochus alexandri	black-chinned hummingbird				X		X		X
Calypte anna	Anna's hummingbird		X	X	X	X	X	X	X
Calypte costae	Costa's hummingbird				X		X	X	X
Selasphorus rufus	rufous hummingbird				X	X		X	X
Selasphorus sasin	Allen's hummingbird		X	X	X	X	X	X	X
PICIDAE–WOODPECKERS									
Melanerpes lewis	Lewis's woodpecker		X	X					X
Melanerpes formicivorus	acorn woodpecker			X[a]	X[a]	X[a]	X[a]	X[a]	X
Picoides nuttallii	Nuttall's woodpecker				X	X		X	X
Picoides pubescens	downy woodpecker				X				X
Colaptes auratus	northern flicker			X	X	X	X	X	X
FALCONIDAE–FALCONS									
Falco sparverius	American kestrel			X	X	X	X	X	X
Falco columbarius	merlin			X				X	X

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
TYRANNIDAE–TYRANT FLYCATCHERS									
Contopus sordidulus	western wood-pewee				X				X
Empidonax traillii	willow flycatcher				X				X
Empidonax difficilis	Pacific-slope flycatcher				X		X		X
Sayornis nigricans	black phoebe		X	X	X	X	X	X	X
Sayornis saya	Say's phoebe			X	X		X	X	X
Myiarchus cinerascens	ash-throated flycatcher			X	X	X	X	X	X
Tyrannus vociferans	Cassin's kingbird			X	X	X	X	X	X
Tyrannus verticalis	western kingbird			X	X				X
VIREONIDAE–VIREOS									
Vireo gilvus	warbling vireo				X			X	X
CORVIDAE–JAYS AND CROWS									
Aphelocoma californica	California scrub-jay		X	X	X	X	X	X	X
Corvus brachyrhynchos	American crow				X		X		X
Corvus corax	common raven		X	X	X	X	X	X	X
HIRUNDINIDAE–SWALLOWS									
Tachycineta bicolor	tree swallow						X		X
Stelgidopteryx serripennis	northern rough-winged swallow			X	X	X	X		X
Hirundo rustica	barn swallow				X	X		X	X
PARIDAE–TITS									
Baeolophus inornatus	oak titmouse							X	X
AEGITHALIDAE–BUSHTITS									
Psaltriparus minimus	bushtit		X	X	X	X[a]	X[a]	X	X
TROGLODYTIDAE–WRENS									
Salpinctes obsoletus	rock wren			X	X	X	X	X	X
Catherpes mexicanus	canyon wren			X					X
Troglodytes aedon	house wren		X	X	X	X	X[a]	X	X
Thryomanes bewickii	Bewick's wren		X	X	X	X	X[a]	X[a]	X

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
POLIOPTILIDAE–GNATCATCHERS AND GNATWRENS									
Polioptila caerulea	blue-gray gnatcatcher			X			X	X	X
REGULIDAE–KINGLETS									
Regulus calendula	ruby-crowned kinglet			X	X		X		X
SYLVIIDAE–SYLVIID WARBLERS									
Chamaea fasciata	wrentit			X	X	X	X	X	X
TURDIDAE–THRUSHES AND ROBINS									
Sialia mexicana	western bluebird			X	X	X	X	X	X
Catharus guttatus	hermit thrush				X	X	X		X
Turdus migratorius	American robin			X	X	X	X	X	X
MIMIDAE–THRASHERS									
Toxostoma redivivum	California thrasher					X	X	X	X
Mimus polyglottos	northern mockingbird		X	X	X	X	X[a]	X[a]	X
MOTACILLIDAE–PIPITS									
Anthus rubescens	American pipit		X						X
BOMBYCILLIDAE–WAXWINGS									
Bombycilla cedrorum	cedar waxwing				X	X	X		X
PTILOGONATIDAE–SILKY-FLYCATCHERS									
Phainopepla nitens	phainopepla			X		X	X	X	X
PARULIDAE–WOOD-WARBLERS									
Oreothlypis celata	orange-crowned warbler				X	X	X	X	X
Oreothlypis ruficapilla	Nashville warbler					X			X
Geothlypis tolmiei	MacGillivray's warbler				X				X
Geothlypis trichas	common yellowthroat		X	X[a]			X		X
Setophaga petechia	yellow warbler				X				X
Setophaga coronata	yellow-rumped warbler		X	X	X	X	X	X	X
Setophaga occidentalis	hermit warbler				X				X
Cardellina pusilla	Wilson's warbler				X	X	X	X	X

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
EMBERIZIDAE–SPARROWS									
Pipilo maculatus	spotted towhee		X	X	X	X	X	X	X
Aimophila ruficeps	rufous-crowned sparrow			X		X	X	X[a]	X
Melozone crissalis	California towhee		X	X	X	X[a]	X[a]	X[a]	X
Chondestes grammacus	lark sparrow				X	X			X
Melospiza melodia	song sparrow		X	X	X	X	X	X	X
Melospiza lincolnii	Lincoln's sparrow			X		X	X		X
Zonotrichia leucophrys	white-crowned sparrow		X	X	X	X	X	X	X
Zonotrichia atricapilla	golden-crowned sparrow					X	X		X
Junco hyemalis	dark-eyed junco				X	X	X	X	X
CARDINALIDAE–CARDINALS, GROSBEAKS, AND ALLIES									
Piranga ludoviciana	western tanager				X				X
Pheucticus melanocephalus	black-headed grosbeak			X			X	X	X
Passerina caerulea	blue grosbeak				X				X
Passerina amoena	lazuli bunting				X		X	X	X
ICTERIDAE–BLACKBIRDS									
Sturnella neglecta	western meadowlark			X				X	X
Molothrus ater	brown-headed cowbird				X		X	X	X
Icterus cucullatus	hooded oriole			X	X	X	X	X	X
Icterus bullockii	Bullock's oriole			X	X	X	X		X
FRINGILLIDAE–FINCHES									
Carpodacus mexicanus	house finch		X	X	X	X	X	X	X
Carduelis pinus	pine siskin				X				X
Carduelis psaltria	lesser goldfinch		X	X	X	X	X	X	X
Carduelis lawrencei	Lawrence's goldfinch				X				X
Carduelis tristis	American goldfinch			X	X		X		X
Subtotal: Native Bird Species			**23**	**49**	**68**	**51**	**60**	**54**	**85**

TABLE G-1
NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates): 104 Total Native Species (Cumulative)		Special Status	2013	2014	2015	2016	2017	2018	Cumulative
MAMMALS									
***MAMMALIA*–MAMMALS**									
DIDELPHIDAE–AMERICAN OPPOSSUM FAMILY									
Didelphia virginiana	Virginia opossum						X		X
SCIURIDAE–SQUIRRELS									
Otospermophilus beecheyi	California ground squirrel			X	X	X	X	X	X
Tamias merriami	Merriam's chipmunk						X		X
FELIDAE–CAT FAMILY									
Lynx rufus	bobcat						X	X	X
Puma concolor	mountain lion							X	X
CANIDAE–DOGS, WOLVES, FOXES									
Canis latrans	coyote				X	X	X	X	X
Urocyon cinereoargenteus	common gray fox					X	X	X	X
MEPHITIDAE–SKUNKS									
Mephitis mephitis	striped skunk					X	X	X	X
PROCYONIDAE–PROCYONIDS									
Procyon lotor	northern raccoon						X		X
CERVIDAE–DEER									
Odocoileus hemionus	southern mule deer		X	X	X	X	X	X	X
Subtotal: Native Mammal Species			**1**	**2**	**3**	**5**	**9**	**7**	**10**
Total: Native Vertebrate Species			***27***	***55***	***77***	***64***	***73***	***67***	***104***

[a] Bird species observed nesting on the site.

TABLE G-2
NON-NATIVE VERTEBRATE WILDLIFE COMPENDIUM (SEPTEMBER 2013 TO JULY 2018)

Species (Vertebrates)		2013	2014	2015	2016	2017	2018	Cumulative
***AVES*–BIRDS**								
COLUMBIDAE–PIGEONS AND DOVES								
Columba livia	rock pigeon						X	X
Streptopelia decaocto	Eurasian collared-dove			X			X	X
PSITTACIDAE–PARROTS								
Amazona viridigenalis	red-crowned parrot			X	X	X	X	X
PYCNONOTIDAE–BULBULS								
Pycnonotus jocosus	red-whiskered bulbul					X	X	X
STURNIDAE–STARLINGS								
Sturnus vulgaris	European starling			X		X	X	X
PASSERIDAE–OLD WORLD SPARROWS								
Passer domesticus	house sparrow			X				X
ESTRILDIDAE–WAXBILLS AND MANNIKINS								
Lonchura punctulata	scaly-breasted munia	X	X		X		X	X
MAMMALS								
***MAMMALIA*–MAMMALS**								
URSIDAE–BEARS								
Ursus americanus[*]	black bear		X		X		X	X

[*] Although native to the State of California, black bear (*Ursus americanus*) was introduced to the San Gabriel Mountains (SGM) by the California Department of Fish and Wildlife in 1933 following the local (SGM) extirpation of the now-extinct California subspecies of the grizzly bear (*Ursos arctos californicus*) in 1894.