BASELINE BIODIVERSITY SURVEY REPORT FOR THE KEYS CREEK PRESERVE COUNTY OF SAN DIEGO DEPARTMENT OF PARKS AND RECREATION

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May 2020

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EXECUTIVE SUMMARY

In 2016 and 2017, the County of San Diego (County) Department of Parks and Recreation acquired Keys Creek Preserve (hereafter collectively referred to as the Preserve) totaling approximately 192 acres. The Preserve is located within the planning boundaries of the Draft North County Multiple Species Conservation Program (MSCP) and consists primarily of southern mixed chaparral. The majority of the habitat is considered moderate or very high quality, although some of the Preserve area is considered low quality due to unauthorized human activities (e.g., unauthorized trails). The Resource Management Plan developed for this Preserve will integrate survey information contained within this report.

The following biological inventory surveys were conducted within the Preserve from winter 2018 through fall 2019: vegetation mapping; rare plant surveys; invasive/non-native plant surveys; butterfly surveys; herpetological drift fence surveys; diurnal and nocturnal avian surveys; small mammal trapping; passive and active acoustical bat surveys; and medium and large mammal remote camera surveys.

Vegetation on the Preserve consists of nine vegetation alliances, associations, or semi-natural stands, including grassland, scrub, chaparral, and woodland habitats, as well as one land cover type, as described as Oberbauer et al. (2008). A total of 198 plant species were recorded within the Preserve during field surveys, including 52 non-native species and 1 special-status plant species, which is also covered under the Draft North County MSCP. A total of 100 wildlife species were observed or detected within the Preserve during surveys, including 20 invertebrates, 9 reptiles, 3 amphibians, 44 birds, and 24 mammals. Of these, a total of 17 special-status wildlife species were observed or detected within the Preserve. One of the detected special-status wildlife species is also covered by the Draft North County MSCP.

Based on the surveys conducted in 2018 and 2019 and the presence of multiple special-status species within the Preserve, management recommendations have been included to protect, preserve, and sustain populations of special-status species within the Preserve. General management recommendations to protect special-status plant and wildlife species include monitoring and removing invasive nonnative plant species; maintaining fencing and signage to prevent unauthorized public access, surveying and monitoring for specific species, and reducing human-caused edge effects (such as introduction of invasive/exotic species and domestic pets, increase in trash/pollution, and/or habitat destruction) may be necessary.

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1.0 INTRODUCTION

1.1 PURPOSE OF THE REPORT

The purpose of this report is to document the results of the baseline biological surveys conducted from spring 2018 to fall 2019 within the Keys Creek Preserve (Preserve) for the County of San Diego (County) Department of Parks and Recreation (DPR) (**Figures 1 and 2**). The Preserve was acquired in 2016 and 2017 by DPR. The purpose of these surveys was to identify and map biological resources that exist on the Preserve. This information will be used to create a Resource Management Plan (RMP) for the Preserve, which will include management directives that will provide the framework for managing and monitoring the resources on the Preserve.

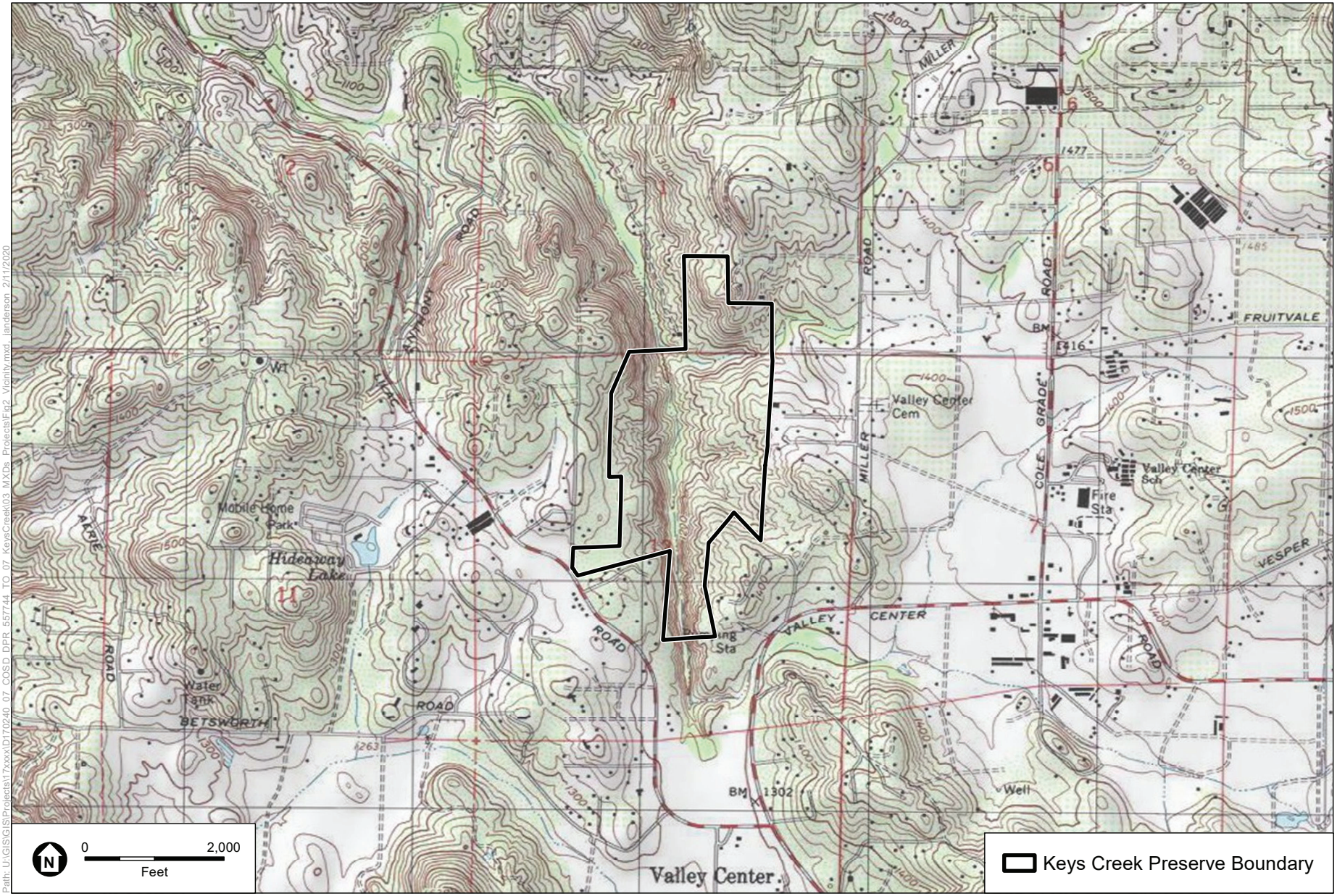
1.2 MULTIPLE SPECIES CONSERVATION PROGRAM CONTEXT

The Preserve is located within the planning boundaries of the County's Draft North County Multiple Species Conservation Program (MSCP) (**Figure 3**). Upon approval, the Draft North County MSCP would assemble a preserve system to protect species and habitats covered by the plan in western, north-central San Diego County. The Draft North County MSCP includes a Draft Framework Resource Management Plan to guide the preparation of RMPs for lands conserved under the MSCP.

This baseline report has been prepared based on the covered species list and vegetation tiers from the 2017 working draft of the Draft North County MSCP (County of San Diego 2017). Additionally, management recommendations for covered species are based on the 2018 working draft of the Framework Management Plan (County of San Diego 2018).

SOURCE: SanGIS

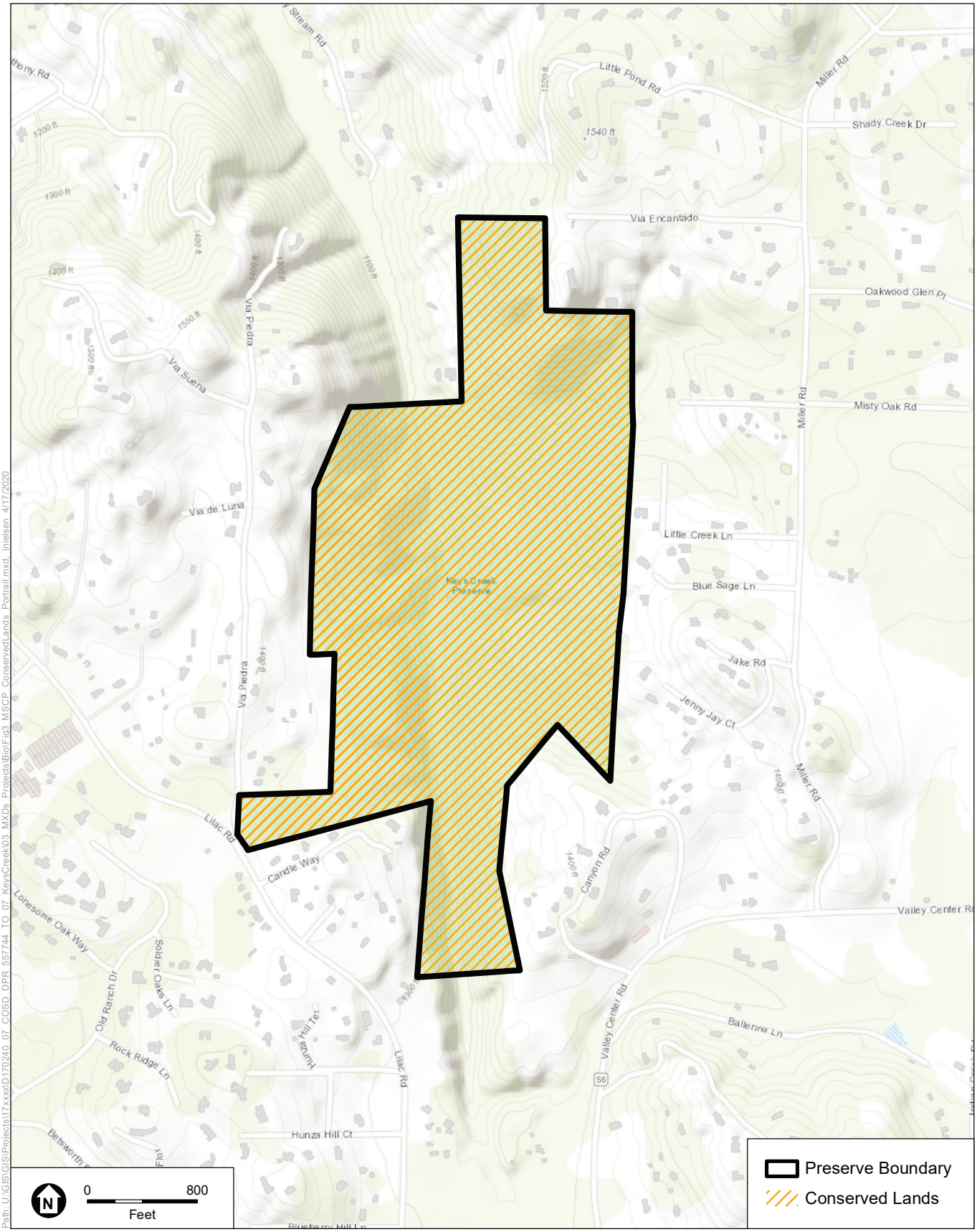
Figure 1
Regional Location



SOURCE: USGS 7.5' Topo Quad Valley Center 1975, 1978; Pala 1980, 1985

Figure 2
Preserve Vicinity

ESA



SOURCE: ESRI; SanGIS 2020.

Figure 3
Conserved Lands

2.0 STUDY AREA DESCRIPTION

2.1 PRESERVE LOCATION

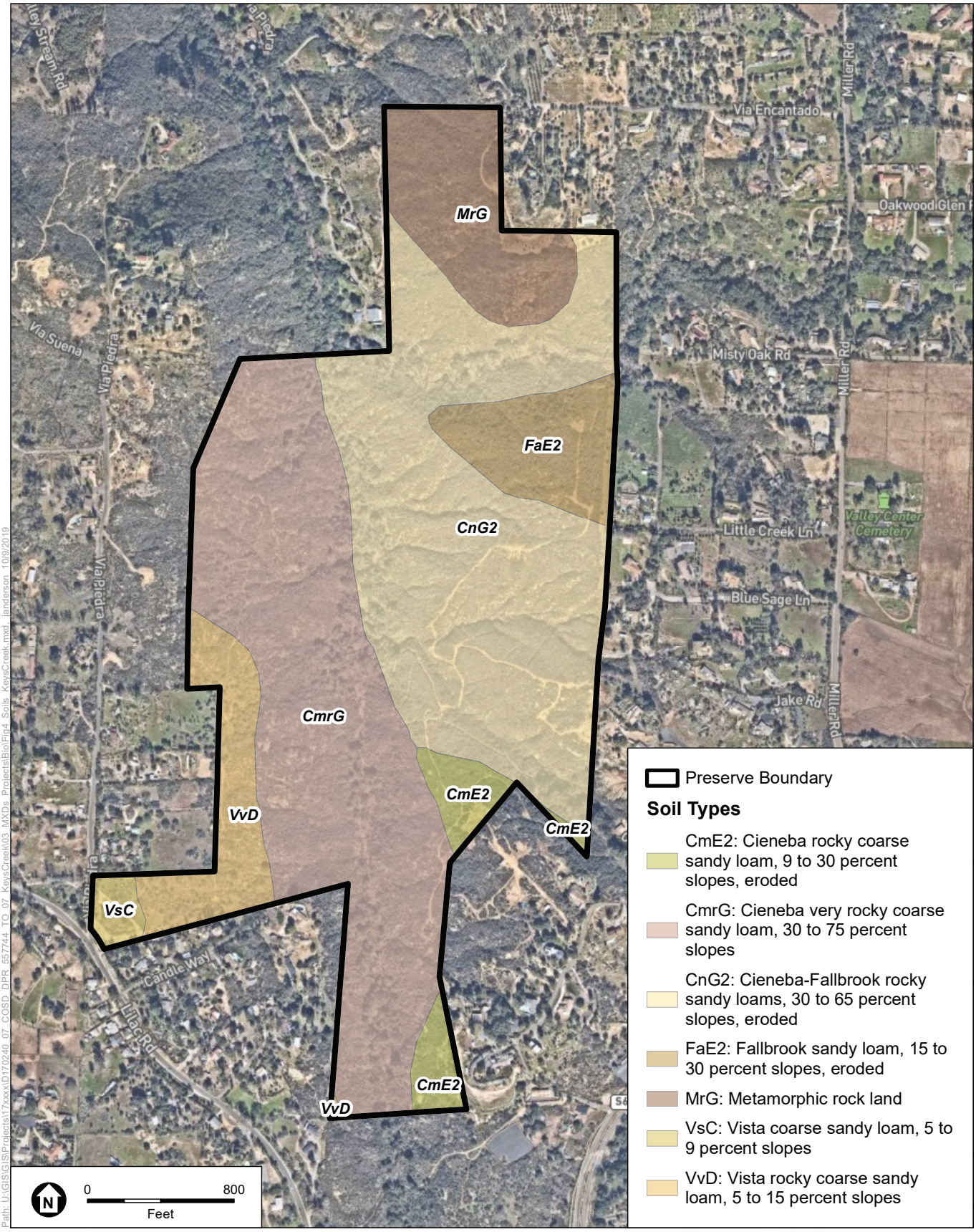
The Preserve is located in the northern portion of Valley Center, an unincorporated area of San Diego County, east of Interstate 15 and northeast of Lilac Road (Figure 1). The Preserve is mapped within Sections 1 and 12, Township 11 South, Range 2 West, of the U.S. Geological Survey (USGS) 7.5-minute topographic map, Valley Center quadrangle (Figure 2). The Preserve is a combination of three parcels, 185-451-15, 185-201-34, and 185-201-33, encompassing 192 acres.

2.2 GEOGRAPHICAL SETTING

The Preserve is located in the Peninsular Range Geomorphic Province (Fuller et al. 2015) and consists of undeveloped open space along the slopes and riparian corridor of a small, steep valley, east of the Red Mountain and north of Bear Valley and Burnt Mountain. Elevations within the Preserve range from 1,130 feet to 1,400 feet above mean sea level, with the lowest elevation occurring within the riparian corridor of Keys Creek. Keys Creek runs through the entire length of the Preserve, flowing south to north, which eventually discharges into the San Luis Rey River, located approximately 10 miles northwest of the Preserve. Rural residential development generally surrounds the Preserve in all directions.

2.3 GEOLOGY AND SOILS

The Preserve contains seven soil types belonging to four soil series: Cieneba, Fallbrook, Vista, and metamorphic rock land (**Figure 4**). The four soil series mapped for the Preserve consist of residuum derived as follows: Cieneba (granite and granodiorite), Fallbrook (granodiorite), Vista (granodiorite and quartz-diorite), and metamorphic rock land (metasedimentary rock) (USDA 2019). The majority of the soils within the Preserve are derived from granodiorite rock, which is considered a normal soil type. However, metasedimentary rock soil series located in the northern portion of the Preserve is known to support rare and/or sensitive plant species (AECOM 2018a). Descriptions of each soil series and the attendant soil types were derived from the U.S. Department of Agricultural Natural Resources Conservation Service, and they are discussed in further detail below.



SOURCE: ESRI; NRCS; SanGIS 2019

Figure 4
Soils Map

ESA

2.3.1 Cieneba Series

The Cieneba series (CnG2, CMrG, CmE2) consists of very shallow to shallow, excessively drained soils that formed in material weathered from granitic rock. This series is typical on hills and mountains with slopes that have 9 to 85 percent slopes. The series is sourced from residuum derived from granite and granodiorite and is 4 to 20 inches deep over hard rock. Runoff is low to high, somewhat excessively drained, with moderately rapid permeability in the soil that is much slower in the weathered bedrock (USDA 2012a). This series is found throughout the Preserve and constitutes the series majority of approximately 75 percent of the Preserve.

2.3.2 Fallbrook Series

The Fallbrook series (FaE2) consists of deep, well-drained soils that formed in material from deeply weathered granitic rock. This series is found on rolling hills with slopes of 5 to 75 percent, and rock outcrops are common in some areas. The series is sourced from residuum derived from granodiorite and is 20 to 40 inches deep over hard rock. Runoff is medium to rapid, with well-drained soils and moderate slow permeability (USDA 2003). This series is found in the northeastern portion of the Preserve and constitutes roughly 5 percent of the Preserve.

2.3.3 Vista Series

The Vista series (VsC, VvD) consists of moderately deep soil formed from decomposed granitic rocks. The soils can be found on hills and mountainous uplands with slopes of 2 to 85 percent. The series is sourced from residuum derived from granodiorite and quartz-diorite and is 20 to 40 inches deep over hard rock. Runoff is slow to rapid, with well-drained soils and moderate rapid permeability (USDA 2012b). This series is found at the southwest tip and western edge of the Preserve and constitutes roughly 10 percent of the Preserve.

2.3.4 Metamorphic Rock Land

Metamorphic rock land (MrG) occurs as excessively drained and occurs in hilly to mountainous areas with slopes of 30 to 75 percent. Numerous areas are covered with rock outcrops and rock, with exposed rock covering 50 to 90 percent of the areas. The rock outcrops are metasedimentary in nature. The soil material is very fine sandy loam to silt loam in texture and is generally less than 10 inches over hard rock or deeper in some locations between boulders. Runoff is rapid to very rapid (USDA 2018). This series is located only in the northern portion, constituting roughly 10 percent, of the Preserve.

2.4 CLIMATE

The climate of the Preserve is considered Mediterranean, with hot, dry summers and cool, wet winters (George 2019). The closest consistent weather station to the Preserve is located in Vista, approximately 9 miles southwest of the Preserve (Western Regional Climate Center 2019). Average annual precipitation in Vista is 13.09 inches of rain, with the greatest amount, 2.76 inches, falling in January (**Table 1**). The summer months, from May through September, are generally dry and receive 0.14 inches of rain on average. July and August are typically the hottest and driest months, with an average of 0.06 inches and 0.07 inches of rainfall and an average maximum temperature of 81.3°Fahrenheit and 83.0°Fahrenheit, respectively. Given the Preserve's distance and higher elevation than the Vista weather station, temperature and precipitation values may vary slightly. Due to its location in Southern California, the Preserve is subject to Santa Ana winds, which are hot, dry winds that blow from the Great Basin desert typically from September to May and may increase and enhance fire danger (Fovell 2007).

Table 1. Temperature and Precipitation Data for Vista Weather Station (049378)

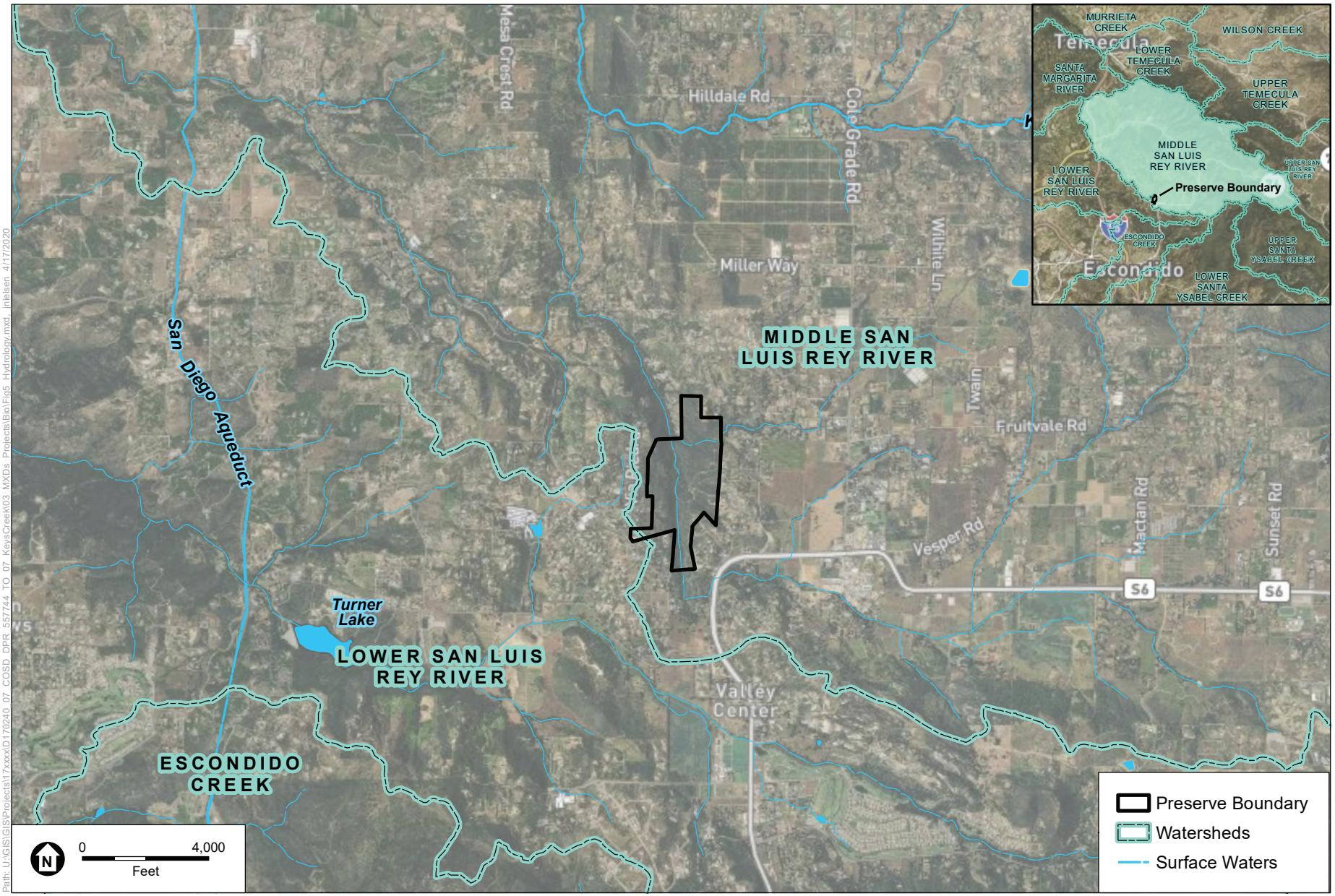
	Period of Record: August 1, 1957, through May 12, 2016												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Average Max. Temperature (°F)	67.4	67.8	68.2	70.8	72.9	76.3	81.3	83.0	82.2	77.9	72.3	67.4	74.0
Average Min. Temperature (°F)	44.0	45.0	46.3	48.5	53.5	56.6	60.3	61.6	60.0	55.0	48.3	44.0	51.9
Average Total Precipitation (inches)	2.76	2.55	2.24	1.05	0.22	0.11	0.06	0.07	0.25	0.54	1.4	1.83	13.09

SOURCE: WRCC 2019

While California is prone to natural drought periods, California recently experienced an acute drought period lasting about five and a half years, from December 2011 through April 2017. By the winter of 2013–2014, California had experienced three below-normal rainfall seasons, causing lower groundwater levels and abnormally dry vegetation, which raised wildfire risks. Although a heavy rain event occurred toward the beginning of 2016, drought conditions resumed by February 2016 and continued until April of the following year (NOAA 2019). As of September 2019, San Diego County is still considered abnormally dry (NDMC 2019).

2.5 HYDROLOGY

The Preserve is located within the San Luis Rey watershed or Hydrologic Unit (County of San Diego 2014). Within the San Luis Rey watershed are three hydrologic areas: the Lower San Luis, Monserate, and Warner Valley. The Preserve is located in the Lower San Luis hydrologic area. Within this hydrologic area, a majority of the Preserve falls within the Bonsall hydrologic sub-area, with a small portion of the southwestern corner in the Valley Center hydrologic sub-area (**Figure 5**). The San Luis Rey watershed has two major water bodies, the San Luis Rey River and Lake Henshaw.



SOURCE: SanGIS 2019

Figure 5
Hydrology

The Preserve is located on Keys Creek, an intermittent stream that is a southerly tributary of the San Luis Rey River. Keys Creek is divided into two forks, the Main Fork and South Fork, both flowing predominantly west through narrow canyons before confluencing at Keys Canyon and flowing as a single stream for approximately 5 miles before terminating at the San Luis Rey River (USACE 1976). The Preserve is intersected by the South Fork, which runs south-north through the site, as well as an unnamed stream in the northeastern corner of the Preserve. Drainage within the Preserve generally runs directly into Keys Creek or the unnamed drainage, which drains immediately into Keys Creek.

2.6 FIRE HISTORY

Based on historical fire data from the California Department of Forestry and Fire Protection (CalFIRE) and the San Diego Geographic Information Source (SanGIS), the Preserve has been affected by one wildfire (**Table 2** and **Figure 6**) according to records beginning in 1913 (SanGIS 2019; CalFIRE 2019). The most recent fire to burn the Preserve was an unnamed fire in 1947, which burned approximately 33 percent of the Preserve. The Preserve is located within an area of high wildland fire potential (County of San Diego 2019).

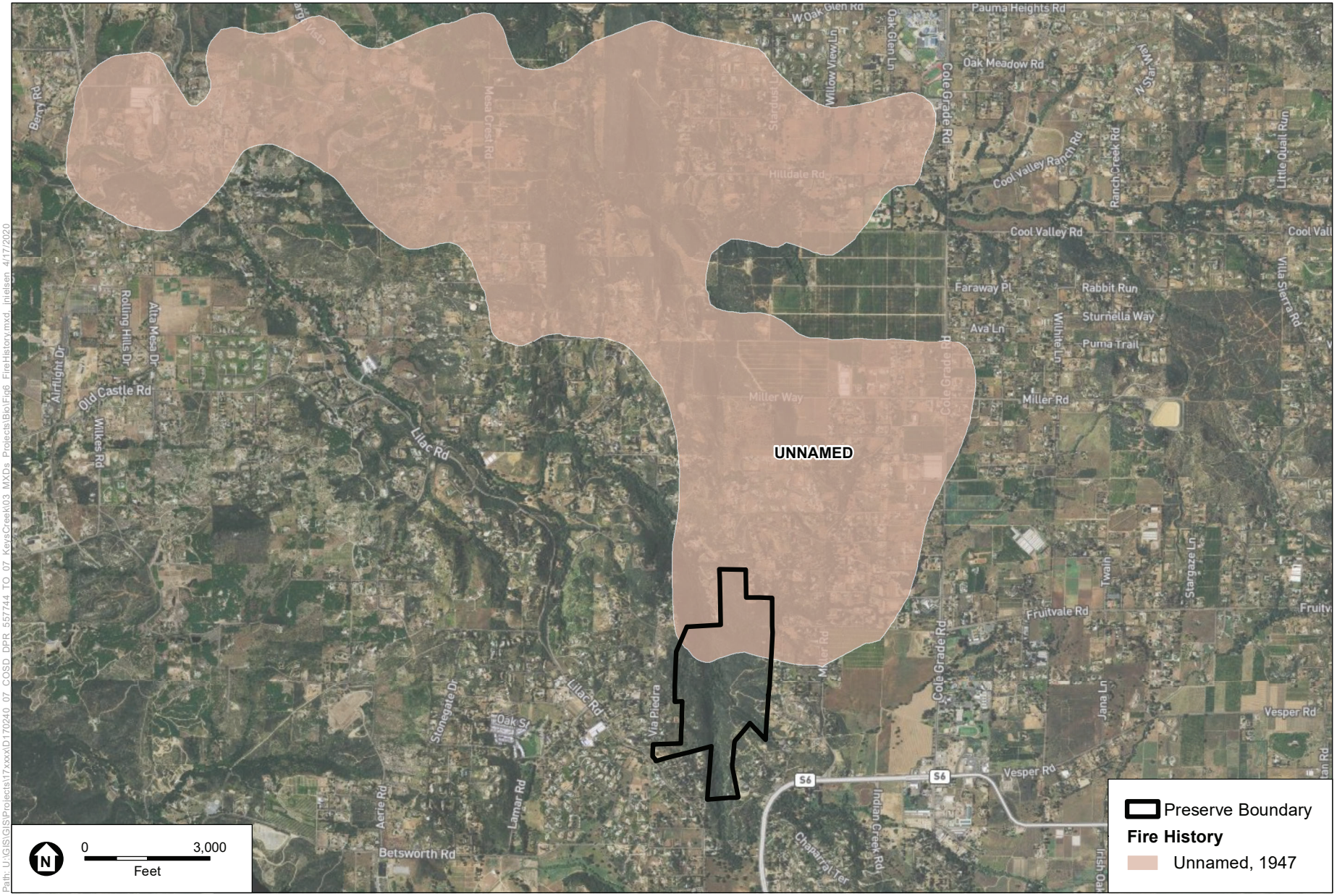
Table 2. Preserve Fire Interval Data

Fire Year	Fire Name	Interval (years)	Acreage Burned on Preserve	Percent of Preserve Burned
1947	Unnamed	–	64.12	33

SOURCE: SanGIS 2019; CalFIRE 2019.

2.7 TRAILS

The Preserve is not open to the public. The Preserve has one entrance on the west at an overgrown gravel access road off of Lilac Road. An unauthorized trail leads from the entrance through chaparral along the top of a riparian corridor, where rock outcroppings provide views of the Preserve and surrounding hills. The trail narrows to a single track as it descends down to the creek. It is characterized by steep and loose slopes that are prevalent with poison oak (*Toxicodendron diversilobum*) and overgrown vegetation. A creek bridge is not provided and crossing requires maneuvering between 3-foot-high banks at a location where the creek narrows. The trail then traverses a meadow and heads uphill to the east, where it widens into a 6-foot gravel path. The trail on the east has erosion damage and is surrounded by private properties.



SOURCE: SanGIS 2019

Figure 6
Fire History

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3.0 METHODS

Baseline biological surveys were conducted on the Preserve between March 2018 and September 2019. **Table 3** lists the survey dates and personnel who conducted the surveys, and the type of survey conducted. Botanical surveys included vegetation mapping, rare plant surveys, and invasive non-native plant species mapping. Wildlife surveys included a butterfly survey, an aquatic survey, herpetological drift fence surveys, diurnal and nocturnal avian surveys, small mammal trapping, passive and active acoustical bat surveys, and medium and large mammal remote camera surveys.

Table 3. Survey Type, Dates, Number, Personnel, and Survey Conditions

Survey Date	Survey Number	Personnel	Conditions[1]
Botanical Surveys: Vegetation Mapping			
March 30 and April 13, 2018	1	AECOM	NA
Botanical Surveys: Rare Plant Surveys			
March 26 and May 7, 2018	1	AECOM	NA
Botanical Surveys: Invasive Non-Native Plant Species Mapping			
March 19, 2019	1	Alanna Sullivan, Cailin Lyons	Start: 50°F, avg. wind 3 mph, 50% CC, Visibility: good End: 59°F, avg. wind 12 mph, 100% CC Visibility: good
March 22, 2019	2	Alanna Sullivan, Cailin Lyons	Start: 42°F, avg. wind 1 mph, 30% CC, Visibility: good End: 60°F, avg. wind 7 mph, 10% CC Visibility: good
Butterfly Survey			
May 13, 2019	1	Barbra Calantas, Alanna Sullivan	Start: 64°F, avg. wind 1 mph, 100% CC, Visibility: good End: 81°F, avg. wind 2.5 mph, 10% CC Visibility: good
Aquatic Survey			
May 20, 2019	1	Kris Alberts*, Ryan Quilley*	Start: 64°F, avg. wind 12 mph, 30% CC, Visibility: good End: 59°F, avg. wind 7 mph, 60% CC Visibility: good
Herpetofauna Drift Fence Surveys			
April 22 through 26, 2019	1	Adrienne Lee, Lisa Maier, Kris Alberts*	NA
May 20 through 24, 2019	2	Kris Alberts*	NA
June 17 through 21, 2019	3	Ryan Quilley*, Andy Steyers*	NA
July 15 through 19, 2019	4	Kris Alberts*	NA
Avian Nocturnal and Diurnal Surveys			
February 19, 2019	1	Jaclyn Catino-Davenport, Adrienne Lee	Start: 35°F, avg. wind 2 mph, 0% CC, Visibility, fair End: 44°F, avg. wind: 3 mph 5% CC, Visibility, good

Table 3. Survey Type, Dates, Number, Personnel, and Survey Conditions

Survey Date	Survey Number	Personnel	Conditions[1]
April 30, 2019	2	Jaclyn Catino-Davenport, Lisa Maier	Start: 51°F, avg. wind 0 mph, 100% CC, Visibility, good End: 55°F, avg. wind: 3 mph 100% CC, Visibility, good
July 1, 2019	3	Jaclyn Catino-Davenport, Adrienne Lee	Start: 55°F, avg. wind 1 mph, 0% CC, Visibility, good End: 76°F, avg. wind: 1 mph 0% CC, Visibility, good
September 3, 2019	4	Jaclyn Catino-Davenport, Adrienne Lee	Start: 74°F, avg. wind 0 mph, 5% CC, Visibility, good End: 79°F, avg. wind: 5 mph 40% CC, Visibility, good
Small Mammal Trapping			
April 22 through 26, 2019	1	Karla Flores, Kelly Rios	Temp: 57°F, wind: 1–2 mph, 0% CC Temp: 61°F, wind: 1–2 mph, 0% CC Temp: 62°F, wind: 1–2 mph, 0% CC Temp: 55°F, wind: 1–2 mph, 0% CC
September 16 through 20, 2019	2	Karla Flores; Karl Fairchild	Temp: 62°F, wind: 1–2 mph, 100% CC Temp: 59°F, wind: 0 mph, 0% CC Temp: 58°F, wind: 1–2 mph, 100% CC Temp: 62°F, wind: 0 mph, 0% CC
Bats – Passive Surveys			
April 11 through 18, 2019	1	Julie Stout, Adrienne Lee	NA
July 10 through 17, 2019	2	Julie Stout, Lisa Maier	NA
Bats – Active Surveys			
April 11, 2019	1	Julie Stout, Adrienne Lee	Start: 70°F, avg. wind 3 mph, 100% CC End: 60°F, wind: 3 mph 0% CC
July 10, 2019	1	Julie Stout, Lisa Maier	Start: 65°F, avg. wind 3 mph, 80% CC End: 60°F, avg. wind: 3 mph 100% CC
Wildlife Cameras			
December 11, 2018, through January 15, 2019	1a	Alanna Sullivan, Jaclyn Catino-Davenport	NA
January 17 through February 18, 2019	1b	Jaclyn Catino-Davenport, Adrienne Lee	NA
March 19 through April 19, 2019	2	Alanna Sullivan, Cailin Lyons	NA
July 1 through 31, 2019	3	Jaclyn Catino-Davenport, Jessie Johnson	NA
August 1 through September 1, 2019	4	Jaclyn Catino-Davenport, Adrienne Lee	NA

[1] NA = not applicable due to the survey spanning multiple days and multiple weather conditions

°F = degrees Fahrenheit; mph = miles per hour; CC = cloud cover

* = Blackhawk Environmental personnel

A review of state and federal databases for existing biological resources information for the Preserve was conducted to provide baseline information regarding special-status biological resources potentially occurring on the Preserve and in the surrounding area. Sources reviewed and used include the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2019a); California Natural Diversity Database (CDFW 2019a); County of San Diego SanBIOS Database (County of San Diego 2019); and the U.S. Fish and Wildlife Service

(USFWS) Environmental Conservation Online System (USFWS 2019). For all four databases, a 1-mile radius search around the Preserve was conducted to determine if there were nearby known occurrences of special-status species (CDFW 2019a).

For purposes of this Baseline Biodiversity Report, a species is considered a special-status species if it meets at least one of the following criteria:

- Listed or proposed for listing (including candidate species[1]) under the federal Endangered Species Act (FESA) or California Endangered Species Act (CESA).
- California Department of Fish and Wildlife (CDFW) Species of Special Concern (CDFW 2019b).
- CDFW fully protected species (CDFW 2019b).
- CDFW watch list species (CDFW 2019b).
- Listed by CNPS as California Rare Plant Ranks (CRPRs) 1A (presumed extinct in California and rare/extinct elsewhere), 1B (rare, threatened, and endangered in California and elsewhere), 2A (presumed extinct in California, but more common elsewhere), 2B (rare, threatened, or endangered in California, but more common elsewhere), 3 (review list: plants about which more information is needed), and 4 (watch list: plants of limited distribution) (CNPS 2019b).
- Species considered sensitive by the County (County of San Diego 2010).
- Any species covered by the Draft North County MSCP (County of San Diego 2017).

3.1 VEGETATION COMMUNITIES/HABITAT

3.1.1 Vegetation Communities Mapping

Vegetation communities and land cover were delineated in the field by AECOM on March 30 and April 13, 2018. Mapping of the Preserve included a 100-foot buffer pursuant to County guidelines (County of San Diego 2010). Vegetation classification during field mapping was based on the Vegetation Classification Manual for Western San Diego County (VCM) (Sproul et al. 2011) and then cross-walked to the Holland (1986) classification system modified by Oberbauer (Oberbauer et al. 2008). Acreage calculations were generated using ArcGIS. Vegetation classifications described in Section 4.1 of this report follow the VCM.

[1] Candidate species are those petitioned species that are actively being considered for listing under the FESA, as well as those species for which the USFWS has initiated a FESA status review, as announced in the *Federal Register*. Proposed species are those candidate species that were found to warrant listing and have been officially proposed for listing in the *Federal Register*. Under the CESA, candidate species are those species currently petitioned for state-listing status.

3.2 PLANTS

3.2.1 Special-Status/Rare Plant Surveys

AECOM botanists conducted comprehensive sensitive/rare plant surveys on the Preserve on March 26 and May 7, 2018. Rare plant surveys were conducted in accordance with the County Guidelines Report Format and Content Requirements for Biological Resources (County of San Diego 2010); Guidelines for Conducting and Reporting Botanical Inventories of Federally Listed, Proposed, and Candidate Plants (USFWS 1996); Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities (CDFG 2009; CDFW 2018); and CNPS Botanical Survey Guidelines (CNPS 2001).

All accessible areas with a potential to support rare plant species were surveyed on foot. Surveys were floristic in nature; therefore, all plant species detected were identified to subspecies or variety to determine sensitivity status, and were recorded to inventory plant species on the Preserve. For each rare plant species detected, attributes of relative abundance, general distribution, and global positioning system (GPS) coordinates were recorded within the Preserve. Latin and common names follow the Checklist of Vascular Plans of San Diego County (Rebman and Simpson 2014).

The vegetation, elevation, soil types and rock formations, disturbance, status, and distribution within the vicinity of the Preserve were considered when evaluating the Preserve for potential for special-status plant species to occur. The Preserve is located in the northwest central portion of San Diego County in what is primarily chaparral habitat. The majority of soils that occur across the Preserve are derived from granodiorite rock, considered a normal type of soil, and is not likely to support unusual and sensitive plant species. However, this part of San Diego County is within the core home range for the special-status Engelmann oak (*Quercus engelmannii*).

3.2.2 Invasive Non-Native Plant Species Mapping

Non-native plant species are defined by California Invasive Plant Council (Cal-IPC) as species that were introduced to California after European contact and as a direct or indirect result of human activity. Invasive non-native plants are also not native, but once introduced, can establish, quickly reproduce and spread, and cause harm to the environment, economy, and/or human health. Once invasive non-native plant species spread into wildland ecosystems, they can hybridize with native plant species, displace native plant and wildlife species, alter biological communities, and/or alter ecosystem processes (Cal-IPC n.d.). Invasive non-native plant surveys were conducted by ESA biologists on March 19 and 21, 2019. Special attention was given to the 29 invasive non-native plant species identified as priorities for near-term management and monitoring by the San Diego Environmental Mitigation Program Working Group in their Management Priorities for Invasive Non-Native Plants (Conservation Biology Institute 2012).

When encountered, these species' locations were mapped with GPS sub-meter-accuracy, and estimates of population size were recorded using the ArcGIS Collector (Collector app) mobile application. Species of greatest concern include those rated by the California Invasive Plant Council (Cal-IPC) (Cal-IPC Invasive Plant Inventory Database 2019), existing on the Federal Invasive and Noxious Plant List (USDA Natural Resources Conservation Service 2019), or occurring on the California Noxious Weeds List (California Department of Food and Agriculture 2019). Species that were considered the most invasive or were represented in a few locations were of greatest priority for mapping individual locations. No Level 1 or 2 Management Priority species (Conservation Biology Institute 2012) were identified on the Preserve (presence of these species would have required ESA to contact the County Project Manager within 7 days of detection, to allow the County to treat these species promptly).

3.3 WILDLIFE

3.3.1 Invertebrates

A general butterfly survey was conducted on May 13, 2019, to document the diversity of butterfly species within the Preserve. The survey was conducted by ESA biologists slowly walking meandering transects across the Preserve during the warmest and sunniest period of the day, from late morning to mid-afternoon, when butterfly activity was at its peak, following the Checklist Method (Royer et al. 1998). Areas with flowering plants or potential butterfly nectar sources were checked and existing trails were walked, as they provided easy access through vegetation and butterflies often rest on bare ground. Binoculars were used to aid in butterfly identification. A habitat assessment for special-status butterfly species was conducted concurrently with the general butterfly survey. Any incidental observations of butterflies that were made during other biological surveys were recorded. Survey dates, times, personnel, and weather are shown in Table 3. Photographs from the survey can be found in **Appendix E**.

3.3.2 Herpetofauna

3.3.2.1 Aquatic Surveys

A general aquatic survey was conducted to document the presence of amphibian species within the Preserve, specifically within Keys Creek. The aquatic survey consisted of a diurnal and a nocturnal survey. The diurnal portion of the survey was conducted by two biologists walking slowly along the creek banks/margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae, juveniles, and/or adults during daylight hours. If larvae or individuals were observed in the creek, dip netting was used to identify the larvae or individual to species. Dip nets had a sturdy wooden or aluminum handle with mesh size ranging from 2 to 4 mm. The nocturnal portion of the survey was conducted by two biologists walking slowly and carefully on the creek banks between 1 hour after dusk and midnight using strong headlamps or flashlights to

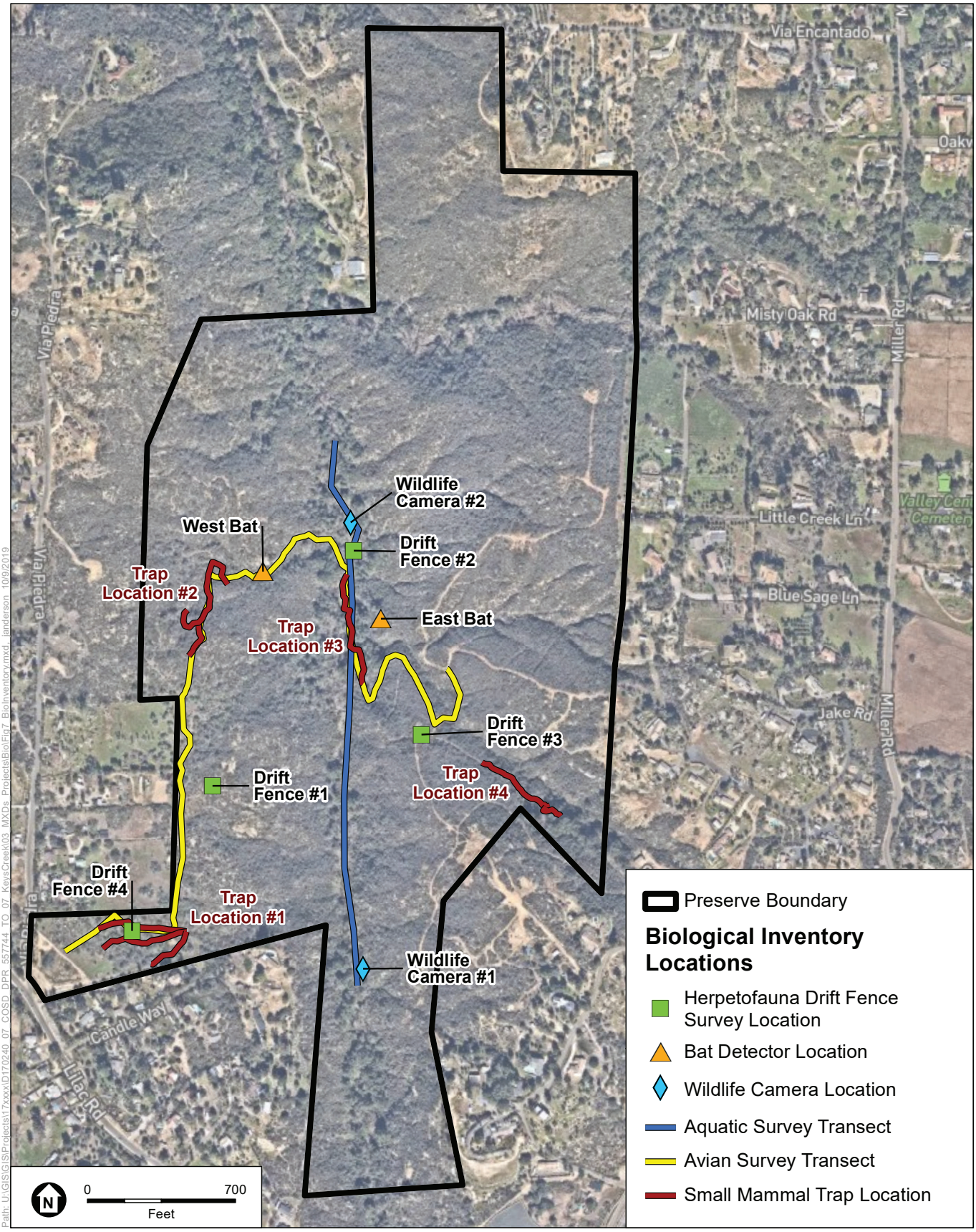
visually identify individuals, egg masses, and/or larvae. Biologists would stop periodically and remain still and silent for approximately 15 minutes at appropriate sites to wait for calling amphibians. Representative photographs of amphibians were taken when possible (Appendix E).

3.3.2.2 General Herpetological Surveys

General herpetological surveys were conducted to document the presence of amphibian and reptile species within the Preserve. Herpetological surveys were conducted using drift fences with a box funnel trap at each end of the fence (hereafter referred to as drift fence surveys). Biologists conducted a habitat assessment for herpetofauna by reviewing aerial data and vegetation community mapping and by walking the site to determine suitable locations for drift fences based on soil substrate, topography, and vegetative cover. The biologists assessed the Preserve for the various herpetofaunal species that might occur, and strategically placed drift fences in representative areas for the various vegetation communities that occur within the Preserve to fully capture the diversity of the herpetofauna on-site.

Four drift fences with box funnel traps were installed on the Preserve on April 22, 2019 (**Figure 7**). Each drift fence was 50 feet long and 1 foot tall (composed of thick, dark-green shade cloth), trenched about 2 inches into the ground and staked in place with one box funnel trap (12 by 8 by 18 inches) at each end. Each box funnel trap had two 28-inch-long drift fence "wings" protruding off the front of each trap to increase the size of the funnel. Box funnel traps capture any species that enter them, including small mammals; therefore, each box funnel trap contained a piece of PVC pipe (generally 1 to 2 inches in diameter by 3 to 4 inches in length) to provide shelter for captured herpetofauna, and pieces of cotton and a small amount of food to provide shelter and food for small mammals. For the drift fence location adjacent to the creek, a small, round ceramic bowl filled with water (4.8 by 0.8 inches) was included in the box funnel trap to ensure amphibians did not desiccate throughout the day. Each box funnel trap was covered with a 2-by-2-foot piece of plywood to protect captured animals from the heat of the sun.

Drift fences were monitored for approximately 4 days per month for 4 months (April through July 2019; see Table 3 for specific survey dates). Traps were opened on the first day and checked every morning for four consecutive mornings. When box funnel traps were "opened" on the first day of a trapping session, they were placed at the ends of the drift fence to capture any animals that encountered the fence and followed it into the box funnel traps. Species captured were identified to species (if possible) and then released. Any incidental observations of amphibians and reptiles that were made while walking between drift fences and during other biological surveys were also recorded. Drift fences and funnel traps were removed upon survey completion on July 19, 2019. Representative photographs of amphibian and reptile species were taken when possible (Appendix E).



SOURCE: ESRI, 2019; SanGIS 2019; ESA 2019

Figure 7
Biological Inventory Locations

3.3.3 Birds

ESA conducted nocturnal and diurnal avian surveys throughout the Preserve to document avian species that nest, winter, or migrate through the Preserve. The surveys were conducted by two biologists walking meandering transects through all habitat types on the Preserve. ESA conducted a total of four 8-hour of meandering transect surveys. These four surveys were spaced throughout the year (February, April, July, and September 2019) to capture data from each season, including spring and early fall migration periods (Table 3).

Nocturnal avian surveys consisted of calling and listening for nocturnal birds in the pre-dawn hours before starting the diurnal surveys. The biologists arrived on the Preserve 2 hours before sunrise and surveyed by walking unauthorized dirt trails and listening and looking for various nocturnal species. The biologists periodically stopped and played a vocal recording (via Android phone or similar playback device) of nocturnal species with potential to occur, including common poorwill (*Phalaenoptilus nuttallii*), western screech owl (*Megascops kennicottii*), barn owl (*Tyto alba*), long-eared owl (*Asio otus*), and great horned owl (*Bubo virginianus*). The recording was played at two locations throughout the Preserve, where potentially suitable habitat existed for the various nocturnal species. If a nocturnal species was already heard on the Preserve prior to playback, the vocal recording for the species was not played.

Once the sun rose, vocal playback for nocturnal species ceased and the biologists recorded diurnal avian species detected either visually or aurally. Diurnal surveys consisted of walking meandering transects along the unauthorized dirt trails within the Preserve and recording all avian species detected, without playing any vocal recordings. Additionally, the biologists surveyed any canyons, ridges, or areas with good vantage points.

For both nocturnal and diurnal avian surveys, the biologists recorded the avian species, number of individuals, and the GPS location for any special-status avian species detected. Weather conditions, such as temperature, wind, cloud cover, and visibility, were recorded during each survey. Incidental observations of avian species that were made during other biological surveys were also recorded.

3.3.4 Mammals

3.3.4.1 Small Mammals

Small mammal trapping was conducted in April and September 2019 to document the diversity of small mammal species within the Preserve. Prior to the start of trapping, biologists conducted a habitat assessment for small mammals by reviewing aerial data and vegetation community mapping and by walking the Preserve.

Surveys were conducted according to the standard live-trapping protocols established by CDFW. Each trapping session (spring/summer and fall) consisted of a total of four nights. Nine-inch collapsible Sherman traps with modified trapdoors were strategically set in four distinct areas that had potential to capture a representative sampling of small mammals within the Preserve based on vegetation communities and habitat conditions, such as terrain and soil type. Traps were placed in locations that would minimize exposure to direct sunlight and where small mammals might frequent (such as along rock ledges, in front of woodrat nests, rock outcrops, runs, and burrow entrances). If ants were detected within or adjacent to traps, the traps were adjusted slightly to a location that was free of ants. The specific locations where traps were set are depicted in Figure 7.

Each trapping area consisted of at least one meandering transect that contained 23 to 38 traps (spaced 5 to 7 meters apart), for a total of 120 traps set during spring surveys and 125 traps set during fall surveys to sample the small mammal species at the Preserve. Traps in spring consisted of a combination of 115 small traps and 5 large traps to account for larger small mammals such as cottontail (*Sylvilagus* spp.). Traps in fall consisted of 125 small traps due to lack of cottontails observed during the spring trapping surveys. Traps were opened and baited with a commercial bird seed mix containing sunflower seeds and millet in the late afternoon hours, and were checked early the following morning before direct sunlight could cause temperatures to rise in the traps and result in possible mortality. When a small mammal was captured in a trap, it was identified to species and then released. All traps were closed in the morning to prevent any wildlife from entering the traps during the heat of the day.

In addition to the above-mentioned trapping, two small mammals, a shrew (Family Soricidae) and a deer mouse (*Peromyscus maniculatus*) were captured during drift fence surveys for herpetofauna species. Representative photographs of small mammal species were taken when possible; they are included in Appendix E.

3.3.4.2 Bats

ESA conducted a daytime roosting habitat assessment, emergence surveys and active acoustic monitoring, and passive acoustic surveys. The methodology of each survey type is described below.

Roosting Habitat Assessment

A daytime habitat assessment survey was conducted on April 11, 2019, to assess the presence and value of roosting habitat at appropriate geological formations and habitats, such as rocky outcroppings, caves, and snags, if present on-site. The assessment was conducted prior to and coinciding with the setup of passive acoustic equipment. During the habitat assessment, two biologists walked throughout the Preserve, focusing on searching rocky areas for crevices or caves, searching for trees with cavities or sloughing bark, and searching for presence of riparian or open

water habitats, which are of high foraging value to certain bat species. If potential roost sites were identified during the habitat assessment survey, roost sites were visually inspected for guano, staining, and other signs of bat presence.

Emergence Surveys and Active Acoustic Monitoring

Emergence surveys and active acoustic monitoring were conducted over two nights, including one night in spring (April 11, 2019) and one night in summer (July 10, 2019) to capture the bat migration period and summer maternity season. Emergence surveys and active acoustic monitoring were conducted by a biologist using a high-beam flashlight and handheld Echo Meter Touch acoustic detector. Surveys and monitoring were conducted approximately 30 minutes before sunset to an hour after sunset in key habitats identified during the daytime habitat assessment. Monitoring was conducted on foot from existing roads and unauthorized trails where possible. During the surveys, a biologist noted bat behavior and any observations of bats emerging from roost sites (if present).

Passive Acoustic Surveys

Two Wildlife Acoustics Inc. SM4 bat echolocation detectors were passively deployed in spring (April 11 through 18, 2019) to capture migratory and year-round resident species, and in summer (July 10 through 17, 2019) to document species during the summer/maternity season. The two locations of the detectors were selected to maximize the diversity of bat species detected by geographically separating the detectors and placing them near different habitat areas and to maximize accessibility by using existing trails while limiting the potential for vandalism by distancing the detectors from direct trail access (Figure 7). These locations were used for both spring and summer surveys. The detectors had SMM-U2 microphones mounted approximately 10 to 12 feet above the ground level. One detector was placed within rocky chaparral habitat along an east-facing slope within the center of the Preserve. The other was placed within an open patch of non-native grassland surrounded by riparian forest habitat (California Sycamore-Coast Live Oak Association) along the creek within an opening in the canopy (Figure 7). Appendix E contains photographs of both detectors.

The detectors were programmed to turn on 30 minutes before solar sunset and off 30 minutes after solar sunrise and default settings were modified to trigger recording at 5 kilohertz. Bat calls were automatically recorded by the units during the monitoring period, and, at the end of each passive survey period, the bat detector equipment was removed.

The recorded bat calls were processed using Sonobat Version 4.4.1, using the region and subregion classifiers for southwest California [c20190609]. Manual vetting of automatically identified calls consisted of manually reviewing subsets of calls for each species, as well as reviewing individual calls and comparing them to a reference library of bat calls. Where initial manual review indicated

automated misclassifications of call groups (e.g., groupings by minimum frequency, species, season, or time of night), these groups were manually reviewed and identified to most likely species. Many bat species have overlapping call repertoires; therefore, not all bat calls can be conclusively identified to a species. Identifications for inconclusive calls were deferred to the most likely species based on a combination of automatic species identification, survey-specific trends noted during manual call review, and species expected to occur based on known seasonal and geographic distribution. Relative activity indexes were then calculated for each species based on the number of call files recorded per species per night multiplied by 10.

3.3.4.3 Medium to Large Mammals

Remote wildlife cameras were used to document the diversity of medium and large mammals that occur or move through the Preserve. Two Bushnell 20MP Trophy Cam Low Glow Trail Camera HD Aggressor cameras were set in areas that were likely being utilized by wildlife (i.e., signs of scat and/or tracks present) (Figure 7). All cameras were positioned approximately 3 to 5 feet off the ground to best record medium- to large-size wildlife.

The cameras were set to have "low sensitivity" to movement such that anything from a small bird to large mule deer would likely trigger the cameras to start taking photographs, but vegetation moving in the wind would not. Most medium- to large-size objects that moved within the camera's field of view would trigger the camera to take photos. Once triggered, the wildlife cameras were set to take a series of three photographs, 1 second apart. The cameras were set to continue to take a series of three photographs until movement in front of the camera was not detected as a result of the animal leaving the field of view (i.e., no time would elapse between triggers). To prevent vandalism and theft, each camera was locked inside specialized security boxes and the words "wildlife movement study" were written on the boxes. Both wildlife cameras' security boxes were screwed into trees. The cameras were oriented away from the sun (to the extent practical) and were positioned to take photos of wildlife walking along the creek, headed either toward or away from the wildlife camera. Representative photographs were taken of both wildlife cameras locations (Appendix E).

Both wildlife cameras were turned on and left to record for four survey periods; however, due to a wildlife camera deficiency, during the winter period both cameras did not run during the same period. The survey periods were from December 11, 2018, through January 15, 2019, from January 17 through February 18, from March 19 through April 19, from July 1 through July 31, and from August 1 through September 1, 2019 (Table 3). The photographs were then reviewed and categorized based on the species detected. All photographs displaying human activity and/or dogs were separated out and organized by camera location in order to make general assumptions regarding amount of human traffic in certain areas of the Preserve compared to others. Any illegal activity detected by the cameras was documented and reported to DPR.

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4.0 RESULTS AND DISCUSSION

4.1 VEGETATION COMMUNITIES/HABITAT

Vegetation community classification was based on two separate systems: the VCM (Sproul et al. 2011) and the Holland (1986) (as modified by Oberbauer et al. 2008) classification systems. Field mapping was conducted in spring 2018 according to the VCM and then cross-walked to the Holland/Oberbauer classification system. Acreages of the vegetation communities on the Preserve are listed in **Table 4**, *Vegetation Communities/Land Cover Type Acreages for Keys Creek Preserve* (AECOM 2018b). Vegetation communities according to the VCM and Holland/Oberbauer classification system are shown in **Figures 8a** and **8b**, respectively.

The predominant vegetation community within the Preserve is the *Adenostoma fasciculatum–Xylococcus bicolor–Ceanothus tomentosus* (Chamise–Mission Manzanita–Ramona Ceanothus) Association. It composes approximately 67 percent of the Preserve with more than 128 acres. Other vegetation communities within the Preserve include *Quercus* (*berberidifolia* x *acutidens*)–*Adenostoma fasciculatum* (Scrub Oak–Chamise) Association, *Adenostoma fasciculatum–(Eriogonum fasciculatum–Artemisia californica–Salvia mellifera*) (Chamise–California Buckwheat–California Sagebrush–Black Sage) Association, *Quercus agrifolia/Quercus* (*berberidifolia* x *acutidens*) (Coast Live Oak/Scrub Oak) Association, *Quercus engelmannii/Salvia apiana* (Engelmann Oak/White Sage) Association, *Quercus agrifolia – Toxicodendron diversilobum*–Grass (Coast Live Oak–Poison Oak–Grass) Association, *Eriogonum fasciculatum* (California Buckwheat) Association, Mediterranean California Naturalized Annual and Perennial Grassland Semi-natural Stands, and disturbed land cover.

The following vegetation communities and land cover type descriptions for the Preserve follow those designated in the VCM.

4.1.1 Herbaceous

4.1.1.1 Mediterranean California Naturalized Annual and Perennial Grassland Semi-Natural Stands (5.21)

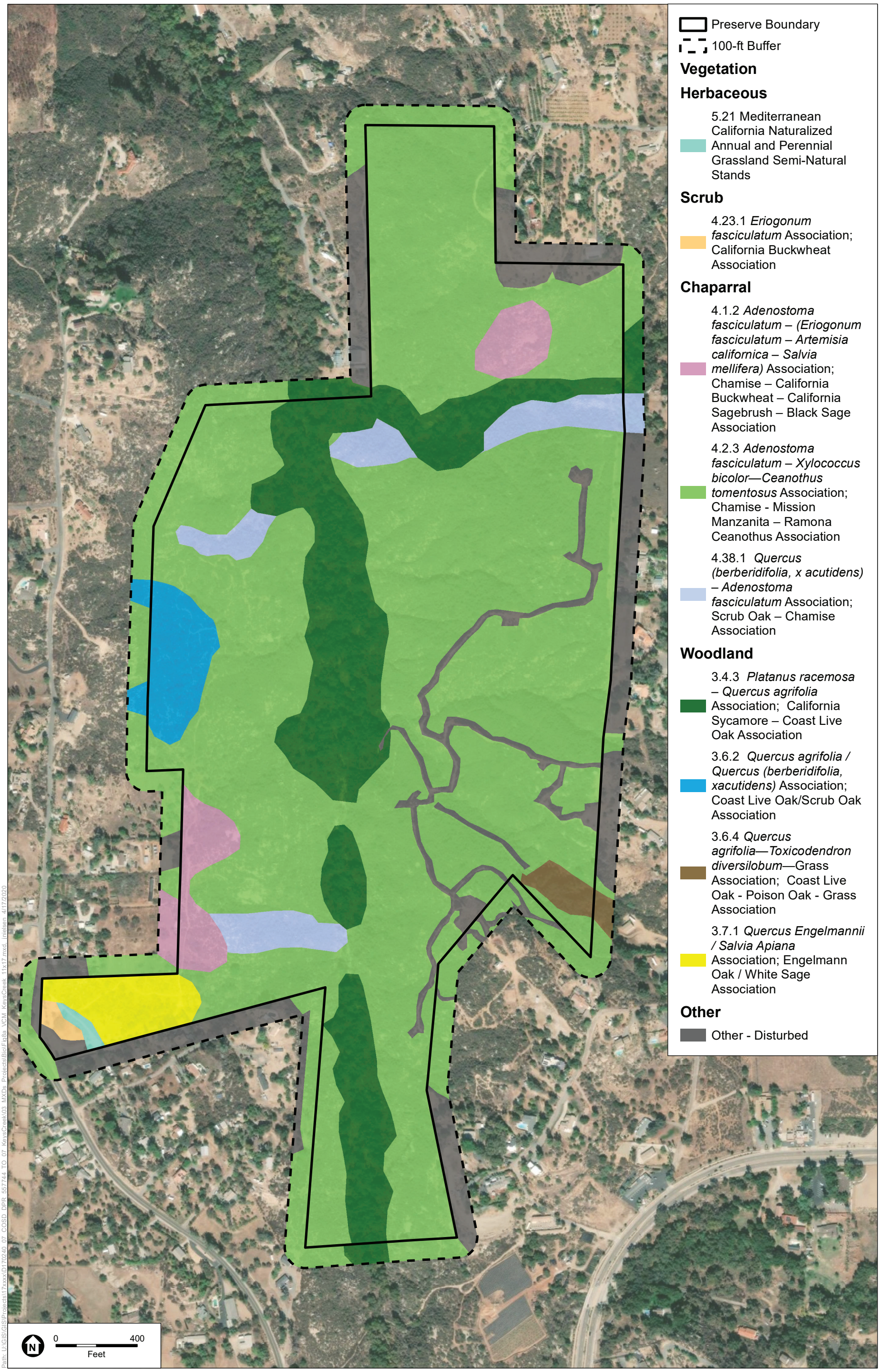
Mediterranean California naturalized annual and perennial grassland semi-natural stands consists of dominant non-native grasses and forbs that have replaced native types through repeated soil disturbance and introduction of non-native plant species (Sproul et al. 2011). This vegetation community type occurs on approximately 0.43 acres of the Preserve and is generally located in a small portion within the southwest portion of the Preserve. The area is dominated by weedy invasive non-native species, including short-pod mustard (*Hirschfeldia incana*), ripgut brome (*Bromus diandrus*), and soft chess brome (*Bromus hordeaceus*). This habitat is listed as Tier III in Draft North County MSCP (2017).

Table 4. Vegetation Communities/Land Cover Types for Keys Creek Preserve

San Diego Vegetation Classification Manual		Holland/Oberbauer	Property (acres)[1]	100-Foot Buffer (acres)[1]
Alliance Level	**Association Level**			
Herbaceous				
Mediterranean California naturalized annual and perennial grassland semi-natural stands	5.21 Mediterranean California naturalized annual and perennial grassland semi-natural stands	42200 Non-Native Grassland	0.43	—
Scrub				
Eriogonum fasciculatum Alliance	4.23.1 *Eriogonum fasciculatum* Association; California Buckwheat Association	32800 Flat-topped or California Buckwheat	0.52	—
Chaparral				
Quercus (*berberidifolia* x *acutidens*) – Adenostoma fasciculatum Alliance	4.38.1 *Quercus* (*berberidifolia* x *acutidens*) – *Adenostoma fasciculatum* Association; Scrub Oak – Chamise Association	37900 Scrub Oak Chaparral	7.64	0.45
Adenostoma fasciculatum – *Xylococcus* bicolor Alliance	4.2.3 *Adenostoma fasciculatum* – *Xylococcus bicolor* – *Ceanothus tomentosus* Association; Chamise – Mission Manzanita – Ramona Ceanothus Association	37120 Southern Mixed Chaparral	128.68	20.03
Adenostoma fasciculatum Alliance	4.1.2 *Adenostoma fasciculatum* – (*Eriogonum fasciculatum* – *Artemisia californica* – *Salvia mellifera*) Association; Chamise – California Buckwheat – California Sagebrush – Black Sage Association	37G00 Coastal Sage – Chaparral Transition	6.02	0.76
Woodland				
Platanus racemosa Alliance	3.4.3 *Platanus racemosa* – *Quercus agrifolia* Association; California Sycamore – Coast Live Oak Association	61300 Southern Riparian Forest	29.98	2.08
Quercus agrifolia Alliance	3.6.2 *Quercus agrifolia / Quercus* (*berberidifolia* x *acutidens*) Association; Coast Live Oak/Scrub Oak Association	71161 Open Coast Live Oak Woodland	4.59	0.60
Quercus agrifolia Alliance	3.6.4 *Quercus agrifolia* – *Toxicodendron diversilobum* – Grass Association; Coast Live Oak – Poison Oak – Grass Association	61310 Southern Coast Live Oak Riparian Forest	1.29	0.39
Quercus engelmannii Alliance	3.7.1 *Quercus engelmannii / Salvia apiana* Association; Engelmann Oak/White Sage Association	71180 Engelmann Oak Woodland	4.23	—
Other				
Disturbed	Other – Disturbed	11300 Disturbed	7.21	16.22
Total			**190.58**	**40.53**

[1] Vegetation acreage may not sum due to rounding.

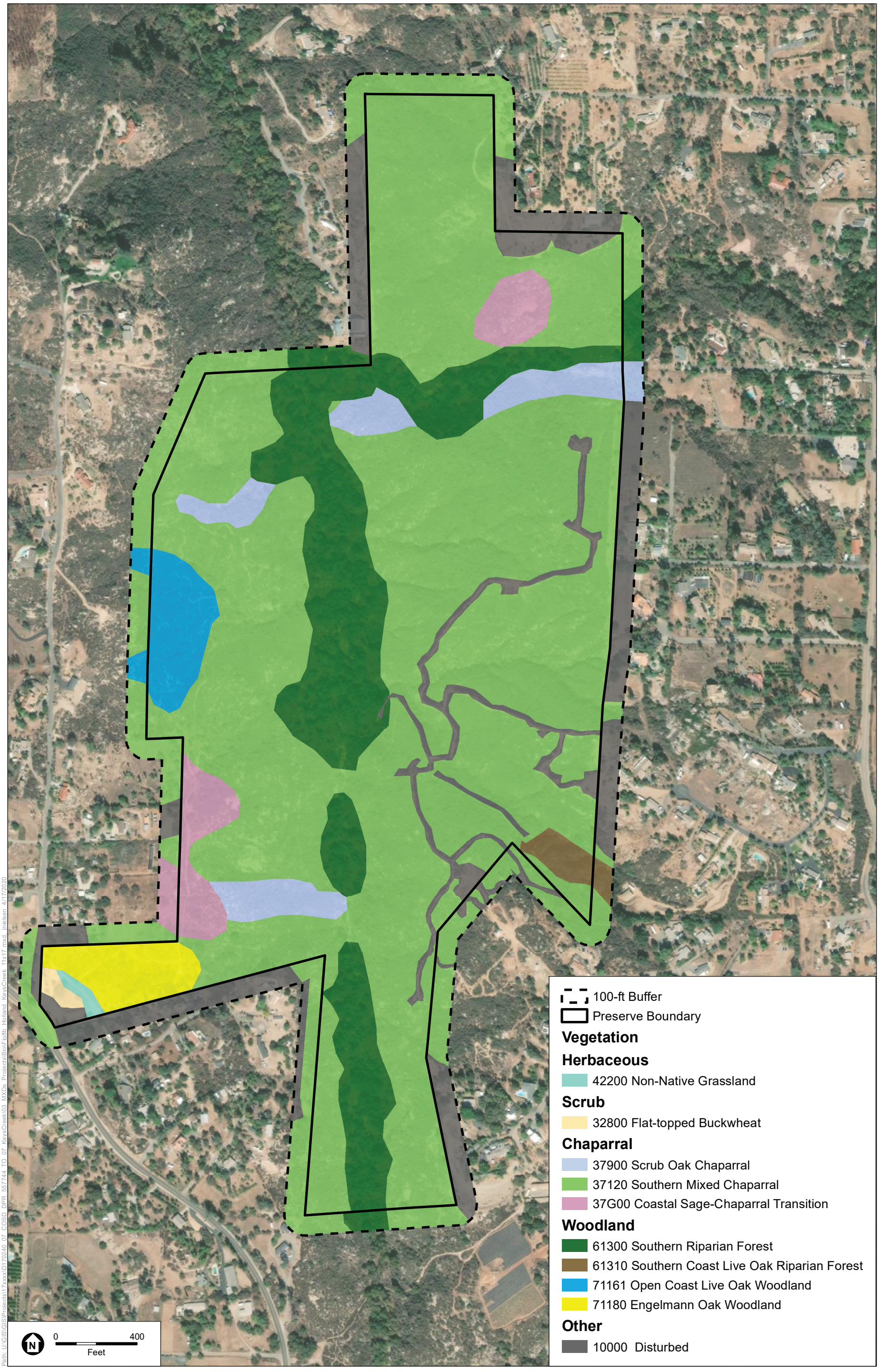
SOURCE: AECOM 2018b.



SOURCE: ESRI, 2019; SanBios, 2019; AECOM 2018

Figure 8a
Vegetation Communities/Habitats
(VCM Classification)

ESA



SOURCE: ESRI, 2019; SanGIS, 2019; AECOM 2018

Figure 8b
Vegetation Communities/Habitats
(Holland/Oberbauer Classification)

ESA

4.1.2 Scrub

4.1.2.1 California Buckwheat Association (4.23.1)

California Buckwheat Association (*Eriogonum fasciculatum* association) consists of dominant California buckwheat open shrub canopy, often occurring with subdominant shrubs. This association can occur both as an early transitional phase of other shrub associations or as a relatively stable association in ecotonal areas (Sproul et al. 2011). This association occurs on approximately 0.52 acres and is located only in the southwest portion of the Preserve. The dominant shrubs within this community include California buckwheat, laurel sumac (*Malosma laurina*), and coyote bush (*Baccharis pilularis*). Herbaceous plants occurring in the openings of this association include short-pod mustard, golden yarrow (*Eriophyllum confertiflorum*), and common cryptantha (*Cryptantha intermedia*). This habitat is listed as Tier II in the Draft North County MSCP (2017).

4.1.3 Chaparral

4.1.3.1 Scrub Oak–Chamise Association (4.38.1)

Scrub Oak–Chamise Association (*Quercus* (*berberidifolia* x *acutidens*)–*Adenostoma fasciculatum* association) is composed of codominant stands of scrub oak and chamise, subdominant shrubs, and sparse herbaceous cover (Sproul et al. 2011). Typically, shrubs are relatively tall in mature stands and the canopy is open to continuous (Sproul et al. 2011). This association occurs on approximately 7.64 acres and is found in patches throughout the Preserve. The dominant shrubs within this community include scrub oak and chamise, with various ceanothus species (*Ceanothus crassifolius, Ceanothus leucodermis,* and *Ceanothus tomentosus*) as subdominants. This habitat is listed as Tier III in the Draft North County MSCP (2017).

4.1.3.2 Chamise–Mission Manzanita–Ramona Ceanothus Association (4.2.3)

Chamise–Mission Manzanita–Ramona Ceanothus Association (*Adenostoma fasciculatum–Xylococcus bicolor–Ceanothus tomentosus* association) is composed of codominant shrubs. Chamise (*Adenostoma fasciculatum*), mission manzanita (*Xylococcus bicolor*), and Ramona ceanothus (*Ceanothus tomentosus*) form an open or continuous canopy, and occur as co-dominant shrubs. Herbaceous plants often occur in openings of this association, and they spread throughout the vegetation following fire (Sproul et al. 2011). This vegetation community occurs on approximately 128.68 acres on slopes east and west of Keys Creek within the Preserve, on non-mafic soils. This habitat is listed as Tier III in the Draft North County MSCP (2017).

4.1.3.3 Chamise–California Buckwheat–California Sage Brush–Black Sage Association (4.1.2)

Chamise–California Buckwheat–California Sage Brush–Black Sage Association (*Adenostoma fasciculatum–Eriogonum fasciculatum–Artemisia californica–Salvia mellifera* association) consists of chamise as the dominant shrub and other shrubs, such as California buckwheat, California sage brush, and black sage, occurring as subdominants. This association is typically a mix of chaparral and coastal sage scrub, and occurs both as a mature, stable shrub community or an early transitional stage of other shrublands in response to fire or other disturbance (Sproul et al. 2011). This vegetation community occurs on approximately 6.02 acres in two areas along the northern and western boundary of the Preserve on exposed slopes. This habitat is listed as Tier II in the Draft North County MSCP (2017).

4.1.4 Woodland

4.1.4.1 California Sycamore–Coast Live Oak Association (3.4.3)

California Sycamore–Coast Live Oak Association (*Platanus racemosa–Quercus agrifolia* association) consists of a continuous to open tree canopy where California sycamore and coast live oak are co-dominant, subdominant trees, and riparian shrubs. Herbaceous diversity is high and cover is continuous to open (Sproul et al. 2011). It occurs on approximately 29.98 acres and runs north and south through the entirety of the Preserve. The dominant trees within this community are California sycamore and coast live oak, with poison oak, California thistle (*Cirsium occidentale*), Douglas mugwort (*Artemisia douglasiana*), sedges (*Cyperus* spp.), and rushes (*Juncus* spp.) within the herbaceous understory. This habitat is listed as Tier I in the Draft North County MSCP (2017).

4.1.4.2 Coast Live Oak/Scrub Oak Association (3.6.2)

Coast Live Oak/Scrub Oak Association (*Quercus agrifolia/Quercus* (*berberidifolia* x *acutidens* association) consists of coast live oak in an open tree canopy, scrub oak present in the shrub canopy, and herbaceous cover in the openings of this association. This association is typical of mesic slopes where coast live oak is not associated with riparian vegetation types (Sproul et al. 2011). It occurs on approximately 4.59 acres in one area along the western boundary of the Preserve. Subdominant shrubs occurring within this community include laurel sumac, sawtooth goldenbush (*Hazardia squarrosa*), and toyon (*Heteromeles arbutifolia*). This habitat is listed as Tier I in the Draft North County MSCP (2017).

4.1.4.3 Coast Live Oak–Poison Oak–Grass Association (3.6.4)

The Coast Live Oak–Poison Oak–Grass Association (*Quercus agrifolia–Toxicodendron diversilobum*–Grass association) is dominated by coast live oak in the tree canopy and poison oak subdominant in the shrub canopy. The herbaceous diversity is high and cover is generally

intermittent to continuous (Sproul et al. 2011). This association occurs on approximately 1.29 acres and is located only in the southeast corner of the Preserve. This habitat is listed as Tier I in the Draft North County MSCP (2017).

4.1.4.4 Engelmann Oak/White Sage Association (3.7.1)

Engelmann Oak/White Sage Association (*Quercus engelmannii/Salvia apiana* association) consists of an open tree canopy dominated by Engelmann oaks, white sage diagnostically present in an open shrub canopy, and high herbaceous diversity (Sproul et al. 2011). This association occurs on approximately 4.23 acres in the southwest corner of the Preserve. Subdominant shrubs occurring within this community include California buckwheat and California sage brush. Herbaceous cover includes non-native short-pod mustard, ripgut brome, and filaree (*Erodium* spp.). This habitat is listed as Tier I in the Draft North County MSCP (2017).

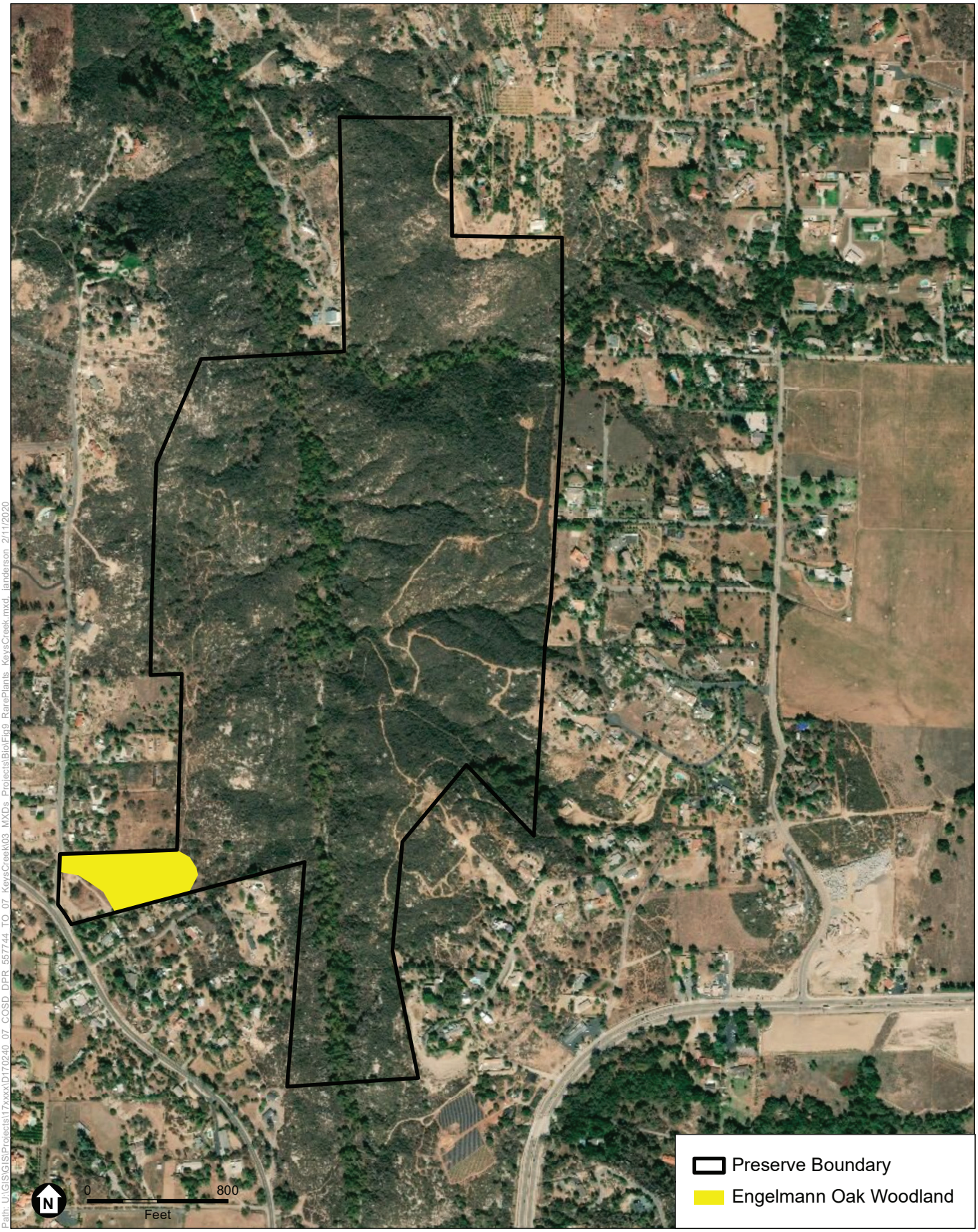
4.1.5 Other

4.1.5.1 Disturbed Habitat (11300)

Land designated as disturbed habitat is not addressed by the VCM; therefore, this description follows Oberbauer et al. (2008). Disturbed habitat consists of areas that have been physically disturbed and are no longer recognizable as a native vegetation community but continue to retain a soil substrate. Vegetation is nearly exclusively composed of non-native species, including ornamentals or ruderal exotic species (Oberbauer et al. 2008). Approximately 7.21 acres within the Preserve and 16.22 acres within the 100-foot buffer were mapped as disturbed habitat. The disturbed habitat within the Preserve consists primarily of unauthorized trails and roads. These areas generally consist of bare ground, but contain scattered non-native plant species, including short-pod mustard, tocalote, and stinkwort (*Dittrichia graveolens*). This habitat is listed as Tier IV in the Draft North County MSCP (2017).

4.2 PLANTS

A total of 198 species of plants were observed on the Preserve during the 2018 and 2019 baseline surveys. Of these 198 species, 52 species are non-native species and nine of those species are target invasive non-native species. One special-status rare plant, Engelmann oak (*Quercus engelmannii*), was documented on the Preserve during 2018 special-status/rare plant surveys and is discussed below and shown in **Figure 9**. A list of plant species observed on the Preserve is included in **Appendix A**.



SOURCE: ESRI, 2019; SanGIS, 2019; AECOM 2018

Figure 9
Special-Status Plant Species

ESA

4.2.1 Special-Status Plant Species Observed

4.2.1.1 Engelmann Oak (Quercus engelmannii)

CRPR 4.2, County List D

Engelmann oak is a perennial deciduous tree that grows 16 to 26 feet high in oak woodlands or grassland habitats. Engelmann oak is predominantly found in the foothills of San Diego County, but scattered observations extend up into Los Angeles and southwestern San Bernardino Counties, and down into Baja California, Mexico. Engelmann oak often occurs with coast live oak, in savannah-like habitats with annual grasses, or in areas where white sage occurs. It is drought-tolerant and will regrow new leaves following rain after going dormant. Reiser (2001) indicates that Engelmann oak populations are relatively stable in Southern California, but reproduction has been limited as a result of cattle grazing and herbivory by small mammals and deer. The introduction of feral pig (*Sus scrofa*) in the county in recent years and wild turkey (*Meleagris gallopavo*) in the early 1990s further exacerbates problems with oak reproduction, as both species consume acorns. Engelmann oak is known to hybridize with scrub oak (*Quercus berberidifolia*) (Baldwin et al. 2012).

Engelmann oaks were found growing at the Preserve's access point along the western border (Figure 9). Approximately two dozen Engelmann oaks were detected within the Preserve, but some individuals on the eastern portion of the population appear to be potential hybrids with scrub oaks.

4.2.2 Special-Status Plant Species with High Potential to Occur

Based on the vegetation communities occurring on the Preserve, elevation, soils, and distribution of species within the vicinity, no special status/rare plants have a high potential to occur within the Preserve. Other special-status/rare plant species were identified to have a moderate or low potential to occur. Life history, habitat occurring on the Preserve, rationale for moderate or low potential to occur, and sensitivity status for these species are detailed in **Appendix B**.

4.2.3 Invasive Non-Native Plants

A total of 52 non-native plant species[2] were detected on the Preserve during botanical surveys in spring 2018 and 2019 and other 2019 surveys. Not all species that were noted in the 2018 surveys were also noted during the 2019 surveys. This could have been due to the timing of surveys or seasonal rainfall. **Table 5** lists the nine target invasive non-native species that were mapped within the Preserve, along with their associated Management Priority Level (Conservation Biology Institute 2012) and Cal-IPC Inventory Ranking (Cal-IPC 2019). Target invasive non-native species were selected based on their invasive potential, prevalence throughout the Preserve, and ability for

[2] Non-native plant species includes invasive plant species.

management. These target invasive non-native plant species locations are shown in **Figure 10**. Additional invasive non-native plant species were observed throughout the Preserve, particularly along unauthorized dirt trails and around grassy areas. Also shown in Figure 10 is a large area in the southwestern region of the Preserve in which invasive non-native grasses, composed primarily of ripgut brome, are present throughout the understory and intermixed within the native habitat.

Table 5. Invasive Non-Native Plant Species with High Priority for Removal on the Preserve[1]

Common Name	Scientific Name	CBI Management Priority for Invasive Non-native Plants[2]	Cal-IPC Rating[3]
Giant Reed	*Arundo donax*	Management Level 3	High
Sweet Fennel	*Foeniculum vulgare*	Management Level 4	High
Stinkwort	*Dittrichia graveolens*	Management Level 4	Moderate
Iceplant	*Carpobrotus edulis*	NA	High
Poison Hemlock	*Conium maculatum*	NA	Moderate
Tree Tobacco	*Nicotiana glauca*	NA	Moderate
Brazilian Pepper Tree	*Schinus terebinthifolius*	NA	Moderate
Mexican Fan Palm	*Washingtonia robusta*	NA	Moderate
Peruvian Pepper Tree	*Schinus molle*	NA	Limited

[1] Species are included in this table due to their potential for being invasive and the feasibility of removal from the Preserve since they currently remain in low enough numbers for removal and eradication.

[2] **Source**: San Diego Environmental Mitigation Program Working Group in their Management Priorities for Invasive Nonnative Plants. Conservation Biology Institute (CBI) 2012.

Management Levels for San Diego County's Natural Community Conservation Programs (NCCP):

Level 3 – Containment: Eradication with coordinated programs by management unit or watershed.

Level 4 – Directed Management: Control within reserve or sub-management unit to benefit NCCP resources.

[3] **Source**: Cal-IPC Invasive Plant Inventory Database, 2019. Overall rating listed for southwest region, factoring impact, invasiveness, distribution, and documentation level.

Cal-IPC Inventory Categories:

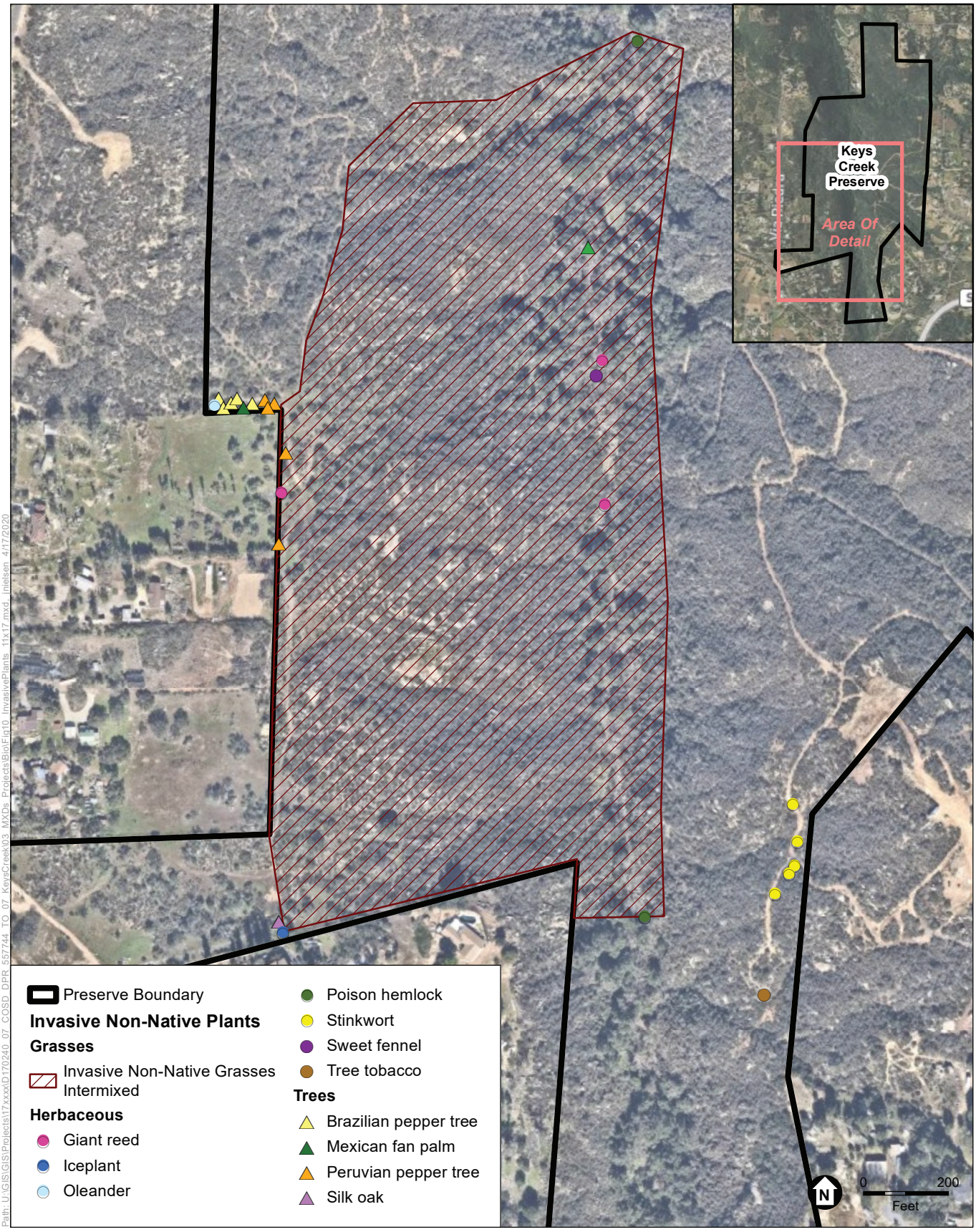
High: Species have severe ecological impacts, are conducive to moderate to high rates of dispersal/establishment, and most are widely spread.

Moderate: Species have substantial and apparent, but generally not severe, ecological impacts; are conducive to moderate to high rates of dispersal, though establishment is generally dependent on ecological disturbance; and distribution may range from limited to widespread.

Limited: Species are invasive, but their ecological impacts are minor on a statewide level, or there was not enough information to justify a higher score; have low to moderate rates of invasiveness; and are generally limited but may be locally persistent and problematic.

4.2.3.1 Giant Reed (*Arundo donax*)

Giant reed is a tall perennial grass that typically forms dense stands on disturbed sites, sand dunes, riparian areas, and wetlands. It is threatening California's riparian ecosystems by outcompeting native species, such as willows, for water (Cal-IPC 2019). It spreads vegetatively either by rhizomes or fragments. Within the Preserve, a small patch of giant reed was detected encroaching from a neighbor's yard. Another small patch was located within the drainage during a survey performed on December 11, 2018 (Figure 10). However, when the area was surveyed again for invasive non-native plants, giant reed was not detected. It is possible the occurrence washed downstream from a large storm event during the heavy 2018/2019 rainy season.



SOURCE: ESRI, 2019; SanGIS 2019; ESA 2019

Figure 10
Invasive Non-Native Plant Species

4.2.3.2 Sweet Fennel (*Foeniculum vulgare*)

Sweet fennel is an invasive perennial species that has a high ability to spread. It has established dense local populations throughout California, such as in the Marine Corps Base Camp Pendleton, where it has drastically altered the composition and structure of the landscape and prevented the recovery of native vegetation from disturbance. It is an upright, branching species that produces aromatic yellow-green leaves and small yellow flowers in compound umbels. This species can be found within grasslands, coastal scrub, riparian, and wetland communities (Cal-IPC 2019). It was detected in one location in the central of the Preserve (Figure 10) within Keys Creek and included one mature individual with several seedlings downstream of the creek.

4.2.3.3 Stinkwort (*Dittrichia graveolens*)

Stinkwort is an annual species that occurs commonly in disturbed areas, but is also found in native wetland and upland habitats. It reproduces via the large amounts of seed its flowers produce. It is ranked as a Management Priority Level 4 species and is considered a species that can be effectively managed (Conservation Biology Institute 2012). On the Preserve, this species occurs along an unauthorized dirt trail in the southeastern region (Figure 10).

4.2.3.4 Iceplant (*Carpobrotus edulis*)

Iceplant is an invasive succulent shrub found throughout coastal California and the Channel Islands due to ornamental planting. This species propagates by seed and vegetatively, where even small stem fragments can regenerate into a new plant. It can grow into dense mats within coastal scrub, grasslands, chaparral, bluffs, dunes, and beaches, where it increases soil organic matter over time, allowing new non-native species to invade (Cal-IPC 2019). Within the Preserve, a small mat of iceplant was detected in the southwestern corner of the Preserve, presumably an escaped ornamental from a nearby resident's yard (Figure 10).

4.2.3.5 Poison Hemlock (*Conium maculatum*)

Poison hemlock is a biennial forb that prefers disturbed areas and is commonly found in dense patches along roadsides and fields, but can also be found in meadows and riparian forests. Once established, it is highly competitive and prevents establishment of native plants by over-shading (Cal-IPC 2019). Within the Preserve, this species was detected in two locations on the banks adjacent to Keys Creek; approximately 50 plants were documented at both occurrences (Figure 10).

4.2.3.6 Tree Tobacco (*Nicotiana glauca)*

Tree tobacco is a short-lived shrub or tree that can grow up to 20 feet tall. It was introduced to California approximately 100 years ago and can be found in disturbed areas, in vacant lots, along roadsides and streamsides, and in other riparian areas (Cal-IPC 2019). One individual was detected near the southeastern boundary of the Preserve near a disturbed trail (Figure 10).

4.2.3.7 Peruvian and Brazilian Pepper Tree (*Schinus molle* and *S. terebinthifolius*)

Pepper tree is an evergreen shrub or tree. Brazilian pepper tree commonly occurs within riparian areas, canyons, fields, and roadsides, typically where some water is available throughout the year, whereas Peruvian pepper trees more often occur in upland habitats. Both species can be prolific, producing fruits that get eaten and dispersed by wildlife, and root shoots that can result in dense monotypic growth within the tree canopy. Five Peruvian pepper trees and five Brazilian pepper trees were recorded on the western edge of the Preserve, neighboring a residential property also with these species (Figure 10).

4.2.3.8 Mexican Fan Palm (*Washingtonia robusta*)

Mexican fan palm is a single-trunked palm tree found in the San Francisco Bay area, in southern Sacramento Valley, and along the Southern California coast. It was introduced as a common landscape ornamental that escaped and became invasive in riparian areas, orchards, and landscaped areas. It can create monospecific stands in riparian areas where the dead fronds can become a fire hazard (Cal-IPC 2019). Four individuals were detected along the western boundary of the Preserve, adjacent to a residential property, and one seedling was detected within Keys Creek in the center of the Preserve (Figure 10).

4.3 WILDLIFE

A total of 100 wildlife species were detected and/or observed during surveys conducted from December 2018 to September 2019: 20 invertebrates, 9 reptile species, 3 amphibian species, 44 birds, and 24 mammals. A total of 17 special-status wildlife species were observed or detected, and are shown in **Figure 11**. A comprehensive list of wildlife species observed or detected on the Preserve is included in **Appendix C**.

4.3.1 Invertebrates

A number of invertebrates observed were incidentally observed or caught within the Preserve and were identified to genus when feasible. These include Jerusalem cricket (Family Stenopelmatidae), tarantula hawks (*Pepsis* spp.), yellow jackets (*Vespula* spp.), orb-weaver spiders (Family Araneidae), velvet ant (*Dasymutilla* spp.), water striders (Family Gerridae), and harvester ants (*Pogonomyrmex* sp.). No special-status invertebrate species were observed.

4.3.1.1 Butterflies

Thirteen species of butterflies were detected during the butterfly survey on the Preserve. Commonly detected butterflies include Sara orangetip (*Anthocharis sara*), funereal duskywing (*Erynnis funeralis*), Acmon blue (*Icaricia acmon*), marine blue (*Leptotes marina*), Behr's metalmark (*Apodemia virgulti*), and anise swallowtail (*Papilio zelicaon*). The full list of all butterfly and moth species detected is located in Appendix C. No special-status butterfly species were observed.

4.3.2 Herpetofauna

4.3.2.1 Amphibians

Three amphibian species were documented during the aquatic survey. All three species are common, non-special-status species: Baja California treefrog (*Pseudacris hypochondriaca*), California treefrog (*Pseudacris cadaverina*), and western toad (*Anaxyrus boreas halophilus*).

4.3.2.2 Reptiles

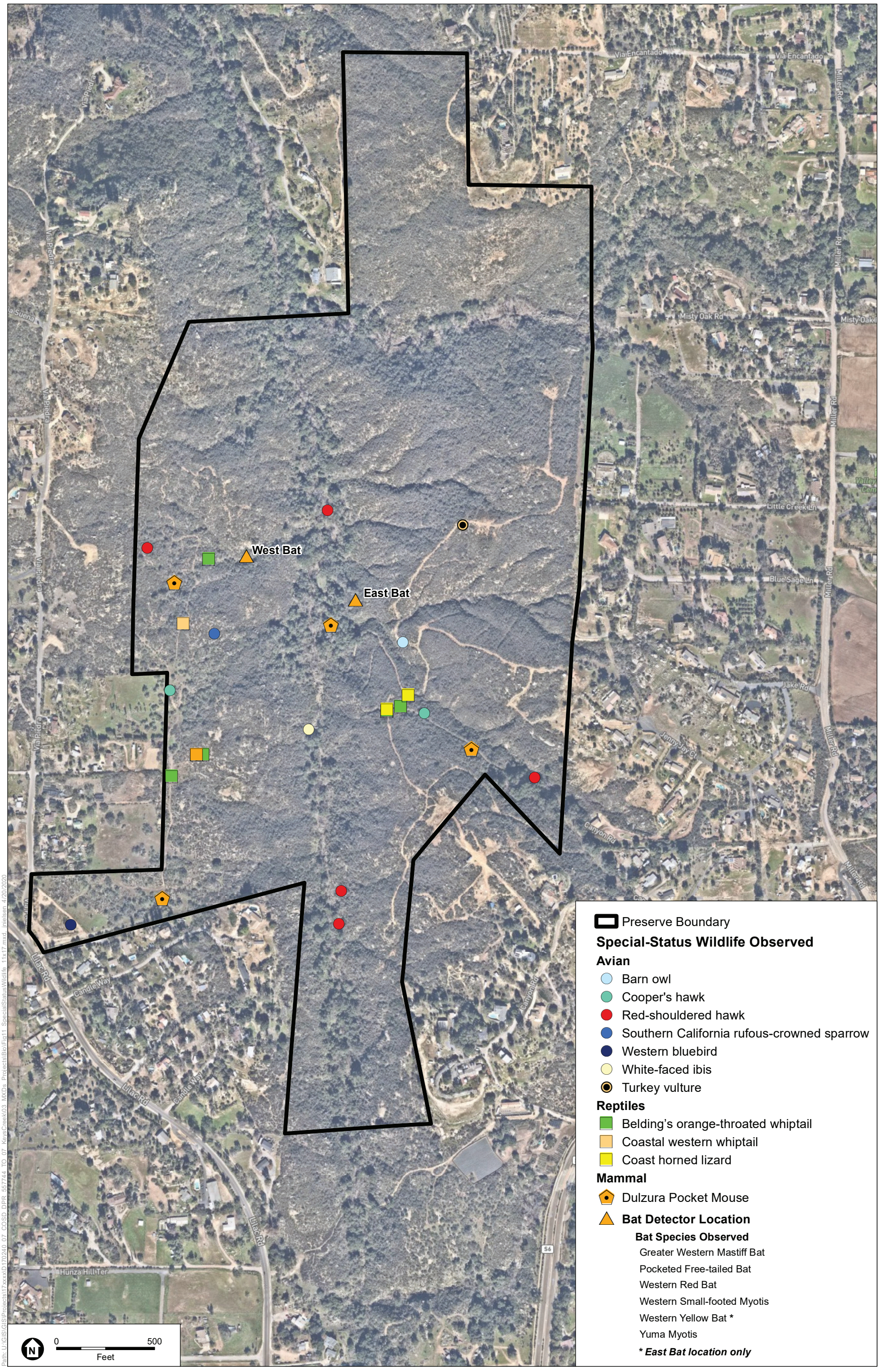
A total of nine reptile species were detected within the Preserve. Seven species were detected during drift fence surveys, including six lizard species and one snake species, with a total of fifteen reptiles captured (**Table 6**). Two additional species (one lizard and one snake species) were detected during incidental observations. Three special-status reptile species, Belding's orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), coast horned lizard (*Phrynosoma coronatum blainvillei*), and coastal western whiptail (*Aspidoscelis tigris stejnegeri*), were detected during drift fence surveys or incidentally within the Preserve; these are discussed in detail in Section 4.3.5.

The lizard species captured during drift fence surveys within the Preserve include Belding's orange-throated whiptail, coastal western whiptail, southern alligator lizard (*Elgaria multicarinata*), western fence lizard (*Sceloporus occidentalis*), western red-tailed skink (*Plestiodon gilberti rubricaudatus*), and western side-blotched lizard (*Uta stansburiana elegans*). (Table 6). One coast horned lizard individual was detected incidentally during the fourth round of drift fence surveys adjacent to Trap 3.

Only one snake species was captured during drift fence surveys within the Preserve: California striped racer (*Coluber lateralis lateralis*) (Table 6). A southern Pacific rattlesnake (*Crotalus oreganus helleri*) was also detected incidentally during the third round of drift fence surveys adjacent to Trap 2. Appendix E contains representative photographs of amphibian and reptile species caught during drift fence surveys.

4.3.3 Birds

A total of 44 bird species were observed within the Preserve during avian surveys in February, April, July, and September 2019, and incidentally during other surveys (**Table 7**). Of these, seven special-status bird species were observed: white-faced ibis (*Plegadis chihi*), turkey vulture (*Cathartes aura*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), barn owl (*Tyto alba*), western bluebird (*Sialia mexicana*), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). These species are discussed in further detail in Section 4.3.5. The full list of all avian species detected is located in Appendix C.



SOURCE: ESRI; SanGIS 2019; ESA 2020

Figure 11
Special-Status Wildlife Species

ESA

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Table 6. Reptile Drift Fence Captures

Common Name	Scientific Name	Status[1]	Array (Number of Captures)																Total Number of Captures
			Week 1 (April 22–26, 2019)				Week 2 (May 20–24, 2019)				Week 3 (June 17–21, 2019)				Week 4 (July 15–19, 2019)				
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Lizards																			
Coast Horned Lizard	*Phrynosoma blainvillii*	SSC, MSCP, Group 2	—	—	—	—	—	—	—	—	—	—	*	—	—	—	*	—	0
Belding's Orange-Throated Whiptail	*Aspidoscelis hyperythra beldingi*	WL, Group 2	—	—	*	*	—	—	—	—	1	—	—	—	1	—	2	—	4
Coastal Western Whiptail	*Aspidoscelis tigris stejnegeri*	SSC, Group 2	—	—	*	—	—	—	—	—	—	—	—	—	1	*	—	—	1
Southern Alligator Lizard	*Elgaria multicarinata*	None	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Western Fence Lizard	*Sceloporus occidentalis*	None	*	2	*	—	—	—	1	—	*	—	—	—	—	1	—	—	4
Western Red-tailed Skink	*Plestiodon gilberti rubricaudatus*	None	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Western Side-Blotched Lizard	*Uta stansburiana elegans*	None	2	—	1	—	—	—	—	—	—	—	—	—	—	—	—	*	3
Snakes																			
California Striped Racer	*Coluber lateralis*	None	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
Southern Pacific Rattlesnake	*Crotalus oreganus helleri*	None	—	—	—	—	—	*	—	—	—	—	—	—	—	—	—	—	0
Total Number of Captures			**2**	**3**	**1**	**2**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**2**	**0**	**15**

[1] SSC: CDFW Species of Special Concern
WL: CDFW Watch List
MSCP: Covered under the Draft North County MSCP
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County)

* Individual(s) or sign were observed incidentally along trails near this herpetological array.

Table 7. Avian Survey Results

Common Name by Family	Scientific Name	Winter (02/19/19)	Spring (04/30/19)	Summer (07/01/19)	Fall (09/03/19)	Incidental Observations	Status[1]
Anatidae							
American Wigeon	*Mareca americana*	9[a]	—	—	—	—	
Odontophoridae							
California Quail	*Callipepla californica*	1	8	1	2	X	
Columbidae							
Mourning Dove	*Zenaida macroura*	3	1	6	6	X	
Cuculidae							
Greater Roadrunner	*Geococcyx californianus*	1	—	—	—	—	
Caprimulgidae							
Common Poorwhill	*Phalaenoptilus nuttallii*	—	X	X	X	—	
Trochilidae							
Anna's Hummingbird	*Calypte anna*	2	4	2	1	X	
Costa's Hummingbird	*Calypte costae*	2	—	—	—	—	
Threskiornithidae							
White-Faced Ibis	*Plegadis chihi*	—	1[a]	—	—	—	WL, Group 1
Cathartidae							
Turkey Vulture	*Cathartes aura*	—	—	—	—	X	Group 1
Accipitridae							
Cooper's Hawk	*Accipiter cooperii*	—	1	1	—	—	WL, Group 1
Red-Shouldered Hawk	*Buteo lineatus*	1	—	1	1	—	Group 1
Red-Tailed Hawk	*Buteo jamaicensis*	1	—	—	1	X	
Tytonidae							
Barn Owl	*Tyto alba*	—	—	—	1[a]	—	Group 2
Strigidae							
Great Horned Owl	*Bubo virginianus*	X	X	—	X	—	
Picidae							
Acorn Woodpecker	*Melanerpes formicivorus*	—	—	1	1	X	
Nuttall's Woodpecker	*Dryobates nuttallii*	1	1	1	1	—	
Northern Flicker	*Colaptes auratus*	7	—	—	—	X	

Table 7. Avian Survey Results

Common Name by Family	Scientific Name	Winter (02/19/19)	Spring (04/30/19)	Summer (07/01/19)	Fall (09/03/19)	Incidental Observations	Status[1]
Tyrannidae							
Black Phoebe	*Sayornis nigricans*	1	—	—	1	—	
Say's Phoebe	*Sayornis saya*	1	—	—	—	—	
Ash-Throated Flycatcher	*Myiarchus cinerascens*	—	—	—	—	X	
Western Kingbird	*Tyrannus verticalis*	—	1	—	—	—	
Corvidae							
California Scrub-Jay	*Aphelocoma californica*	4	2	4	3	X	
American Crow	*Corvus brachyrhynchos*	30[a]	2[a]	8[a]	—	X	
Common Raven	*Corvus corax*	3[a]	—	1[a]	—	—	
Aegithalidae							
Bushtit	*Psaltriparus minimus*	10	4	—	2	—	
Sylviidae							
Wrentit	*Chamaea fasciata*	7	4	5	1	X	
Regulidae							
Ruby-Crowned Kinglet	*Regulus calendula*	2	—	—	—	—	
Polioptilidae							
Blue-Gray Gnatcatcher	*Polioptila caerulea*	2	1	1	1	—	
Troglodytidae							
House Wren	*Troglodytes aedon*	—	—	1	—	—	
Bewick's Wren	*Thryomanes bewickii*	4	2	1	1	—	
Sturnidae							
European Starling	*Sturnus vulgaris*	—	2[a]	—	—	X	
Mimidae							
California Thrasher	*Toxostoma redivivum*	5	3	1	4	—	
Turdidae							
Western Bluebird	*Sialia mexicana*	8	—	—	—	—	Group 1
Ptiliogonatidae							
Phainopepla	*Phainopepla nitens*	—	—	—	—	X	
Fringillidae							
House Finch	*Haemorhous mexicanus*	2	12	2	2	X	
Lawrence's Goldfinch	*Spinus lawrencei*	—	1	2	—	—	
Lesser Goldfinch	*Spinus psaltria*	7	3	—	—	X	

Table 7. Avian Survey Results

Common Name by Family	Scientific Name	Winter (02/19/19)	Spring (04/30/19)	Summer (07/01/19)	Fall (09/03/19)	Incidental Observations	Status[1]
Passerellidae							
Song Sparrow	*Melospiza melodia*	1	2	—	—	—	
California Towhee	*Melozone crissalis*	10	6	2	1	X	
Southern California Rufous-Crowned Sparrow	*Aimophila ruficeps canescens*	1	—	—	—	—	WL, Group 1
Spotted Towhee	*Pipilo maculatus*	3	5	1	1	X	
Parulidae							
Orange-Crowned Warbler	*Leiothlypis celata*	—	2	—	—	X	
Common Yellowthroat	*Geothlypis trichas*	—	—	—	—	X	
Cardinalidae							
Black-Headed Grosbeak	*Pheucticus melanocephalus*	—	—	1	—	X	
Number of Species Observed/Detected		**29**	**24**	**21**	**20**	**20**	

[1] WL: CDFW Watch List.
Group 1: Animals of high sensitivity (listed or specific natural history requirements) (County).
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County).
X – species heard and/or number of individuals not determined.

[a] Flyover.

The most common species observed in terms of numbers of individuals recorded were American crow (*Corvus brachyrhynchos*), California towhee (*Melozone crissalis*), house finch (*Haemorhous mexicanus*), mourning dove (*Zenaida macroura*), California quail (*Callipepla californica*), and bushtit (*Psaltriparus minimus*). The following birds were detected during nocturnal surveys: common poorwill (*Phalaenoptilus nuttallii*), barn owl (*Tyto alba*), and great-horned owl (*Bubo virginianus*).

Common resident species on the Preserve include Bewick's wren (*Thryomanes bewickii*), California scrub jay (*Aphelocoma californica*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*), California quail, blue-gray gnatcatcher (*Polioptila caerulea*), and Anna's hummingbird (*Calypte anna*). These species were observed during each survey and are presumed to nest within the Preserve. Other resident species that were common on the Preserve but are presumed to use the Preserve only for foraging are American crow (*Corvus brachyrhynchos*) and common raven (*Corvus corax*).

In addition to the resident breeding species, one winter resident species, ruby-crowned kinglet (*Regulus calendula*), was present within the Preserve. Additional species such as yellow-rumped warbler (*Setophaga coronata*) or white-crowned sparrow (*Zonotrichia leucophrys*) are expected to use the Preserve but, because of very cold weather conditions during the winter survey, were not observed. These winter resident species are found within chaparral and oak woodland habitat in San Diego County and are detected only during the winter or early springtime, before they migrate north. Few non-resident migratory species were detected within the Preserve, and include orange-crowned warbler (*Setophaga celata*) and phainopepla (*Phainopepla nitens*). These individual migratory species moved through the Preserve, but no large pulses of migratory birds were detected. The habitat within the Preserve, especially along the creek and oak woodland canopy that runs south to north, could potentially support avian species during migration and/or provide migratory stopover habitat.

Table 7 lists the bird species found during the four avian surveys in 2019, as well as incidental avian observations from other focused survey efforts. The numbers in Table 7 indicate the approximate number of individuals per species that were heard or observed during each survey. Avian diversity was highest in the winter (February) and lowest in the fall (September).

4.3.4 Mammals

4.3.4.1 Small Mammals

A total of nine small mammal species were observed within the Preserve during baseline surveys. Of these, eight small mammals species, all rodents, were trapped on the Preserve during the small mammal surveys. This included the special-status species Dulzura pocket mouse (*Chaetodipus californicus femoralis*), which is discussed in further detail in Section 4.3.5. One additional small

mammal species not noted during small mammal trapping, shrew (Family Soricidae), was incidentally captured during drift fence surveys. The most common species trapped was the California mouse (*Peromyscus californicus*). Representative photographs of small mammal species found on the Preserve are located in Appendix E.

Table 8 provides a summary of the total number of individuals captured in each trapline during the spring and fall trapping sessions. For four consecutive nights of trapping during spring 2019, 120 traps were used, and for four consecutive nights during fall 2019, 125 traps were used, for a total of 980 "trap nights"—defined as one trap set for one night. There were 231 small mammal captures across those 980 trap nights for an approximate 23.6 percent trap night success rate.

Table 8. Small Mammal Trapping Results

Common Name	Scientific Name	Status[1]	Spring 2019 (4/22/19–4/26/19)				Fall 2019 (9/16/19–9/20/19)				Total
			Sampling Location				Sampling Location				
			1	2	3	4	1	2	3	4	
Dulzura pocket mouse	*Chaetodipus californicus femoralis*	SSC, Group 2	2	4	—	—	2	6	1	5	20
Big-eared woodrat	*Neotoma macrotis*	None	3	3	—	1	16	25	—	25	73
Northern Baja mouse	*Peromyscus fraterculus*	None	—	5	—	—	—	8	—	—	13
California mouse	*Peromyscus californicus*	None	—	10	1	14	1	26	—	25	77
Deer mouse[2]	*Peromyscus maniculatus*	None	10	2	1	3	20	3	2	—	41
Western harvest mouse	*Reithrodontomys megalotis*	None	—	—	1	—	2	—	1	—	4
Merriam's chipmunk	*Neotamias merriami*	None	—	—	—	2	—	—	—	—	2
California vole	*Microtus californicus*	None	—	—	—	—	1	—	—	—	1
Shrew[3]	Family Soricidae	None	—	—	—	—	—	—	—	—	0
Total			**15**	**24**	**3**	**20**	**42**	**68**	**4**	**55**	**231**

[1] SSC: CDFW Species of Special Concern.
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County).

[2] Deer mouse was also captured during the herpetological drift fence surveys at the drift fence #4 location in May 2019.

[3] Shrew was captured during the herpetological drift fence surveys at the drift fence #4 location in July 2019, but not captured during small mammal trapping.

4.3.4.2 Bats

Eleven bat species were detected within the Preserve during passive and active acoustic surveys in 2019, including big brown bat (*Eptesicus fuscus*), greater western mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), western yellow bat (*Lasiurus xanthinus*), California myotis (*Myotis californicus*), western small-footed myotis (*Myotis ciliolabrum*), Yuma myotis (*Myotis yumanensis*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), canyon bat (*Parastrellus hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*). Four of these species are CDFW Species of Special Concern: greater western mastiff bat, western red bat, western yellow bat, and pocketed free-tailed bat. **Table 9** lists the status, preferred roosting habitat, and detection method for each bat species that was detected during the 2019 spring and summer bat surveys.

Roosting Habitat Assessment

Overall, roosting habitat within the Preserve is relatively abundant. Multiple trees within the Sycamore-Oak Woodland habitat along the creek provide roosting habitat for multiple species, including western red bat, which roost in various broad-leaved tree species such as the California sycamore (*Platanus racemosa*) found throughout the Preserve. California myotis and western small-footed myotis could also roost in crevices beneath sloughing bark. The Preserve does not contain cliffs, large rock faces, snags, culverts, bridges, or mines. The abandoned structure within the Preserve may provide small, exposed crevices similar to rock outcrops that could be used as temporary roosts, but the structure does not provide any of the cave-like or cavity-like roosting habitats that could support roosting colonies or the typical species that are known for roosting in abandoned buildings. Small rocky outcrops occur throughout the Preserve and may provide roosting habitat for canyon bats; however, these features are generally low to the ground and lack the vertical drop and predator protection preferred by other cliff and multiple roosting habitat species, such as the pocketed or Mexican free-tailed bats. One abandoned structure on the Preserve was investigated for potential roosting habitat but was found to not contain any large or deep cavities that could provide roosting habitat for bat maternity colonies or for species associated with roosting in buildings.

Table 9. Summary of Bat Species Detected During 2019 Surveys

Common Name	Scientific Name	Status[1]	Roosting Habitat[2]	Detection Method
Big brown bat	*Eptesicus fuscus*	None	Multiple	Acoustic
Greater western mastiff bat	*Eumops perotis californicus*	SSC, Group 2	Cliff	Acoustic
Western red bat	*Lasiurus blossevillii*	SSC, Group 2	Tree	Acoustic
Hoary bat	*Lasiurus cinereus*	None	Tree	Acoustic
Western yellow bat	*Lasiurus xanthinus*	SSC	Tree	Acoustic
California myotis	*Myotis californicus*	None	Multiple	Acoustic
Western small-footed myotis	*Myotis ciliolabrum*	Group 2	Multiple	Acoustic
Yuma myotis	*Myotis yumanensis*	Group 2	Multiple	Acoustic
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	SSC, Group 2	Cliff	Acoustic
Canyon bat	*Parastrellus hesperus*	None	Cliff[3]	Acoustic, visual
Mexican free-tailed bat	*Tadarida brasiliensis*	None	Multiple	Acoustic

[1] SSC: CDFW Species of Special Concern.
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County).

[2] Source: Western Bat Working Group (WBWG). 2019. Species Matrix. Accessed at http://wbwg.org/matrices/species-matrix/ in September 2019.

[3] Roosts primarily in rock crevices.

Emergence Surveys and Active Acoustic Monitoring

One species of bat, the canyon bat, was detected during the spring and summer active acoustic monitoring within the Preserve (**Table 10**). No potential concentrated roost sites or focused emergence points (e.g., tree cavities) were identified during the roosting habitat assessment; therefore, the emergence surveys were focused on a snag near the abandoned structure and along the creek for foraging species. No bats were directly observed emerging from the snag or

abandoned structure; however, directly observing the emergence of solitary roosting bats or small roosting colonies in these areas would be unlikely, even if roosting bats were present.

Table 10. Results of Emergence Surveys and Active Acoustic Monitoring during Spring and Summer 2019

Date	Surveyors	Results
Spring		
4/11/19	Julie Stout, Adrienne Lee	Canyon bats were observed and acoustically detected foraging along Keys Creek.
Summer		
7/10/19	Julie Stout, Lisa Maier	Shortly after sunset at 7:55 p.m., five canyon bats were observed and acoustically detected foraging adjacent to Keys Creek.

Passive Acoustic Surveys

Ten bat species were detected during the spring passive acoustic survey and all eleven bat species were detected during the summer passive acoustic survey. **Table 11** presents the relative activity index for each bat species during the spring and summer passive acoustic surveys. The relative activity index provides a basis for relative comparison of activity for each bat species, but does not directly correlate with the abundance of individuals. A higher activity index could be the result of a single bat foraging in the survey area for an extended period of time or multiple bats briefly passing through the survey area. Representative photographs of passive bat survey detectors are located in Appendix E.

Table 11. Results of Passive Acoustic Bat Surveys during Spring and Summer 2019

Common Name	Scientific Name	Status[1]	Relative Nightly Activity Index[2]		
			Spring (April)	Summer (July)	Average Activity Index[3]
Big brown bat	*Eptesicus fuscus*	None	8.57	214.29	111.43
Greater western mastiff bat	*Eumops perotis californicus*	SSC, Group 2	2.14	6.43	4.29
Western red bat	*Lasiurus blossevillii*	SSC, Group 2	14.29	11.43	12.86
Hoary bat	*Lasiurus cinereus*	None	99.29	2.86	51.07
Western yellow bat	*Lasiurus xanthinus*	SSC	—	4.29	2.14
California myotis	*Myotis californicus*	None	34.29	11.43	22.86
Western small-footed myotis	*Myotis ciliolabrum*	Group 2	5.00	2.14	3.57
Yuma myotis	*Myotis yumanensis*	Group 2	20.71	12.14	16.43
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	SSC, Group 2	45.00	0.71	22.86
Canyon bat	*Parastrellus hesperus*	None	29.29	330.00	179.64
Mexican free-tailed bat	*Tadarida brasiliensis*	None	100.71	38.57	69.64

[1] SSC: CDFW Species of Special Concern.
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County).

[2] Number of bat passes per detector per night multiplied by 10.

[3] Average of seasonal measures of relative activity for each bat species detected.

For migratory species such as the hoary bat and Mexican free-tailed bat (a species that occurs as both a migrant and year-round resident in Southern California), trends of increased activity in the spring, as compared to summer, may be the result of migratory activity. Trends of increased activity in the spring for year-round resident species such as the pocketed free-tailed bat may be the result of local dispersals or seasonal movements between winter and summer roosts sites or may indicate different foraging patterns or distances tied to maternity roost locations or seasonal insect distribution or abundance. For species with increased summer activity, such as the big brown bat and canyon bat, these activity trends may be associated with local seasonal movement patterns and changes in seasonal foraging activity, or these trends could also indicate that maternity roosts occur in the vicinity.

4.3.4.3 Medium and Large Mammals

Wildlife Cameras

Several mammal and bird species were detected at the two wildlife camera locations. Species detected at the wildlife cameras in approximate order of abundance based on the total number of instances a camera was triggered by each species were coyote (*Canis latrans*), northern raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), and various bird species (red-shouldered hawk [*Buteo lineatus*], red-tailed hawk [*Buteo jamaicensis*], mourning dove, great horned owl, and a hummingbird species [Trochilidae Family]). No special-status wildlife species were detected at either camera location. Representative photographs of the wildlife cameras and their views are located in Appendix E.

Table 12 details the number of instances a wildlife species triggered a wildlife camera per species. It is important to note that, while the number of instances triggered per species per camera is useful to show the locations where various wildlife species were detected, the number of instances are not meant to provide an index or estimate of relative abundance. For example, species such as the northern raccoon are very active and if one is foraging in front of a wildlife camera, the camera will continue to take photos of the same raccoon, until the raccoon exits the camera's field of view. It is likely that, for several of the species, the cameras detected many of the same individuals moving around the Preserve.

In addition to the wildlife species captured on wildlife cameras, multiple photographs of hikers and domestic dogs were taken by the wildlife cameras located within the Preserve.

4.3.5 Special-Status Wildlife Observed

A total 17 special-status wildlife species were observed or detected within the Preserve during surveys in 2018–2019 (Figure 11). Of these species, one species is also covered under the Draft North County MSCP. No special-status amphibian or invertebrate species, including butterflies, were detected. Special-status wildlife species detected include three reptile species, seven bird species, and seven mammal species. Life history, range description, and occurrence of these species within the Preserve are discussed in further detail in the following sections.

Table 12. Wildlife Species Detected at Wildlife Camera Stations

Wildlife Camera Station ID	Number of Instances a Camera Was Triggered			
	Winter (12/11/18–2/18/19)[1] (1/17/19–2/18/19)[2]	Spring (3/19/19–4/19/19)	Summer (7/1/19–7/31/19)	Fall (8/1/19–9/1/19)
Bird Species				
South	3	3	—	1
North	1	2	2	3
Total	**4**	**5**	**2**	**4**
Bobcat				
South	4	—	1	5
North	—	1	—	—
Total	**4**	**1**	**1**	**5**
Coyote				
South	27	6	4	3
North	20	28	2	22
Total	**47**	**34**	**6**	**25**
Gray Fox				
South	—	—	—	—
North	—	—	—	2
Total	**0**	**0**	**0**	**2**
Northern Raccoon				
South	12	—	2	5
North	3	—	—	—
Total	**15**	**0**	**2**	**5**
Total Photos (All Species)	**70**	**40**	**11**	**41**

[1] South Camera Winter Survey Period
[2] North Camera Winter Survey Period

4.3.5.1 Herpetofauna

Belding's Orange-Throated Whiptail (*Aspidoscelis hyperythra beldingi*)
CDFW Watch List, County Group 2

Belding's orange-throated whiptail is a slim-bodied lizard with a long slender tail. The back is unspotted with dark brown, black, and white-ish yellow stripes and the throat is orange, turning brighter orange during breeding season. In California, Belding's orange-throated whiptail ranges from the Santa Ana River in Orange County, and near Colton in San Bernardino County, west of the Peninsular Ranges, into the Baja Peninsula. This subspecies inhabits semi-arid brushy areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, and coastal chaparral (Zeiner et al. 1988). Their diet consists of a variety of small invertebrates, especially spiders, scorpions, centipedes, and termites. This species is considered special-status primarily due to loss of suitable coastal sage scrub habitat. Development of floodplains and stream terraces has also greatly contributed to this species' decline, as well as habitat fragmentation.

Belding's orange-throated whiptail was detected in the open chaparral habitat on-site during surveys in 2019. This species was the most frequently trapped species on the Preserve and was observed in the eastern and western portions of the Preserve. This species likely inhabits most of the open chaparral habitat throughout the Preserve.

Coastal Western Whiptail (*Aspidoscelis tigris stejnegeri*)
CDFW Species of Special Concern, County Group 2

Coastal western whiptail is a slim-bodied lizard with a long slender tail. The back and sides are grey, tan, or brown, marked with sharply-defined dark spots or mottling. This subspecies is found in coastal Southern California, predominantly west of the Peninsular Ranges and south of the Transverse Ranges, and north into Ventura County, extending south into Baja California, Mexico. It inhabits a variety of ecosystems such as chaparral, woodland, and riparian areas, primarily hot and dry open areas with sparse foliage. This species is considered special-status primarily due to habitat fragmentation and destruction (Zeiner et al. 1988).

Coastal western whiptail was detected in the open chaparral habitat on-site during surveys in 2019. This species was caught only in the southwestern portion of the Preserve but was also observed incidentally in the central and eastern portions of the Preserve. It likely inhabits most of the open chaparral habitat throughout the Preserve.

Coast Horned Lizard (*Phrynosoma coronatum blainvillei*)
CDFW Species of Special Concern, County Group 2, MSCP Covered Species

The coast horned lizard is a flat-bodied lizard with a wide oval-shaped body and a large crown of horns or spines on its head. They are historically found in California along the Pacific coast, from the San Francisco Bay Area down to Baja California, Mexico, west of the deserts and the Sierra Nevada, and inland as far north as Shasta Reservoir. Currently, the range has been severely fragmented due to land alteration, and populations seem to be restricted to localized areas that support loose soils and have a high sand content (Jennings and Hayes 1994). This species relies on open areas of sandy soil and low vegetation and can inhabit a variety of habitats, including grasslands, coniferous forests, woodlands, and chaparral (Stebbins 2003). They are commonly found in lowlands along sandy washes with scattered shrubs, along dirt roads, and near native ant hills.

One coast horned lizard individual and signs of scat were observed incidentally in loose sandy soil along the dirt trail in the eastern portion of the Preserve. This species likely inhabits most of the open chaparral habitats where they coincide with sandy or friable soils and their food source, harvester ants, within the Preserve.

4.3.5.2 Birds

Barn Owl (*Tyto alba*)
County Group 1

Barn owls reside in much of the continental United States, including California. They are found in many open habitats, including grassland, chaparral, riparian, and developed or urban habitats. This species will roost in barns, caves, dense trees, or other structures and hunt for small mammals on the wing or from a perch. Prey species include mice, voles, gophers, and squirrels, as well as other small birds. Barn owls in California retain their home range throughout the year and are not migratory (Zeiner et al. 1990a). Barn owls are threatened by the conversion of agricultural land to urban and suburban development, and the loss of suitable nesting sites such as large, hollow trees and old buildings. They can also be impacted by rodenticides, as rodents make up the majority of their diet.

One barn owl was detected during the fall diurnal avian survey just before dawn, flying over the Preserve south to north to its roost site. There is suitable foraging, roosting, and nesting habitat within the oak woodlands found within the Preserve; therefore, it is highly likely this species is found year-round on the Preserve.

Cooper's Hawk (*Accipiter cooperii*)
CDFW Watch List, County Group 1

Cooper's hawks inhabit live oak, riparian deciduous, or other forest habitats near water. This species is a year-round resident of much of western and eastern United States and is migratory in its range throughout the central United States south to Mexico. This species is a resident of California, and most of its breeding occurs in the southern Sierra Nevada foothills, the New York Mountains, Owens Valley, and throughout Southern California. This species nests and forages near open water or in riparian vegetation. Cooper's hawks primarily hunt small birds, although they will consume small mammals, reptiles, and amphibians (Zeiner et al. 1990a). This species has been impacted due to continued use of pesticides, but population numbers have rebounded in recent years. Loss of suitable riparian habitat may also be impacting this species, but they are known to occupy more urbanized habitats as well (NatureServe 2019).

One individual Cooper's hawk was detected during the spring and summer diurnal avian surveys. Both individuals were observed in the southern portion of the Preserve within the oak woodland. The entire Preserve provides suitable foraging, roosting, and nesting habitat for this species; therefore, it is highly likely this species is found year-round on the Preserve.

Red-Shouldered Hawk (*Buteo lineatus*)

County Group 1

Red-shouldered hawks in California originally inhabited lowland riparian woodland and oak woodland habitat, but during the 20th century they began occupying eucalyptus and other ornamental woodland habitats. It is widespread across San Diego County, especially along the coastal slope, but is absent in areas like Otay Mountain, which is devoid of tall trees. Red-shouldered hawks in California are a year-around resident and non-migratory species that mainly prey upon reptiles and amphibians (Unitt 2004). Red-shouldered hawks are threatened by the conversion of oak and riparian woodland habitats into urban or suburban developments. Although they have adapted well to urbanized environments, it has also led to more exposure to rodenticides.

One individual red-shouldered was detected during the winter, summer, and fall diurnal avian surveys. All detections were determined by call and an approximate location on where the individual was located on the Preserve was added. The entire Preserve provides suitable foraging, roosting, and nesting habitat for this species; therefore, it is highly likely this species is found year-round on the Preserve.

Southern California Rufous-Crowned Sparrow (*Aimophila ruficeps canescens*)

CDFW Watch List, County Group 1

Southern California rufous-crowned sparrow is a resident species in San Diego County and primarily inhabits coastal sage scrub or mixed chaparral habitats, preferably along steep grassy or rocky hillsides. This species is secretive and frequently hides in shrub patches or near rocky outcrops where it can forage on the ground for insects, spiders, seeds, and other vegetation. Southern California rufous-crowned sparrow is not migratory as it maintains year-round territories, but territory size may increase during the post-breeding season. Like many other species that inhabit coastal scrub habitats, this species is threatened primarily by habitat loss and fragmentation of coastal scrub habitats. Brown-headed cowbird (*Molothrus ater*) parasitism has also been recorded for this sparrow (Zeiner et al. 1990a).

Southern California rufous-crowned sparrow was only detected once during the winter diurnal survey in the open chaparral habitat on the western boundary of the Preserve. Given the lack of detection during the other three seasons of diurnal avian surveys, it is likely this species only winters on the Preserve; however, suitable breeding habitat is present within the Preserve.

Turkey Vulture (*Cathartes aura*)

County Group 1

Turkey vultures are a highly migratory species and San Diego County lies within the overlap zone of the species' winter and summer ranges. Thus, turkey vultures are present in the county year-round. They are a wide-ranging species that forage on the wing, searching for carrion in a variety

of habitats. They nest in secluded rocky outcrops, usually away from human activity. Many areas in San Diego County have suitable nesting habitats but are not utilized for nesting due to frequent human disturbances. They are threatened by human disturbance to nest sites, habitat loss from urbanization, and pesticides (Unitt 2004).

This species was incidentally observed flying over the Preserve during another focused survey. Though there are some rocky outcrops present throughout the Preserve, the outcroppings are small and do not provide enough protection from predators. The Preserve is also surrounded by residential housing, which may also deter turkey vultures from using the Preserve for roosting and/or nesting; hence, this species is expected to only fly over the Preserve.

Western Bluebird (*Sialia mexicana*)

County Group 1

Western bluebirds are a year-round resident throughout California, excluding the high mountains and eastern deserts. They forage on berries and insects within open oak, riparian, and conifer woodlands during the breeding season and forage in flocks during the winter months. Despite being a cavity nester and competing with other species for scarce holes in trees, the western bluebird has colonized urban areas with mature trees and wide lawns. They are secondary cavity nesters that are opportunistic and have been documented nesting under houses' roof tiles, in nest boxes, and wooden utility poles (Unitt 2004). Threats to the western bluebird population in San Diego County include habitat degradation from logging activities, natural-fire suppression, grazing, industrialization, and urbanization. Additional conversion of mistletoe-laden oak woodlands to vineyards have disrupted winter food supplies (Dickinson and McGowan 2005).

A flock of eight western bluebirds were observed foraging within the non-native grassland and oak woodland habitats on the western boundary of the Preserve during the winter diurnal avian survey. Oak woodland habitats on the Preserve provide suitable nesting and foraging habitat for this species. Additionally, the non-native grassland and other open habitat on the Preserve provide suitable foraging habitat.

White-Faced Ibis (*Plegadis chihi*)

CDFW Watch List, County Group 1

White-faced ibis inhabit wetlands, marshes, and flooded grasslands, including stands of tamarisk (*Tamarix* spp.). Outside of California they can also be found in ponds, mudflats, and swamps (Ryder and Manry 1994). They forage for insects, crustaceans, earthworms, small fish, and amphibians in shallow waters, such as wet grass and irrigated or flooded pastures and croplands in San Diego County. They are known to breed within multiple waterways in San Diego County and winter primarily in the San Pasqual Valley (Unitt 2004). This species depends on dense freshwater marshes for nesting, where they nest in large colonies ranging in size from 30 to 50

nests (Trost 1989). They are threatened by habitat loss of agricultural fields, pastures, croplands, wetlands, and marshes (Unitt 2004).

One individual was observed flying over the Preserve heading north to south, most likely from the San Luis Rey River Valley toward the San Pasqual Valley. This species can stop over at nearby ponds and reservoirs in the surrounding area, but the Preserve lacks any open waterways; hence, this species is expected to only fly over the Preserve.

4.3.5.3 Mammals

Dulzura Pocket Mouse (*Chaetodipus californicus femoralis*)
CDFW Species of Special Concern, County Group 2

The Dulzura pocket mouse is found in a variety of vegetation communities within San Diego County, including coastal sage scrub, sagebrush, grassland, and various chaparral communities. It is found in a variety of habitats year-round, including coastal scrub, chamise-redshank and montane chaparral, sagebrush, annual grassland, valley foothill hardwood, valley foothill hardwood-conifer, and montane hardwood habitats at elevations from sea level to 7,900 feet (Brylski 2005). The species occurs in brushy areas but probably is attracted to grass-chaparral edge (Brylski 2005).

Within the Preserve, this species was detected in oak woodland and chaparral type habitats throughout the Preserve.

Pocketed Free-Tailed Bat (*Nyctinomops femorosaccus*)
CDFW Species of Special Concern, County Group 2

While the pocketed free-tailed bat can be found in Riverside, San Diego, and Imperial Counties, it is rare in California and more common in Mexico. This species inhabits pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. This species is capable of traveling long distances from its day roost locations. The status of this species in California is poorly known, but it appears rare (Harris 2000). The pocketed free-tailed bat can be found throughout San Diego County where it is closely associated with its preferred roosting habitats (vertical cliffs, quarries, and rocky outcrops) (Tremor et al. 2017).

The pocketed free-tailed bat was detected during spring and summer passive acoustic surveys. Suitable foraging habitat for this species was observed within the Preserve; however, suitable roosting habitat was not observed.

Greater Western Mastiff Bat (*Eumops perotis californicus*)
CDFW Species of Special Concern, County Group 2

The greater western mastiff bat inhabits the western United States from northern California to Mexico and eastward to Texas. The species' range is geomorphically determined in that it occurs in areas with significant rock features that provide suitable roosting habitat. It occurs in a variety of habitats, including desert scrub, chaparral, oak woodlands, and coniferous forest (Pierson 2005). The species is primarily a cliff-dwelling species that requires large rock slabs, crevices, and large boulders. This species is a large, fast flier that can cover long distances between roosting and foraging locations. It will forage over large open areas, including agricultural fields, chaparral, dry desert washes, flood plains, grasslands, and oak woodlands. The species has also been detected foraging over large bodies of water.

The greater western mastiff bat was observed during spring and summer passive acoustic surveys. Suitable foraging habitat for this species was observed within the Preserve; however, suitable roosting habitat was not observed.

Western Red Bat (*Lasiurus blossevillii*)
CDFW Species of Special Concern, County Group 2

The western red bat is locally common in some areas of California, occurring from Shasta County to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts. The winter range includes western lowlands and coastal regions south of San Francisco Bay. They are not found in desert areas. This species roosts primarily in forests and woodlands from sea level up through mixed conifer forests and are often in edge habitats adjacent to streams, fields, or urban areas. Western red bats forage over a wide variety of habitats, including grasslands, shrublands, open woodlands, and croplands, where they feed on a variety of insects. Most individuals likely make relatively short migrations between summer and winter ranges in California (Zeiner et al. 1990b).

The western red bat was detected during spring and summer passive acoustic surveys. Suitable riparian habitat is present within the Preserve where this species is most likely to roost (trees) and forage.

Western Small-Footed Myotis (*Myotis ciliolabrum*)
County Group 2

The western small-footed myotis occurs in arid upland habitats from Contra Costa County south to the Mexico boundary in California. It can occupy a variety of habitats but requires a nearby water source for drinking. It often forages for small flying insects around wooded or brushy upland habitats near water. It prefers humid roosting locations and seeks cover in caves, buildings, mines, crevices, and occasionally under bridges. It hibernates in the winter, usually from November to March and is tolerant of cold, drafty sites (Zeiner et al. 1990b). In San Diego County, this species

is typically associated with chaparral and montane habitats and appears to most commonly roost in abandoned mines and forage in riparian zones within chaparral (Tremor et al. 2017).

This species was detected during detected during spring and summer passive acoustic surveys. The Preserve provides suitable foraging habitat for this species, and the limited rocky outcrops and potential tree cavities in the Preserve may provide roosting habitat.

Western Yellow Bat (*Lasiurus xanthinus*)
CDFW Species of Special Concern

The western yellow bat is uncommon in California, known only in Los Angeles and San Bernardino Counties south to the Mexican border, where it occurs year-round. It inhabits valley foothill riparian, desert riparian, desert washes, and palm oasis habitats below 2,000 feet in elevation (Harris 2008). In coastal Southern California, this species is associated with suburban environments with palms and water sources; however, this species may also establish in native riparian habitats (Tremor et al. 2017). This species roosts primarily in palm trees, but can roost in other riparian trees such as cottonwoods (Tremor et al. 2017), and forages for insects over water and among trees.

This species was detected only during summer passive acoustic surveys within the Preserve. Suitable riparian foraging habitat for this species was observed within the Preserve, and riparian trees may provide roosting habitat; however, it is more likely that this species would prefer to roost off-site in the palm trees that occur in the surrounding residential areas.

Yuma Myotis (*Myotis yumanensis*)
County Group 2

Yuma myotis is common and widespread throughout California in many habitat types, particularly open forests and woodlands with sources of water to forage over. It ranges from sea level to 11,000 feet in elevation, but is generally found below 8,000 feet. This species roosts in buildings, mines, caves, or crevices, but has also been seen roosting in abandoned swallow nests and under bridges. Yuma myotis forages over water sources such as ponds, streams, and stock tanks, where the species feeds on a variety of small flying insects. It probably makes local or short migrations to suitable hibernacula, where it hibernates during the winter (Zeiner et al. 1990b).

This species was detected during detected during spring and summer passive acoustic surveys. Roosting (trees, rocky outcrops) and foraging habitat for this species is present on the Preserve.

4.3.6 Special-Status Wildlife with High Potential to Occur

In addition to the special-status wildlife species documented during the field surveys, eight special-status wildlife species have a high potential to occur on the Preserve. The evaluation of their

potential for occurrence was based on the elevation, soils, and vegetation communities present on the Preserve; known occurrences within the Preserve; and the range and distribution of species within the vicinity of the Preserve. The sensitivity status, life history, habitat preferences, and rationale for occurrence potential of each species are detailed below. A table of all special-status wildlife species evaluated for a potential to occur on the Preserve is included in **Appendix D**.

Southern California Legless Lizard (*Anniella stebbinsi*)
CDFW Species of Special Concern, County Group 2

The Southern California legless lizard occurs in a variety of habitats and are locally abundant. Suitable habitat includes coastal dunes, chaparral, and coastal scrub. Slightly moist habitat especially in the soil appears to be an essential habitat requirement. They forage at base of shrubs or other vegetation and below the vegetation within leaf litter or sandy soil. They eat insect larvae, small adult insects, and spiders. Due to their low thermal preference, they are not seen sun basking and can be active on cool days (Zeiner et al. 1988).

Suitable habitat occurs specifically within the oak woodland habitats of the Preserve and wherever leaf litter accumulates.

Coronado Skink (*Plestiodon skiltonianus interparietalis*)
CDFW Species of Special Concern, County Group 2

The Coronado skink can be found in a variety of habitats including open oak woodland and sage scrub but typically avoid heavy brush or densely forested areas. It usually prefers moist micro-habitats and forages within leaf litter and dense vegetation for a variety of insects, including beetles, sow bugs, grasshoppers, crickets, ants, spiders, and centipedes. This subspecies ranges from Riverside County south to Baja California (Zeiner et al. 1988).

Suitable habitat occurs specifically within the oak woodland habitats of the Preserve for this species.

Rosy Boa (*Lichanura orcutti*)
County Group 2

This heavy-bodied snake is found in inland habitats in Southern California, specifically in desert and chaparral habitat. It is found as far north as Los Angeles and as far east as the Salton Sea. This species is rarely observed but is most frequently seen during the late spring and early summer. It is known to eat small rodents and birds but could also take lizards. They prefer moderate to dense vegetated habitats with rocky cover. They are usually found under rocks, in boulder piles, and along rock outcrops (Zeiner et al. 1988).

Suitable habitat such as chaparral is found throughout the Preserve for this species.

Coast Patch-Nosed Snake (*Salvadora hexalepis virgultea*)
CDFW Species of Special Concern, County Group 2

The coast patch-nosed snake is found from the Carrizo Plains in San Luis Obispo County south through Baja California. It occupies a variety of habitats, including coastal chaparral, desert scrub, washes, sandy flats, and rocky areas. It eats anything it can overpower but it is known to prey upon small mammals (*Dipodomys*), lizards, and the eggs of lizards and snakes. This species is diurnal and makes use of whatever cover is available in the habitat it is occupying. Little is known about its reproduction and it appears to have no water requirements (Zeiner et al. 1988).

Suitable habitat such as chaparral is found throughout the Preserve for this species.

Two-Striped Garter Snake (*Thamnophis hammondii*)
CDFW Species of Special Concern, County Group 1

The two-striped garter snake can be found from the Salinas Valley south to the Mexico border. This highly aquatic species, found only along permanent or semi-permanent streams where fish or amphibians are inhabiting. While fish and amphibians are its main prey source, it can also feed on invertebrates (leeches and worms) and small mammals. This diurnal snake seeks refuge in holes, specifically small mammal burrows, and crevices at night and can be found basking on streamside rocks or vegetated stream banks (Zeiner et al. 1988).

Suitable habitat for this species occurs on the Preserve specifically along the creek which runs the entire length of the Preserve.

Red Diamond Rattlesnake (*Crotalus ruber*)
CDFW Species of Special Concern, County Group 2

The red diamond rattlesnake is found in southwestern California from the Morongo Valley west to the coast and south along the peninsular ranges to mid Baja California, Mexico. This heavy bodied species inhabits arid scrub, coastal chaparral, oak and pine woodlands, rocky grasslands, and cultivated areas (Zeiner et al. 1988). It can also be found on the desert slopes of the mountains east toward Anza Borrego Desert. This species preys predominantly on small mammals, including ground squirrels, wood rats, mice, and rabbits, but has been known to eat lizards and birds as well.

Suitable habitat occurs throughout most of the Preserve for this species, especially in the rocky areas with thick vegetative cover.

Bell's Sage Sparrow (*Artemisiospiza belli belli*)
CDFW Watch List, County Group 1

The Bell's sage sparrow can be found from the coastal ranges of California and across the Sacramento Valley to the west slope of the Sierra Nevadas, where it inhabits large, unfragmented

blocks of coastal sage scrub and southern mixed chaparral habitats. This species is generally non-migratory, but San Joaquin Valley and northern Mohave Desert populations do migrate, and some populations move upslope and downslope with season changes (Johnson and Marten 1992). Bell's sage sparrows forage primarily on insects, spiders, and seeds.

Suitable habitat occurs throughout most of the Preserve, within the various chaparral habitats.

San Diego Pocket Mouse (*Chaetodipus fallax*)
CDFW Species of Special Concern, County Group 2

The San Diego pocket mouse ranges from parts of Riverside and San Bernardino Counties into San Diego County, where it inhabits sandy herbaceous areas, usually in association with rocks or coarse gravel (Grinnell 1933; Miller and Stebbins 1964). It occurs in arid coastal and desert border areas that support coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert scrub, desert succulent shrub, pinyon-juniper, and annual grassland habitats in San Diego County. San Diego pocket mouse forages primarily on seeds of forbs, grasses, and shrubs, but has been documented to eat some insects as well.

Suitable habitat occurs throughout most of the Preserve but specifically within the chaparral habitats.

4.3.7 Invasive Wildlife Species

No invasive invertebrates, herpetofauna, or mammal wildlife species were detected on the Preserve; however, a pair of European starlings (*Sturnus vulgaris*) were observed flying over the Preserve during the spring diurnal survey and could potentially use the Preserve for foraging and nesting. This species can displace native avian species during the breeding season given the lack of natural cavities in oak woodland habitats (Unitt 2004).

4.4 WILDLIFE MOVEMENT

The Preserve is located along the South Fork of Keys Creek, approximately 5.5 miles south of its confluence with Keys Canyon and the Main Fork of Keys Creek. Keys Canyon is an important linkage for landscape connectivity, providing a throughway for wildlife movement from undeveloped open space areas throughout Valley Center to the San Luis Rey River, a regionally significant movement corridor. In addition to providing a linkage for wildlife movement to Keys Canyon, the Preserve provides a near-perennial water source and an array of upland and riparian habitats that make it a valuable habitat block for localized and home range movements.

The Preserve itself is generally surrounded by a mosaic of rural development, roads, and undeveloped open space. Low-density residential development occurs along both the western and eastern Preserve boundaries, with some areas open to the Preserve while other areas are restricted by chain-link fencing. While roads and development may constrain wildlife movement in some

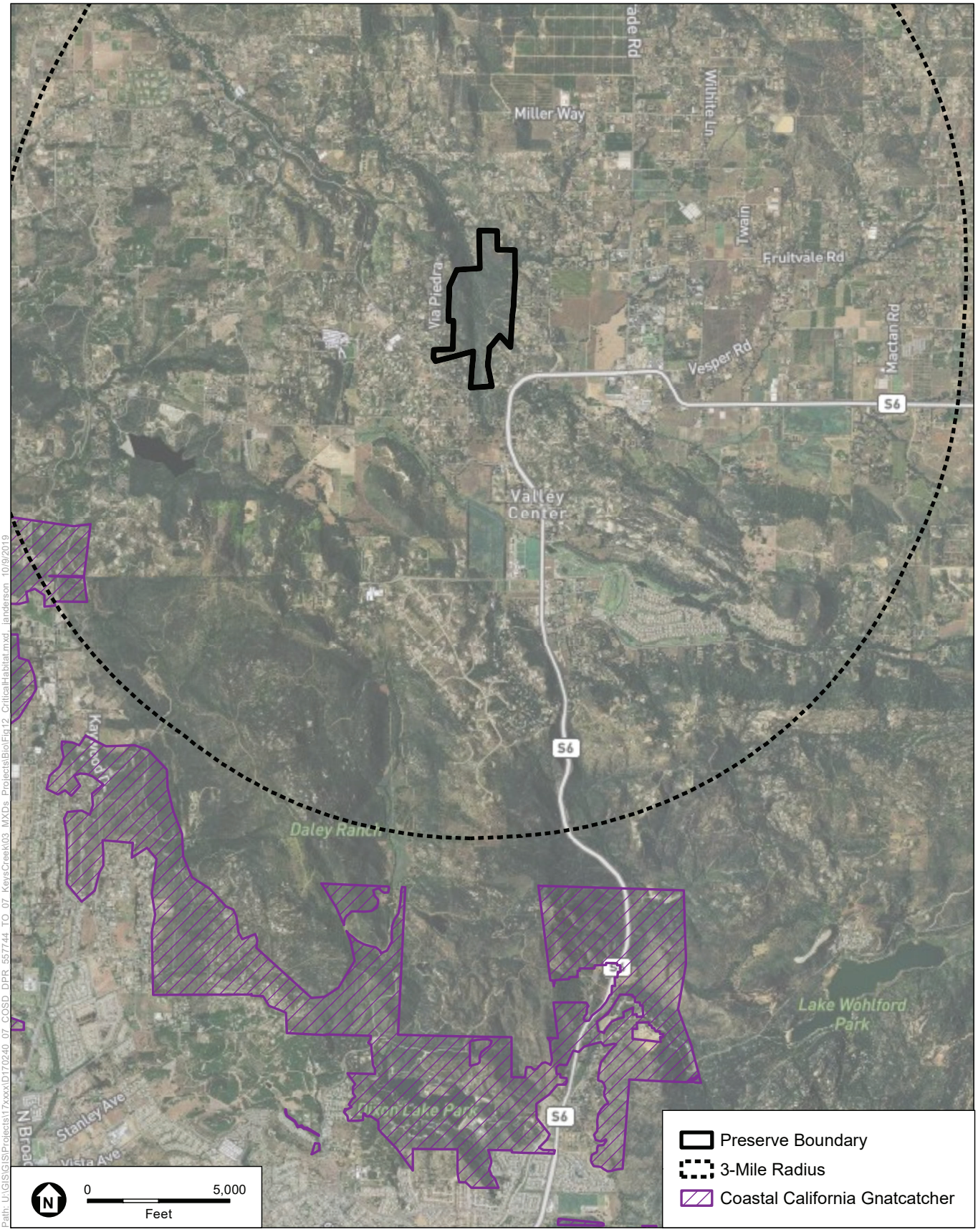
areas surrounding the Preserve, Keys Creek and an additional unnamed drainage provide a throughway for wildlife movement from smaller blocks of habitat immediately surrounding the Preserve to Keys Canyon, north of the Preserve. Through a series of canyons and drainages, Keys Canyon has connectivity to larger expanses of open space and corridors associated with the San Luis Rey River, Pala Mountain, and the Pama Valley, thus providing an avenue for longer range movements.

As indicated by the presence of numerous species detected during surveys, the Preserve is also part of the home range of many species, which may use it at different times of the year depending on available resources. In general, wildlife species are likely to use the Preserve primarily for local movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). The large mammals detected on-site such as bobcats, gray foxes, and coyotes require fresh water and, as confirmed by wildlife camera photographs, Keys Creek is a source of water for a variety of wildlife species and can be used to traverse the Preserve as well.

The Preserve is also a part of the broader Pacific Flyway, a major north-south migration route for birds that travel between North America and South America. Various avian species pass through the Preserve during migration and/or may use the Preserve as migratory stopover habitat. While there is riparian and woodland vegetation or topographical configurations within the Preserve that would concentrate or funnel avian species during migration, they likely move through on-site habitat in small groups or fly over it at night. Based on the avian surveys conducted during 2019, no major pulses of avian species were detected within the Preserve; however, surveys were infrequent and may have missed large pulses of birds. Additionally, bat species are likely to move through the Preserve while in transit to permanent sources of water to the northeast and southeast.

4.5 CRITICAL HABITAT

There is no USFWS-designated critical habitat within the Preserve. USFWS-designated critical habitat nearest to the Preserve include coastal California gnatcatcher (*Polioptila californica californica*) approximately 2.6 miles southwest of the Preserve boundary (**Figure 12**).



SOURCE: ESRI, 2019; SanGIS 2019; USFWS 2019

Figure 12
Critical Habitat

ESA

5.0 CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

Surveys conducted in 2018 and 2019 documented nine vegetation group level classifications, alliances, associations, or semi-natural stands as described in the VCM (Sproul et al. 2011), as well as one land cover type as described by Oberbauer et al. (2008). 198 plant species and 100 wildlife species were observed or detected within the Preserve during surveys, including 20 invertebrates, 9 reptiles, 3 amphibians, 44 birds, and 24 mammals.. One plant and 17 wildlife special-status species were detected or observed, of which the plant and one wildlife species are covered under the Draft North County MSCP.

This section provides resource-specific conclusions and management recommendations for the vegetation communities, plants, and wildlife species detected during the 2018 and 2019 field surveys. These recommendations are based on the results of the baseline biological diversity surveys and management and monitoring guidelines associated with the Draft North County MSCP.

5.1 VEGETATION COMMUNITIES/HABITAT

5.1.1 Management

Vegetation on the Preserve consists of nine vegetation alliances, associations, or semi-natural stands, including grassland, scrub, and woodland habitats, as well as one land cover types as described by Oberbauer et al. (2008). The Preserve generally consists of Keys Creek and associated upland slopes. Rural residential development generally surrounds the Preserve in all directions. The upland habitats of the Preserve, notably chaparral and woodland habitats, are relatively undisturbed and will most likely not require extensive management. Specific management recommendations to ensure compliance with the Draft North County MSCP's Framework Management Plan are discussed below.

5.1.2 MSCP Framework Management Plan

Per the Draft North County MSCP's Framework Management Plan, the primary management goal for vegetation communities is to maintain or enhance natural vegetation communities to benefit native species and habitats, sustain ecosystem functions, and promote connectivity to other conserved lands (County of San Diego 2018). Management objectives identified by the Framework Management Plan for this species include managing non-native and invasive non-native plant species, implementing fire management, controlling exotic pests, implementing erosion control best management practices, managing off-trail use, and using signage, public education, and

enforcement to reduce edge effects (County of San Diego 2019). The following measures are recommended to ensure consistency with the Framework Management Plan:

- Monitoring of invasive shot-hole borers (Section 5.2.2)
- Invasive non-native plant control and/or removal (Section 5.4.1)
- Implementation of fire management practices to reduce the risk of catastrophic fire (Section 5.6)
- Strategic placement of fencing and signage to deter unauthorized access (Section 5.8.1)
- Implement erosion control best management practices such as hydroseeding, fiber rolls, and gravel bags, as needed to control erosion

5.2 PLANTS

5.2.1 Management

The 2018 and 2019 baseline inventory surveys identified one special-status plant species: Engelmann oak. Engelmann oak is a covered species under the Draft North County MSCP Plan. The general management recommendations in Section 5.1, *Vegetation Communities*, will protect the integrity of vegetation within the Preserve. Species-specific recommendations for Engelmann oak are below.

5.2.2 MSCP Framework Management Plan

5.2.2.1 Engelmann Oak (*Quercus engelmanii*)

A small population of Engelmann oak is located in the southwestern corner of the Preserve. Per the Draft North County MSCP's Framework Management Plan, the primary management goal for Engelmann oak is to ensure its persistence by protecting, maintaining, and enhancing existing populations within conserved lands (County of San Diego 2018). Management objectives identified by the Framework Management Plan for this species include maintaining robust populations, removing invasive non-native plant species, augmenting seeding reproduction, and targeted management of pests such as shot-hole borers (County of San Diego 2019). The following measures are recommended to ensure consistency with the Framework Management Plan:

- Protect the occupied area in the southwestern portion of the Preserve through fencing, signage, and enforcement. Conduct inspections, at least quarterly, to assess for the integrity of fencing, and signage and to watch for any new disturbances, including trespass and fire. Fence and sign maintenance should occur as needed to protect Engelmann oaks from disturbance.

- Monitor for shot-hole borer/Fusarium dieback on an annual basis. If this species is detected, remove infected branches to help reduce vector populations and the spread of this pest-disease complex, as appropriate. Pruning would be conducted by a qualified arborist and would follow best management practices, as described in the most recent guidance from scientific institutions such as U.C. Riverside.
- Expand the existing population of Engelmann oak on-site through habitat restoration and/or trails revegetation (Section 5.5).

5.3 WILDLIFE

5.3.1 Management

The surveys in 2019 identified 17 special-status wildlife species. Of these species, only one is covered under the Draft North County MSCP Plan: coast horned lizard. General management recommendations for all special-status wildlife species detected and with a high potential to occur within the Preserve include:

- Invasive non-native plant control and/or removal.
- Habitat monitoring every 10 years, or following a change in conditions (e.g., fire, drought).
- Management and reduction of human-caused edge effects (such as introduction of invasive/exotic species and domestic pets, increase in trash/pollution, and/or habitat destruction—especially through human-induced fires).
- Provision of habitat for tree-cavity-nesting bird species, such as western bluebird, and tree-cavity-roosting bat species, such as the pallid bat; dead snags should be left in place when these trees do not pose a safety concern.
- Vegetation maintenance activities that involve tree trimming, removal of exotic trees, and vegetation thinning/clearance should implement avian and/or bat mitigation measures to avoid potential impacts to nesting birds and roosting bats, as needed.
- Plant Engelmann oak and coast live oak trees to provide additional habitat to avian and bat species that use oak woodland.
- Signage, fencing, and strategic placement of barriers to deter unauthorized access to special-status wildlife species and sensitive habitats.
- Once authorized trails occur within the Preserve, dogs and other pets should be leashed to prevent them from harassing and injuring special-status wildlife species.

5.3.2 MSCP Framework Management Plan

5.3.2.1 Coast horned lizard (*Phyrnosoma blainvillii*)

Coast horned lizard was detected in the eastern portion of the Preserve. Per the Draft North County MSCP's Framework Management Plan, the primary management goal for coast horned lizard is to ensure the persistence of this species within conserved lands by protecting and maintaining occupied habitat, as well as managing and enhancing unoccupied areas that have potential to provide ample foraging, breeding, and aestivating opportunities (County of San Diego 2018). Management objectives identified by the Framework Management Plan for this species include controlling invasive, exotic species such as Argentine ants, and controlling urban-related predators. The following measures are recommended to ensure consistency with the Framework Management Plan:

- Monitoring of the urban/wildlands interface should occur to identify Argentine ants and any activities that facilitate Argentine ant infestations, such as artificially damp soil conditions from over-watering of landscapes. If situations are identified, coordination with adjacent landowners to address the situation should occur.
- Trails, staging areas, or other facilities that involve human presence should be sited away (100-foot buffer) from areas of occupied coast horned lizard habitat to the extent feasible to avoid the introduction of new facilities or trails that could reduce habitat quality, increase risk of trampling, or allow for unauthorized collecting.
- Upon approval of the Public Access Plan, it is required that pets must be leashed at all times. Additionally, signage around the perimeter of the Preserve that includes information regarding penalties for unauthorized collection is recommended.
- Uncontrolled pets (e.g., dogs) were observed during baseline surveys. If threats from these species continue to be observed during routine monitoring, a public awareness program that includes information for adjacent residences regarding uncontrolled pets should be implemented.
- Presence/absence surveys should be conducted every 5 years for this species. Occupied habitat should be inspected concurrently using the threats assessment contained in the San Diego Management & Monitoring Program's (SDMMP's) Inspect & Manage Protocol.

5.4 INVASIVE NON-NATIVE SPECIES REMOVAL AND CONTROL

Invasive non-native species can outcompete native species for limited resources such as water, food, and space. Invasive non-native plant species often have adaptations that allow them to germinate and grow faster than native species, thereby outcompeting native species. Removal of

invasive non-native plant species is recommended to enhance habitat quality. A detailed Vegetation Management Plan is being prepared for the Preserve and will address invasive non-native plant species control.

5.4.1 Plants

Fifty-two nonnative plant species were observed within the Preserve; of these, nine species have been targeted for removal (**Table 13**). Species designated as high priority are recommended for immediate removal and moderate species should be removed after high-priority species are under control. A Vegetation Management Plan is being prepared for the Preserve and includes specific information regarding methods for removing each of the nine targeted species.

Table 13. Priorities for Removal or Management of Invasive Non-Native Plant Species[1]

Common Name	Scientific Name	CBI Management Priority for Invasive Non-Native Plants[2]	Cal-IPC Rating[3]	Removal Priority
Giant Reed	*Arundo donax*	Management Level 3	High	High
Sweet Fennel	*Foeniculum vulgare*	Management Level 4	High	High
Stinkwort	*Dittrichia graveolens*	Management Level 4	Moderate	High
Iceplant	*Carpobrotus edulis*	NA	High	High
Poison Hemlock	*Conium maculatum*	NA	Moderate	Moderate
Tree Tobacco	*Nicotiana glauca*	NA	Moderate	Moderate
Brazilian Pepper Tree	*Schinus terebinthifolius*	NA	Moderate	Moderate
Mexican Fan Palm	*Washingtonia robusta*	NA	Moderate	Moderate
Peruvian Pepper Tree	*Schinus molle*	NA	Limited	Moderate

[1] Species are included in this table due to their potential for being invasive and the feasibility of removal from the Preserve since they currently remain in low enough numbers for removal and eradication.

[2] **Source**: San Diego Environmental Mitigation Program Working Group in their Management Priorities for Invasive Nonnative Plants. Conservation Biology Institute (CBI) 2012.

Management Levels for San Diego County's Natural Community Conservation Programs (NCCP):

Level 3 – Containment: Eradication with coordinated programs by management unit or watershed.

Level 4 – Directed Management: Control within reserve or sub-management unit to benefit NCCP resources.

[3] **Source**: Cal-IPC Invasive Plant Inventory Database, 2019. Overall rating listed for southwest region, factoring impact, invasiveness, distribution, and documentation level.

Cal-IPC Inventory Categories:

High: Species have severe ecological impacts, are conducive to moderate to high rates of dispersal/establishment, and most are widely spread.

Moderate: Species have substantial and apparent, but generally not severe, ecological impacts; are conducive to moderate to high rates of dispersal, though establishment is generally dependent on ecological disturbance; and distribution may range from limited to widespread.

Limited: Species are invasive, but their ecological impacts are minor on a statewide level, or there was not enough information to justify a higher score; have low to moderate rates of invasiveness; and are generally limited but may be locally persistent and problematic.

Priority species occur as small, isolated patches that are not yet widespread throughout the Preserve. With the exception of the stinkwort, sweet fennel, tobacco tree, and poison hemlock, all populations occur along the perimeter of the Preserve adjacent to residential development. These nine species are recommended for removal consistent with Early Detection Rapid Response practices. Early Detection Rapid Response is a management approach recommended by Cal-IPC to effectively

eradicate invasive plant populations before they have had a chance to spread and develop a large seed bank. Removal methodologies will be recommended in the Vegetation Management Plan that is currently being prepared, and may include manual removal, mechanical removal, herbicides, and cut and daub. However, the appropriate removal methodology should ultimately be determined with consideration of many variables, including time of year, severity of infestation, presence of special-status plant species, the degree of intermixing of invasive non-native plant species with sensitive native habitats, access, and proximity to surface water. Continued surveillance is also necessary to ensure that these species or other highly invasive non-native plant species do not spread into other areas of the Preserve.

Additional non-native plant species, including brome grasses, short-pod mustard, tocalote, and Italian thistle (*Carduus pycnocephalus*), are not prioritized for removal but should be included as species to monitor and control as components of general habitat management. These species are generally widespread throughout the Preserve and management for these species would most likely not be cost-effective or successful.

5.4.2 Wildlife

European starlings (*Sturnus vulgaris*) were detected in small numbers on the Preserve. European starlings exclude tree and cavity nesting species, such as western bluebirds, from access to suitable nesting locations. It is recommended that European starling activity around the nesting season be monitored to determine if they are negatively affecting native species, particularly western bluebird, within the Preserve. During 2019 avian surveys, only one pair of European starlings were detected; therefore, they may not represent a significant threat to native avian species. However, their populations should be monitored. If European starlings become prolific on the Preserve and/or interfere with western bluebird nesting, then removal activities such as trapping may be necessary to allow western bluebirds to nest successfully.

There is also potential for invasive non-native Argentine ants to occur on-site and become established. Argentine ants often displace native ants, an important food source for the coast horned lizard, which has a high potential to occur within the Preserve. Measures to reduce the risk and extent of invasion include restricting litter and food waste, inspecting planting stock if active restoration occurs on-site, and educating nearby residents about Argentine ants. Argentine ants are generally associated with a water source; therefore, it is recommended that monitoring for this invasive wildlife species be conducted within the riparian habitat and other mesic portions of the Preserve, as well as the Preserve boundaries that abut residential properties.

Domestic dogs were detected within the Preserve based on photographs from the wildlife cameras, and it is likely that stray dogs and cats wander through the Preserve, based on proximity to residential homes. Dogs do not kill nearly as many native species as cats do; however, they can stress native

wildlife species and have the potential to kill. Cats kill native wildlife, particularly avian and lizard species. Upon approval of the Public Access Plan, it will be required that pets must be leashed at all times.

5.5 RESTORATION OPPORTUNITIES

The Preserve is primarily composed of high-quality native vegetation, and areas such as the southern mixed chaparral on-site are generally composed of closed canopy stands that generally preclude the development of invasive species as a dominant part of the vegetation community. However, the Preserve has a fairly extensive unauthorized trail network that has resulted in areas of disturbed habitat within and adjacent to trails. These areas generally are composed of bare ground with scattered invasive non-native plant species, and lack native vegetation. A Public Access Plan is currently being prepared that will identify trails to become open to the public. Restoration opportunities could include active restoration to eliminate unauthorized trails not proposed for public access to assist in the rehabilitation of habitat.

Additionally, the Engelmann oak population on-site is currently limited to a small area in the southwestern corner of the Preserve. The current population is bordered by disturbed habitat and non-native grassland to the west, which could be restored to Engelmann oak woodland to expand the current population on-site, as well as the amount of suitable nesting habitat for western bluebird. Where appropriate, plant palettes for trail restoration could also include Engelmann oak.

5.6 FIRE MANAGEMENT

The Preserve is dominated by upland chaparral vegetation communities. Upland areas are susceptible to burns, particularly as the vegetation ages and drought conditions continue. The most recent wildfire burned the northern portion of the Preserve in 1947. The primary concern for impacts is from increased presence of non-native and invasive non-native plant species.

A Vegetation Management Plan is being prepared for the Preserve and will include a short-term tactical fire suppression plan and a long-term strategic plan for vegetation management. These plans will consider strategic fire prevention activities, fire suppression with regard to fire effects on habitat, and post-fire monitoring and rehabilitation. Fuel management recommendations will include prescriptions specific to high-value vegetation resources present on the Preserve, such as coastal sage scrub components, based on a combination of prevention practices. Management recommendations that would complement fuel reduction practices will also be identified, including delineating and maintaining fuel modification zones, providing emergency fire access, promoting data sharing, preventing unauthorized access and trespass, increasing public education to reduce potential for ignition, and suppressing wildfires.

5.7 WILDLIFE LINKAGES AND CORRIDORS

Wildlife are expected to move freely within the Preserve, given that it is relatively open and the entire area is accessible to medium and large mammals, such as bobcat and coyote. It is presumed that species are likely to use the Preserve for local movements related to home-range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover), as well as longer range movements facilitated by connectivity to Keys Canyon.

Conservation and management of habitat within the Preserve would allow wildlife to continue to use the Preserve. Additionally, the recommendations in Sections 5.1 through 5.6 will also ensure that habitat on the Preserve is viable for local and regional movement.

5.8 ADDITIONAL MANAGEMENT RECOMMENDATIONS

5.8.1 Public Access

The Preserve is not currently open to the public; however, a Public Access Plan is being prepared to allow for passive recreational activities such as hiking. Type of trail users, staging areas, access to trails and features, and trail alignments will be considered and discussed in the Preserve's Public Access Plan. As discussed in Section 5.5, closure and restoration of all unauthorized trails is recommended to limit public access to designated areas, as well as assisting in habitat recovery.

5.8.1.1 Fencing and Gates

Fencing and gates for the Preserve are generally limited to the main entrance and staging area for the Preserve in the southwestern corner of the property. Additional fencing associated with off-site properties is present in some areas; however, other areas are unfenced and open to adjoining properties. Unauthorized access by the public and dogs was noted during baseline surveys, including within the dry creek-bed of Keys Creek in the spring. However, it is unclear what access points are being used by the public to gain access the Preserve. Monitoring and regular patrols is recommended to identify unauthorized access points and ensure that the public stays on designated trails once the Public Access Plan is approved. Fencing is also recommended as a prescriptive measure to keep the public from accessing unauthorized areas, including Keys Creek.

5.8.1.2 Litter/Trash Removal

When performing surveys, litter and trash were not prevalent on the Preserve. No illegal dumping areas were located during surveys of the Preserve, although some trash and debris were noted in the historic structure located to the east of the creek. Regular monitoring and management of the Preserve would detect increases of littering in the area, and then a strategy could be implemented to control the problem. Organized volunteer cleanup days could manage litter and trash issues on the Preserve, as necessary.

5.8.2 Emergency and Safety Issues

The main emergency and safety issue concerning the Preserve is threat of wildfires. Fire management was discussed in detail in Section 5.6. The Public Access Plan and Vegetation Management Plan will discuss in further detail the recommended emergency and safety measures including an emergency response plan and emergency contact information to be placed on signs throughout authorized access trails.

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Appendix A

Plants Species Detected on the Preserve

PLANT SPECIES DETECTED ON THE PRESERVE

LYCOPHYTES

Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Selaginellaceae	**Spike-Moss Family**	
Selaginella bigelovii	Bigelow's spike moss	None/None/None/None

FERNS

Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Dryopteridaceae	**Wood Fern Family**	
Dryopteris arguta	California wood fern	None/None/None/None
Pteridaceae	**Maidenhair Fern Family**	
Adiantum jordanii	California maidenhair	None/None/None/None
Myriopteris clevelandii	Cleveland's lip fern	None/None/None/None
Pellaea andromedifolia var. *andromedifolia*	coffee cliffbrake	None/None/None/None
Pellaea mucronata var. *mucronata*	birdfoot cliffbrake	None/None/None/None
Pentagramma triangularis subsp. *triangularis*	California goldback fern	None/None/None/None

EUDICOTS

Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Adoxaceae	**Muskroot Family**	
Sambucus nigra ssp. *caerulea*	blue elderberry	None/None/None/None
Aizoaceae	**Fig-Marigold Family**	
* *Carpobrotus edulis*	iceplant	None/None/None/None
Anacardiaceae	**Sumac Family**	
Malosma laurina	laurel sumac	None/None/None/None
Rhus aromatica var. *aromatica*	skunkbush	None/None/None/None
Rhus ovata	sugar bush	None/None/None/None
* *Schinus molle*	Peruvian pepper tree	None/None/None/None
* *Schinus terebinthifolius*	Brazilian pepper tree	None/None/None/None
Toxicodendron diversilobum	western poison oak	None/None/None/None
Apiaceae	**Carrot Family**	
Apiastrum angustifolium	mock celery	None/None/None/None
* *Apium graveolens*	wild celery	None/None/None/None
* *Conium maculatum*	poison hemlock	None/None/None/None
* *Foeniculum vulgare*	sweet fennel	None/None/None/None

EUDICOTS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
	Sanicula crassicaulis	Pacific sanicle	None/None/None/None
	Taushia arguta	southern tauschia	None/None/None/None
	Apocynaceae	**Dogbane Family**	
	Asclepias fascicularis	narrow-leaf milkweed	None/None/None/None
*	*Nerium oleander*	oleander	None/None/None/None
*	*Vinca major*	greater periwinkle	None/None/None/None
	Asteraceae	**Aster Family**	
	Acourtia microcephala	sacapellote	None/None/None/None
	Ambrosia psilostachya	western ragweed	None/None/None/None
	Artemisia californica	California sage brush	None/None/None/None
	Artemisia douglasiana	Douglas mugwort	None/None/None/None
	Baccharis pilularis	coyote bush	None/None/None/None
	Baccharis salicifolia	mule fat	None/None/None/None
	Brickellia californica	California brickellbush	None/None/None/None
*	*Carduus pycnocephalus*	Italian thistle	None/None/None/None
*	*Centaurea melitensis*	tocalote/ Maltese star-thistle	None/None/None/None
	Chaenactis artemisiifolia	white pincushion	None/None/None/None
	Chaenactis glabriuscula var. *glabriuscula*	yellow pincushion	None/None/None/None
	Cirsium occidentale var. *californicum*	California thistle	None/None/None/None
	Corethrogyne filaginifolia var. *filaginifolia*	common sandaster	None/None/None/None
	Deinandra fasciculata	fascicled tarplant	None/None/None/None
*	*Dittrichia graveolens*	stinkwort	None/None/None/None
*	*Erigeron bonariensis*	flax-leaf fleabane	None/None/None/None
	Erigeron canadensis	horseweed	None/None/None/None
	Erigeron foliosus var. *foliosus*	leafy daisy	None/None/None/None
	Eriophyllum confertiflorum var. *confertiflorum*	Golden yarrow	None/None/None/None
	Gutierrezia californica	California matchweed	None/None/None/None
	Hazardia squarrosa	sawtooth goldenbush	None/None/None/None
	Heterotheca grandiflora	telegraphweed	None/None/None/None
*	*Hypochaeris glabra*	smooth cat's ear	None/None/None/None
	Isocoma menziesii var. *menziesii*	spreading goldenbush	None/None/None/None
*	*Lactuca serriola*	prickly lettuce	None/None/None/None
	Lasthenia gracilis	needle goldfields	None/None/None/None
	Logfia filaginoides	California cottonrose	None/None/None/None
*	*Logfia gallica*	narrowleaf cottonrose	None/None/None/None
	Pseudognaphalium biolettii	two-color rabbit-tobacco	None/None/None/None
	Pseudognaphalium californicum	ladies' tobacco	None/None/None/None
	Rafinesquia californica	California chicory	None/None/None/None
*	*Sonchus asper* subsp. *asper*	spiny sowthistle	None/None/None/None

EUDICOTS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
	Stephanomeria exigua subsp. *exigua*	small wreath plant	None/None/None/None
	Stephanomeria diegensis	San Diego wreath plant	None/None/None/None
	Stylocline gnaphalioides	mountain neststraw	None/None/None/None
	Uropappus lindleyi	silver puffs	None/None/None/None
	Xanthium strumarium	cocklebur	None/None/None/None
	Boraginaceae	**Borage Family**	
	Amsinckia menziesii	Menzies' fiddleneck	None/None/None/None
	Cryptantha intermedia	common cryptantha	None/None/None/None
	Cryptantha muricata var. *jonesii*	pointed cryptantha	None/None/None/None
	Eriodictyon crassifolium var. *crassifolium*	felt-leaf yerba santa	None/None/None/None
	Eucrypta chrysanthemifolia var. *chrysanthemifolia*	common eucrypta	None/None/None/None
	Johnstonella micromeres	minute-flower johnstonella	None/None/None/None
	Nemophila menziesii var. *menziesii*	baby blue eyes	None/None/None/None
	Pectocarya linearis ssp. *ferocula*	sagebrush combseed	None/None/None/None
	Pectocarya penicillata	winged combseed	None/None/None/None
	Phacelia cicutaria var. *hispida*	caterpillar phacelia	None/None/None/None
	Phacelia parryi	Parry's phacelia	None/None/None/None
	Plagiobothrys canescens	valley popcornflower	None/None/None/None
	Plagiobothrys collinus var. *fulvescens*	rough popcornflower	None/None/None/None
	Brassicaceae	**Mustard Family**	
*	*Hirschfeldia incana*	shortpod mustard	None/None/None/None
*	*Lobularia maritima*	Sweet alyssum	None/None/None/None
	Nasurtium officinale	watercress	None/None/None/None
*	*Raphanus sativus*	cultivated radish	None/None/None/None
	Cactaceae	**Cactus Family**	
	Opuntia ficus-indica	Mission cactus	None/None/None/None
	Caprifoliaceae	**Honeysuckle Family**	
	Lonicera subspicata var. *denudata*	Johnston's honeysuckle	None/None/None/None
	Caryophyllaceae	**Pink Family**	
*	*Cerastium glomeratum*	mouse-ear chickweed	None/None/None/None
*	*Silene gallica*	common catchfly	None/None/None/None
*	*Stellaria media*	common chickweed	None/None/None/None
	Chenopodiaceae	**Goosefoot Family**	
	Chenopodium californicum	California goosefoot	None/None/None/None
*	*Salsola tragus*	prickly Russian thistle	None/None/None/None

EUDICOTS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Cistaceae		**Rock-rose Family**	
	Crocanthemum scoparium var. *scoparium*	peak rush-rose	None/None/None/None
Convolvulaceae		**Morning-Glory Family**	
	Calystegia macrostegia subsp. *arida*	San Diego morning glory	None/None/None/None
Crassulaceae		**Stonecrop Family**	
	Crassula connata	sand pygmyweed	None/None/None/None
Cucurbitaceae		**Gourd Family**	
	Marah macrocarpa	wild cucumber	None/None/None/None
Ericaceae		**Heath Family**	
	Xylococcus bicolor	mission manzanita	None/None/None/None
Euphorbiaceae		**Spurge Family**	
	Croton setiger	doveweed	None/None/None/None
*	*Euphorbia lathyris*	caper spurge	None/None/None/None
*	*Euphorbia peplus*	petty spurge	None/None/None/None
Fabaceae		**Legume Family**	
	Acmispon americanus var. *americanus*	Spanish lotus	None/None/None/None
	Acmispon argophyllus var. *argophyllus*	silver-leaf lotus	None/None/None/None
	Acmispon glaber var. *glaber*	deerweed	None/None/None/None
	Acmispon strigosus	strigose lotus	None/None/None/None
	Lathyrus vestitus var. *alefeldii*	San Diego sweet pea	None/None/None/None
	Lupinus bicolor	miniature lupine	None/None/None/None
	Lupinus truncatus	collar lupine	None/None/None/None
*	*Medicago polymorpha*	bur clover	None/None/None/None
*	*Melilotus indicus*	sourclover	None/None/None/None
Fagaceae		**Oak Family**	
	Quercus x acutidens	Torrey's scrub oak	None/None/None/None
	Quercus agrifolia var. *agrifolia*	coast live oak	None/None/None/None
	Quercus engelmannii	Engelmann oak	None/None/4.2/MSCP; List D
Geraniaceae		**Geranium Family**	
*	*Erodium botrys*	longbeak stork's bill	None/None/None/None
*	*Erodium cicutarium*	redstem filaree	None/None/None/None
*	*Geranium rotundifolium*	round-leaf geranium	None/None/None/None
Lamiaceae		**Mint Family**	
*	*Marrubium vulgare*	horehound	None/None/None/None
	Salvia apiana	white sage	None/None/None/None
	Salvia clevelandii	Cleveland sage	None/None/None/None
	Salvia columbariae	chia sage	None/None/None/None

EUDICOTS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
	Salvia mellifera	black sage	None/None/None/None
	Scutellaria tuberosa	Danny's skullcap	None/None/None/None
	Stachys stebbinsii	Stebbin's hedge-nettle	None/None/None/None
	Malvaceae	**Mallow Family**	
	Sidalcea sparsifolia	southern checkerbloom	None/None/None/None
	Montiaceae	**Miner's Lettuce Family**	
	Caladrinia menziesii	red maids	None/None/None/None
	Claytonia perfoliata subsp. *mexicana*	Mexican miner's lettuce	None/None/None/None
	Myrsinaceae	**Myrsine Family**	
*	*Lysimachia arvensis*	scarlet pimpernel	None/None/None/None
	Nyctaginaceae	**Four O'Clock Family**	
	Mirabilis laevis var. *crassifolia*	coastal wishbone bush	None/None/None/None
	Oleaceae	**Olive Family**	
*	*Olea europaea*	olive	None/None/None/None
	Onagraceae	**Evening Primrose Family**	
	Camissoniopsis bistorta	California sun cup	None/None/None/None
	Clarkia purpurea var. *quadrivulnera*	four-spot clarkia	None/None/None/None
	Orobanchaceae	**Broom-rape Family**	
	Cordylanthus rigidus subsp. *brevibracteatus*	stiff-branch bird's beak	None/None/None/None
	Paeoniaceae	**Peony Family**	
	Paeonia californica	California peony	None/None/None/None
	Phrymaceae	**Lopseed Family**	
	Diplacus x australis	San Diego monkeyflower	None/None/None/None
	Erythranthe guttata	seep monkeyflower	None/None/None/None
	Platanaceae	**Sycamore Family**	
	Platanus racemosa	California sycamore	None/None/None/None
	Plantaginaceae	**Plantain Family**	
	Antirrhinum nuttallianum ssp. *nuttallianum*	Nuttall's snapdragon	None/None/None/None
	Collinsia heterophylla var. *heterophylla*	Chinese houses	None/None/None/None
	Keckiella antirrhinoides	yellow bush penstemon	None/None/None/None
	Keckiella cordifolia	climbing bush penstemon	None/None/None/None
	Penstemon spectabilis	showy penstemon	None/None/None/None
*	*Plantago lanceolata*	English plantain	None/None/None/None
*	*Veronica anagallis-aquatica*	water speedwell	None/None/None/None

EUDICOTS

Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Polemoniaceae	**Phlox Family**	
Eriastrum filifolium	lavender eriastrum	None/None/None/None
Eriastrum sapphirinum ssp. *dasyanthum*	sapphire woolly-star	None/None/None/None
Navarretia hamata ssp. *hamata*	hooked navarretia	None/None/None/None
Polygonaceae	**Buckwheat Family**	
Chorizanthe procumbens	prostrate spineflower	None/None/None/None
Chorizanthe staticoides	Turkish rugging	None/None/None/None
Eriogonum fasciculatum var. *fasciculatum*	California buckwheat	None/None/None/None
Pterostegia drymarioides	California thread-stem	None/None/None/None
* *Rumex crispus*	curly dock	None/None/None/None
Proteaceae	**Proteas Family**	
* *Grevillea robusta*	silk oak	None/None/None/None
Ranunculaceae	**Buttercup Family**	
Clematis pauciflora	ropevine	None/None/None/None
Thalictrum fendleri var. *polycarpum*	smooth-leaf meadow rue	None/None/None/None
Rhamnaceae	**Buckthorn Family**	
Ceanothus crassifolius	hoaryleaf ceanothus	None/None/None/None
Ceanothus leucodermis	Chaparral whitethorn	None/None/None/None
Ceanothus tomentosus	Ramona ceanothus	None/None/None/None
Rhamnus ilicifolia	holly-leaf redberry	None/None/None/None
Rhamnus pilosa	hairy-leaf redberry	None/None/None/None
Rosaceae	**Rose Family**	
Adenostoma fasciculatum var. *fasciculatum*	chamise	None/None/None/None
Cercocarpus minutifolius	San Diego mountain mahogany	None/None/None/None
Heteromeles arbutifolia	toyon	None/None/None/None
Prunus ilicifolia	holly-leaf cherry	None/None/None/None
Rubiaceae	**Madder Family**	
Galium angustifolium ssp. angustifolium	narrow-leaf bedstraw	None/None/None/None
Galium aparine	goose grass	None/None/None/None
Galium nuttallii subsp. *nuttallii*	San Diego bedstraw	None/None/None/None
Galium porrigens var. *porrigens*	climbing bedstraw	None/None/None/None
Salicaceae	**Willow Family**	
Salix gooddingii	black willow	None/None/None/None
Salix laevigata	red willow	None/None/None/None

EUDICOTS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Saxifragaceae		**Saxifrage Family**	
	Lithophragma affine	woodland star	None/None/None/None
Scrophulariaceae		**Figwort Family**	
	Scrophularia californica	California figwort	None/None/None/None
Solanaceae		**Nightshade Family**	
	Datura wrightii	western jimson weed	None/None/None/None
*	*Nicotiana glauca*	tree tobacco	None/None/None/None
	Solanum americanum	small-flowered nightshade	None/None/None/None
	Solanum parishii	Parish's nightshade	None/None/None/None
Tamaricaceae		**Tamarix Family**	
*	*Tamarix ramosissima*	Mediterranean tamarisk	None/None/None/None
Urticaceae		**Nettle Family**	
*	*Urtica urens*	Dwarf nettle	None/None/None/None

MONOCOTYLEDONS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
Agavaceae		**Agave Family**	
	Chlorogalum parviflorum	small-flowered soap	None/None/None/None
	Hesperoyucca whipplei	chaparral yucca	None/None/None/None
Arecaceae		**Palm Family**	
*	*Washingtonia robusta*	Mexican fan palm	None/None/None/None
Juncaceae		**Rush Family**	
	Cyperus eragrostis	tall flatsedge	None/None/None/None
	Cyperus esculentus	yellow nutsedge	None/None/None/None
Juncaceae		**Rush Family**	
	Juncus mexicanus	Mexican rush	None/None/None/None
	Juncus xiphioides	iris-leaf rush	None/None/None/None
	Luzula comosa	common wood-rush	None/None/None/None
Liliaceae		**Lily Family**	
	Calochortus splendens	lilac mariposa lily	None/None/None/None
Poaceae		**Grass Family**	
*	*Arundo donax*	giant reed	None/None/None/None
*	*Avena fatua*	wild oat	None/None/None/None
*	*Bromus diandrus*	ripgut brome	None/None/None/None
*	*Bromus hordeaceus*	soft chess brome	None/None/None/None
*	*Bromus madritensis* ssp. *rubens*	foxtail chess	None/None/None/None

MONOCOTYLEDONS

	Scientific Name	Common Name	Status (Federal/State/CRPR/Local)
	Elymus glaucus	blue wildrye	None/None/None/None
	Festuca microstachys	Gray's fescue	None/None/None/None
*	*Festuca myuros*	rattail fescue	None/None/None/None
	Festuca octoflora	tufted fescue	None/None/None/None
*	*Hordeum* sp.	barley	None/None/None/None
	Melica imperfecta	coast range melic	None/None/None/None
	Muhlenbergia rigens	deergrass	None/None/None/None
*	*Polypogon monspeliensis*	annual beard grass	None/None/None/None
*	*Schismus barbatus*	Mediterranean	None/None/None/None
*	*Stipa miliaceae*	Smilo grass	None/None/None/None
	Stipa pulchra	purple needlegrass	None/None/None/None
*	*Vulpia myuros*	rat-tail fescue	None/None/None/None
	Themidaceae	**Brodiaea Family**	
	Dichelostemma capitatum subsp. *capitatum*	blue dicks	None/None/None/None
	Muilla maritima	common muilla	None/None/None/None
	Typhaceae	**Cattail Family**	
	Typha latifolia	broad-leaf cattail	None/None/None/None

CRPR 1B.1 = *Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California.*
CRPR 1B.2 = *Plants rare, threatened, or endangered in California and elsewhere; moderately threatened in California.*
CRPR 2B.1 = *Plants rare, threatened, or endangered in California but more common elsewhere; seriously threatened in California.*
CRPR 2B.2 = *Plants rare, threatened, or endangered in California but more common elsewhere; moderately threatened in California.*
CRPR 4.2 = *Watch List: Plants of limited distribution; moderately threatened in California.*
CRPR 4.3 = *Watch List: Plants of limited distribution; not very threatened in California.*
MSCP = *Proposed coverage under Draft North County MSCP Covered Species*
County List D = *Plants of limited distribution and are uncommon, but not presently rare or endangered.*
* *Non-native species*

Appendix B

Special-Status Plant Species Evaluated for Potential to Occur on the Preserve

Special-Status Plant Species Evaluated for Potential to Occur on the Preserve

Scientific Name	Common Name	Flowering Period	Federal	State	Local (CRPR/MSCP/ Other)	Preferred Habitat	Distribution	Potential to Occur
ANGIOSPERMS (DICOTYLEDONS)								
Asteraceae	**Sunflower Family**							
Baccharis vanessae	Encinitas baccharis	Aug–Nov	FT	SE	1B.1 MSCP County List A	Slopes with rocky and sandy soil. Lower elevations in coastal areas but more ridges and hilltops in interior locations. 60–720 meters.	San Diego	Low This species has an odd distribution in a variety of locations. However, there is low potential it could occur on the site due to the lack of other known locations nearby and lack of ridges and hilltops on the Preserve (AECOM 2018).
Fagaceae	**Oak Family**							
Quercus engelmannii	Engelmann Oak	Mar–Jun	None	None	4.2 MSCP County List D	Areas with deep soils on slopes, mesa areas and in shallow drainages. 50–1300 meters.	Los Angeles, Orange, Riverside, Santa Catalina Island, San Diego, and Baja California.	Present The Preserve supports a population on the west side of the Preserve. The population may be hybrids with *Quercus X acutidens* on the eastern side of the Preserve (AECOM 2018).

Scientific Name	Common Name	Flowering Period	Federal	State	Local (CRPR/MSCP/ Other)	Preferred Habitat	Distribution	Potential to Occur
Onagraceae	**Evening Primrose Family**							
Clarkia delicata	Delicate clarkia	Apr–Jun	None	None	2B.2 MSCP County List A	North facing slopes in areas with oak woodlands and large chaparral vegetation and good soil development. 235–1000 meters.	San Diego and Baja California.	Low. Suitable habitat is present on the Preserve but no individuals were observed during rare plant surveys and the Preserve is on the outer fringe of the distribution for this species (AECOM 2018).

Key to Species Listing Status Codes

FE	*Federally Endangered*	SE	*State Listed as Endangered*
FT	*Federally Threatened*	ST	*State Listed as Threatened*
NE	*MSCP Narrow Endemic Species*		
County List A	*Plants rare, threatened, or endangered in California and elsewhere.*		
County List D	*Plants of limited distribution and are uncommon, but not presently rare or endangered.*		
MSCP	*Draft North County MSCP Covered Species*		

CNPS and California Rare Plant Rank (CRPR):

1B: Plants rare, threatened, or endangered in California and elsewhere
2B: Plants rare, threatened, or endangered in California, but more common elsewhere
3: Plants more information is needed – a review list
4: Plants of limited distribution – a watch list

CRPR Threat Ranks

0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat);
0.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat);
0.3 = Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Footnotes continued on next page

Scientific Name	Common Name	Flowering Period	Federal	State	Local (CRPR/MSCP/ Other)	Preferred Habitat	Distribution	Potential to Occur

Occurrence Potential Definitions

High Potential: The project area and/or immediate vicinity provide high quality or ideal habitat (i.e., soils, vegetation assemblage, and topography) for a particular species and/or there are known occurrences in the general vicinity of the project area.

Medium Potential: The project area and/or immediate vicinity provides moderately suitable habitat for a particular species. For example, proper soils may be present, but the desired vegetation assemblage or density is less than ideal; or soils and vegetation are suitable, but the site is outside of the known elevation range of the species.

Low Potential: The project area and/or immediate vicinity provides low quality habitat for a particular species, such as improper soils, disturbed or otherwise degraded habitat, improper assemblage of desired vegetation, and/or the site is outside of the known elevation range of the species.

Not Expected: The project area and/or immediate vicinity does not provide suitable habitat necessary to support the species and/or the site is located outside of the known geographic range of the species. Within suitable habitat, focused protocol surveys and/or botanical surveys conducted during optimal timing (e.g. flowering period) and climatic conditions (e.g. average to above-average hydrologic year) would preclude the presence of the species.

Appendix C

Wildlife Species Detected on the Preserve

WILDLIFE SPECIES DETECTED ON THE PRESERVE

INVERTEBRATES

Scientific Name	Common Name	Status (Federal/State/Local)
Arachnida (Order Araneae)	**Spiders**	
Family Araneidae	Orb-weaver spider	None/None/None
Insecta (Order Orthoptera)	**Grasshoppers, Katydids, and Crickets**	
Family Stenopelmatidae	Jerusalem cricket	None/None/None
Insecta (Order Hemiptera)	**True Bugs**	
Family Gerridae	water strider bug	None/None/None
Insecta (Order Hymenoptera)	**Ants, Bees, and Wasps**	
Family Mutillidae	velvet ant	None/None/None
Pepsis thisbe	tarantula hawk wasp	None/None/None
Vespula spp.	yellow jacket	None/None/None
Pogonomyrmex sp.	Harvester ant	None/None/None
Insecta (Order Lepidoptera)	**Butterflies and Moths**	
Anthocharis cethura	desert orangetip butterfly	None/None/None
Apodemia virgulti	Behr's metalmark butterfly	None/None/None
Erynnis funeralis	funereal duskywing butterfly	None/None/None
Glaucopsyche lygdamus	silvery blue butterfly	None/None/None
Icaricia acmon	Acmon blue	None/None/None
Leptotes marina	marine blue butterfly	None/None/None
Limenitis lorquini	Lorquin's admiral	None/None/None
Nathalis iole	dainty sulphur	None/None/None
Papilio zelicaon	anise swallowtail	None/None/None
Pieris rapae	cabbage white butterfly	None/None/None
Pontia protodice	California checkered white butterfly	None/None/None
Junonia coenia	common buckeye	None/None/None
Vanessa cardui	painted lady butterfly	None/None/None

AMPHIBIANS

Scientific Name	Common Name	Status (Federal/State/Local)
Bufonidae	**True Toads**	
Anaxyrus boreas halophilus	western toad	None/None/None

AMPHIBIANS

Scientific Name	Common Name	Status (Federal/State/Local)
Hylidae	**Treefrogs**	
Pseudacris cadaverina	California treefrog	None/None/None
Pseudacris hypochondriaca	Baja California treefrog	None/None/None

REPTILES

Scientific Name	Common Name	Status (Federal/State/Local)
LACERTILIA	**LIZARDS**	
Anguidae	**Alligator Lizards**	
Elgaria multicarinatus	southern alligator lizard	None/None/None
Phrynosomatidae	**Zebratail, Earless, Horned, Spiny, Fringe-Toed Lizards**	
Phrynosoma blainvillii	coast horned lizard	None/SSC/MSCP, Group 2
Sceloporus occidentalis	western fence lizard	None/None/None
Uta stansburiana elegans	western side-blotched lizard	None/None/None
Scincidae	**Skinks**	
Plestiodon gilberti rubricaudatus	western red-tailed lizard	None/None/None
Teiidae	**Whiptail Lizards**	
Aspidoscelis hyperythra beldingi	Belding's orange-throated whiptail	None/WL/Group 2
Aspidoscelis tigris stejnegeri	coastal western whiptail	None/SSC/Group 2
SERPENTES	**SNAKES**	
Colubridae	**Colubrid Snakes**	
Coluber lateralis lateralis	California striped racer	None/None/None
Viperidae	**Vipers**	
Crotalus oreganus helleri	southern Pacific rattlesnake	None/None/None

BIRDS

Scientific Name	Common Name	Status (Federal/State/Local)
ANSERIFORMES		
Anatidae	**Waterfowl**	
Anas americana	American wigeon	None/None/None

BIRDS

Scientific Name	Common Name	Status (Federal/State/Local)
GALLIFORMES		
Odontophoridae	**Quails**	
Callipepla californica	California quail	None/None/None
COLUMBIFORMES		
Columbidae	**Pigeons and Doves**	
Zenaida macroura	mourning dove	None/None/None
CAPRIMULGIFORMES		
Caprimulgidae	**Goatsuckers**	
Phalaenoptilus nuttallii	common poorwill	None/None/None
CUCULIFORMES		
Cuculidae	**Cuckoos and Roadrunners**	
Geococcyx californianus	greater roadrunner	None/None/None
APODIFORMES		
Trochilidae	**Hummingbirds**	
Calypte anna	Anna's hummingbird	None/None/None
Calypte costae	Costa's hummingbird	None/None/None
PELECANIFORMES		
Threskiornithidae	**Ibises**	
Plegadis chihi	white-faced ibis	None/WL/Group 1
ACCIPITRIFORMES		
Cathartidae	**New World Vultures**	
Cathartes aura	turkey vulture	None/None/Group 1
Accipitridae	**Hawks**	
Accipiter cooperii	Cooper's hawk	None/WL/Group 1
Buteo jamaicensis	red-tailed hawk	None/None/None
Buteo lineatus	red-shouldered hawk	None/None/Group 1
STRIGIFORMES		
Tytonidae	**Barn Owls**	
Tyto alba	barn owl	None/None/Group 2
Strigidae	**True Owls**	
Bubo virginianus	great horned owl	None/None/None
PICIFORMES		
Picidae	**Woodpeckers**	
Colaptes auratus	northern flicker	None/None/None
Melanerpes formicivorus	acorn woodpecker	None/None/None
Picoides nuttallii	Nuttall's woodpecker	None/None/None

BIRDS

Scientific Name	Common Name	Status (Federal/State/Local)
PASSERIFORMES		
Tyrannidae	**Tyrant Flycatchers**	
Myiarchus cinerascens	ash-throated flycatcher	None/None/None
Sayornis nigricans	black phoebe	None/None/None
Sayornis saya	Say's phoebe	None/None/None
Tyrannus verticalis	western kingbird	None/None/None
Corvidae	**Jays and Crows**	
Aphelocoma californica	California scrub-jay	None/None/None
Corvus brachyrhynchos	American crow	None/None/None
Corvus corax	common raven	None/None/None
Aegithalidae	**Bushtits**	
Psaltriparus minimus	bushtit	None/None/None
Troglodytidae	**Wrens**	
Thryomanes bewickii	Bewick's wren	None/None/None
Troglodytes aedon	house wren	None/None/None
Polioptilidae	**Gnatcatchers**	
Polioptila caerulea	blue-gray gnatcatcher	None/None/None
Regulidae	**Kinglets**	
Regulus calendula	ruby-crowned kinglet	None/None/None
Sylviidae	**Wrentits**	
Chamaea fasciata	wrentit	None/None/None
Turdidae	**Thrushes**	
Sialia mexicana	western bluebird	None/None/Group 1
Mimidae	**Thrashers**	
Toxostoma redivivum	California thrasher	None/None/None
Fringillidae	**Finches**	
Haemorhous mexicanus	house finch	None/None/None
Spinus lawrencei	Lawrence's goldfinch	None/None/None
Spinus psaltria	lesser goldfinch	None/None/None
Passerellidae	**New World Sparrows**	
Aimophila ruficeps canescens	southern California rufous-crowned	None/None/None
Melospiza melodia	song sparrow	None/None/None
Melozone crissalis	California towhee	None/None/None
Pipilo maculatus	spotted towhee	None/None/None
Parulidae	**Wood Warblers**	
Geothlypis trichas	common yellowthroat	None/None/None
Oreothlypis celata	orange-crowned warbler	None/None/None

BIRDS

Scientific Name	Common Name	Status (Federal/State/Local)
PSITTACIFORMES		
Sturnidae	**Starlings**	
* *Sturnus vulgaris*	European starling	None/None/None
Ptilogonatidae	**Silky-flycatchers**	
Phainopepla nitens	phainopepla	None/None/None
Cardinalidae	**Buntings, Grosbeaks, and Tanagers**	
Pheucticus melanocephalus	black-headed grosbeak	None/None/None

MAMMALS

Scientific Name	Common Name	Status (Federal/State/Local)
Canidae	**Canines**	
Canis latrans	coyote	None/None/None
Urocyon cinereoargenteus	gray fox	None/None/None
Felidae	**Cats**	
Lynx rufus	bobcat	None/None/None
Heteromyidae	**Pocket Mice and Kangaroo Rats**	
Chaetodipus californicus femoralis	Dulzura pocket mouse	None/SSC/Group 2
Molossidae	**Free-Tailed Bats**	
Eumops perotis californicus	greater western mastiff bat	None/SSC/Group 2
Nyctinomops femorosaccus	pocketed free-tailed bat	None/SSC/Group 2
Tadarida brasiliensis	Mexican free-tailed bat	None/None/None
Muridae	**Mice, Rats, and Voles**	
Neotoma macrotis	big-eared woodrat	None/None/None
Peromyscus californicus	California mouse	None/None/None
Peromyscus fraterculus	northern Baja mouse	None/None/None
Peromyscus maniculatus	deer mouse	None/None/None
Reithrodontomys megalotis	western harvest mouse	None/None/None
Microtus californicus	California vole	None/None/None
Soricidae	**Shrew**	
Family Soricidae	Shrew species	None/None/None
Procyonidae	**Ringtails and Raccoons**	
Procyon lotor	northern raccoon	None/None/None
Sciuridae	**Squirrels and Chipmunks**	
Neotamias merriami	Merriam's chipmunk	None/None/None
Vespertilionidae	**Evening Bats**	
Eptesicus fuscus	big brown bat	None/None/None

MAMMALS

Scientific Name	Common Name	Status (Federal/State/Local)
Lasiurus blossevillii	western red bat	None/SSC/Group 2
Lasiurus cinereus	hoary bat	None/None/None
Lasiurus xanthinus	western yellow bat	None/SSC/None
Myotis californicus	California myotis	None/None/None
Myotis ciliolabrum	western small-footed myotis	None/None/Group 2
Myotis yumanensis	Yuma myotis	None/None/Group 2
Parastrellus hesperus	canyon bat	None/None/None

[1] FE: Federally Endangered
FT: Federally Threatened
SE: State Endangered
WL: California Department of Fish and Wildlife Watch List
SSC: California Department of Fish and Wildlife Species of Special Concern
MSCP: Covered under the Draft North County MSCP
Group 1: Animals of high sensitivity (listed or specific natural history requirements) (County)
Group 2: Animals declining but not in immediate threat of extinction or extirpation (County)
* Non-native species

Appendix D

Special-Status Wildlife Species Evaluated for Potential to Occur on the Preserve

Special-Status Wildlife Species Evaluated for Potential to Occur on the Preserve

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
INVERTEBRATES						
Insecta/Hymenoptera	**Butterflies and Moths**					
Euphydryas editha quino	Quino checkerspot butterfly	FE	None	MSCP, County Group 1	Chaparral and coastal scrub with sunny clearings. Require high densities of larval host plants, such as *Plantago erecta*, *Cordylanthus rigidus*, and *Castilleja exserta*.	Low The Preserve contains suitable foraging habitat and host plants. However, the Preserve is approximately 10 miles from the USFWS's recommended Quino survey area and there are no known occurrences documented within 1-mile of the Preserve.
Euphyes vestris harbisoni	Harbison's dun skipper	None	None	MSCP, County Group 1	Occurs in open oak woodland, chaparral, or riparian areas along narrow canyons or drainages where seeps or areas of shade allow it's host plant San Diego sedge (*Carex spissa*) to occur.	Not Expected The Preserve contains suitable foraging habitat but lacks the host plant necessary for this species to occur on site. No known occurrences are documented within 1-mile of the Preserve.
Lycaena hermes	Hermes cooper butterfly	FCE	None	MSCP, County Group 1	Occurs in chaparral and coastal sage shrub where it's host plant, redberry (*Rhamnus crocea*), is located. Adults forage in flat-top buckwheat (*Eriogonum fasciculatum*) habitat.	Not Expected The Preserve contains suitable foraging habitat but lacks the host plant necessary for this species to occur on site. No known occurrences are documented within 1-mile of the Preserve.
AMPHIBIANS						
Bufonidae	**True Toad Family**					
Anaxyrus californicus	Arroyo toad	**FE**	SSC	MSCP, County Group 1	Gravelly or sandy washes, stream and river banks, and arroyos. Also found within upland habitats near washes and streams such as sage scrub, mixed chaparral, Joshua tree woodland, and sagebrush habitat.	Low The Preserve contains a creek but it lacks suitable gravel or sandy banks for breeding.
Scaphiopodidae	**American Spadefoot Family**					

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Spea hammondii	western spadefoot	None	SSC	MSCP, County Group 2	Low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food-termites.	Moderate The Preserve during the 2019 season provided low suitable habitat due to rains throughout the area creating a flowing creek through the Preserve throughout the 'dry season' when spadefoots need to breed. In drier years, the creek may pond during the spadefoots breeding season providing more ideal habitat for this species.
REPTILES						
Anniellidae	**Legless Lizard Family**					
Anniella stebbinsi [=*Anniella pulchra*]	southern California legless lizard	None	SSC	County Group 2	Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks.	High This species has a high potential to occur within the Preserve because of high-quality suitable habitat on site.
Emydidae	**Pond Turtle family**					
Clemmys marmorata pallida	southwestern pond turtle	None	SSC	MSCP, County Group 1	Ponds, lakes, rivers, streams, marshes and irrigation ditches with abundant vegetation and either rocky or muddy bottoms. In woodland, forest, or grassland habitats. In creeks that pool to shallower areas and with logs, rocks, cattail mats, and/or exposed banks for basking are required. Could enter brackish or even seawater.	Low The Preserve contains a creek but lacks water year-round which this species requires. No known occurences are documented within 1-mile of the Preserve.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Phrynosomatidae	**Iguanid Lizard Family**					
Phrynosoma blainvillii	coast horned lizard	None	SSC	MSCP, County Group 2	Prefers sandy riparian and sage scrub habitats but also occurs in valley-foothill hardwood, conifer, pine-cypress, juniper and annual grassland habitats below 6,000 feet, open country, especially sandy areas, washes, flood plains, and windblown deposits.	Present This species was detected incidentally during 2019 herpetofauna surveys in loose sandy soil along a dirt trail within the Preserve. This species has been reported within one mile of the Preserve (CDFW 2019).
Scincidae	**Skink Family**					
Plestiodon skiltonianus interparietalis	Coronado skink	None	SSC	County Group 2	Occurs in woodland and scrub habitats with leaf litter and sandy substrates.	High This species has a high potential to occur within the Preserve because of high-quality suitable woodland habitat on site.
Teiidae	**Whiptail Family**					
Aspidoscelis hyperythra beldingi	Belding's orange-throated whiptail	None	WL	County Group 2	Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks.	Present This species was detected during 2019 herpetofauna surveys in open chaparral habitats within the Preserve.
Aspidoscelis tigris stejnegeri	coastal western whiptail	None	SSC	County Group 2	Occurs in sparsely vegetated areas of chaparral, woodland, and riparian areas.	Present This species was detected during 2019 herpetofauna surveys in open chaparral habitats within the Preserve. This species has been reported within one mile of the Preserve (CDFW 2019).
Boidae	**Boa Family**					
Lichanura trivirgata	rosy boa	None	None	County Group 2	Inhabits arid scrublands, semi-arid shrublands, rocky shrublands, rocky deserts, canyons, and other rocky areas. Appears to be common in riparian areas, but does not require permanent water.	High This species has a high potential to occur within the Preserve because of suitable shrubland (e.g. chaparral) habitat and riparian areas/canyons on site.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Colubridae	**Egg-laying Snakes**					
Salvadora hexalepis virgultea	coast patch-nosed snake	None	SSC	County Group 2	Grasslands, scrublands, and woodlands with sandy soils and leaf litter.	High This species has a high potential to occur within the Preserve because of high-quality suitable woodland habitat on site.
Natricidae	**Live-bearing Snakes**					
Thamnophis hammondii	two-striped garter snake	None	SSC	County Group 1	Coastal California near water sources (e.g. pools, creeks, cattle tanks) with permanent fresh water, and near streams with rocky beds and riparian growth. Associated vegetation includes oak woodland, willow, coastal sage scrub, scrub oak, sparse pine, chaparral, and brushland.	High This species has a high potential to occur within the Preserve. While the Preserve lacks permanent water sources, Keys Creek provides suitable stream and riparian habitat particularly during the wet season.
Viperidae	**Vipers**					
Crotalus ruber	red-diamond rattlesnake	None	SSC	County Group 2	Chaparral, woodland, grassland, sage scrub, and desert. In rocky areas and dense vegetation.	High This species has a high potential to occur within the Preserve due to the presence of suitable chaparral and woodland habitat.
BIRDS						
Threskiornithidae	**Ibises and Spoonbills**					
Plegadis chihi	white-faced ibis	None	WL	County Group 1	Wading bird that seeks open, shallow, aquatic bodies such as lagoons, wetlands, ephemeral ponds, and stock ponds to forage. Nests in marsh growth (cattails) or low shrubs and trees above water.	Present This species was detected flying over the Preserve during 2019 diurnal avian surveys.
Accipitridae	**Hawks**					
Accipiter cooperii	Cooper's hawk	None	WL	County Group 1	Inhabits live oak, riparian deciduous, or other forest habitats near water. Nests and forages near open water or in riparian vegetation.	Present This species was detected within the Preserve during 2019 diurnal avian surveys. Suitable nesting habitat is also present.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Buteo lineatus	red-shouldered hawk	None	None	County Group 1	Inhabits oak, riparian, and eucalyptus woodland. Nests in a variety of trees including oaks, eucalyptus, palms, and peppertrees.	Present This species was detected within the Preserve during 2019 diurnal avian surveys. Suitable nesting habitat is also present.
Tytonidae	**Barn Owls**					
Tyto alba	barn owl	None	None	County Group 2	Can be found in open habitats across most of the United States, including grasslands, deserts, marshes, agricultural fields, etc. They nest in tree cavities, caves, and in buildings.	Present This species was detected within the Preserve during 2019 diurnal avian surveys. Suitable nesting habitat is also present.
Vireonidae	**Vireos**					
Vireo bellii pusillus	least Bell's vireo	FE	SE	MSCP, County Group 1	Highly territorial, migratory songbird that nest and forage almost exclusively in riparian woodlands.	Low This species has a low potential to occur within the Preserve due to the presence of riparian habitat with some areas of willows and mulefat, and proximity to the San Luis Rey River which has a large population of this species. However, the Preserve lacks continuous willow or other dense riparian vegetation, which is the preferred nesting habitat for this species.
Polioptilidae	**Gnatcatchers**					
Polioptila californica californica	coastal California gnatcatcher	FT	SSC	MSCP, County Group 1	Found year-round in coastal sage scrub habitats dominated by California sagebrush and flat-topped buckwheat, mainly on cismontane slopes below 1,500 feet in elevation.	Low Preserve lacks coastal sage scrub habitat and has sparse California sage brush throughout the Preserve. Chaparral habitat is on steep slopes that are generally not preferred by this species.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Turdidae	**Thrushes**					
Sialia mexicana	western bluebird	None	None	County Group 1	Inhabits oak, riparian, and conifer woodlands but can also occupy urbanized areas with mature trees and wide lawns.	Present This species was detected within non-native grassland habitat along the western portion of the Preserve during diurnal avian surveys.
Passerellidae	**New World Sparrows**					
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None	WL	County Group 1	Inhabits coastal sage scrub or mixed chaparral habitats, preferably along steep grassy or rocky hillsides.	Present This species was detected within chaparral habitat along the western portion of the Preserve during 2019 diurnal avian surveys.
Artemisiospiza belli belli	Bell's sage sparrow	None	WL	County Group 1	Inhabits large, unfragmented blocks of coastal sage scrub, southern mixed chaparral habitats	High This species has high potential to occur within the Preserve due to large, unfragmented blocks of chaparral habitat.
MAMMALS						
Heteromyidae	**Kangaroo Rats, Pocket Mice, and Kangaroo Mice**					
Chaetodipus californicus femorali	Dulzura pocket mouse	None	SSC	County Group 2	Slopes covered with chaparral and live oaks.	Present. This species was detected during 2019 small mammal surveys in open chaparral and oak woodland habitats within the Preserve
Chaetodipus fallax	San Diego pocket mouse	None	SSC	County Group 2	Coastal scrub, sagebrush, chaparral, grasslands, pinyon-juniper, and desert wash and scrub. Found in sandy, herbaceous areas with nearby shrubs for cover. Burrows are typically dug within gravelly or sandy soil.	High This species has a high potential to occur within the Preserve as suitable habitat occurs throughout most of the Preserve, within the chaparral habitats, particularly around rocky outcrops.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Dipodomys stephensi	Stephens' kangaroo rat	FE	ST	MSCP, County Group 1	Inhabits annual and perennial grassland habitats, but may occur in coastal scrub or sagebrush with sparse canopy cover, or in disturbed areas.	Low There is sparse habitat on the Preserve for this species which prefers open coastal sage scrub habitat. Habitats on the Preserve are dominated by annuals and not forbs and is highly disturbed and dense. The Preserve is also on the edge of the species range.
Muridae	**Mice, Rats, and Vole**					
Neotoma lepida intermedia	San Diego desert woodrat	None	SSC	County Group 2	Coastal scrub and chaparral. Prefer areas with moderate to dense canopy cover. Frequently found in areas with rock outcrops and cliffs.	Low This species has a low potential to occur because the Preserve is on the edge of the species range which is mainly along the coast. However, suitable habitat occurs throughout most of the Preserve, particularly in the dense chaparral and around rocky outcrops.
Molossidae	**Free-tailed Bats**					
Eumops perotis californicus	greater western mastiff bat	None	SSC	County Group 2	Inhabits chaparral, oak woodland, and arid, rocky regions. Requires roosting sites to have downward-opening crevices.	Present This species was detected during spring and summer 2019 passive acoustic bat surveys within the Preserve.
Nyctinomops femorosaccus	pocketed free-tailed bat	None	SSC	County Group 2	Inhabits pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis.	Present This species was detected during spring and summer 2019 passive acoustic bat surveys within the Preserve.
Nyctinomops macrotis	big free-tailed bat	None	SSC	County Group 2	Low-lying arid areas in Southern California. Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	Moderate The Preserve contains suitable foraging habitat for this species but lacks suitable roosting habitat.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Phyllostomidae	**Leaf-Nosed Bats**					
Macrotus californicus	California leaf-nosed bat	None	SSC	County Group 2	Preferred habitats are caves, mines, and rock shelters, mostly in Sonoran desert scrub.	Moderate The Preserve contains suitable foraging habitat but lacks suitable roosting habitat.
Vespertilionidae	**Evening Bats**					
Antrozous pallidus	Pallid Bat	None	SSC	MSCP, County Group 2	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect species from high temperatures.	Moderate The majority of the Preserve contains very dense chaparral and riparian vegetation which would not be conducive to this species' foraging habit of gleaning insects from the ground. However, dirt roads, small openings, and rocky areas in the Preserve may provide limited suitable foraging habitat and large riparian trees on the site may provide potential roosting cavities.
Lasiurus blossevillii	western red bat	None	SSC	County Group 2	Roosts primarily in forests and woodlands from sea level up through mixed conifer forests and are often in edge habitats adjacent to streams, fields, or urban areas.	Present This species was detected during spring and summer 2019 passive acoustic bat surveys within the Preserve.
Lasiurus xanthinus	western yellow bat	None	SSC	None	Roosts primarily in trees, including under palm trees, and forages for insects over water and among trees.	Present This species was detected during summer 2019 passive acoustic bat surveys within the Preserve.
Myotis ciliolabrum	western small-footed myotis	None	None	County Group 2	Inhabits deserts, semi-deserts, and desert mountains, and roosts in crevices and cracks in canyon walls, caves, mine tunnels, behind loose tree bark, or in abandoned houses.	Present This species was detected during spring and summer 2019 passive acoustic bat surveys within the Preserve.
Myotis evotis	long-eared myotis	None	None	County Group 2	Inhabits mostly forested areas with broken rock outcrops. Can also be found in shrublands, meadows near tall timber, wooded streams, and reservoirs. Roosts in buildings, hollowed trees, mines, caves, and fissures.	Moderate The Preserve contains potential foraging habitat and may contain tree-cavity or crevice habitat for roosting; however, this species is locally more associated with roosting in rock crevices and structures.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Myotis thysanodes	fringed myotis	None	None	County Group 2	Occurs in desert scrub to fir-pine habitat but most common in oak and pinyon woodlands. Roosts in caves, mines, and buildings.	Low In San Diego County, this species is found primarily in the mountains; however, this species could occur as an occasional transient species. The Preserve contains suitable foraging habitat but lacks suitable roosting habitat.
Myotis yumanensis	Yuma myotis	None	None	County Group 2	Roosts in buildings, mines, caves, or crevices, but has also been seen roosting in abandoned swallow nests and under bridges.	Present This species was detected during spring and summer 2019 passive acoustic bat surveys within the Preserve.
Leporidae	**Hares and Rabbits**					
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	SSC	County Group 2	Inhabits open grasslands, agricultural fields, and sparse coastal scrub where they occur primarily in arid regions with short grass.	Moderate This species has a moderate potential to occur. The coastal shrub and grassland on-site is limited, and a majority of the chaparral is comprised of dense vegetation. However, the Preserve borders rural, agricultural areas which may support this species and the Preserve is in the species' known range.
Cervidae	**Deer, Elk, and Moose**					
Odocoileus hemionus	southern mule deer	None	None	County Group 2	Occurs in mountain forests, wooded hills, chaparral, and desert scrub habitats.	Moderate This species has a moderate potential to occur due to suitable habitat on-site and potential for movement between rural residential areas to larger, undisturbed, native habitat.
Felidae	**Cats and Relatives**					
Felis concolor	mountain lion	None	None	County Group 2	Prefers large, unfragmented habitats such as mountains, forests, and deserts.	Moderate This species has a moderate potential to occur due to suitable habitat on-site and potential for movement between rural residential areas to larger, undisturbed, native habitat.

Scientific Name	Common Name	Federal	State	Local	Preferred Habitat	Potential for Occurrence in the Study Area
Mustelidae	**Weasels and Relatives**					
Taxidea taxus	American badger	None	SSC	County Group 2	Drier, open stages of shrubland, forest, and herbaceous habitats with friable soils.	Low This species has a low potential to occur within the Preserve. This species is sparsely populated within the County and is generally associated with large, unfragmented expanses of primarily grassland habitat. The grassland habitat on-site is extremely limited and the Preserve lacks suitable open shrubland, but has connectivity to off-site areas of open space with suitable habitat.

Key to Species Listing Status Codes

FE	*Federally Endangered*	SE	*State Listed as Endangered*
FT	*Federally Threatened*	ST	*State Listed as Threatened*
FCE	*Candidate for Federally Listing*	SCE	*State Candidate for Endangered*
WL	*CDFW Watch List Species*	SSC	*CDFW Species of Special Concern*
MSCP	*Draft North County MSCP Covered Species*		
County Group 1	*Animals of high sensitivity (listed or specific natural history requirements).*		
County Group 2	*Animals declining but not in immediate threat of extinction or extirpation.*		

Occurrence Potential Definitions

High Potential: The project area and/or immediate vicinity provide high quality or ideal habitat (i.e., soils, vegetation assemblage, and topography) for a particular species and/or there are known occurrences in the general vicinity of the project area.

Medium Potential: The project area and/or immediate vicinity provides moderately suitable habitat for a particular species. For example, proper soils may be present, but the desired vegetation assemblage or density is less than ideal; or soils and vegetation are suitable, but the site is outside of the known elevation range of the species.

Low Potential: The project area and/or immediate vicinity provides low quality habitat for a particular species, such as improper soils, disturbed or otherwise degraded habitat, improper assemblage of desired vegetation, and/or the site is outside of the known elevation range of the species.

Not Expected: The project area and/or immediate vicinity does not provide suitable habitat necessary to support the species and/or the site is located outside of the known geographic range of the species. Within suitable habitat, focused protocol surveys and/or botanical surveys conducted during optimal timing (e.g. flowering period) and climatic conditions (e.g. average to above-average hydrologic year) would preclude the presence of the species.

Appendix E

Representative Photographs from Surveys

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Butterflies Survey Photographs

Purple Chinese houses (*Collinsia heterophylla*), a Quino checkerspot butterfly larval host plant.

Common buckeye (*Junonia coenia*) among popcorn flower, a butterfly nectar source.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Incidental observation of a painted lady butterfly (*Vanessa cardui*).

Open scrub habitat with multiple butterfly nectar plants in bloom, such as deerweed (*Acmispon glaber*) and chamise (*Adenostoma fasciculatum*).

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Herpetofauna Drift Fence Representative Photographs

Trap array set-up at Trap 1 location.

Zoom in at trap array set-up at Trap 4 location.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Western red-tailed skink (*Plestiodon gilberti rubricaudatus*) caught during week 1 of trapping in drift fence 4.

Southern Pacific rattlesnake adjacent to Trap 2 during May herpetofauna surveys.

Southern alligator lizard (*Elgaria multicarinata*) caught during week 1 of trapping in drift fence 2.

Orange-throated whip tail caught during June herpetofauna surveys.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Coastal western whiptail caught in a trap during July herpetofauna surveys.

Western fence lizard caught in a trap during July herpetofauna surveys.

Side-blotched lizard caught during April herpetofauna surveys.

Incidental observation of a Baja California treefrog

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Incidental observation of a California striped racer.

Western toad caught during July herpetofauna surveys.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Small Mammal Trapping Representative Photographs

Western harvest mouse (*Reithrodontomys megalotis*) caught during fall 2019 small mammal trapping effort.

California mouse (*Peromyscus californicus*) caught during fall 2019 small mammal trapping effort.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Deer mouse (*Peromyscus maniculatus*) caught during fall 2019 small mammal trapping effort.

Northern baja mouse (*Peromyscus fraterculus*) caught during fall 2019 small mammal trapping effort.

Dulzura pocket mouse (*Chaetodipus californicus femoralis*) caught during fall 2019 small mammal trapping effort.

California vole (*Microtus californicus*) caught during fall 2019 small mammal trapping effort..

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Dusky-footed woodrat (*Neotoma macrotis*) caught during the fall 2019 trapping season.

Dulzura pocket mouse (*Chaetodipus californicus femoralis*) caught during fall 2019 small mammal trapping effort.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Bat Passive Acoustic Survey Representative Photographs

West bat detector location on Keys Creek Preserve.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

East bat detector location on Keys Creek Preserve.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Wildlife Camera Locations and Representative Views

South Wildlife Camera location on a tree within Keys Creek Preserve.

South Wildlife Camera representative view.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

North Wildlife Camera location on a tree within Keys Creek Preserve.

North Wildlife Camera representative view.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Medium to Large Mammal Wildlife Camera Representative Photographs

Red-tailed hawk detected on the South Wildlife Camera.

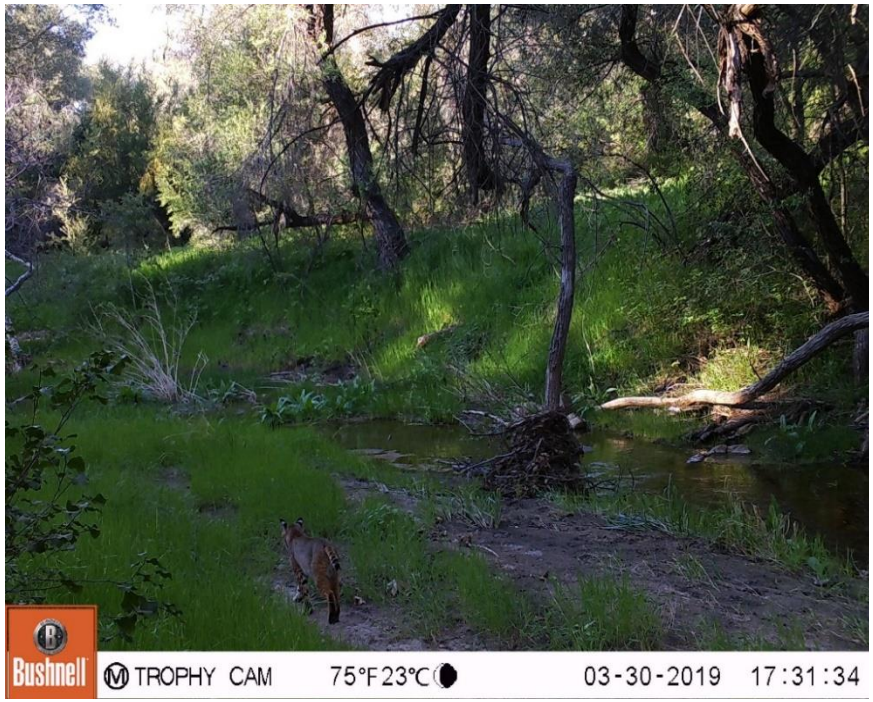
Red-shouldered hawk detected on the South Wildlife Camera.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Two coyotes detected on the North Wildlife Camera.

Coyote detected on the South Wildlife Camera.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS



Bobcat detected on the North Wildlife Camera.

Bobcat detected on the South Wildlife Camera.

REPRESENTATIVE PHOTOGRAPHS FROM SURVEYS

Raccoon detected on the South Wildlife Camera.

Two raccoons detected on the South Wildlife Camera.