

PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN

July 2019

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PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN

**APPROVED:
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July 2019

Executive Summary

At the request of OC Parks, Michael Baker International (MBI) has prepared this Resource Management Plan (RMP) for the Peters Canyon Regional Park (PCRP), located in the cities of Orange, Tustin, and unincorporated area of North Tustin, Orange County, California. The RMP is intended for use by OC Parks in consideration of future management decisions at PCRP.

This RMP focuses on the natural and cultural resources within the park, and the best way to manage those resources in order to benefit both the wildlife within the park and the visitors to the park. The information within this document is to be used as a guideline for management of public access and recreation, public outreach and education, fire management, exotic/invasive pest and plant control, trail design, biological monitoring, mitigation and restoration, park maintenance, and other management purposes at PCRP. The RMP incorporates the Biological Resources Report, Jurisdictional Delineation Report, Cultural Resources, and the Paleontological Resources Report into its discussion on park management. PCRP contains a wide variety of valuable natural and cultural resources, and recommendations are given to help preserve, protect, and expand the resources within the park.

Additionally, because PCRP is located within and is subject to the requirements and provisions set forth in the Central Subarea of the County of Orange Central and Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan (County NCCP/HCP), this report provides an in-depth assessment of the suitability of the habitats on-site to support the three “Target Species” of the County NCCP/HCP, which include coastal California gnatcatcher, cactus wren, and orange-throated whiptail (*Aspidoscelis hyperythra*; SSC). The County NCCP/HCP specifies that the populations of the target species shall be subject to long-term monitoring and that these taxa shall be treated as if they were listed under the Federal Endangered Species Act of 1973 (FESA) and/or California Endangered Species Act (CESA).

The RMP provides a wide variety of goals and strategies to help guide OC Parks on future policy, land use, and resource management decisions for the park. Public access and recreation management, reservoir management, cultural resource management, biological resource management, public outreach and education, fire management, and park operations and management goals and strategies are discussed within.

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LIST OF ACRONYMS

ADA	Americans with Disabilities Act
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CMMS	Computerized Maintenance Management System
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSS	Coastal Sage Scrub
CWA	Clean Water Act
EDRR	Early Detection and Rapid Response
EPA	Environmental Protection Agency
ETC	Eastern Transportation Corridor
FC	Federal Candidate
FE	Federally Endangered
FMU	Fire Management Unit
FT	Federally Threatened
FY	Fiscal Year
GDP	General Development Plan
GIS	Geographic Information System
GPS	Ground Positioning System
HA	Hydrologic Area
HCP	Habitat Conservation Plan
HU	Hydrologic Unit
IPM	Integrated Pest Management
IRWD	Irvine Ranch Water District
KSBS	Kuroshio Shot Hole Borer Beetle
LACM	Natural History Museum of Los Angeles County
LPCR	Lower Peters Canyon Reservoir
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NCC	Natural Communities Coalition
NCCP	Natural Community Conservation Plan
NWP	Nationwide Permit
OCCR	Orange County Community Resources
OCPW	Orange County Public Works
OHWM	Ordinary High Water Mark
PCC	Peters Canyon Creek
PCRP	Peters Canyon Regional Park
PSHB	Polyphagous Shot Hole Borer Beetle
RMP	Resource Management Plan
RPW	Relatively Permanent Water
SAA	Streambed Alteration Agreement
SBBM	San Bernardino Base and Meridian

SE	State Endangered
ST	State Threatened
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditionally Navigable Water
UCMP	University of California Museum of Paleontology
UPCR	Upper Peters Canyon Reservoir
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WFMP	Wildland Fire Management Plan

Section 1 Introduction

This Resource Management Plan (RMP) has been prepared for the 340-acre Peters Canyon Regional Park (PCRP) which is also part of Orange County's Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) reserve system. As required by the NCCP/HCP, programs for implementing NCCP policies will be defined in a Resource Management Plan (RMP) for each County park within the habitat reserve system. The RMP elements are to consist of policies for managing and monitoring the reserve system, including public access and recreation policies, as well as adaptive management activities, which are to be submitted to the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS) for approval. These policies are intended to define recreational uses within the reserve in a manner compatible with CSS protection and management and to provide for management and monitoring of such uses for habitat protection purposes. Adaptive management activities include but are not limited to:

- Monitoring "Target Species" and related habitat conditions
- Monitoring non-Coastal Sage Scrub (CSS) and non- "Target Species" conditions
- Habitat enhancement, restoration, and re-creation activities
- Other management activities that support NCCP/HCP policies and objectives (e.g. cowbird trapping, Pacific pocket mouse research and recovery, and pest/invasive species controls)
- Inventorying for non- "Target Species"
- Fire management activities consistent with the NCCP/HCP and fire management plans

An annual report is prepared by the reserve owners/managers that include monitoring results, activities undertaken to minimize adverse impacts to biological resources resulting from recreational use and recommended or planned management programs in response to changing circumstances/conditions. The ultimate goal is to balance natural resource protection with appropriate public access.

This RMP has been prepared for PCRP in order to provide existing baseline conditions and outline goals and strategies to achieve natural resource protection in balance with appropriate public access. The information gathered and developed through research in preparation of this document will serve as a guideline for future decision-making regarding public access and recreation, public outreach and education, fire management, exotic/invasive pest and plant control, trail design, biological monitoring, mitigation and restoration, park maintenance, and other management purposes at PCRP.

1.1 SITE LOCATION

PCRP, a County of Orange regional park managed by OC Parks, is located within the cities of Orange and Tustin and unincorporated portions of Orange County, California (Figure 1-1, *Regional Vicinity*). Specifically, the park is located within Section 36 of Township 4 South, Range 9 West; Section 31 of Township 4 South, Range 8 West; Section 6 of Township 5 South, Range 8 West; and Section 1 of Township 5 South, Range 9 West, of the U.S. Geological Survey (USGS) Orange, California 7.5-minute topographic quadrangle map (Figure 1-2, *Site Vicinity*).

PCRP (Figure 1-3, *Peters Canyon Regional Park*) is bounded by Skylark Place and Canyon View Avenue to the north (City of Orange); Cowan Heights residential development to the west (unincorporated community of North Tustin); a residential development and Jamboree Road to the east (City of Tustin); and Peters Canyon Road and a residential development to the south (City of Tustin).

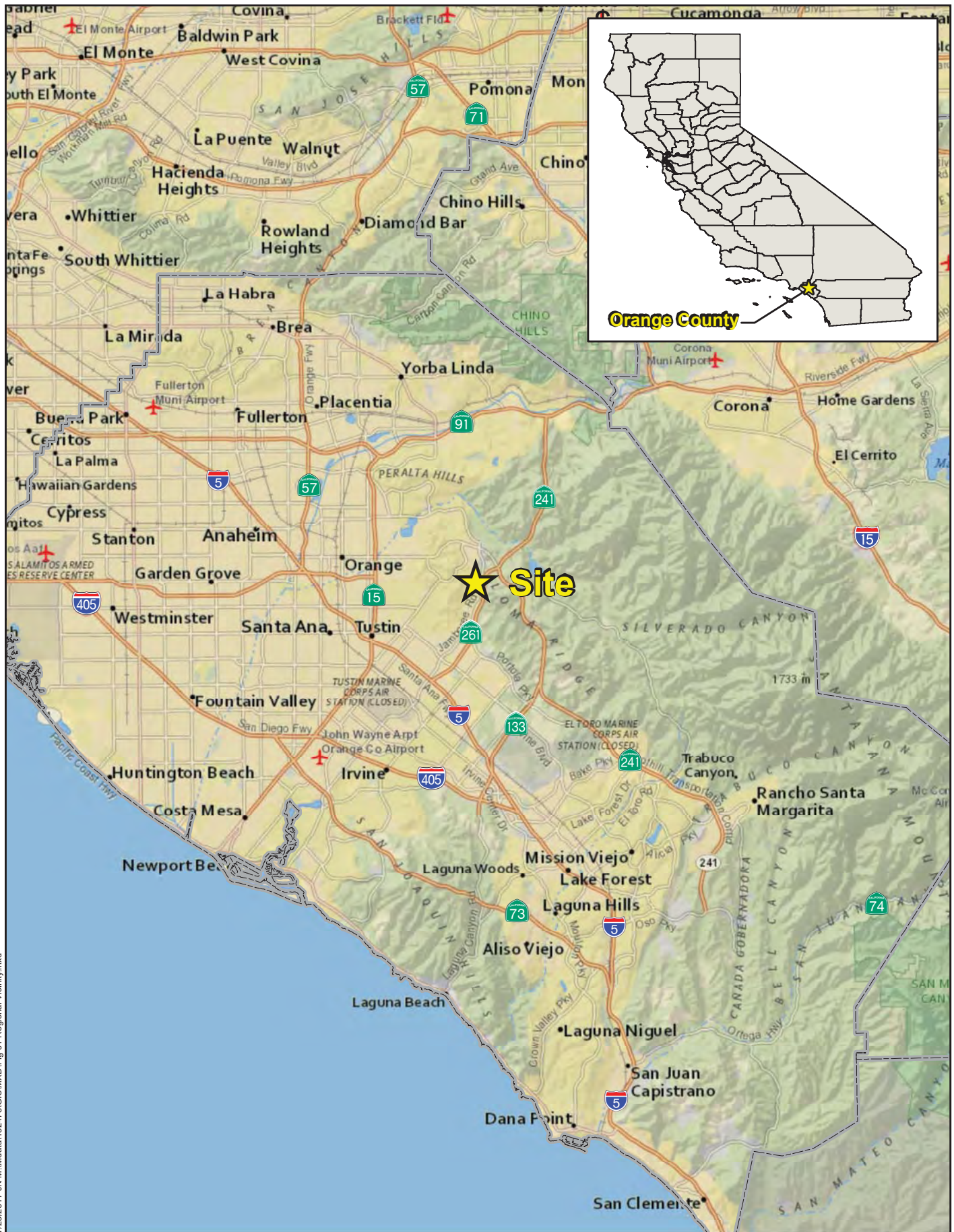
1.2 RESOURCE MANAGEMENT PLAN ORGANIZATION

With a mission of providing PCRP visitors with wilderness-type recreational and educational opportunities while protecting, restoring and enhancing the park's natural resources, specific park management plans with associated goals and strategies have been developed. The goals will help direct future park activities for each park management plan, while the strategies will assist park staff and volunteers with commencing and implementing management to achieve each goal. With existing baseline conditions identified, resource management strategies will also identify opportunities for habitat enhancement and recreation, while maintaining balance between public access and resource protection.

Park Management Plans

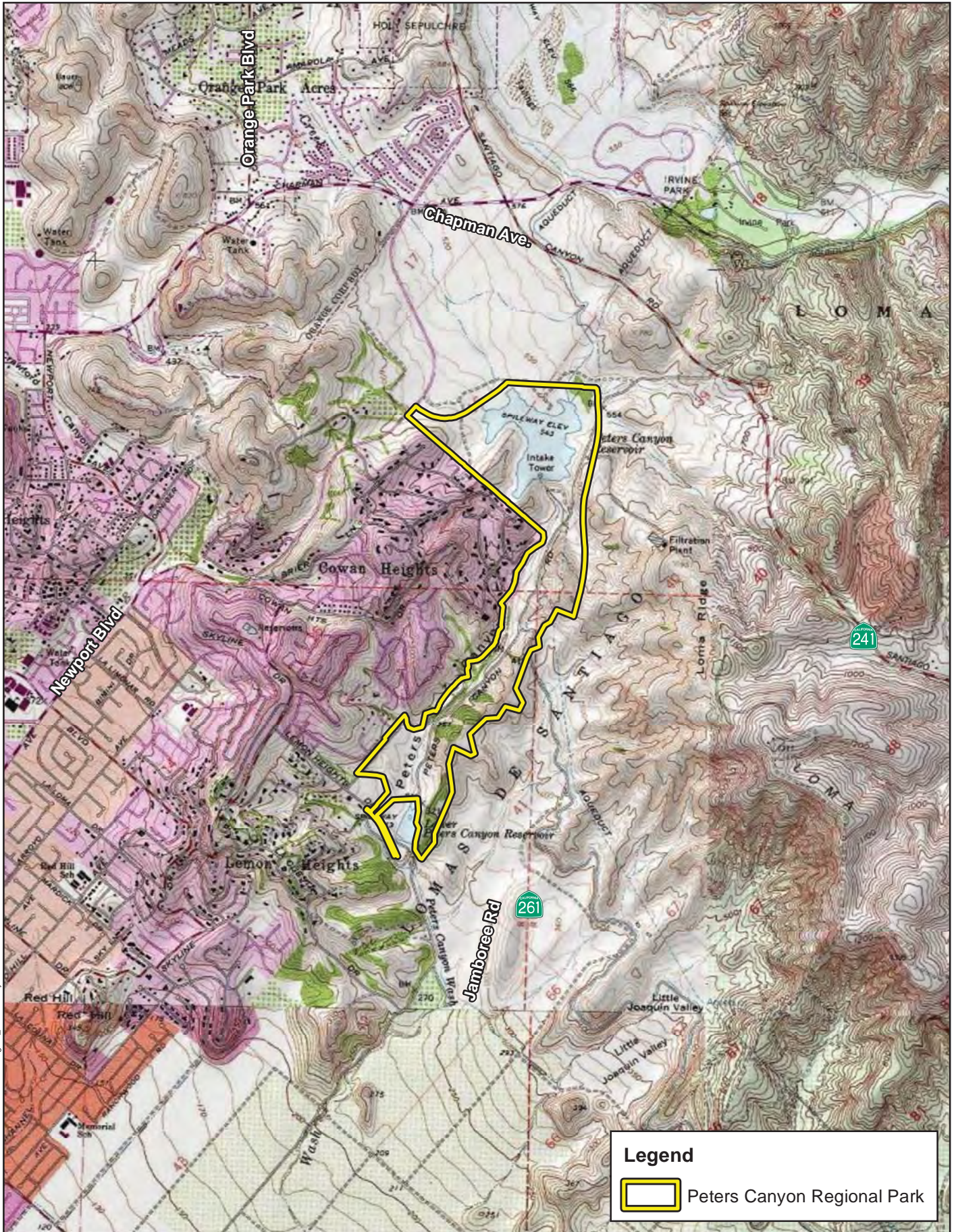
Goals and strategies were developed for seven management plans. These plans are organized within the RMP as follows:

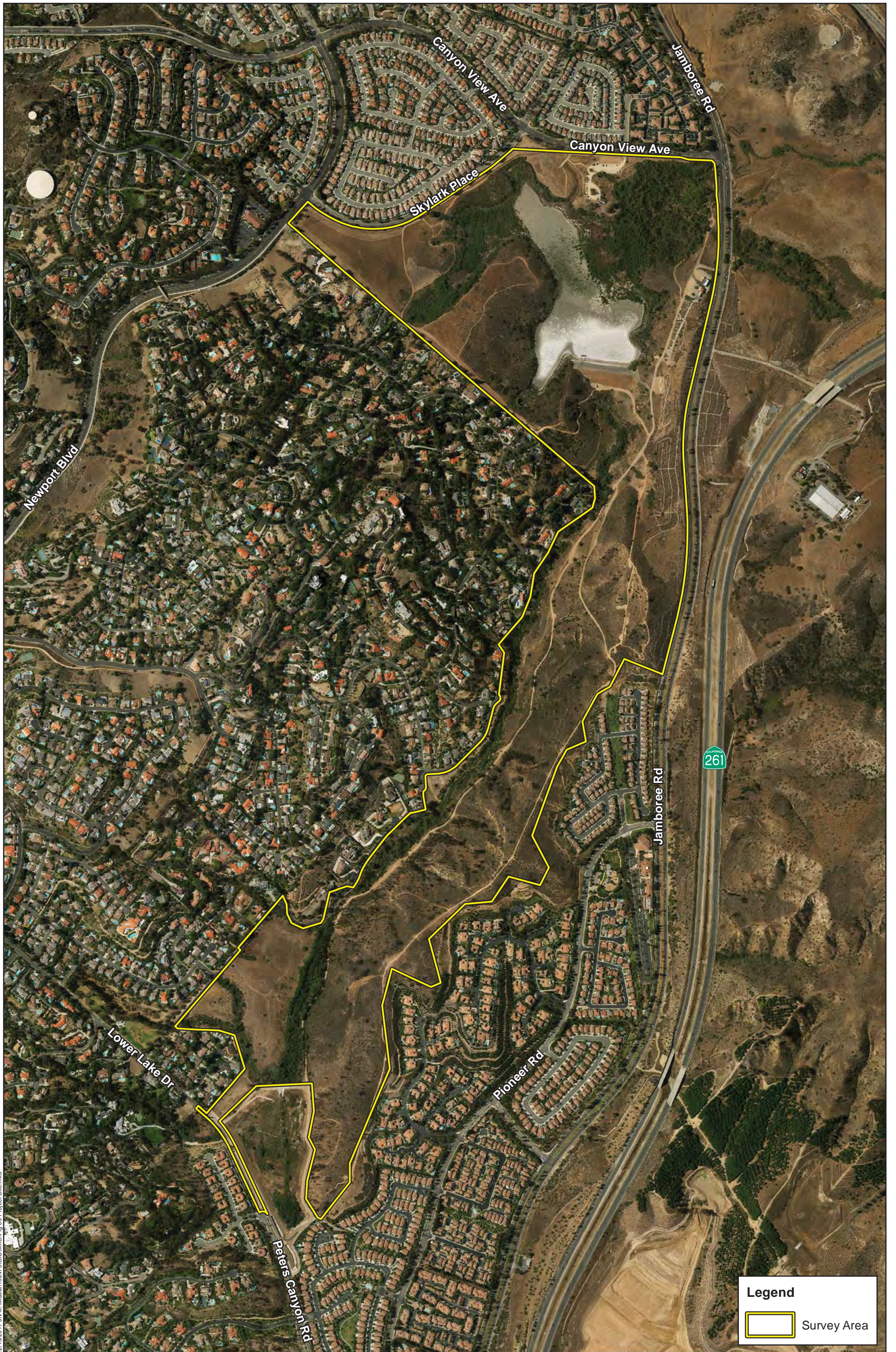
- Section 2: Public Access and Recreation Management (PAR)
- Section 3: Reservoir Management (R)
- Section 4: Cultural Resource Management (CR)
- Section 5: Biological Resource Management (BR)
- Section 6: Fire Management (F)
- Section 7: Park Operation and Management (POM)
- Section 8: Public Outreach and Volunteer Management (POV)



7/25/2017 J:\M:\data\152478\GIS\MXD\Fig 01 Regional Vicinity.mxd

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Each Management Plan has proposed Goals and Strategies connected to the individual plan. These goals and strategies can be used by park staff to commence resource management projects as well as a point of departure to create new strategies based on adaptive management and lessons learned.

1.3 NATURAL COMMUNITY CONSERVATION PLANNING ACT

The Natural Communities Conservation Planning act (NCCP) is an innovative State of California effort to allow compatible land use and development while protecting and managing habitat which supports a wide variety of plant and animal populations. The NCCP act was enacted into law by California Legislature in 1991 and was made possible due to amendments of the Federal Endangered Species Act. It is intended the NCCP program will protect and enhance habitats and associated species through long-term land use planning and management programs.

The Southern California Sage Scrub (CSS) NCCP Program is the first effort to be undertaken pursuant to the NCCP Act. It is a pilot project and may serve as a model for other efforts elsewhere in the State. The CSS NCCP Program is made up of eleven subregions covering 6,000 square miles in a five-county area. The Central and Coastal Subregion is one of the eleven subregions and encompasses 208,000 acres of developed, agricultural, and undeveloped lands, an area encompassing about two-fifths of the County of Orange. Within the Central and Coastal Subregion are 104,000 acres of natural biotic communities, including 34,392 acres of Coastal Sage Scrub.

Nine County of Orange parks, including Peters Canyon Regional Park, are part of the 38,000-acre Habitat Reserve System.

1.4 HABITAT CONSERVATION PLAN

An important requirement of NCCP is the preparation of a Habitat Conservation Plan (HCP). Specific components of the HCP include:

- Protecting multiple species and multiple habitats within the CSS habitat mosaic by creating a habitat reserve system containing substantial coastal sage scrub, chaparral, grassland, riparian, oak woodland, cliff and rock, forest, and other habitats;
- Creating a program that focuses on the conservation of many species and a wide variety of habitats on a subregional level, rather than focusing on project-by-project, single species protection;
- Ensuring protection of identified species and habitats for social and economic uses within the Subregion;

- Protecting the federally-listed coastal California gnatcatcher in a manner consistent with Section 10(a) of the Federal Endangered Species Act and the Special 4(d) Rule for the gnatcatcher while providing for future incidental take of the species;

The NCCP/HCP guidelines include the selection of three “target” species used as surrogates for planning purposes in the Coastal Sage Scrub habitat, home to over 50 potentially threatened or endangered species. The species selected are:

- Coastal California gnatcatcher (*Polioptila californica californica*)
- Cactus wren (*Campylorhynchus brunneicapillus*)
- Belding’s orangethroat whiptail (*Aspidoscelis hyperythra beldingi*)

The three NCCP target species are meant to serve as the basis for protecting the coastal sage scrub community through conservation planning. Providing long-term protection of habitat used by these three species also provides benefit to a much wider variety of coastal sage scrub-related species as well as protecting coastal sage scrub habitat. An adaptive management approach is applied to this comprehensive habitat management program, which means the management actions within the reserve will be monitored closely and modified (adapted) over time to respond to new scientific information, changing conditions, and habitat needs.

1.5 THE NATURAL COMMUNITIES COALITION

The creation of the Natural Communities Coalition (NCC, formerly known as the Nature Reserve of Orange County) is one of the key components of the NCCP/HCP. The Coalition coordinates land management, monitoring and research with NCCP partners across over 18,800 acres of coastal sage scrub, 7,300 acres of chaparral, 6,100 acres of grassland, 1,800 acres of riparian, 950 acres of woodland, 200 acres of forest, and significant portions of six other habitats in the subregion. Southern Coastal Sage Scrub, the primary habitat type identified for protection in the NCCP, is a naturally fragmented habitat interspersed with a mosaic of non-CSS vegetation communities including chaparral, grasslands, and oak woodlands. Inclusion of significant portions of these non-CSS habitats and their resident species within the permanent reserve system increases the biodiversity value and results in a multiple-species, multiple habitat reserve.

The reserve is owned and managed by public agencies and administered by a Non-Profit Management Corporation (NCC) consisting of representatives of each of the following:

- Each local Government owning land in the reserve
- Southern California Water District
- Irvine Ranch Water District
- Southern California Edison

- Metropolitan Water District
- Transportation Corridor Agency
- California Department of Parks and Recreation
- California Department of Fish and Wildlife
- United States Fish and Wildlife Service
- Regents of the University of California
- The Irvine Company (TIC)
- Each non-profit entity owning land within the Reserve
- Three public representatives appointed by the Board of Directors
- Non-voting ex-officio member representing the California Department of Forestry
- Non-voting ex-officio member representing the Orange County Fire Authority

1.6 RESOURCE MANAGEMENT PLAN

As required by the County NCCP/HCP, implementation of NCCP/HCP adaptive management programs and policies will be defined in an RMP for each County park within the habitat reserve system. The RMP elements will include policies for managing and monitoring the Reserve system, research, habitat restoration, habitat enhancement, fire management, public access, public recreation, infrastructure, and existing uses. The RMP will be submitted for review and/or approval to the following:

- California Department of Fish and Wildlife
- U.S. Fish and Wildlife Service
- Natural Communities Coalition
- Irvine Ranch Conservancy
- United States Army Corps of Engineers

1.7 RELATIONSHIP TO OTHER PLANS

The RMP incorporates the *Biological Resources Assessment*, *Jurisdictional Delineation*, *Cultural Resources Report*, and the *Paleontological Resources Report*. These findings can be found in Appendices A, B, C, and D of the RMP. These reports assisted in developing mitigation, monitoring, restoration, and maintenance recommendations for the park, as well as the ultimate goals of the RMP. The RMP also incorporates the General Development Plan (GDP) for Peters Canyon Regional Park, the Santiago Hills Phase II Planned Community and East Orange Planned Community Runoff Management Plan, and the San Diego Creek Watershed SAMP/WSAA.

In addition to preparing the RMP, Michael Baker also prepared the GDP for PCR. The GDP examines the physical, natural, and cultural conditions of the park and its surrounding areas and provides a master plan that addresses current and future park programming

needs, including parking, trail access, regional connectivity, and long-term management plans for ecological and hydrological sustainability within the park. The GDP focuses mainly on improving and expanding upon current trails and trail conditions and improving current facilities within the park.

The RMP incorporates the NCCP/HCP. The County Central and Coastal NCCP/HCP is a comprehensive, multi-jurisdictional habitat conservation plan focusing on conservation of species and their associated habitats in Orange County. The County NCCP/HCP focuses on protection of coastal sage scrub habitat and three designated “Target Species:” the coastal California gnatcatcher, coastal cactus wren, and orangethroat whiptail. The reserve area was created to meet the ecological requirements of these three (3) species and thirty-six (36) other “Identified Species,” with the understanding that the three-target species would serve as “surrogates” for the broader suite of organisms that depend upon coastal sage scrub for their continued survival in the NCCP/HCP planning area. The Implementation Agreement (IA) satisfies the State and Federal mitigation requirements for designated development and adequately provides for the conservation and protection of 39 species and their habitats identified in the NCCP/HCP.

Specifically, PCRP is located within the Central Subarea of the County NCCP/HCP and is subject to the requirements and provisions set forth in the County NCCP/HCP Implementation Agreement, which specifies that populations of the target species shall be subject to long-term monitoring and that these taxa shall be treated as if they were listed under CESA/FESA. Refer to Appendix A, *Documentation*, for NCCP-covered species known to or having potential to occur within the survey area and surrounding vicinity.

The RMP incorporates hydrologic data gathered from the Santiago Hills Phase II Runoff Management Plan.

There are no other local policies or ordinances within the Cities of Orange and Tustin or County of Orange known to be applicable to PCRP.

The RMP may also be referred to within future mitigation and monitoring plans, biological studies, restoration plans, or any other cultural or archaeological studies performed within the park.

Section 2 Public Access and Recreation Management (PAR)

Peters Canyon Regional Park is accessible to the public daily from 7:00 AM to sunset. The park is open to hikers, mountain bicyclists, and equestrians. There are two main vehicular access points to enter the park: 1) entering from Canyon View Avenue into the main parking area at the north end of the park, and 2) entering from parking along Peters Canyon Road into the park at the cul-de-sac from the south end. The park is almost entirely enclosed by a fence, is not lighted, and after-hours visitation by hikers, equestrians, and bicyclists is not permitted.

2.1 EXISTING PARK ACCESS AND RECREATIONAL USES

The main north vehicular entrance (from Canyon View Avenue) gives the public access to the North Loop Trail, which loops around the reservoir and connects to five other trails in the park. These trails include Lake View Trail, Skylark Trail, Cactus Point Trail, Willow Trail and Peters Canyon Trail (Peters Canyon Regional Riding and Hiking Trail). From the south, visitors enter from parking along Peters Canyon Road and can access Eucalyptus Trail, East Ridge View Trail and Peters Canyon Trail. There is currently a total of ten existing trails within the park that provide public access to park amenities, habitat and natural resources.

In addition, there are several pedestrian points of access located throughout the park. Two pedestrian access points are located along Overhill Drive on the east side of the park, one along the Creek Trail and one along the North Loop Trail. Other pedestrian access points are located at the southern end of the park along Lower Lake Road, at the northeastern end of the park at the intersection of Canyon View Avenue and Jamboree Road, at the northern end of the park at the intersection of Skylark Place and Canyon View Avenue, and at the northwestern end of the park at Newport Boulevard and Skylark Place.

2.1.1 Historic Public Use

Historically, the project site under private ownership was used primarily for farming. In addition to agricultural uses, a portion of the park was used by the U.S. Army as a training facility. It was not until 1992 that this approximately 340 acres of historic Irvine Ranch, now Peters Canyon Regional Park, was donated to the County of Orange, and thus made available for public access and recreation. Please refer to Chapter 4 for a complete discussion of historical/cultural resources.

2.1.2 Recreational Uses

The main recreational amenity in the park has over 7.43 miles of trails. The trails offer a variety of recreational opportunities for hikers, mountain bicyclists, and equestrians of all ages and skill levels. The extensive trail system allows park visitors to access and enjoy most of the park's terrain and habitat types.

Along the trail system, the park offers a diversity of habitat for the visitor to experience including coastal sage scrub, willow woodland, freshwater marsh, grassland, mule fat scrub, and other habitat types. These various habitats support a diversity of resident and migrating bird species, reptiles, mammals, and invertebrates. The 55-acre historic reservoir, when full, is home to many local and migrating waterfowl, presenting optimal bird watching opportunities. Peters Canyon Creek Trail winds hikers through groves of black willows and cottonwoods (Figure 2-1, *On-Site Photos*, and Figure 2-2, *Photo Locations*) and Willow Trail presents visitors an opportunity to experience a willow woodland and its associated species.

2.1.3 Existing Trails

The park trail system provides ample recreational opportunities for visitors; however, it can also impact sensitive wildlife and habitats in the park. Trails may border sensitive habitat types or species and if widened over time, can encroach and negatively impact these habitats/species. Trails can also allow conditions that favor non-native species establishment and invasion of native habitat. To help protect native wildlife and habitat throughout the park, park staff should partner with the Natural Resources and Planning & Design Sections to understand where sensitive species and habitat locations exist and modify the trail system to minimize habitat impacts while allowing quality recreational opportunities.

There are two types of trails within the park:

Type 1 – A multi-use trail with a 10-foot tread width. This trail can be used by service vehicles, equestrians, cyclists, and hikers (actual trail widths may exceed 10-feet if required to provide utility or fire authority access).

Type 2 – A single-track trail with a 4-foot tread width. This trail allows access exclusively to hikers.

There are three main trails providing longer distances throughout the park: Peters Canyon Trail (also known as the Mountains to the Sea Trail), Lake View Trail, and East Ridge View Trail.

Peters Canyon Trail is a multi-use trail, is approximately 2 miles long, starts at the northern end of the park and ends at the southern end of the park, and is composed of Mocho loam,



Photo 1: View of non-native grassland in the northeast portion of Peters Canyon Regional Park



Photo 2: Looking north into UPCR from the Lake View Trail



Photo 3: Looking southeast towards PCW from the Lake View Trail vista point



Photo 4: Looking south from the UPCR dam into PCW



Photo 5: Looking northwest from the UPCR dam into the reservoir (currently dry)



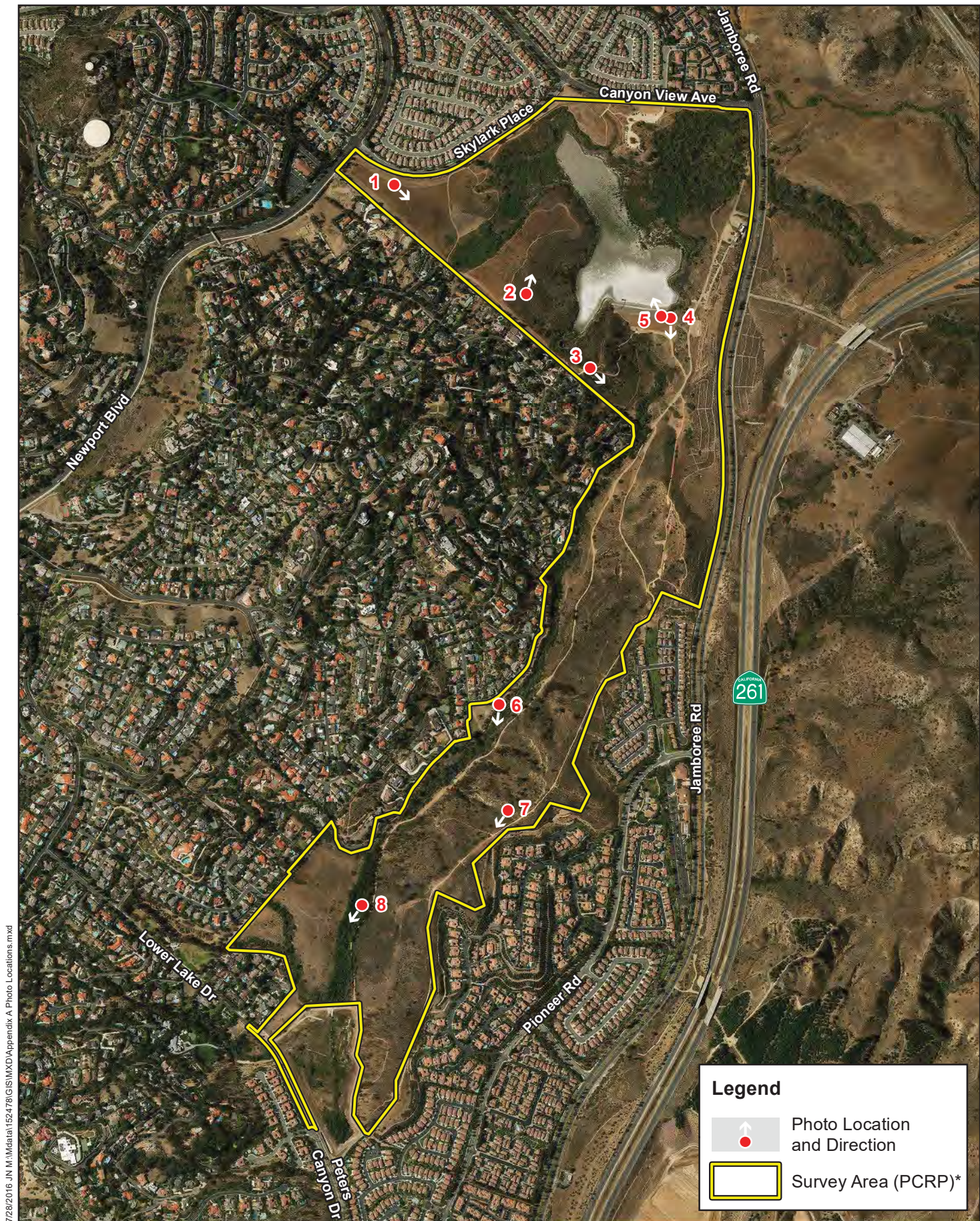
Photo 6: View of coastal sage scrub habitat along PCW, with eucalyptus woodlands in the background



Photo 7: Looking southwest into the non-native eucalyptus woodland from the East Ridge View Trail





Photo 8: Southern cottonwood-willow riparian forest edge within PCW



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Legend

-  Photo Location and Direction
-  Survey Area (PCRP)*

PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN

Alo variant clay, Alo clay, Calleguas clay loam, Cieneba sandy loam, Myford sandy loam, Capistrano sandy loam, Soper cobbly loam, and Riverwash soils. The trail is adjacent to southern cottonwood-willow riparian forest, disturbed non-native habitat, Diegan coastal sage scrub, low-quality Diegan coastal sage scrub, mule fat scrub, non-native grassland, southern willow scrub, and eucalyptus woodland, and ranges in elevation from 320 ft. to 590 ft (Figure 2-4, Peters Canyon Trail).

Lake View Trail is a multi-use trail, is approximately 2 miles long, is located at the northern end of the park around the reservoir, and is composed of Anaheim clay loam, Calleguas Clay loam, Capistrano sandy loam, Myford sandy loam, and Riverwash soils. The trail is adjacent to Diegan coastal sage scrub, mule fat scrub, non-native grassland, low-quality Diegan coastal sage scrub, southern willow scrub, southern cottonwood-willow riparian forest, and disturbed habitat, and ranges in elevation from 500 ft. to 610 ft (Figure 2-5, *Lake View Trail*).

East Ridge View Trail is a multi-use trail, is approximately 1.5 miles long, starts at the northern end of the park and ends at the southern end of the park, and is composed of Calleguas clay loam, Mocho loam, Cieneba sandy loam, Myford sandy loam, Capistrano sandy loam, Alo clay, Alo variant clay, and Soper cobbly loam soils. The trail is adjacent to Diegan coastal sage scrub, low-quality Diegan coastal sage scrub, eucalyptus woodland, and disturbed habitat, and ranges in elevation from 500 ft. to 690 ft (Figure 2-6, *East Ridge View Trail*).

There are seven (7) shorter distance trails within the park: Cactus Point Trail, Creek Trail, Eucalyptus Trail, Gnatcatcher Trail, Scout Trail, Skylark Trail, and the Willow Trail.

Cactus Point Trail is a multi-use trail, is approximately 0.5 miles long, starts and ends at Lake View Trail, and is composed of Anaheim clay loam soil. The trail is adjacent to Diegan coastal sage scrub and low-quality Diegan coastal sage scrub, and ranges in elevation from 555 ft. to 620 ft (Figure 2-7, *Cactus Point Trail*).

Creek Trail is a hiking-only trail, is approximately 0.25 miles long, starts and ends at Peters Canyon Trail, and is composed of Capistrano sandy loam soil. The trail is adjacent to southern willow scrub and Diegan coastal sage scrub, and ranges in elevation from 370 ft. to 415 ft (Figure 2-8, *Creek Trail*).

Eucalyptus Trail is a multi-use trail, is approximately 0.33 miles long, starts at Peters Canyon Trail and ends at East Ridge View Trail, and is composed of Soper cobbly loam soil. The trail is adjacent to eucalyptus woodland, and ranges in elevation from 320 ft. to 430 ft (Figure 2-9, *Eucalyptus Trail*).

Gnatcatcher Trail is a multi-use trail, is approximately 0.2 miles long, starts at Peters Canyon Trail and ends at East Ridge View Trail, and is composed of Calleguas clay loam and Capistrano sandy loam soils. The trail is adjacent to Diegan coastal sage scrub and non-native grassland, and ranges in elevation from 495 ft. to 575 ft (Figure 2-10, *Gnatcatcher Trail*).

Scout Trail is a multi-use trail, approximately 0.25 miles long, starts at Peters Canyon Trail and ends at East Ridge View Trail, and is composed of Soper cobbly loam soil. The trail is adjacent to Diegan coastal sage scrub and low-quality Diegan coastal sage scrub, and ranges in elevation from 380 ft. to 510 ft (Figure 2-11, *Scout Trail*).

Skylark Trail is a multi-use trail, is approximately 0.2 miles long, starts and ends at Lake View Trail, and is composed of Myford sandy loam soil. The trail is adjacent to Diegan coastal sage scrub, non-native grassland, and disturbed vegetation, and ranges in elevation from 550 ft. to 580 ft (Figure 2-12, *Skylark Trail*).

Willow Trail is a hiking-only trail, is approximately 0.2 miles long, starts at Peters Canyon Trail and ends at Lake View Trail, and is composed of Mocho loam soil. The trail is adjacent to southern cottonwood-willow riparian forest vegetation, and ranges in elevation from 540 ft. to 555 ft (Figure 2-13, *Willow Trail*).

2.1.4 Proposed Trails and Realignment

The GDP recommends construction of strategic multi-use trail and trail node additions, as well as realignments of some existing trails. The majority of proposed trails will be soft-surface trails traversing natural areas, consistent with the park's existing trails. Existing and proposed trails at the park are shown in Figure 2-3, *Trails*.

A new Trail, Creek Trail (Segment A) located west of the creek near the south entrance, crossing the creek and joining the southern section of the existing Peters Canyon Trail. This area of the park is not actively used at present and a trail with appropriate fencing, signage and native planting, will allow visitors an opportunity to enter from the southwest side of the park (Figure 2-14, *Creek Trail (Segment A)*).

A new Trail, Overlook Trail, from North Loop Trail to Peters Canyon Trail, will allow park visitors to walk atop the historic dam built in 1931 as part of the irrigation system for citrus orchards on historic Irvine Ranch. From this trail, visitors will have views of the reservoir, associated plants and wildlife, and sweeping views of the foothills to the north (Figure 2-15, *Overlook Trail*).

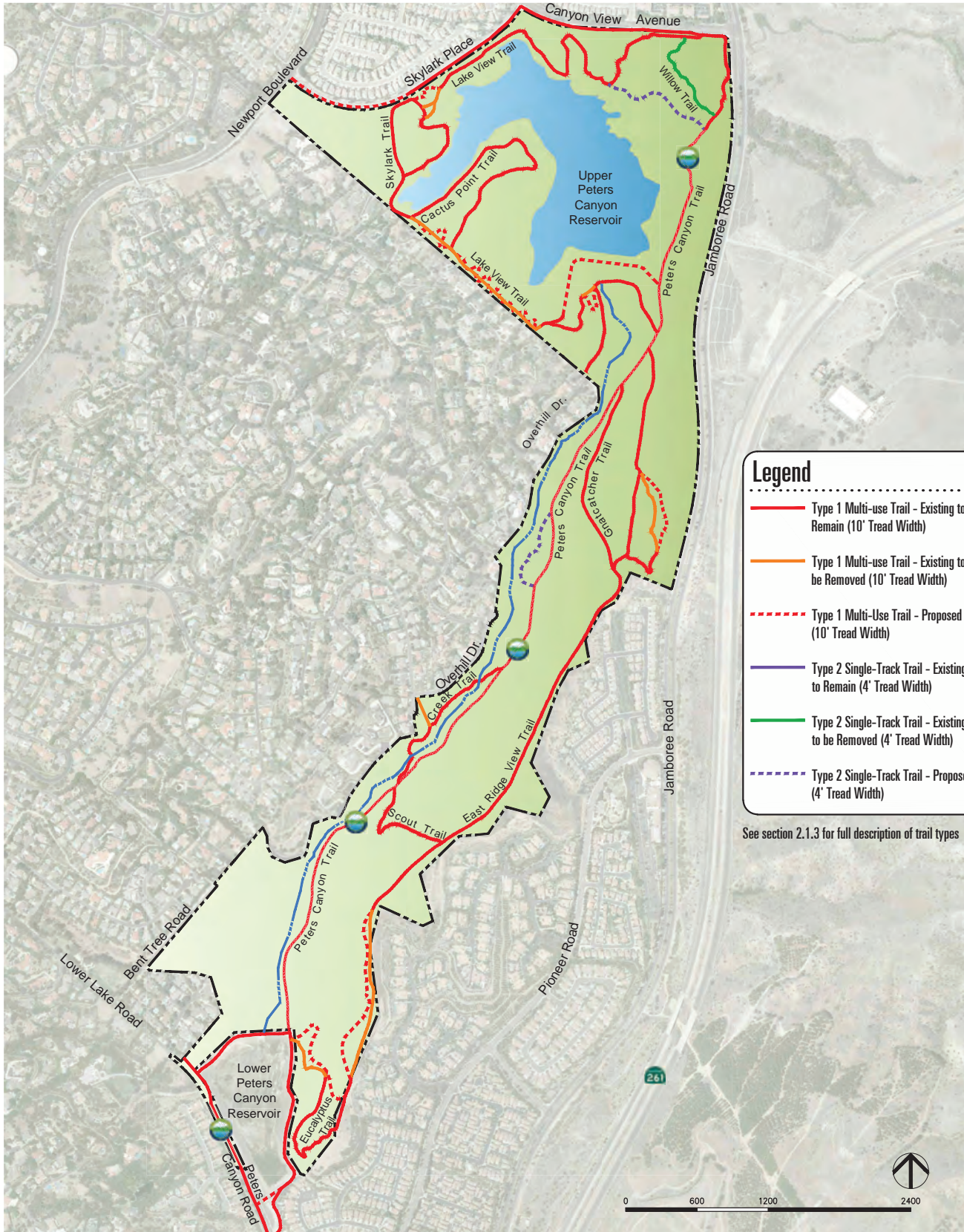
A new Trail, the Eucalyptus Emergency Access Spur, is a trail connecting East Ridge View Trail to Peters Canyon Trail. The trail will branch off East Ridge View Trail just south of

Scout Trail and will travel southwest to connect with Peters Canyon Trail at the northern end of the detention basin (Figure 2-16, *Eucalyptus Emergency Access Spur*).

A proposed Boardwalk, Upper Peters Canyon Boardwalk, over the reservoir will extend from near the end of the Canyon View parking area to North Loop and Cactus Point Trails, crossing the reservoir. This boardwalk will provide visitor access to the reservoir to enjoy the unique habitat and create birdwatching opportunities. Overlook points located along the boardwalk will allow users to stop and enjoy views across the reservoir while observing the natural flora and fauna (Figures 2-17 and 2-18, *Upper Peters Canyon Boardwalk*).

A new trailhead and access point, the Lower Peters Canyon Trailhead, will provide visitors access along the southern end of the park near the lower basin at Peters Canyon Road. This access point will connect to the Peters Canyon Trail (Figure 2-19, *Lower Peters Canyon Trailhead*).

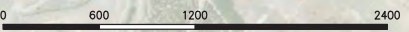
In addition to these new trails, several existing trails have proposed realignments. These trails include the Creek Trail, East Ridge View Trail, North Loop Trail, Willow Trail, and Skylark Trail (Figure 2-20, *Creek Trail (Segment B)*, Figures 2-21 and 2-22, *East Ridge View Trail*, Figures 2-23, 2-24, and 2-25 *North Loop Trail*, Figure 2-26, *Willow Trail*, and Figure 2-27, *Skylark Trail*).

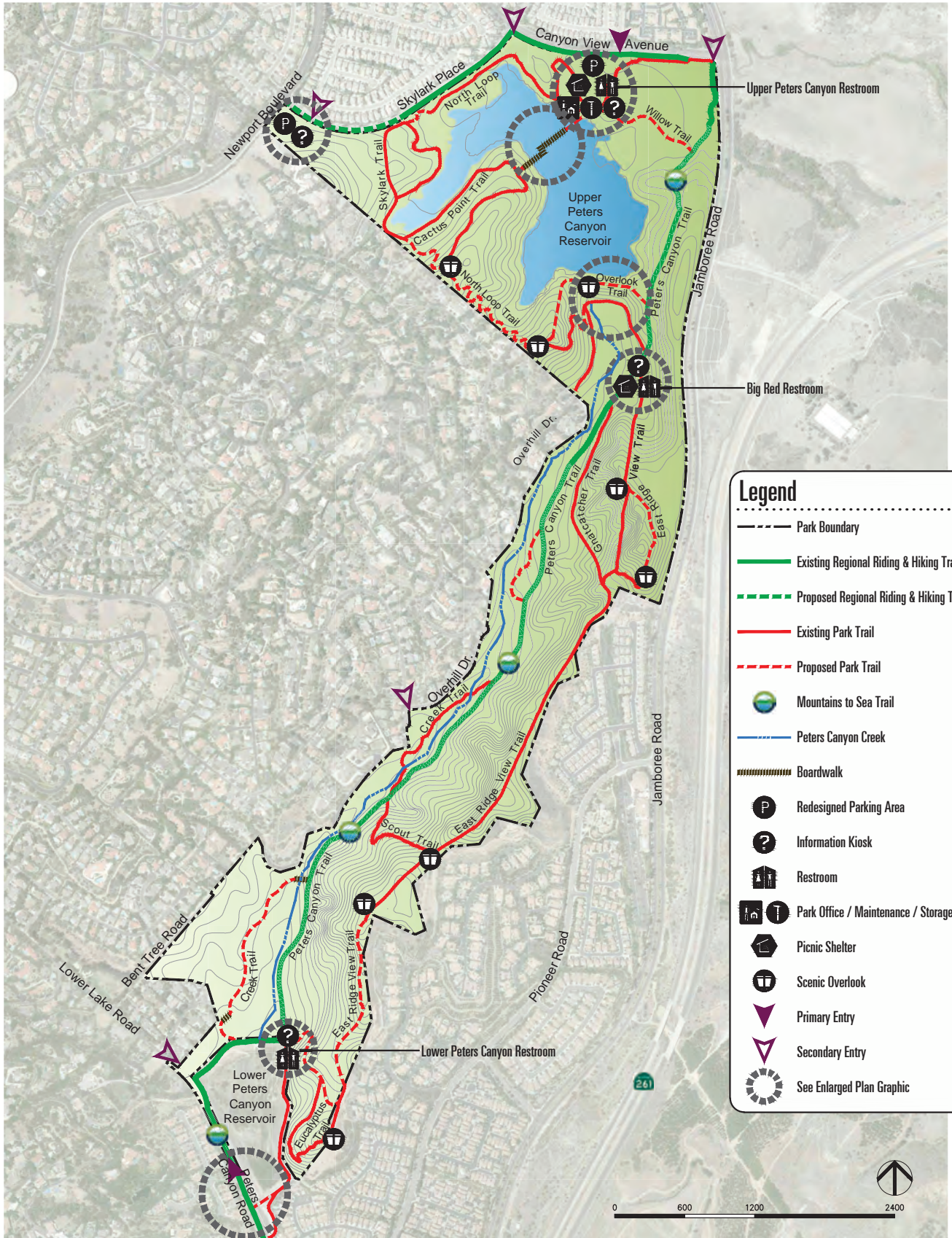


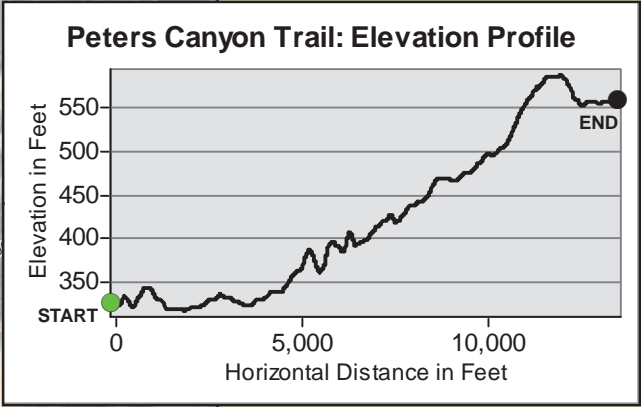
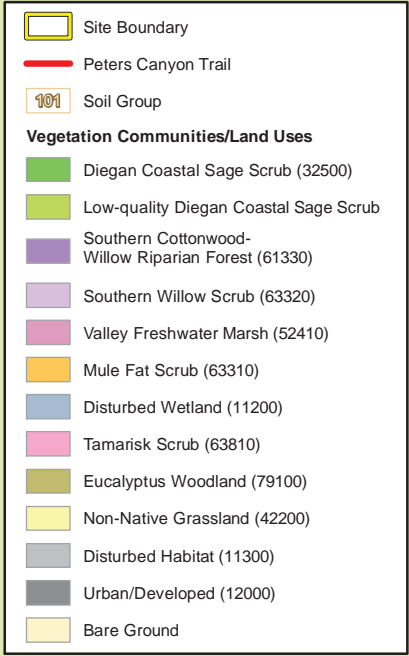
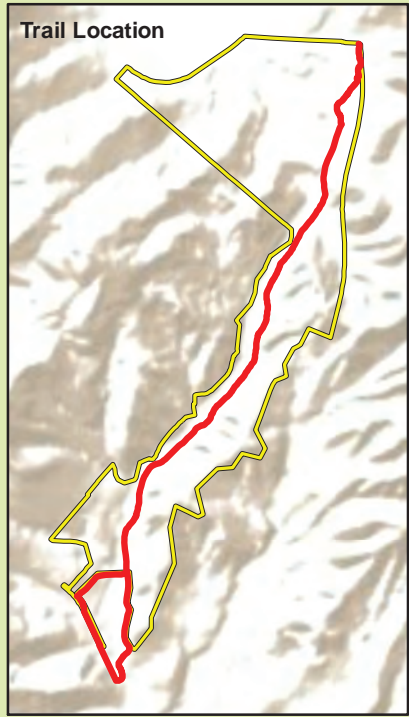
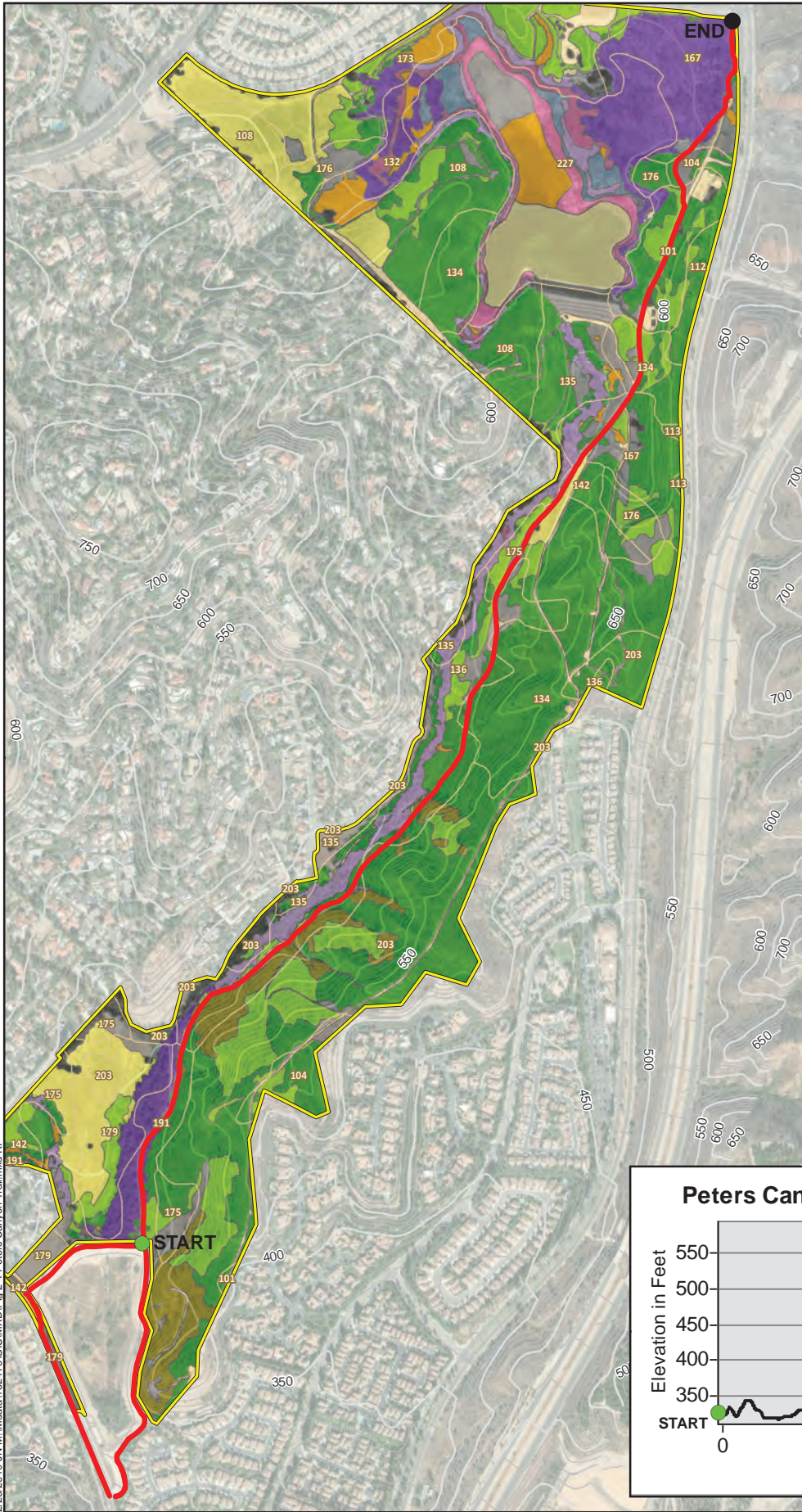
Legend

- Type 1 Multi-use Trail - Existing to Remain (10' Tread Width)
- Type 1 Multi-use Trail - Existing to be Removed (10' Tread Width)
- - - Type 1 Multi-Use Trail - Proposed (10' Tread Width)
- Type 2 Single-Track Trail - Existing to Remain (4' Tread Width)
- Type 2 Single-Track Trail - Existing to be Removed (4' Tread Width)
- - - Type 2 Single-Track Trail - Proposed (4' Tread Width)

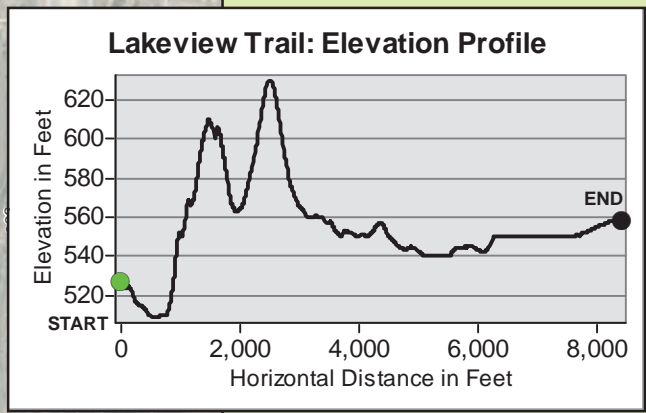
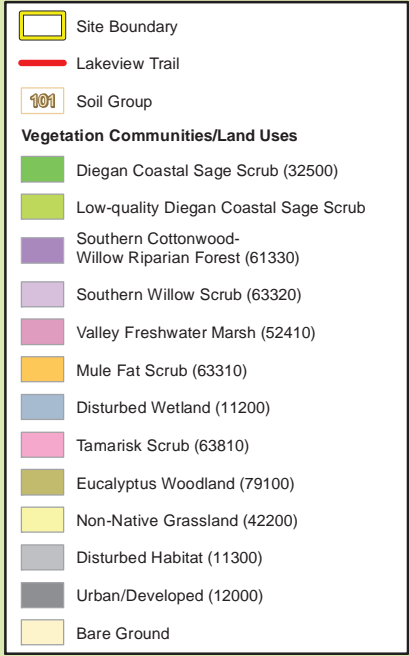
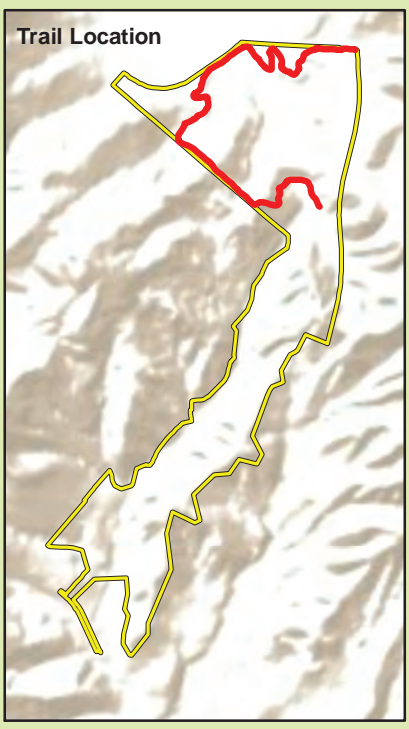
See section 2.1.3 for full description of trail types



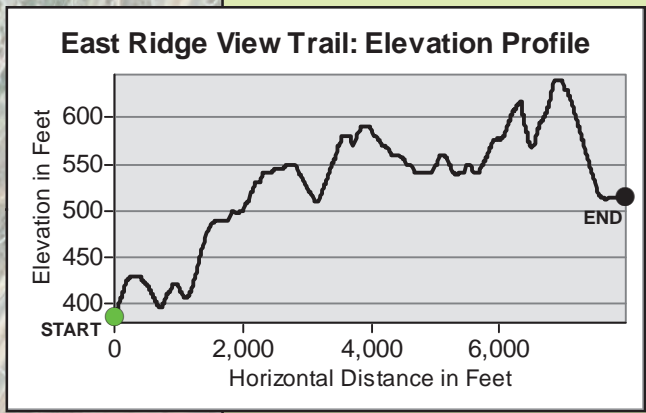
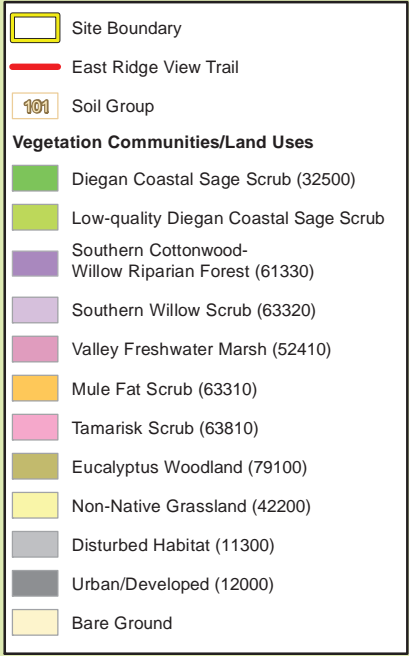
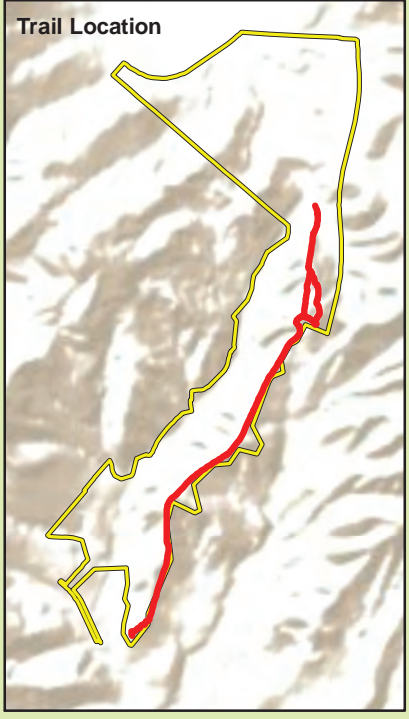
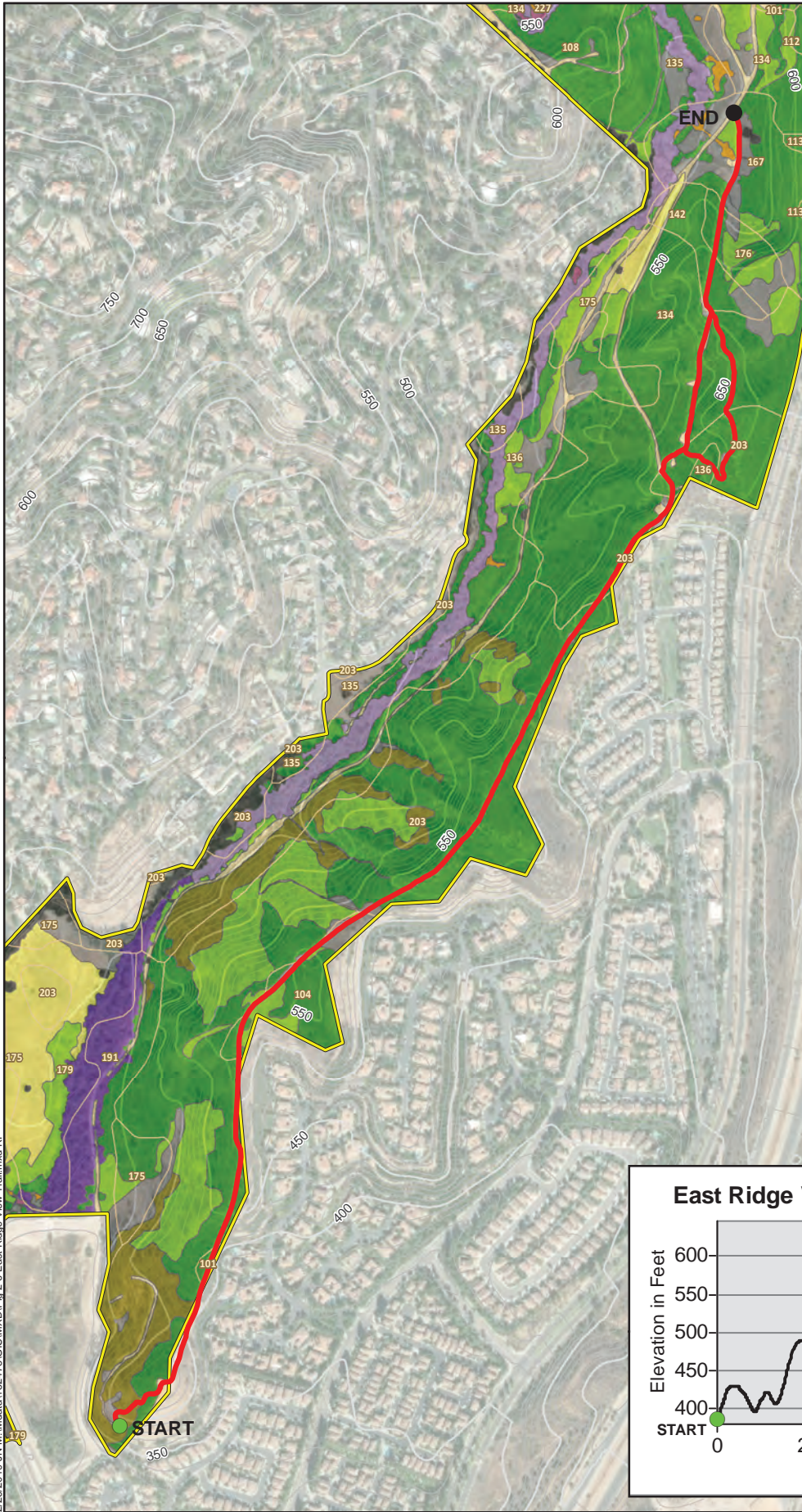




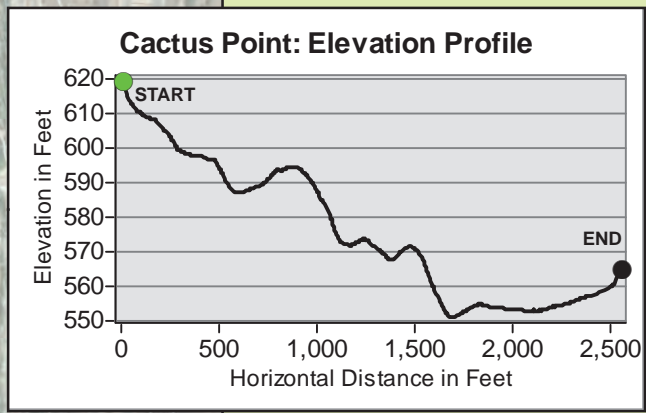
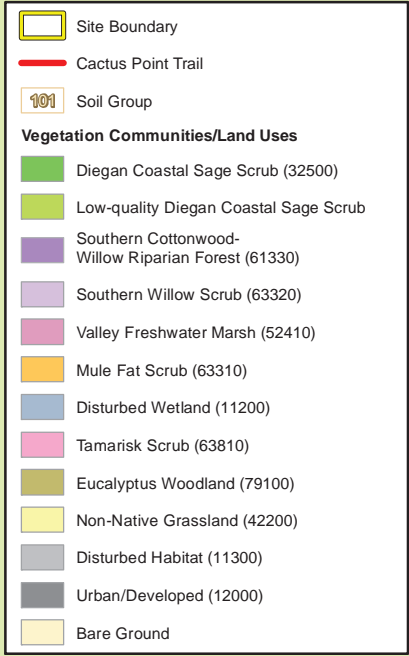
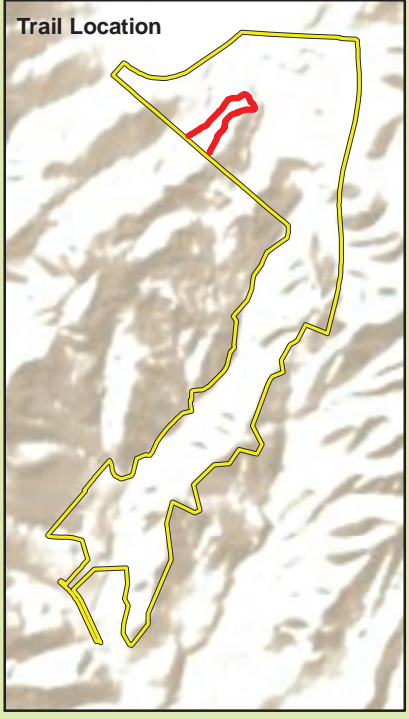
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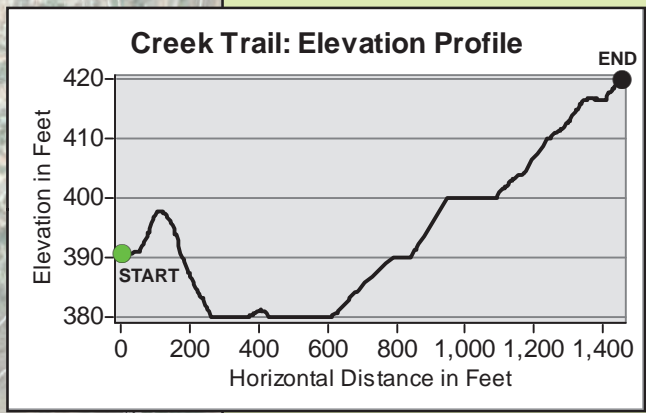
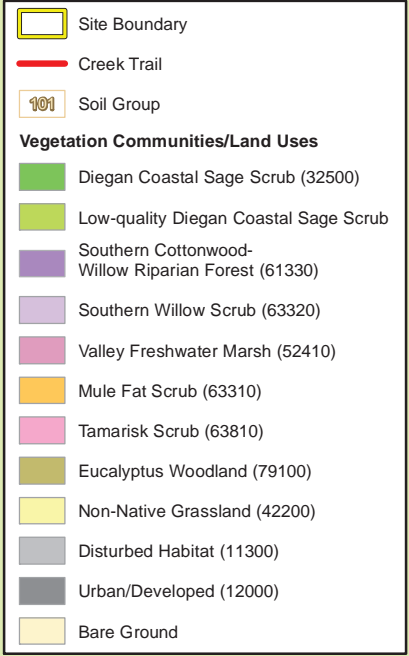
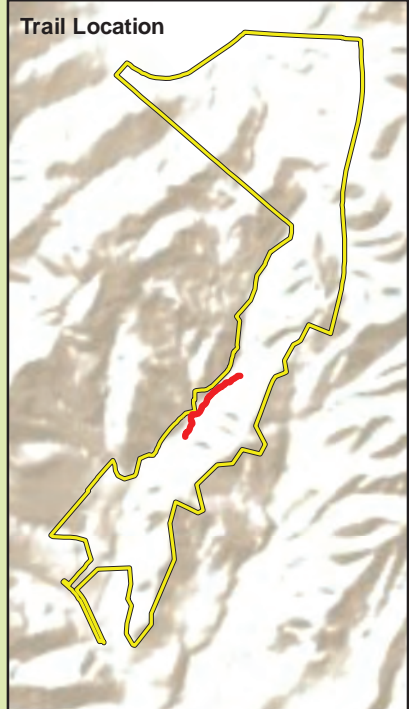
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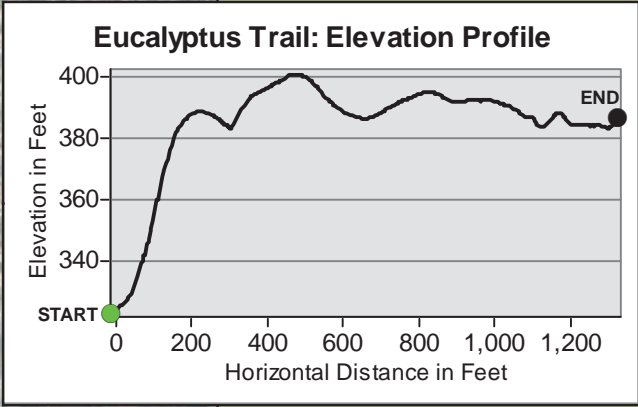
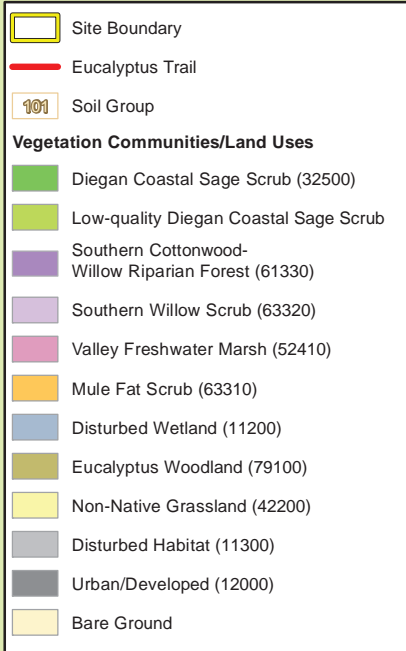
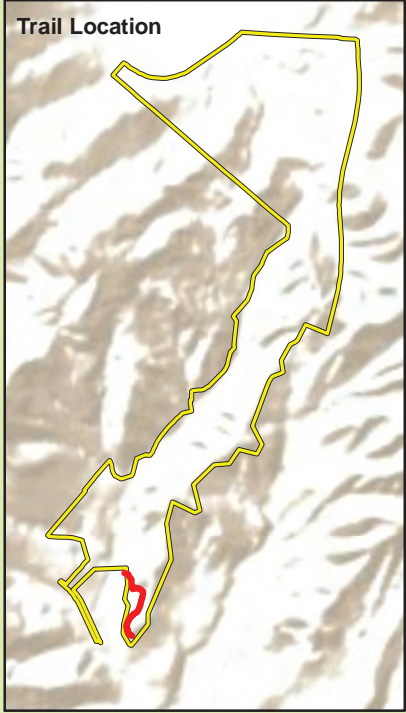
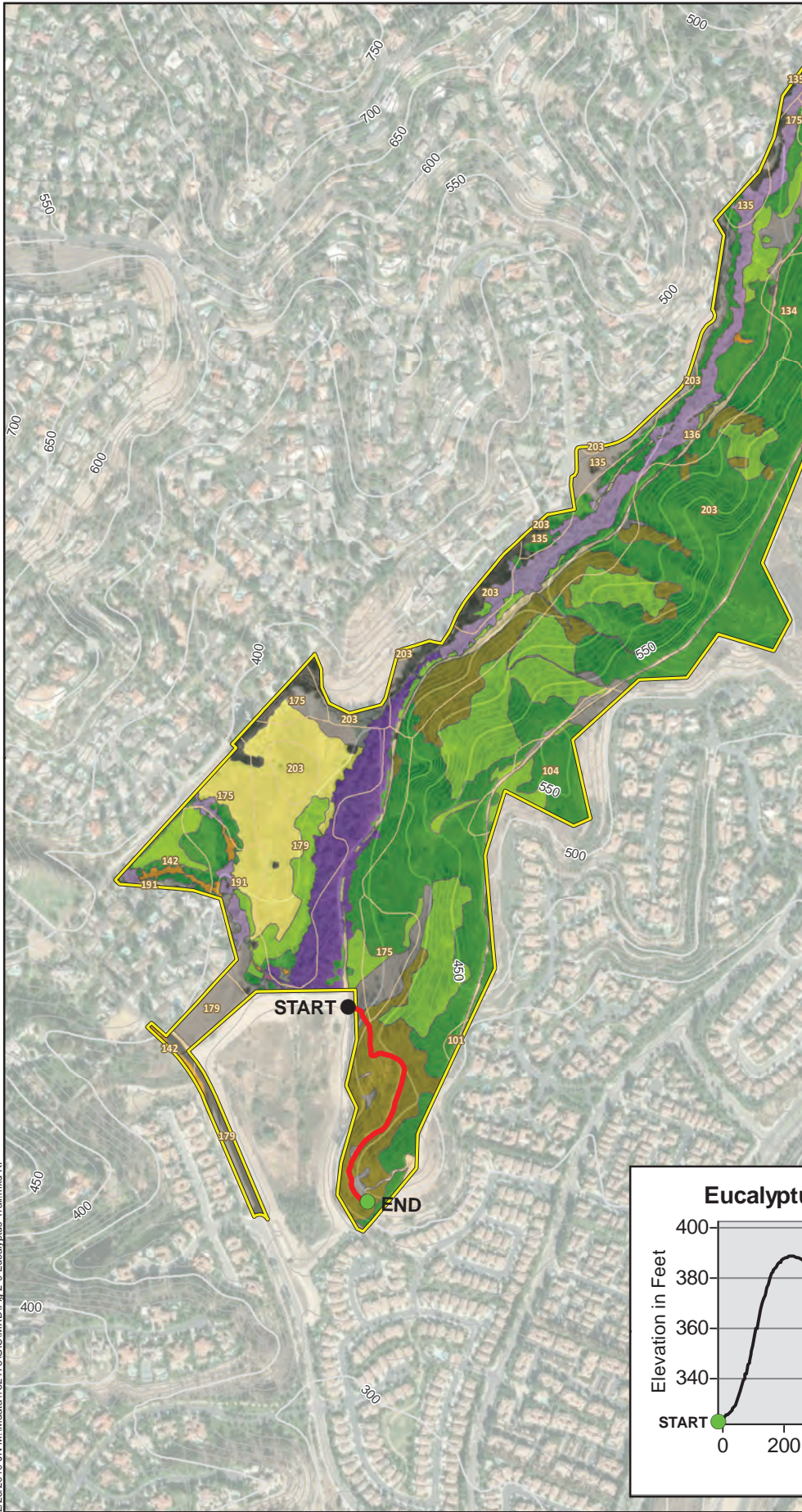
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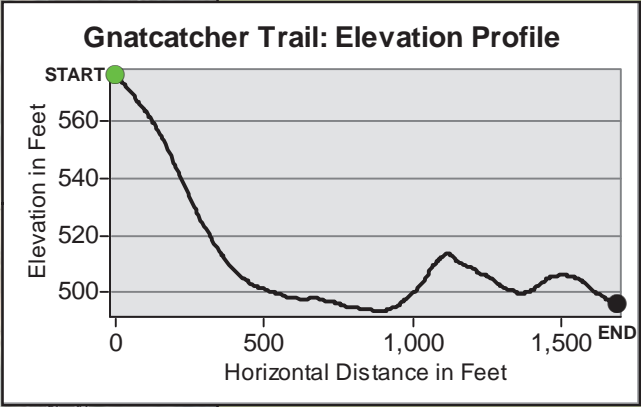
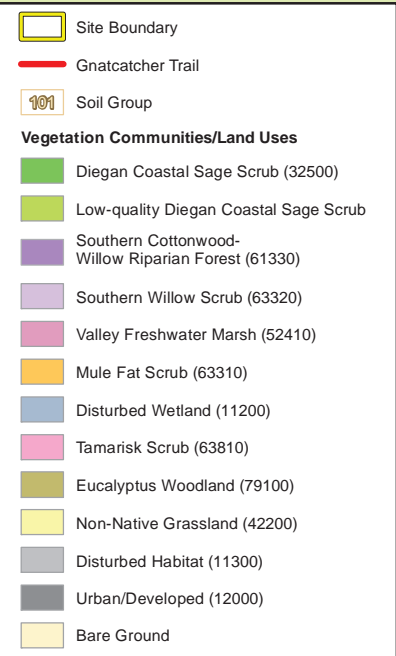
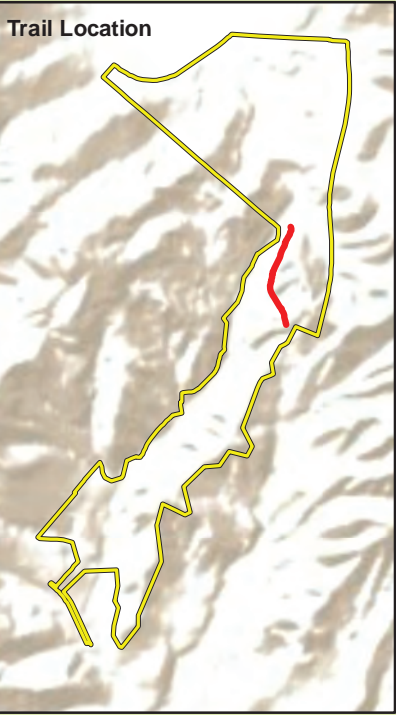
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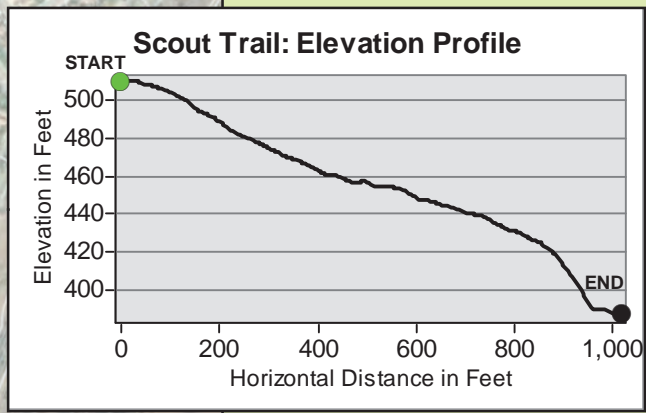
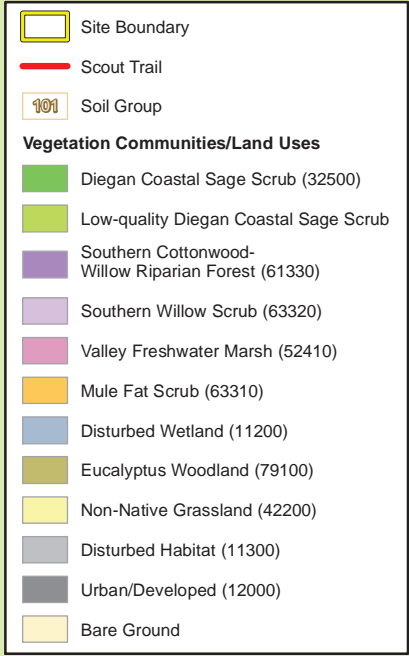
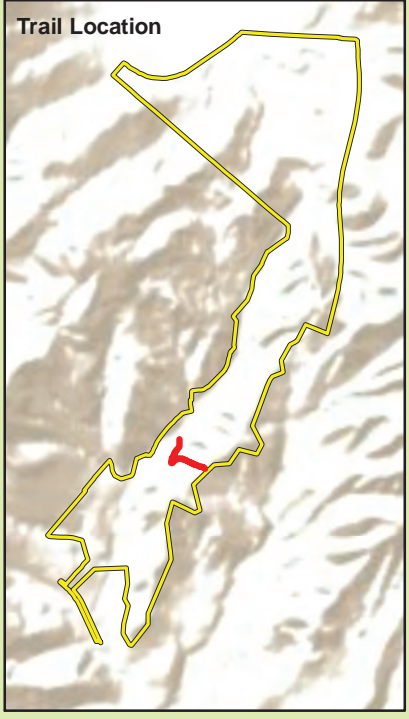
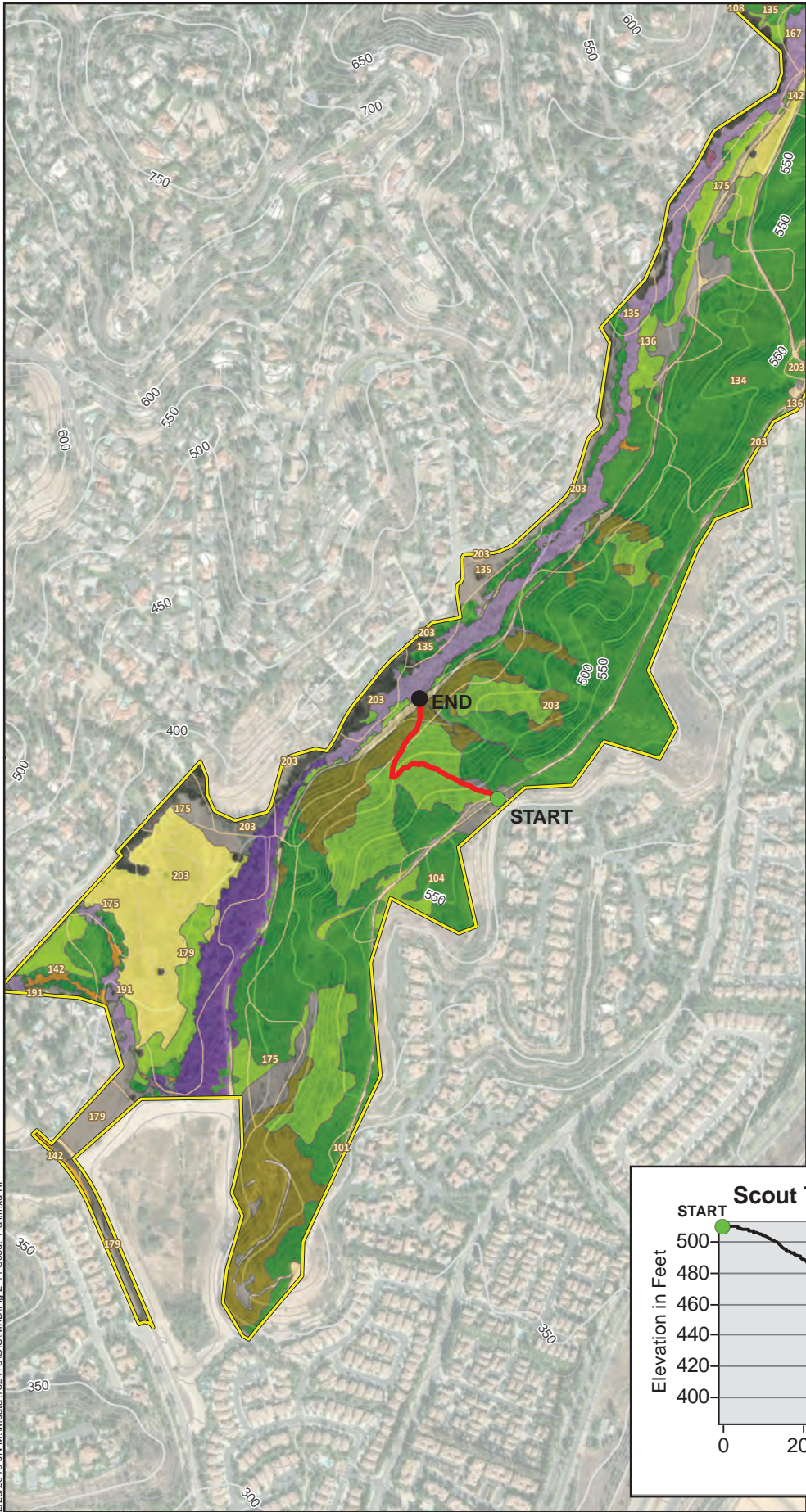
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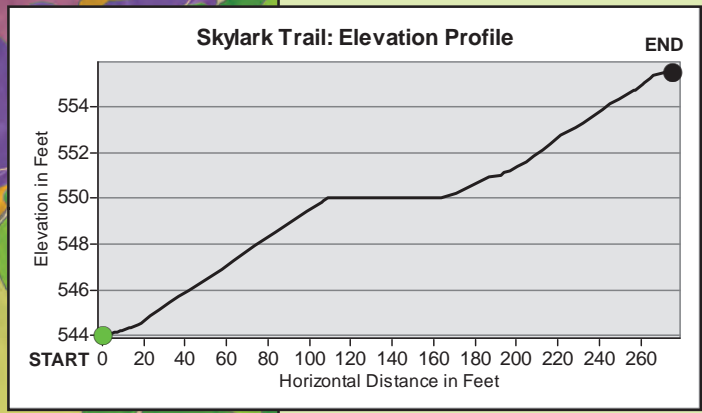
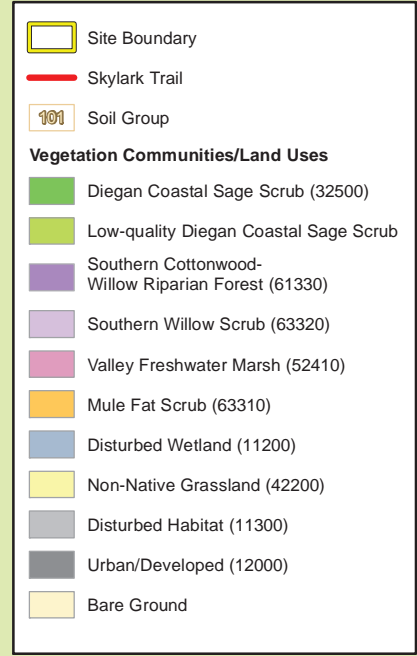
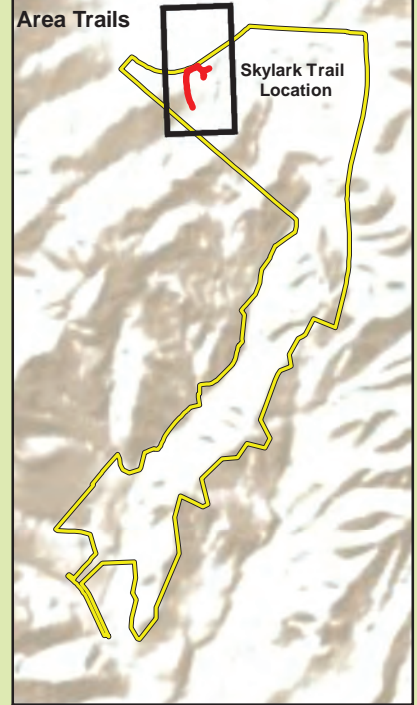
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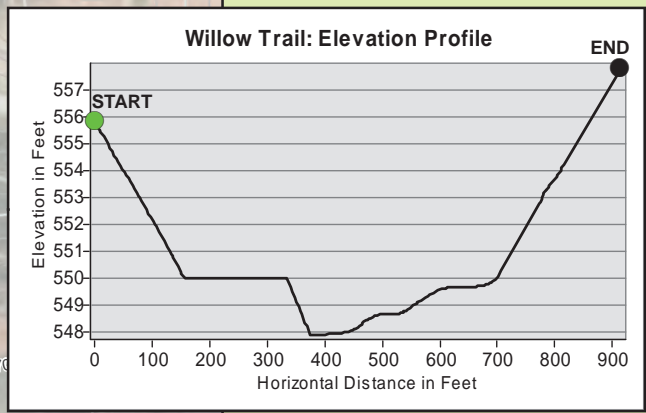
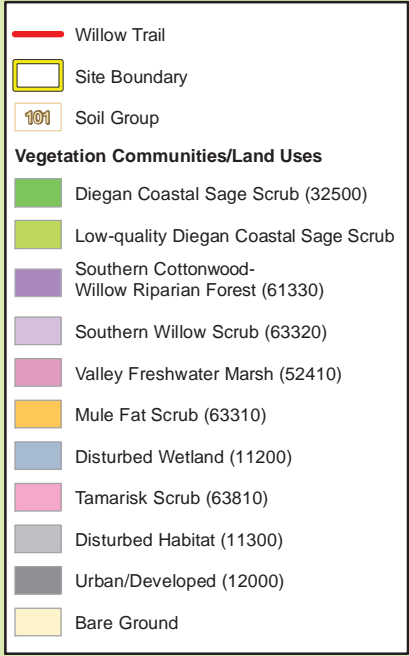
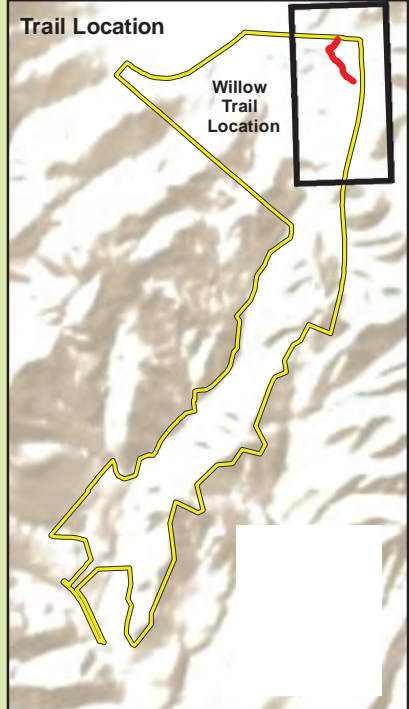
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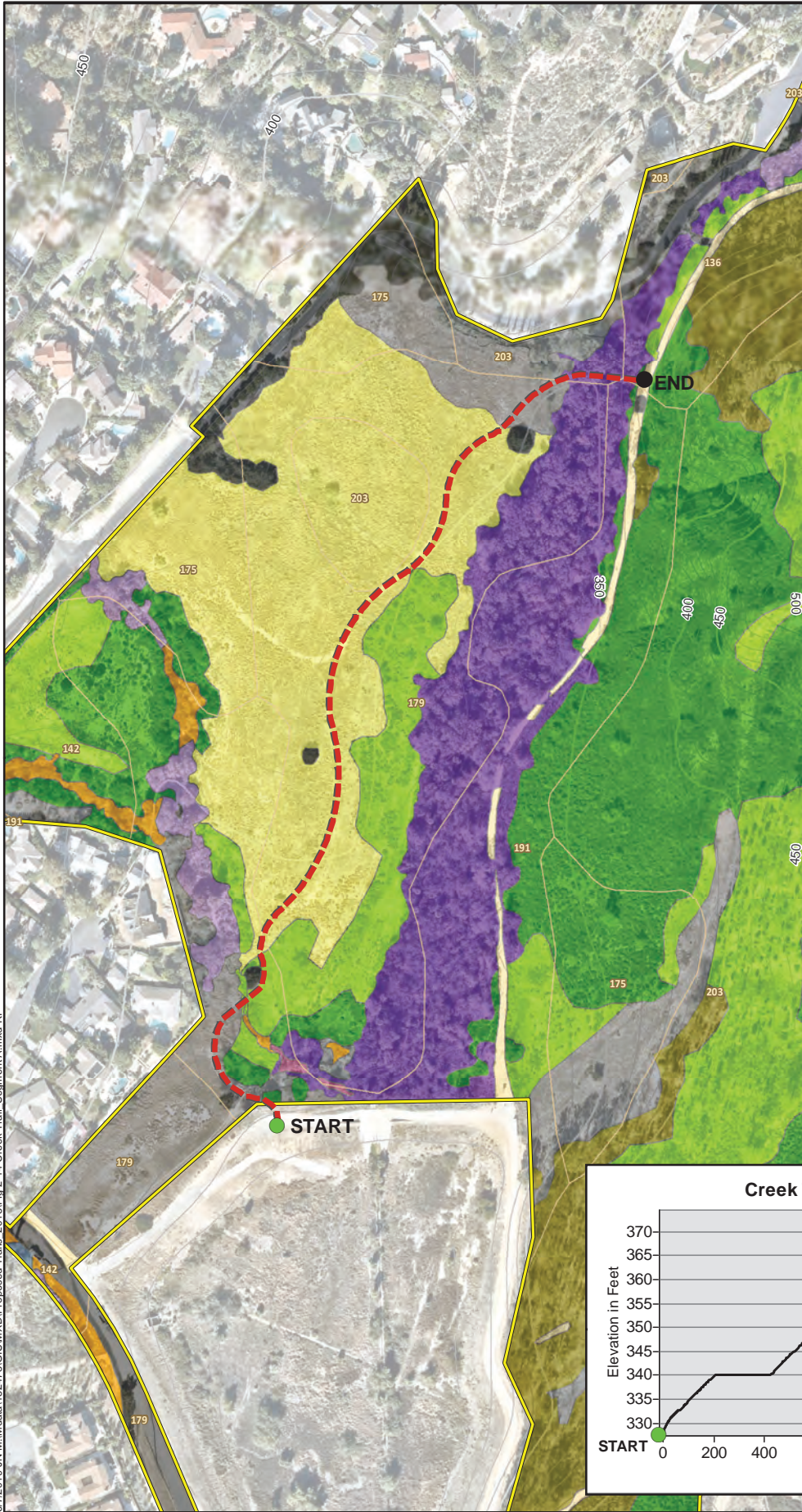
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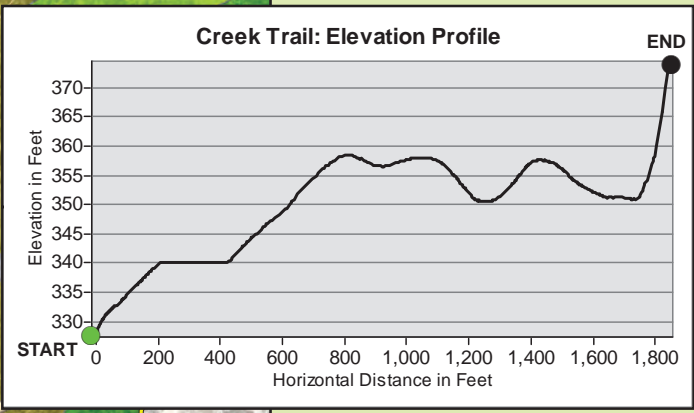
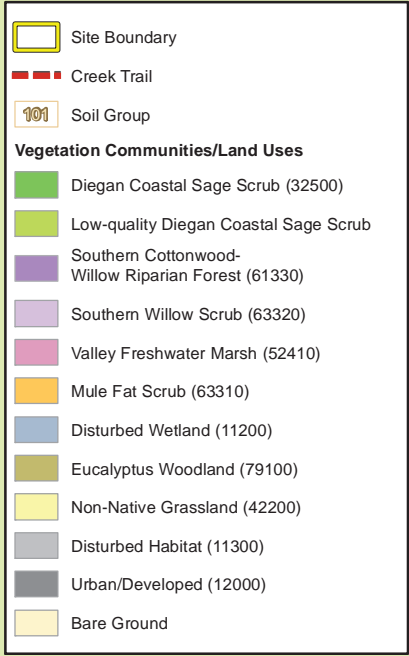
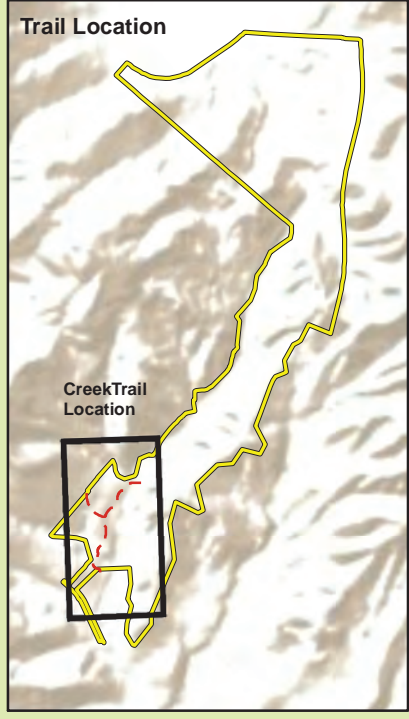
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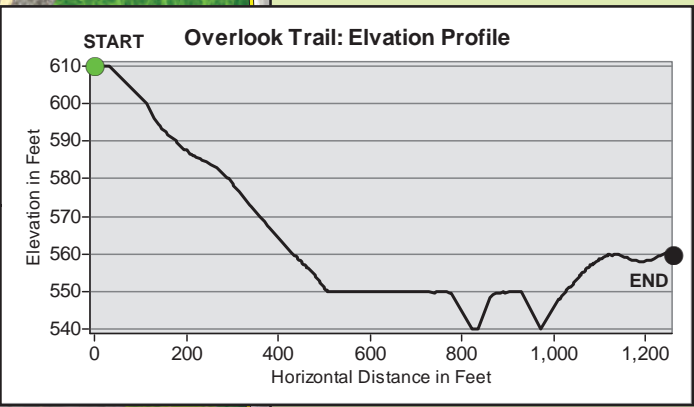
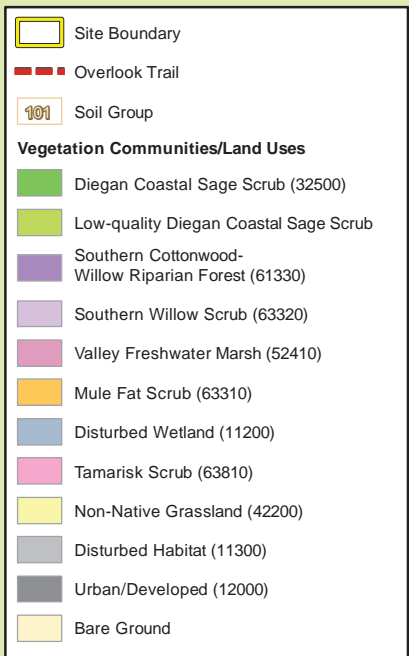
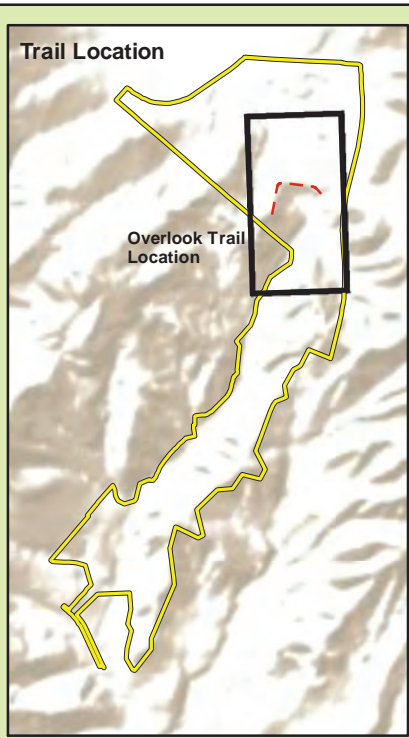


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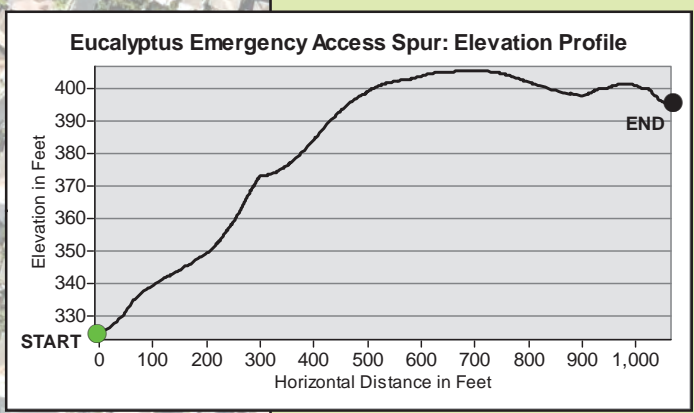
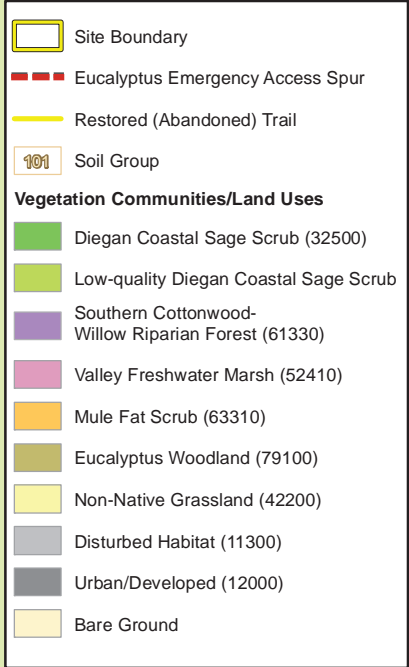
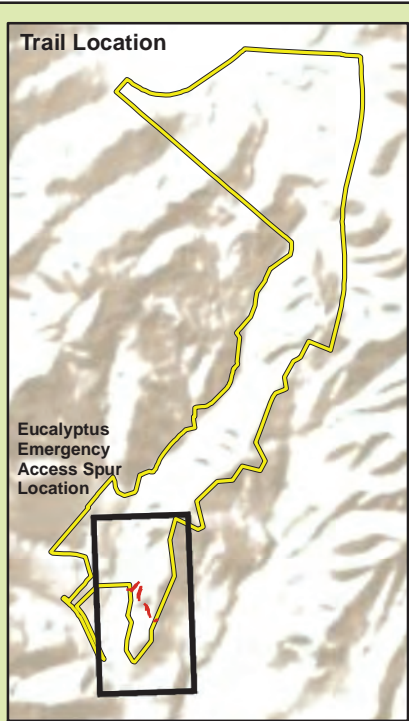


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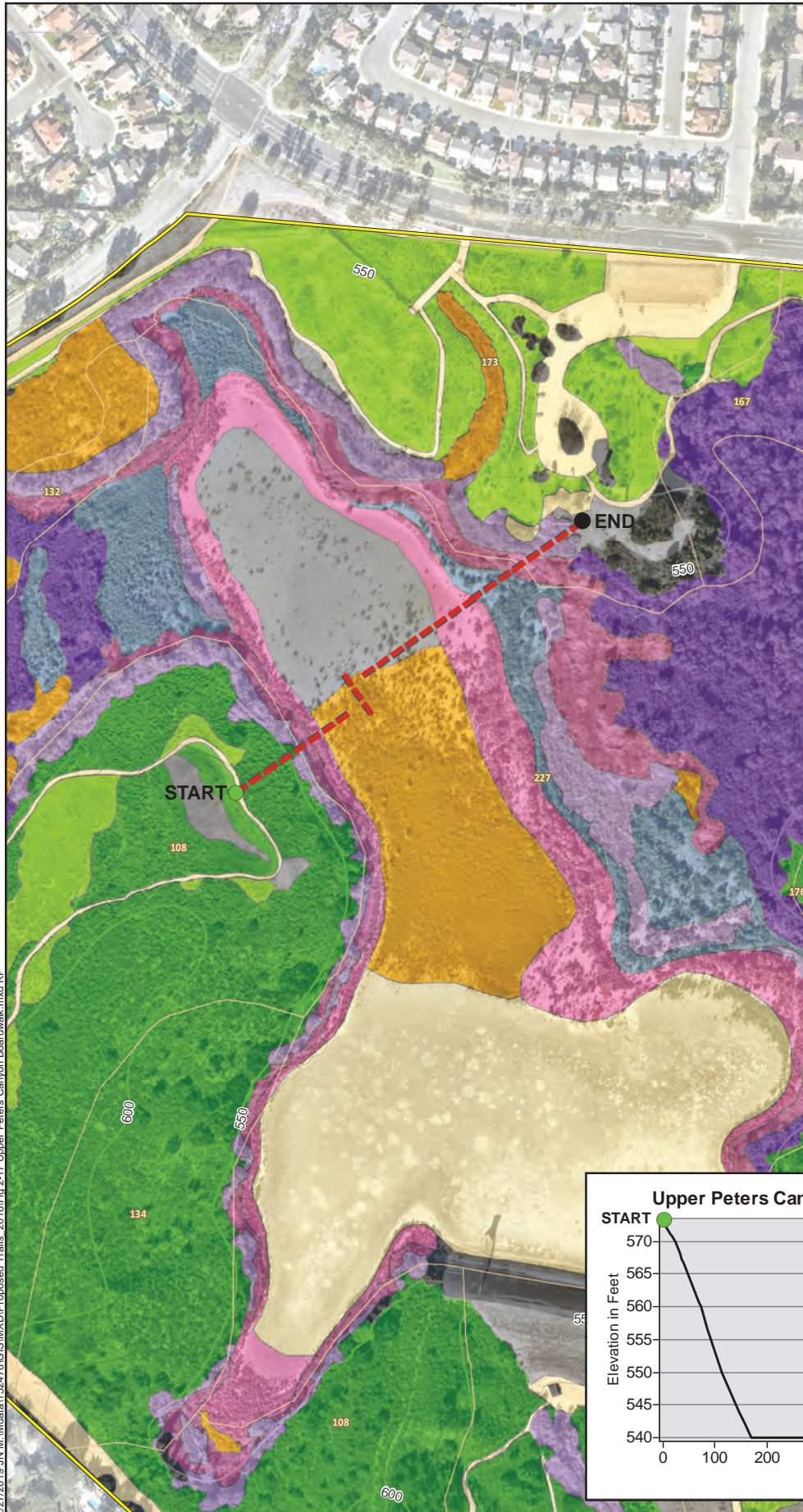




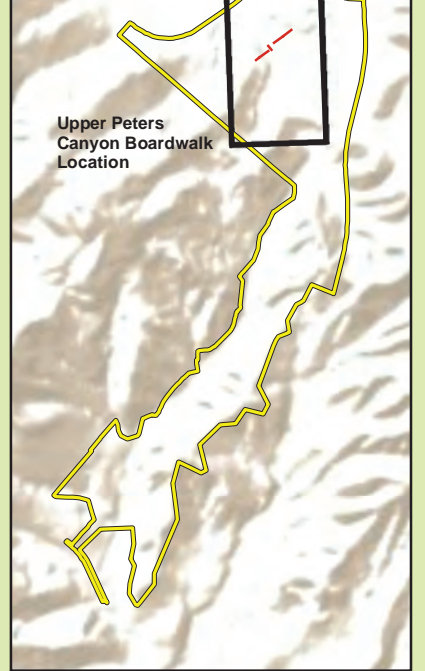
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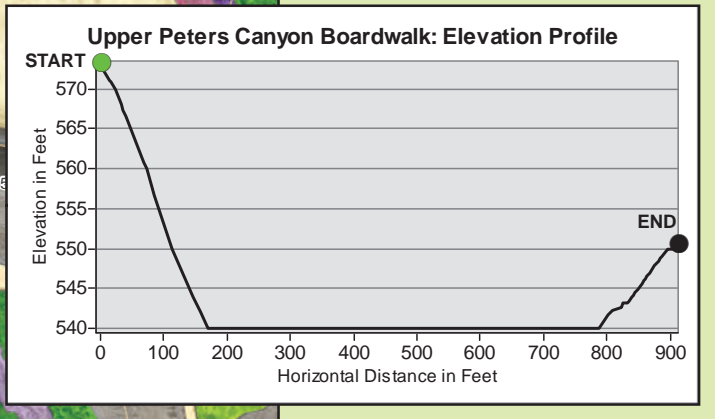
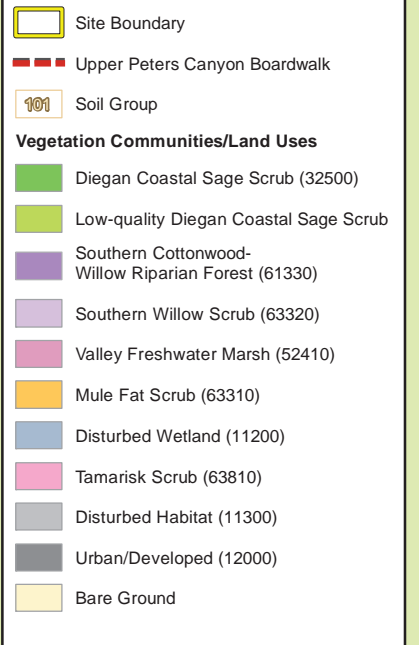
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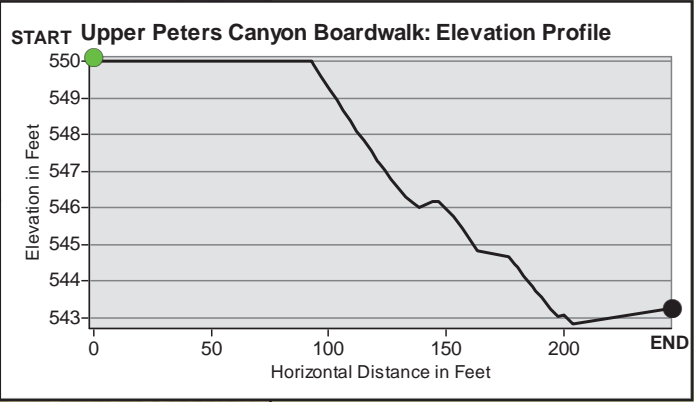
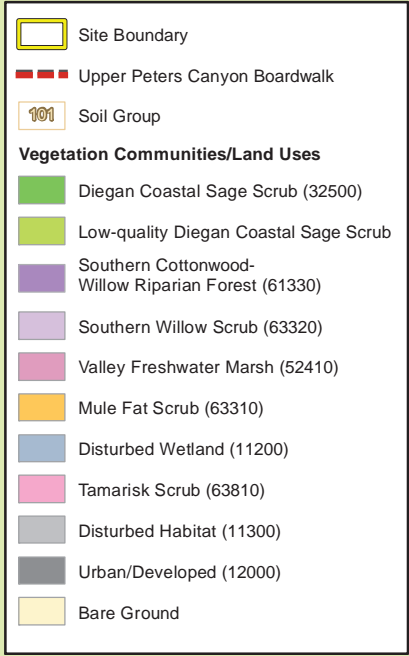
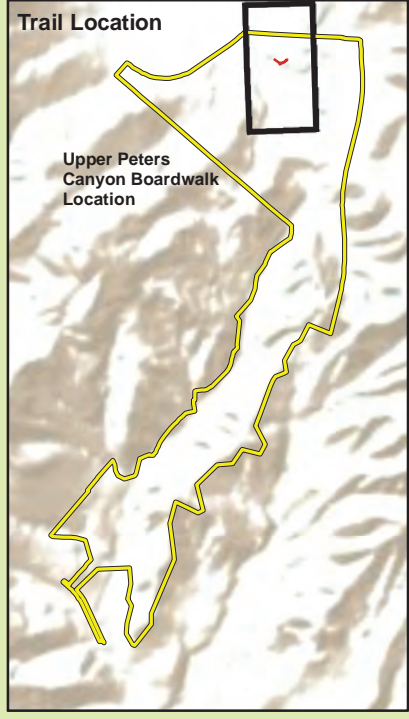
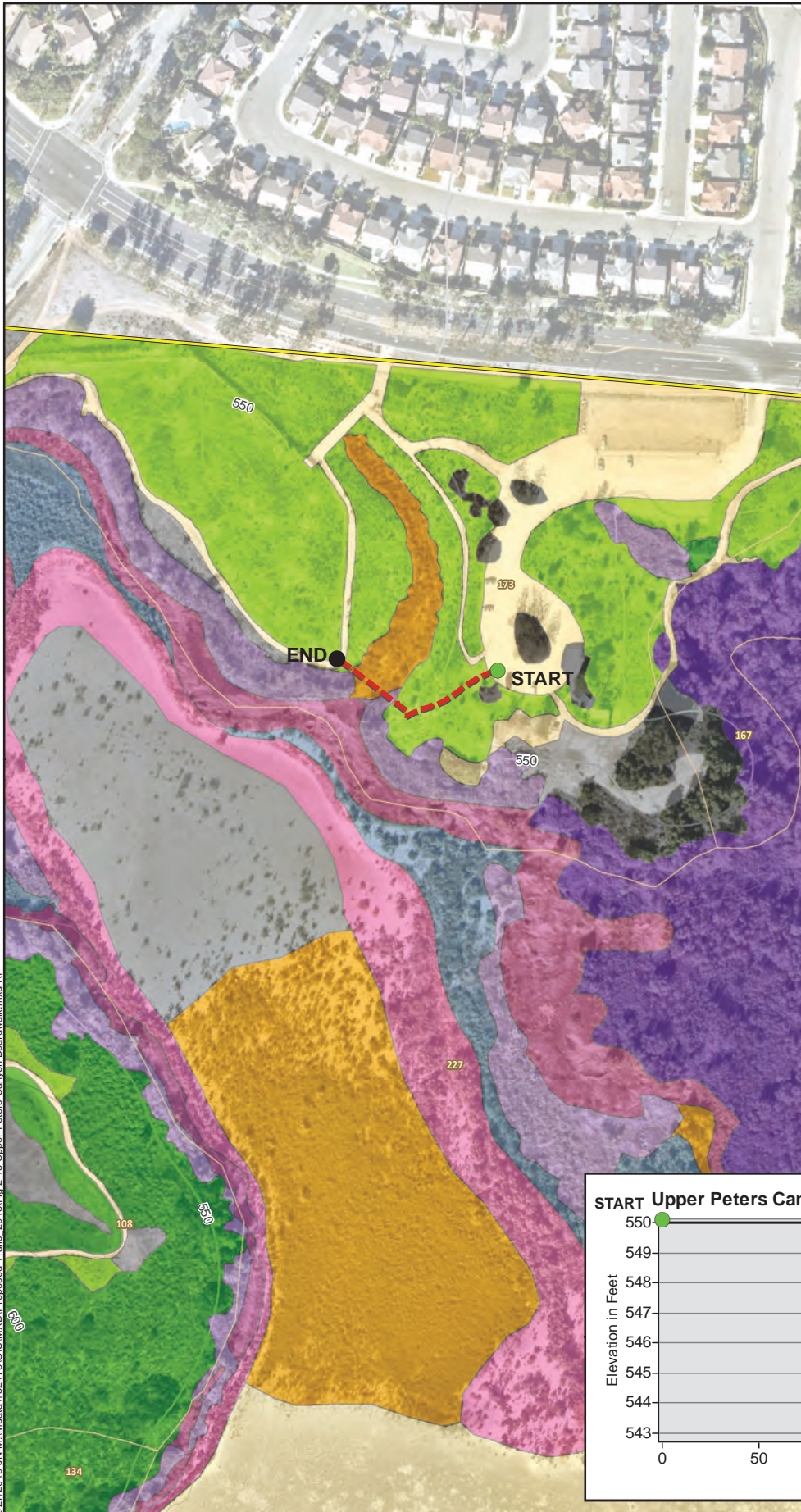
Trail Location



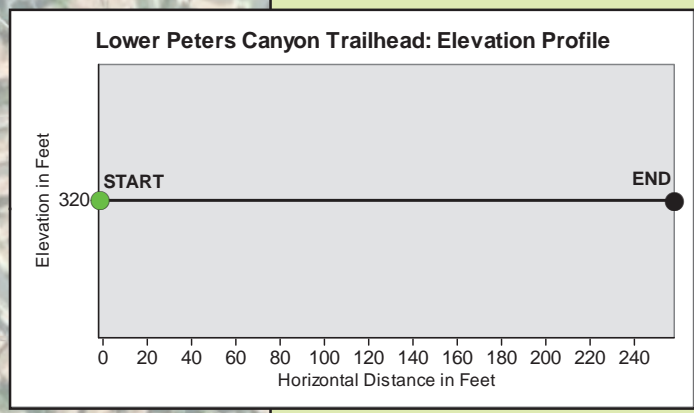
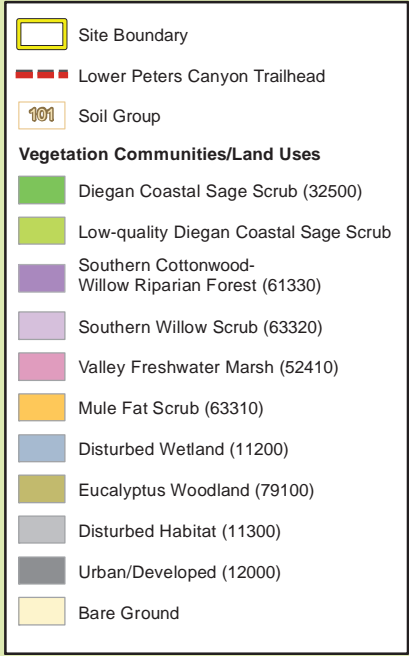
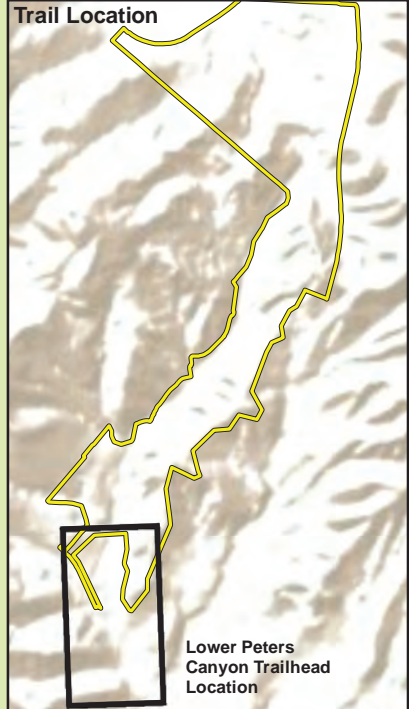
Upper Peters Canyon Boardwalk Location



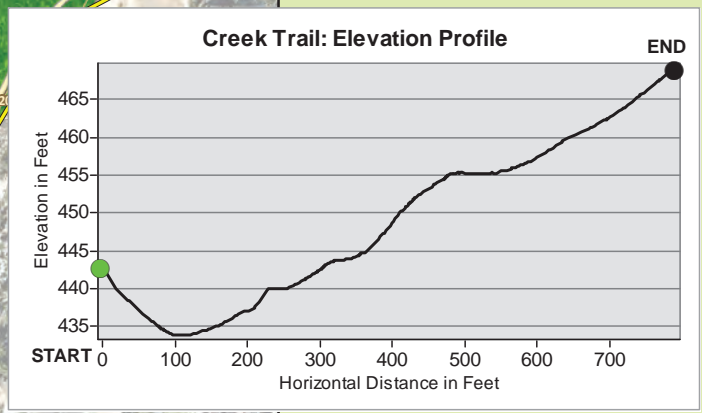
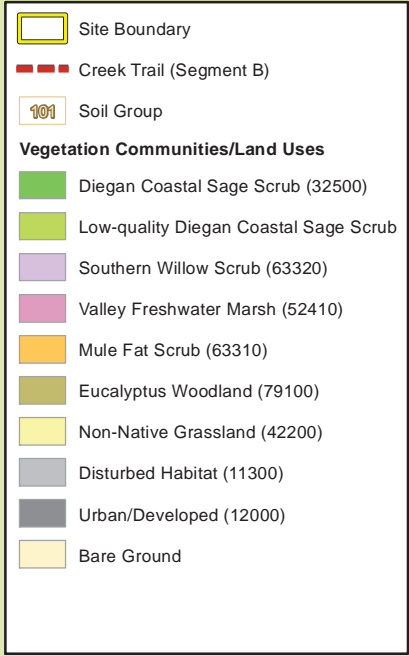
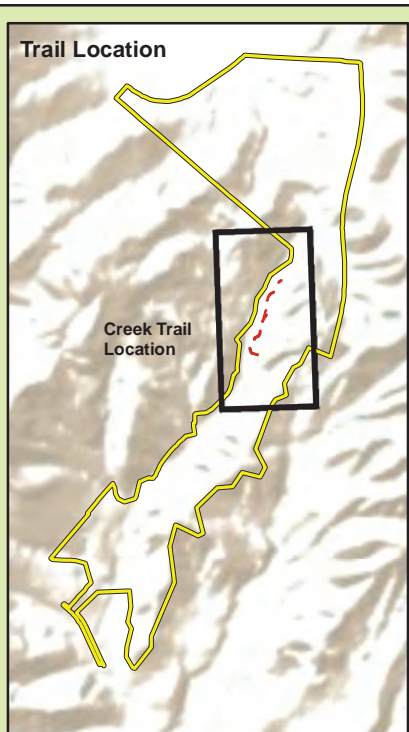
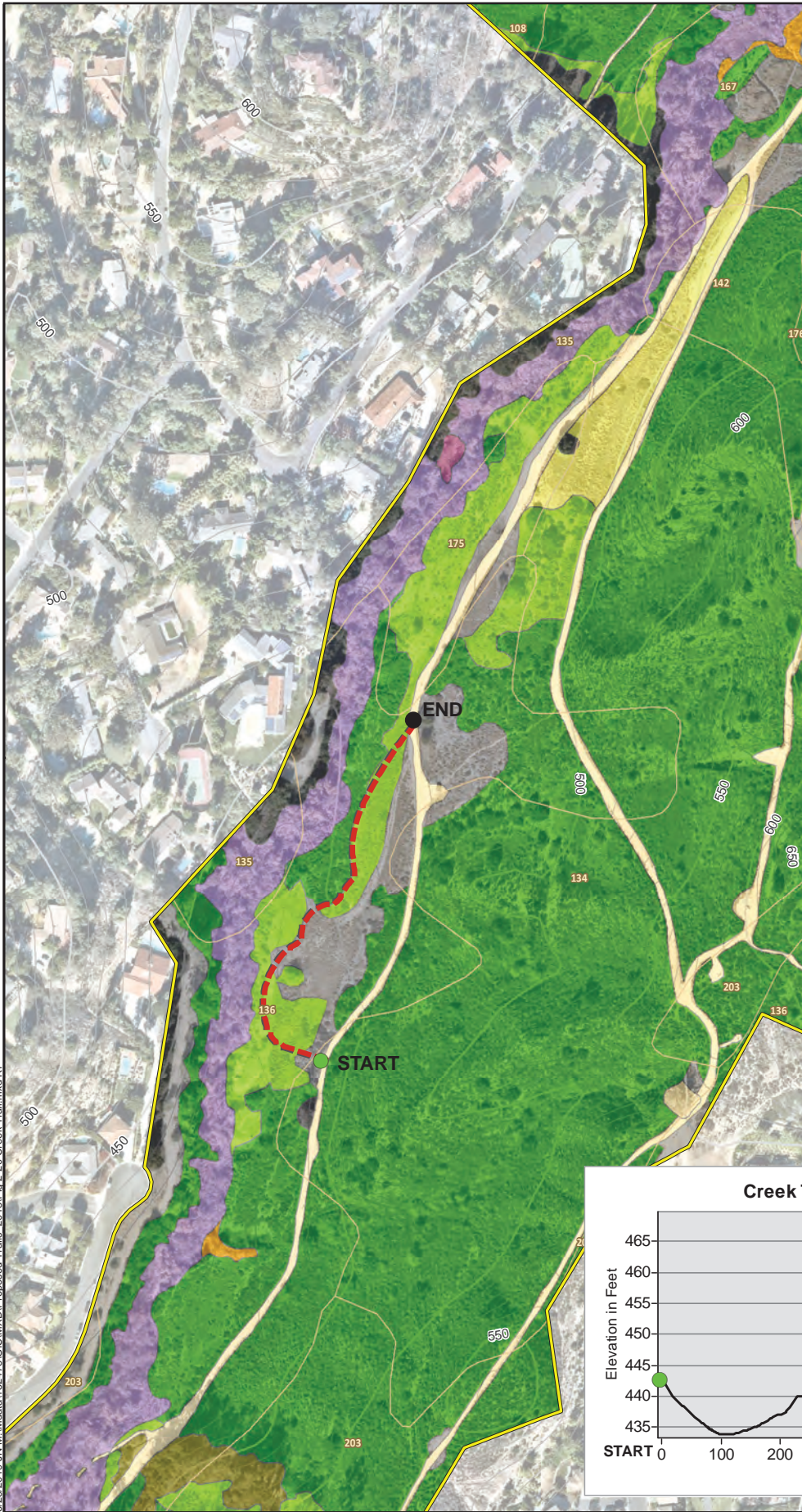
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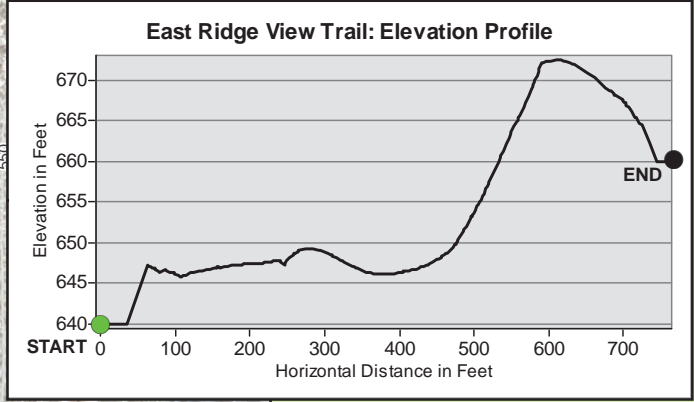
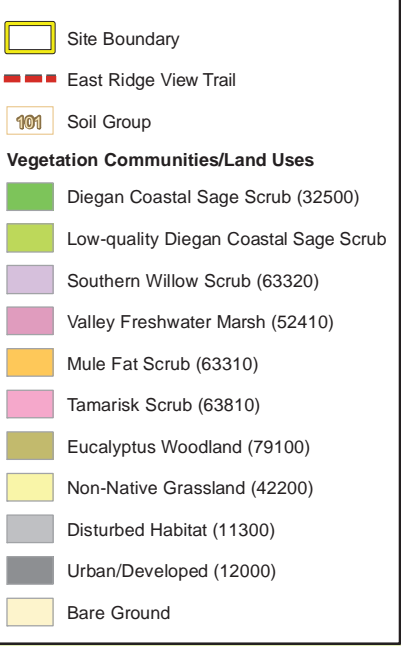
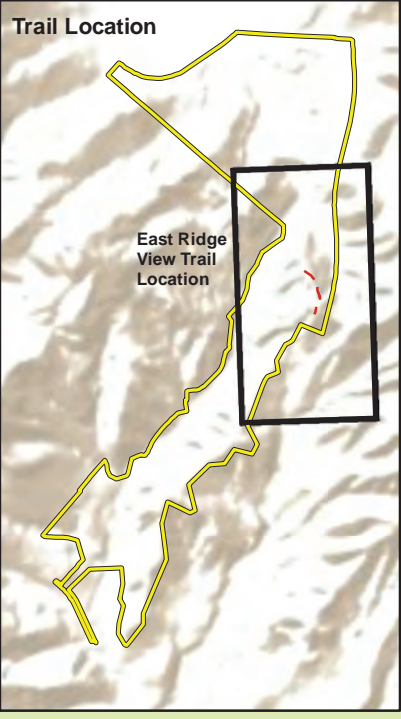
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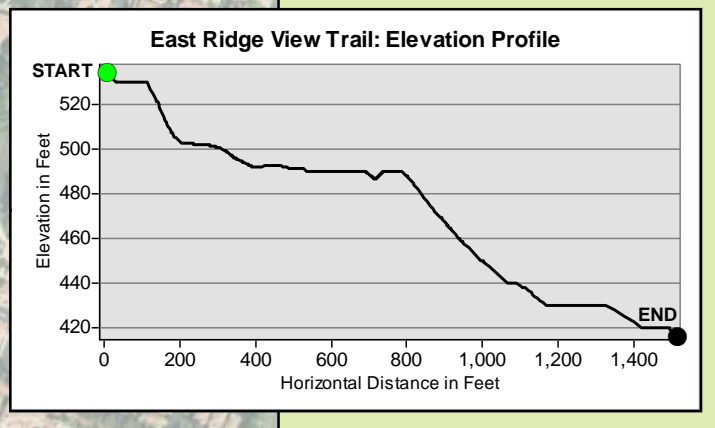
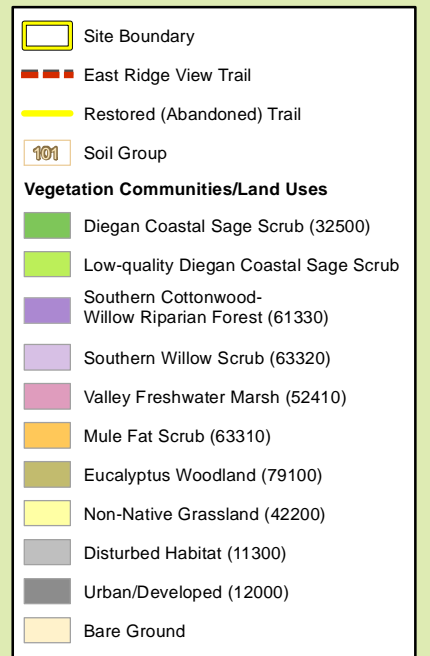
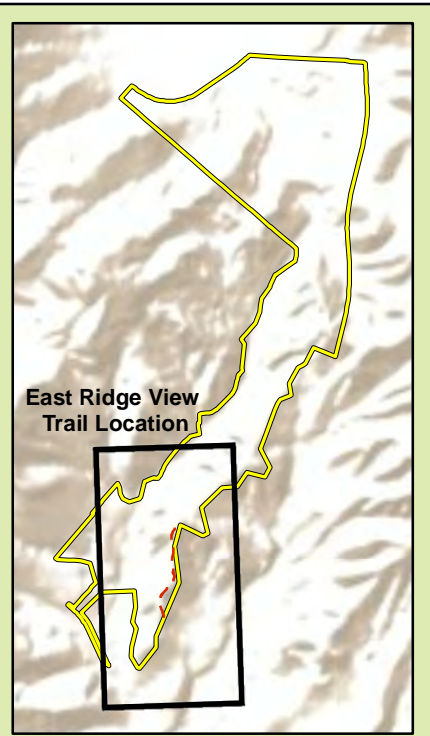
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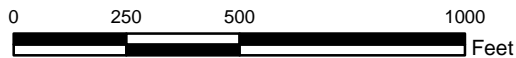
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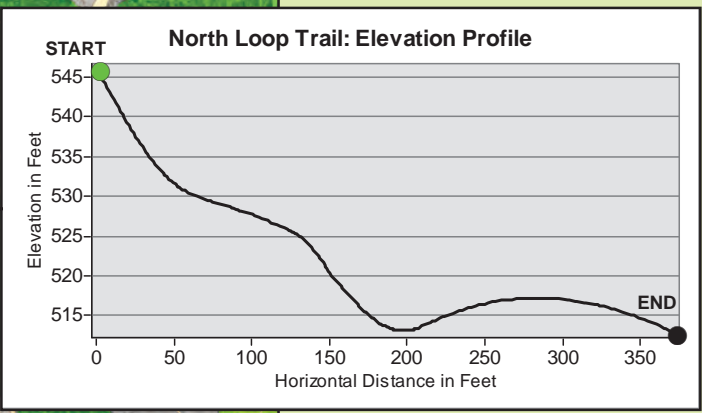
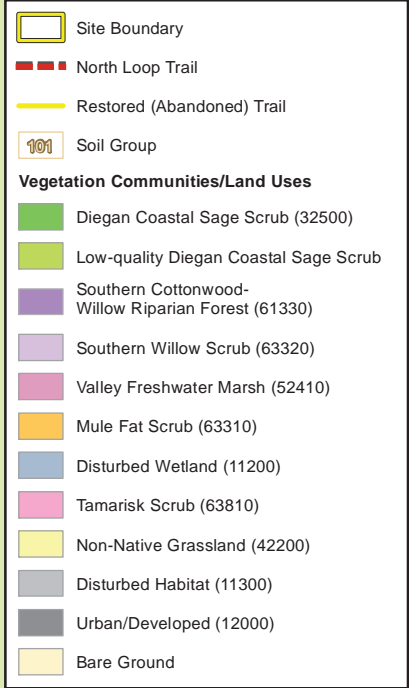
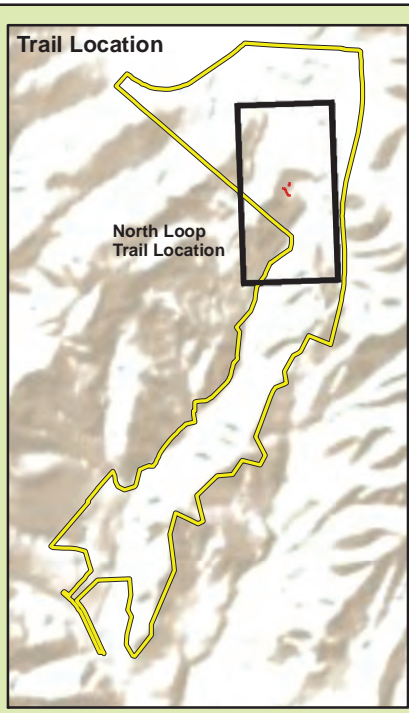


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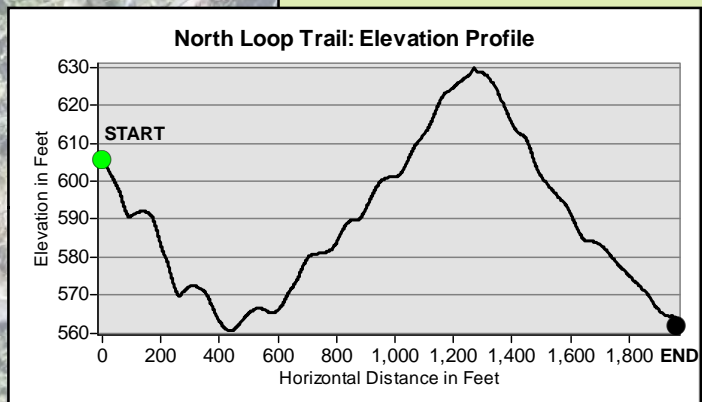
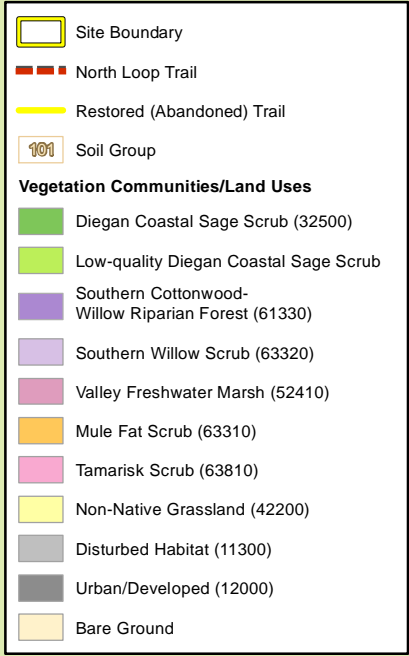
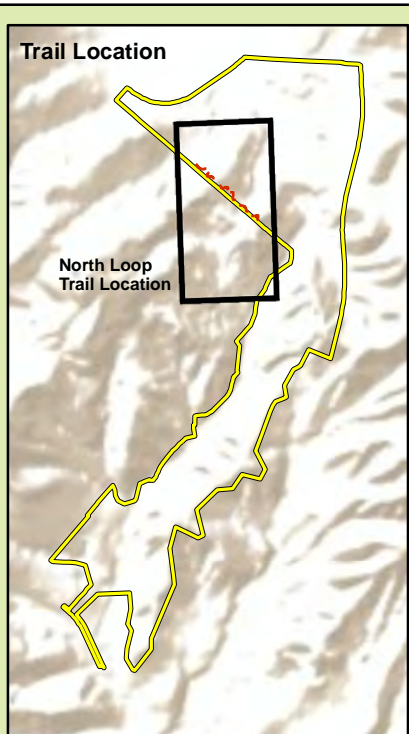
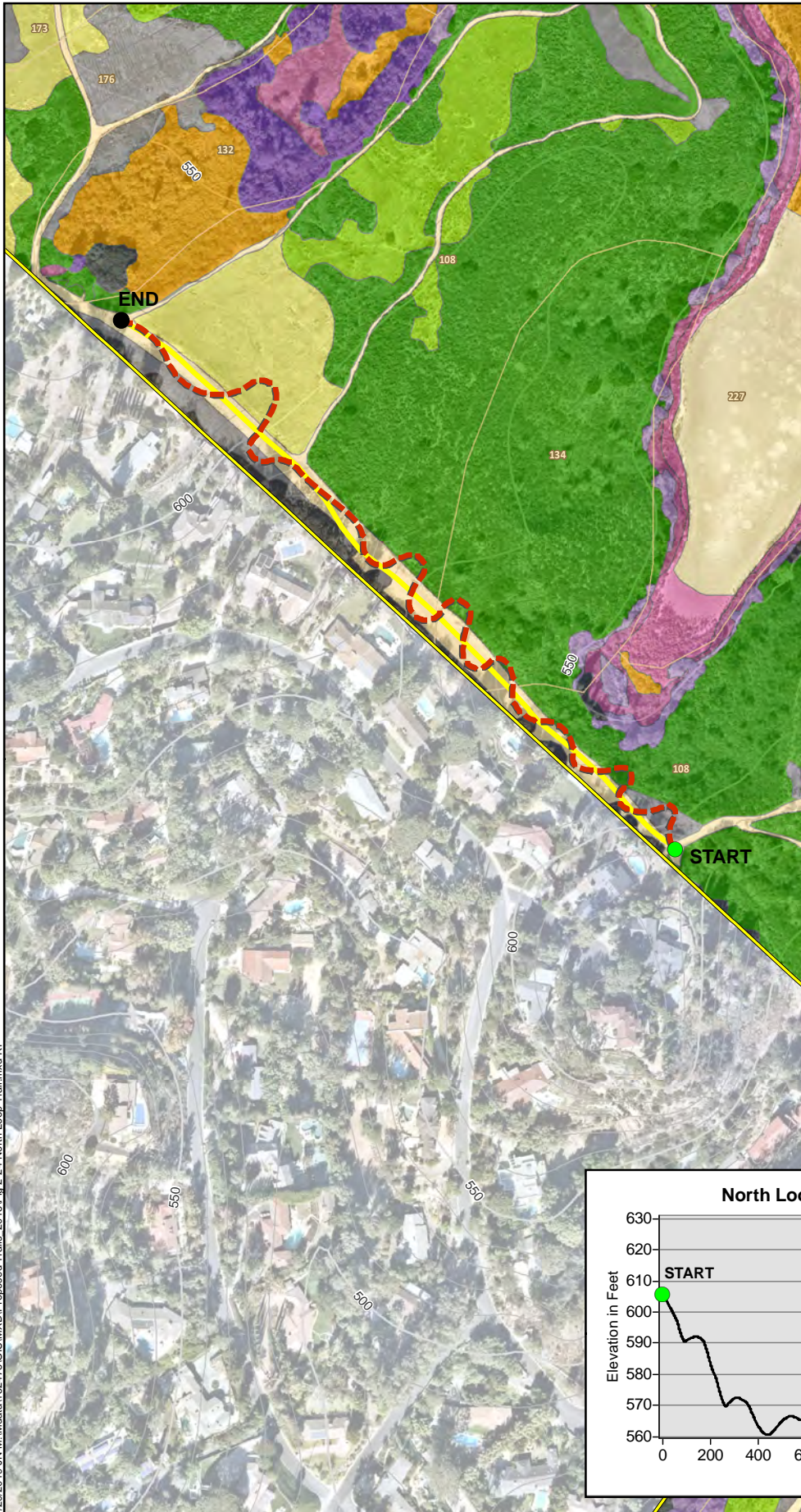


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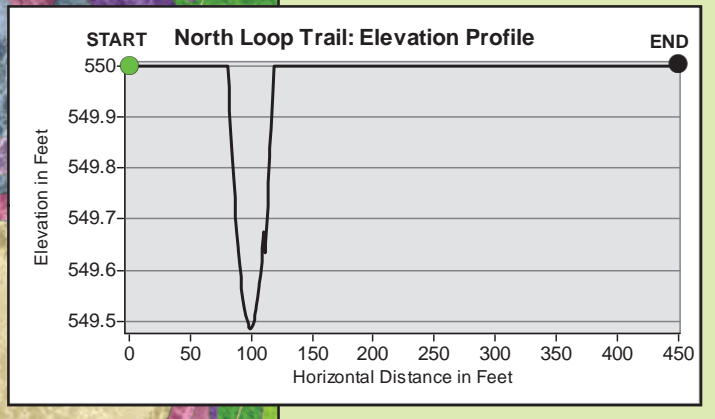
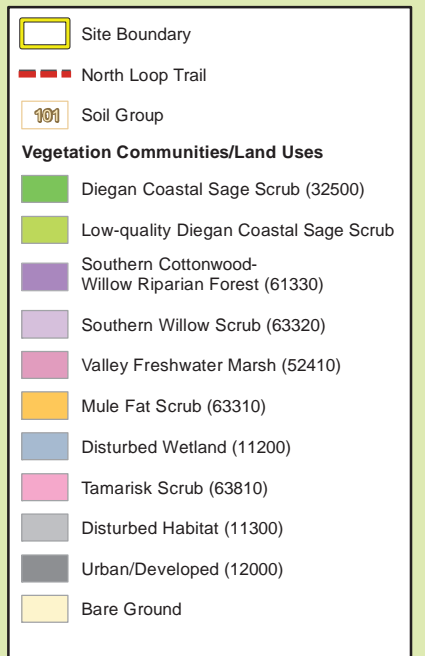
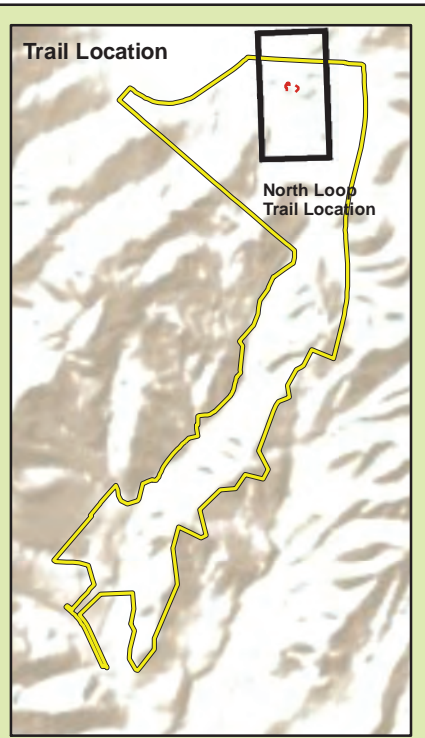
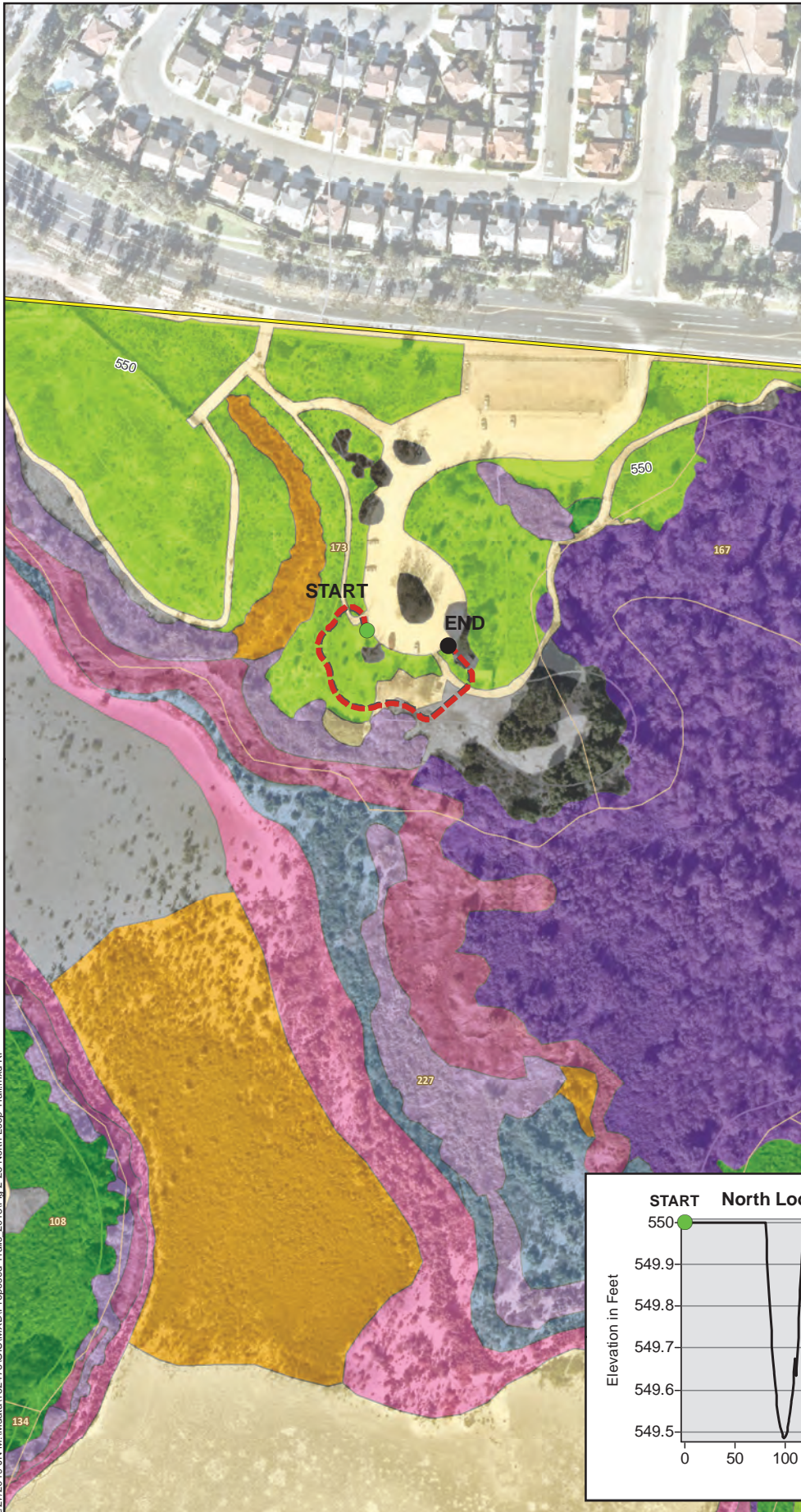




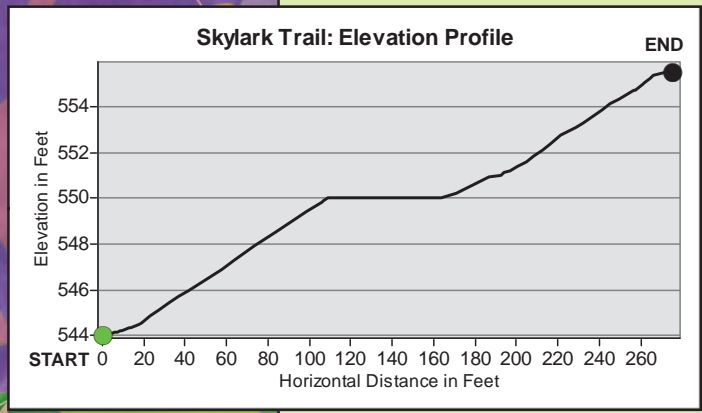
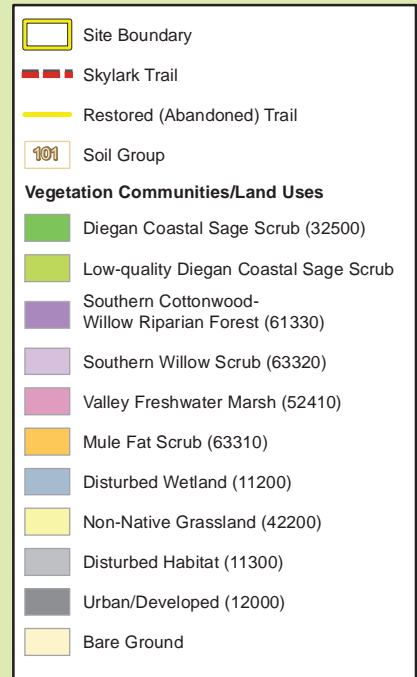
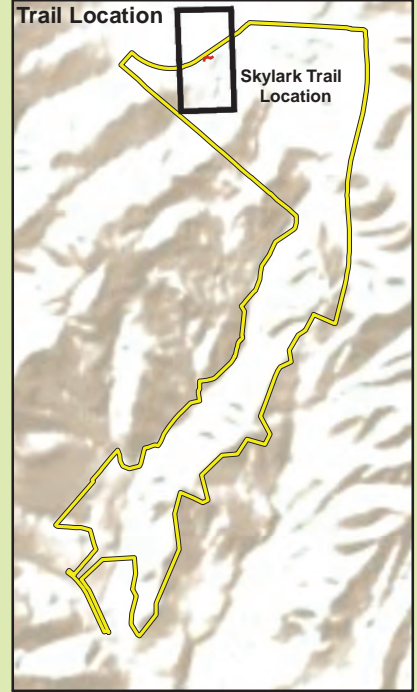
6/26/2019 10:11:00 AM \\data1\52478\GIS\MXD\Proposed Trails_2018\Fig 2-23 North Loop Trail.mxd RP



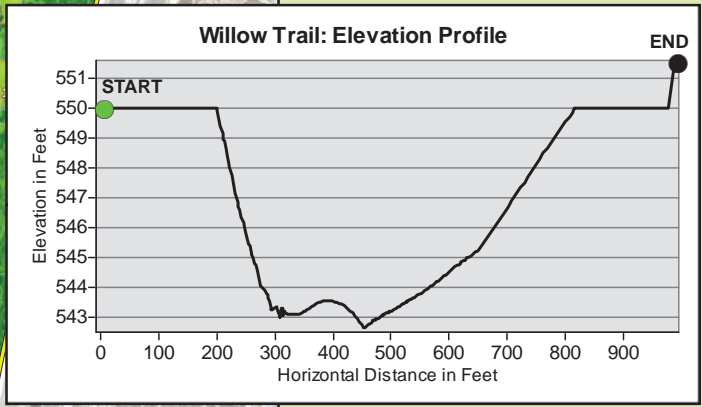
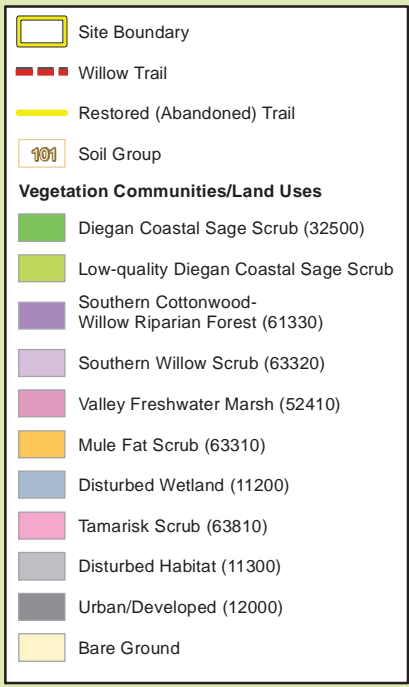
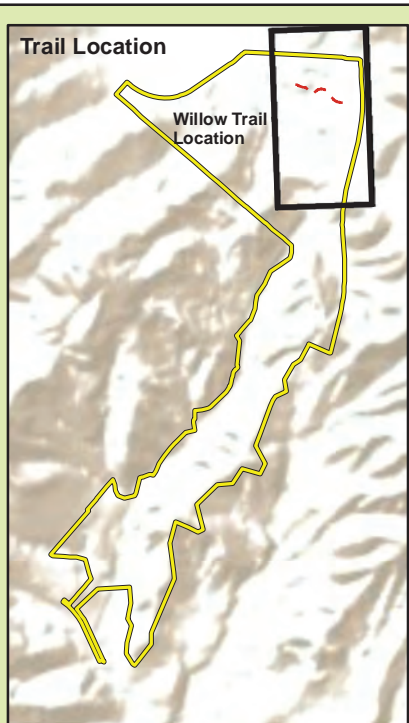
7/29/2019 10:11:52 AM \\M:\data\152478\GIS\IMXD\Proposed Trails_2018\Fig 2-24 North Loop Trail.mxd RP



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6/26/2019 10:11:15 AM I:\data\152478\GIS\MXD\Proposed Trails_2018\Fig 2-28 Skylark Trail.mxd RP



6/26/2019, 10:11 AM, I:\data\152478\GIS\MXD\Proposed Trails_2018\Fig 2-27 Willow Trail.mxd, RP

2.1.5 Trail Rest Areas

At various points along the interior trails, designated rest areas will be created. These rest areas are cut-outs adjacent to trails where visitors can move off a trail, take a break and rest on a bench, enjoy a view, and possibly alleviate trail congestion.

2.1.6 Strategies for Managing Trails

Hikers, mountain bikers, and equestrians can cause severe damage to trails in muddy conditions, creating ruts, potholes, uneven trail surfaces, and general erosion. When ponding occurs along a trail, it is common for trail users to traverse off-trail to avoid the ponding, which damages vegetation and natural resources adjacent to the trail. Allowing trails to properly dry after a significant storm event is necessary to ensure trails stay in good condition. Trails used by hikers, equestrians, and mountain bikers should be prohibited for periods following a significant storm event to avoid damage to trails and damage to adjacent habitats. Temporary closures shall be monitored until conditions, such as mud and ponding, are reduced. General trail use should be monitored periodically to identify overuse and potential impacts of sensitive species or habitat, as well as off-trail use.

Maintenance of Trails:

A thorough maintenance program will reduce deferred maintenance problems and reconstruction projects. Trail maintenance activities can be categorized by three types:

1. Routine bi-annual and cyclical– Includes trail drainage maintenance and trail brushing performed on a recurring basis. Typically, routine trail maintenance tasks require supervision and can be conducted by maintenance staff, conservation corps, volunteer crews or contractors with specific training in basic trail maintenance.
 - The current preventative maintenance schedule for PCRCP calls for two bi-annual preventive trail maintenance (PM) inspections per year. Each PM inspection is automatically generated through an OC Parks Computerized Maintenance Management System (CMMS) and assigned to PCRCP staff. Through these scheduled mandatory inspections, park staff identify trail deficiencies and then create work orders that are routed to either in-house or contracted resources.
 - On a routine basis, all trails are trimmed one or two times per year, fire road trails are graded once per year, all trail drains are cleared once per year, and trail structures such as bridges, culverts, and causeways are inspected twice per year.

2. Pro-rated/Deferred – Includes construction, re-construction, re-engineering, and restoration activities performed on a periodic basis and necessary to address road and trail infrastructure deterioration due to age and/or improper initial design.
 - Many trails at PCRP are beyond what is considered an acceptable sustainable trail grade pursuant of California State Parks and U.S. Forest Service best management practices for trail design, construction and maintenance.
 - All new trail construction and major reroutes away from the current trail alignment should undergo approval from appropriate regulatory agencies, regional stake holders, park visitor surveys and follow NCCP guidelines where applicable.
 - All new trail construction and reroutes should carefully follow current industry best management practices and be reviewed by a subject matter expert such as a professional trail builder.
3. Incident-related/One-time repair – Includes construction, re-construction, re-engineering, re-design, demolition, and restoration activities performed on a project basis to address road and trail infrastructure damage caused by poor design, natural or man-made events such a major storm, wildfire, dam water release, or vandalism.
 - Project is typically identified by park staff and a CMMS work order is created and routed to appropriate resources to conduct the repair.
 - Documentation is required for re-imbursement if damage is caused by a natural disaster.
 - Park staff may temporarily close damaged trails until repairs can be made.

2.2 PROPOSED PARK ACCESS AND RECREATIONAL IMPROVEMENTS

Improvements proposed for the park in the General Development Plan document provide for expanding the visitor experience through more definitive entry access points, additional park amenities such as restrooms, shade and picnic nodes, and improved trails through restoration, rehabilitation, and focused maintenance.

2.2.1 Plan Organization

The plan has been organized into six areas for improvements: Canyon View Staging Area, Skylark Place Staging Area, Reservoir Viewing Areas, Big Red Rest Area, Creek Trail (Segment A), and Lower Peters Canyon Trailheads and Restroom.

2.2.2 Canyon View Staging Area

To create a park entry gateway and sense of arrival into PCRCP, the park's main entrance from Canyon View Avenue is proposed to be re-designed to include a new entry monument sign, vehicular gate, and decorative stone paving and planting for accent and delineation.

The existing parking area is proposed to be improved with a new vehicular parking layout to maximize car parking spaces, add equestrian trailer spaces, provide connections to existing trails, and locate pay stations so as not to conflict with circulation patterns.

A new park office is proposed along with a small maintenance/storage yard to accommodate park staff and materials for operation and maintenance of the park on a full-time basis.

An arrival plaza with a large overhead shade structure and several small gathering nodes is also envisioned to bring individuals as well as groups of visitors into the park to commence their recreational activities via trail connections.

Trail connections from this staging area are proposed to minimize user conflicts and streamline commencement of recreational activities and will consider vehicular, mountain bicycling, equestrian and pedestrian circulation and concentrate on providing clear delineation for each mode of recreational travel. Trails are proposed to connect around and through the reservoir as well as to Willow Trail, Skylark Trail and Peters Canyon Trail. In addition, a pedestrian bridge over Handy Creek will be added, connecting the Canyon View Staging Area to North Loop Trail.

Existing restrooms and drinking fountains will remain and new benches, picnic tables, waste receptacles and doggie bag dispensers will increase the park's amenities. Directional and interpretive signage will delineate trails and trailheads, direct visitors into the park traveling from public transportation, display park rules, and educate visitors about historic and cultural features.

2.2.3 Skylark Place Staging Area

The Skylark Place Staging Area is proposed to handle overflow parking and special events that typically occur on weekends when the main parking area reaches capacity. This entrance is recommended to have a similar look and feel to the main entrance including decorative stone paving and planting for accent and delineation. A secondary entry monument sign is proposed for the approximately 30-35 car parking area. The parking area would be designed to provide screening and dust control from adjacent residences and constructed with a natural surface material such as decomposed granite. ADA and equestrian trailer parking would be accommodated as well as pay stations, signage (park rules and trails), waste receptacles, and trail connections.

2.2.4 Historic Reservoir Viewing Areas

The historic reservoir (referred to as Upper Peters Canyon Reservoir) is an under-utilized feature in the park and public feedback indicates a desire for increased education about the history as well as additional viewing opportunities.

To capitalize on the aquatic habitat and ecological resources, a boardwalk is proposed to cross the reservoir connecting the main entrance and Cactus Point Trail. The boardwalk will be designed to accommodate the reservoir in a wet and dry conditions. Interpretive signage at overlooks along the path is envisioned to tell the story of flora and fauna as visitors appreciate the near and distant views.

A second viewing opportunity of the reservoir is proposed along the top of the dam. A trail parallel to the top of the dam with two small wooden viewing platforms affording visitors 360° views in all directions of the park is also proposed. Visitors would follow the trail to the viewing platforms and return using the same trail.

The viewing areas will include benches, waste receptacles and signage to provide visitor comforts and enhance the enjoyment of the experience.

Habitat restoration will play a significant role in re-envisioning the use and appreciation of the reservoir. Refer to the companion document to this GDP, the Resource Management Plan which outlines goals and strategies for the rehabilitation and habitat restoration of the reservoir.

2.2.5 Big Red Rest Area

Public comment revealed that a restroom was desired about halfway through the park along Peters Canyon Trail. A restroom with a drinking fountain and five small shade structures are proposed at the intersection of East Ridge View and Peters Canyon Trail. The rest area will provide a space for small groups to meet, gather, rest and picnic to further enjoy the park. Amenities include benches, waste receptacles, trail signage and an informational kiosk.

This new restroom location will create a hub for trail connections and an opportunity to practice trail etiquette using good signage and trail volunteers.

2.2.6 Creek Trail (Segment A)

A new trail is proposed at the southwest entry as you enter along the existing trail north of Lower Peter Canyon Reservoir. A pedestrian bridge will be added over Peters Canyon Creek, connecting Creek Trail (Segment A) to the existing Peters Canyon Regional Riding and Hiking Trail.

2.2.7 Lower Peters Canyon Trailheads and Restroom

Trailheads

At the south entry of the park adjacent Peters Canyon Road cul-de-sac, a secondary park entrance is proposed to delineate and promote this entrance. Park entry, park rules and trail signage will contribute to promoting this entrance and waste receptacles and doggie bag dispensers will be provided for visitor convenience. Bicycle, pedestrian and Mountains to Sea trails all converge at this entry point and co-existence without conflict will be a key goal.

Visitors currently use the flood control maintenance road gate to enter PCRP at the south end adjacent Peters Canyon Road. This gate is adjacent to residences and noise and trash has created impacts to the homes on heavy weekend use. A new entrance is proposed along Peters Canyon Road which crosses over the flood control spillway channel. This entrance will direct visitors away from the residences and still allow for park use. Due to the topography at this proposed entrance, a concrete walk and stairs will accommodate the steep slope and allow direct access onto the existing asphalt road. The flood control maintenance gate will be re-designed to prohibit access through it and the new entrance design will be coordinated with Orange County Public Works Flood Division.

Restroom

Six existing porta-potties located at the south entrance to the park's interior trail system have been a semi-permanent fixture for several years. These porta-potties will be removed and a new permanent restroom building is proposed on the south side of the Lower Peters Canyon spillway. Adjacent to this new permanent restroom building is the existing Eucalyptus Trail connecting users to the existing East Ridge View Trail.

A small node will be created to provide a place for visitors to rest on a bench or boulder, review and map trail activity, or get a drink of water before continuing their recreational experience.

The area will also include waste receptacles, signage, and decorative paving and planting for accent and delineation.

2.3 PUBLIC ACCESS AND RECREATION MANAGEMENT (PAR) GOALS AND STRATEGIES

With a mission of providing people with wilderness-type recreational and educational experiences while protecting, restoring and enhancing park natural resources, the goals will direct future activities for PCRP and strategies for management. With baseline conditions identified, resource management goals were also developed to further define the balance between public access and resource protection, enhancement, and restoration. These goals

are essential to ensure the public is able to enjoy the park’s recreational opportunities and natural resources , while protecting the natural resources. Specific strategies are identified to achieve each management goal below, along with how each strategy should be implemented.

In order to determine public access issues and to measure these impacts on biological resources within the park, it is recommended that conditions adjacent to trails and public access areas be closely monitored. In order to determine public access issues and to measure these impacts on biological resources within the park, it is recommended that conditions adjacent to trails and public access areas be closely monitored for signs of negative impacts, including spread of invasive non-native species, degradation of natural vegetation communities, or any erosion features associated with trail and off-trail use by visitors.

Goal PAR-1: Provide an appropriate range of recreation opportunities and associated infrastructure for visitors to enjoy the park.

Strategy PAR-1.1: Provide access to unique park features (e.g., historic reservoir, riparian woodlands, vista points, historic sites).

- Construct new trails in areas that allow park visitors to enjoy the park’s natural resources, taking measures to avoid/minimize resource impacts.

Strategy PAR-1.2: Create a comprehensive and consistent park-wide image for use in all park signs, written materials, and park amenities.

- Capture an image that best represents the park and its unique features that its visitors can enjoy.
- This image will show park visitors and potential park visitors the natural resources that Peters Canyon has to offer and will influence people to come visit the park.

Strategy PAR-1.3: Align trails and/or plant native vegetation to minimize views of adjacent residential areas with consideration of OC Fire Authority recommendations

- Design and implement a planting plan along areas within the park that are adjacent to residential areas with no plant buffer.
- Plants chosen should grow relatively tall and thick in order to obstruct the view of surrounding residential developments.

Strategy PAR-1.4: Provide appropriate visitor amenities such as additional parking and rest areas, which include new benches, picnic tables, restrooms, shade structures, waste receptacles, drinking fountains, and visitor kiosks per the General Development Plan.

Strategy PAR-1.5: Formulate indicators and standards of quality for visitor experiences. Determine the level of use when most visitors feel unacceptably crowded.

- Survey: number of hikers, runners, bikers, equestrians on trails; trail user movement patterns and use densities; parking lot and overflow parking lot use densities; visitor perceptions, motivations, thresholds of acceptability, acceptability of management actions.
- If most visitors feel unacceptably crowded, take appropriate management actions such as providing visitor information about conditions, providing information regarding alternative parks with similar trails, or developing other access controls.
- Develop and implement a pilot plan to study trail usage and understand carrying capacity and impacts on natural resources.
- Coordinate with NCC to identify appropriate methods for monitoring public access, measuring recreational impacts on biological resources, and defining thresholds for management actions.

Strategy PAR-1.6: Analyze existing/propose trail system improvements.

- Implement trail system improvements as suggested within the General Development Plan.

Goal PAR-2: Provide recreational opportunities in balance with protection, restoration and enhancement of natural, cultural and historic resources.

Strategy PAR-2.1: Monitor off-trail use; rehabilitate and deter access to unauthorized trails.

- Conduct quarterly park inspections to determine if off-trail use is occurring and assess the severity of off-trail use and its impact on the park's natural resources.
- Any heavily used off-trail areas should be blocked via wooden fencing, signed, and restored by installing BMP's and re-planting with native vegetation.
- Post-monitoring is critical to unauthorized trail restoration efforts and should include a combination of technology to track illegal use and park staff patrols.

Strategy PAR-2.2: Formulate indicators and standards of quality for natural resources.

- Monitor indicator variables and take appropriate management action to ensure standards of quality are maintained.
- Specify the limit of acceptable resource condition change on trails (e.g., trail width and depth.) Once the limits are approached, take management action, such as trail rehabilitation, resting or redesign.

Strategy PAR-2.3: Provide appropriate levels of park staffing and volunteers to manage park activities, maintain facility, educate visitors and enforce park rules and regulations.

- If necessary, increase the amount of park staff and/or volunteers to help maintain the park and its facilities. If vandalism, off-trail use, and/or other negative impacts to park resources continuously occur, it is recommended that park rules and regulations be more strictly enforced and/or park visitors be further educated on the natural resources within the park and why it is important to preserve and protect them.

Strategy PAR-2.4: Locate new amenities to minimize erosion and sediment delivery.

- Minimize soil disturbance during all trail construction projects.
- Construct trails, staging areas and buildings so runoff is not concentrated.
- Minimize creation of impermeable surfaces.

Goal PAR-3: Maintain trails to County standards in accordance with NCCP/HCP.

Strategy PAR-3.1: Work with Parks Planning and Design Division to develop and implement “trail design criteria.” Use best management practices for trail design and maintenance. Use California State Parks Trails Handbook, IMBA’s Trails solution handbook, or similar best practice guidelines as a basis for trail design guidelines. Provide design criteria for each type of trail.

- Coordinate with OC Parks Natural Resources and Planning & Design Section for trail layout, impact, etc. for proposed trails.
- Once final layout is approved, contact contractor for cost estimate.
- Discuss budget and proposed timeline for installation with Park Operations Manager and include in appropriate FY budget and park project implementation schedule.

- Provide detailed professional engineering and landscape architectural plans prior to construction of trails, staging areas, or any other park improvements.

Strategy PAR-3.2: Establish annual plans for installing and maintaining sustainable trails and performing habitat restoration in conjunction with minor trail reroutes.

- In instances where a trail reroute abandons a section of previously used trail, that section of previously used trail should be restored to the native habitat surrounding that area.
- Trails should be designed and installed in a manner that has minimal impact on the park's natural resources and will not be subject to severe erosion and require frequent maintenance.
- Trails that cannot be rerouted due to habitat constraints must be re-engineered using extensive tread hardening techniques such as soil amendments, rip-rap installation and out-sloped with hardened v-ditch drains.

Strategy PAR-3.3: Provide annual work plan and progress reports which include results of recreation use monitoring, trail conditions, adverse habitat impacts, and erosional issues.

- Trails should be monitored for soil erosion, multiple treads, excessive root exposure, excessive width, wet or muddy soils, or any standing water on the tread way.
- Adaptive management should be implemented to decrease impacts on biological resources from recreational use.
- Annual NCCP reports should be submitted to the NCC by December 31 each year.

Strategy PAR-3.4: Strategically monitor park events and trail traffic volumes for impacts to habitat and trails.

- Install trail counters or other monitoring methods in strategic locations to collect trail use data.
- Assess used trails post-event to determine the impact, if any, visitor use had on the trails and/or the adjacent habitat.
- Monitor trail use during events to determine which trails are most heavily used and determine if there is a correlation between trail use and habitat impacts.

Strategy PAR-3.5: Conduct routine preventative maintenance inspections to ensure trails meet minimum maintenance standards.

- Complete the “Trails Assessment and Recommendations Form” and prioritize trail repairs. See Appendix.
- Discuss recommendations with Park Operations Manager and/or Trails Coordinator.
- Proceed with implementation of work through Purchase Order and/or include in future FY budget.
- Trail inspections should occur after major storm events to determine the erosional impacts storms have on trails.

Strategy PAR-3.6: Close unauthorized trails, abandoned trails and encroachments using appropriate methods such as habitat restoration, and installation of physical barriers and signage.

- Install restoration plantings with thick, difficult to navigate native vegetation to prevent encroachments of park visitors into off-trail areas.
- Close unauthorized and abandoned trails to the public and replant with appropriate native vegetation.
- Utilize technology such as cameras and trail counters to monitor effectiveness of trail closures.

Strategy PAR-3.7: Develop and implement trail maintenance BMPs. Include trail maintenance BMPs developed for NCC.

Strategy PAR-3.8: Create and maintain a map of all trails (existing, abandoned, unauthorized, and proposed).

- The existing park trail map should be expanded to include future trails, trails that have previously been abandoned, and existing trails not authorized by OC Parks.

Strategy PAR-3.9: Design trails with respect to natural topography to maintain or restore natural drainage patterns as much as possible. Design trails to minimize disturbance to native vegetation and soil.

- Trails should be designed with the lowest gradient possible in order to prevent erosion and promote proper drainage. Trails should be built along contour lines wherever possible with proper drainage.

- New trails should avoid native and sensitive vegetation and wildlife as much as possible. Areas with lower-grade habitat or with non-native and/or invasive species present should be first priority.

Strategy PAR-3.10: Monitor soil erosion and slope failure and identify where these processes are accelerated and causing resource damage. Utilize existing information (soils map, topography etc.) to avoid construction in problem areas and to identify areas with conditions that may impact existing infrastructure.

- Areas with less compact soils should be avoided when building a trail due to their vulnerability to erosion.
- Soil erosion and slope failure, especially along trails, should be monitored quarterly. Any areas with severe erosion or slope failure along areas where park visitors' travel should be dealt with immediately to prevent harm to visitors and OC Parks workers.

Goal PAR-4: Maintain safety for visitors and staff. Reduce user conflicts and enhance trail safety.

Strategy PAR-4.1: Maintain emergency access gates, roads and trails to enable emergency response.

- Emergency access gates, roads, and trails should be routinely monitored for any access issues. Any access issues identified should be immediately reported and dealt with.

Strategy PAR-4.2: Coordinate emergency response efforts with OC Fire Authority and other first responders.

- In case of emergency, immediately contact the OC Fire Authority and other first responders.
- If immediate repairs are required and immediate action is necessary, a biologist is not required to be present. Following the work, the disturbed area should be determined, and revegetation plans should be prepared, implemented, and monitored.
- If eight or more hours are available before emergency work will commence, the area should be delineated and a biological assessment should be implemented, followed by revegetation.

- Pre-project photographs should be taken, and photographs documenting the emerging condition should be taken post-project to assist stakeholder review.

Strategy PAR-4.3: Develop and implement wildland-urban interface fire management strategies in consultation with OC Fire Authority.

- Contact OC Fire Authority for recommended BMPS for wildland-urban interface fire management strategies.
- Utilize the BMPS to develop a plan to decrease risks of wildland fires.

Strategy PAR-4.4: Restrict or prohibit trail users from areas of heavy erosion.

- The park should be monitored for erosion and slope failure issues along trails and areas where the public may be present.
- Any identified areas of erosion or slope failure should be temporarily closed to the public until these areas are properly fixed and deemed safe for public use.

Strategy PAR-4.5: Promote awareness of trail safety and etiquette through an education program, such as a backcountry trail patrol volunteer program through OC Parks volunteer program and park website and social media accounts.

Strategy PAR-4.6: Adopt a trail rating system to alert users to the level of difficulty. Post trail rating markers at the top and bottom of each trail and at OC Parks website. Adopt a new sign design program.

- Each trail should be hiked and mapped via a GPS tracker or application, such as Strava or Mytracks.
- Length of trail, total elevation gain, and average gradient should all be considered when assigning a trail a difficulty level.
- Design, produce, and install trail rating markers at the top and bottom of each trail. Make ratings available at primary visitor entrances and on the OC Parks website.

Goal PAR-5: Minimize, to the maximum extent practicable, impacts from the siting and construction of new Park facilities on NCCP/HCP Identified Species, CSS, and Covered Habitats in accordance with Section 5.8 of the NCCP/HCP.

Strategy PAR-5.1: New facility improvements within PCRFP shall be consistent with permitted facilities identified in the PCRFP GDP and RMP.

- Any new proposed facilities will need to be incorporated into the GDP.

Strategy PAR-5.2: New facility siting shall be coordinated with NCC.

Strategy PAR-5.3: Construction of new facilities and realignment of existing facilities shall be designed to minimize impacts to sensitive resources.

- Refer to the RMP when determining impacts to sensitive resources.

Strategy PAR-5.4: Access roads and infrastructure supporting new facilities will be routed to minimize disturbance and impacts to sensitive resources.

- Refer to the RMP to minimize disturbance when implementing new facilities.

Strategy PAR-5.5: Where proposed facilities potentially may impact sensitive resources, a qualified biologist shall document the resources and vegetation in the area to be disturbed by the proposed facility. This information will be used as the basis for impact minimization and annual reporting of habitat impacts within the Habitat Reserve.

- Conduct a Habitat Assessment to determine impacts to resources based on the most recent conditions.

Strategy PAR-5.6: Where impacts to sensitive vegetation occurs, revegetation plans shall become part of the facility improvement plans. Monitoring to track the success of revegetated areas shall be performed for a minimum of five years.

Goal PAR-6: Monitor public access within the park to determine public access issues and quantify impacts.

Strategy PAR-6.1: Monitor conditions adjacent to trails to determine impacts to habitat.

Strategy PAR-6.2: Quantify impacts to natural resources due to public access.

Strategy PAR-6.3: Establish restoration efforts or manage public access to decrease impacts to natural resources.

Section 3 Reservoir Management (R)

One of the defining characteristics of PCRP is the reservoir located at the northern end of the park. When water is present, the reservoir provides habitat for a wide variety of plant and wildlife species and allows park visitors to view a diversity of aquatic bird species rarely seen in Orange county. The adjacent willow woodland habitat also offers opportunities for visitors to enjoy a rich assemblage of bird species, including the endangered least Bell's vireo.

3.1 EXISTING CONDITIONS

3.1.1 Hydrology

PCRCP is located within the Santa Ana River Hydrologic Unit (HU 801.0), Lower Santa Ana River Hydrologic Area (HA 801.10), and East Coastal Plain Subarea (HAS 801.11) of the Santa Ana Hydrologic Basin Planning Area. The Santa Ana River HU is roughly a rectangular-shaped area of about 150 square miles, extending from the Santiago Canyon foothills to the east to the Pacific Ocean to the west, and from the City of Orange to the north, to the City of Lake Forest to the south. The unit includes the Cities of Irvine, Tustin, Orange, Newport Beach, Santa Ana, Costa Mesa, and Lake Forest. PCRCP is located within the San Diego Creek Watershed. Waters from PCRCP (and Handy Creek) are ultimately conveyed to Upper Newport Bay and the Pacific Ocean.

Due to fluctuations in annual rainfall amounts and effects of drought, the presence of surface water within PCRCP is inconsistent. This variability may result in extreme fluctuations of water within Peters Canyon Reservoir, with the reservoir being full in successive wet years and completely dry in periods of extended drought.

The Peters Canyon Reservoir was constructed by The Irvine Company in the 1930s for use as an irrigation water storage and distribution as part of commercial agriculture and ranching operations. The Irvine Company dedicated the reservoir to the County in 1992 with the requirement that it be used for flood control and water storage purposes. Prior to the dedication, The Irvine Company used the reservoir primarily as a water regulating device rather than as a storage facility. The reservoir is connected to Peters Canyon Wash downstream via an earthen dam with an elevation of 552.3 feet and crest length of 580 feet located at the southern end of the reservoir. The outlet works system of the dam includes an outlet tower, trash rack, a 42-inch Reinforced Concrete Pipe (RCP) with a concrete spillway, and floodgates. Flows conveyed into the 42-inch outlet pipe and concrete spillway enter Handy Creek. The 42-inch outlet pipe parallels Canyon View Road and then passes through Santiago Hills I in a combined channel/pipe system before outletting to Handy Creek. The 42-inch outlet pipe and spillway were installed to mitigate anticipated increases in storm

water runoff from the development of the Santiago Hills Phase I project, and as an allowance for the area now known as Santiago Hills Phase II and East Orange Area 1. The emergency outlet works are operated by OCPW; the County occasionally releases reservoir water to Peters Canyon Wash to reduce water levels to protect the integrity of the dam. The reservoir constitutes a critical element in the flood control system for PCRP and the entire watershed. Due to the sediment accumulation since original construction, the reservoir's volume has decreased from approximately 1,070 acre-feet to approximately 500-acre feet.

There are currently seven existing drainages, located at the northern end of the park, that allow flows to enter the park. Five of these drainages are located at the northeastern end of the reservoir and convey flows from Santiago Hills Phase I to the east and surrounding development from the north. One outlet, located at the western area of the reservoir, conveys flows from the surrounding development from the southwest. The final drainage, located at the northwestern portion of the reservoir, conveys flow from the surrounding development to the north.

Since the reservoir is used for flood control purposes, water levels fluctuate based on seasonal rainfall. Peters Canyon Reservoir is connected to the lower reservoir via Peters Canyon Wash, a wetland/riparian corridor located within the park. The lower reservoir is not located within the park boundary but is still integral to the overall character and use of the southern area of the park. The lower reservoir contains willow woodland which provides aesthetic value to the area, as well as habitat for native bird species, including the protected least Bell's vireo.

Peters Canyon Reservoir is a key feature of the PCRP due to its size and dynamic nature through wet and dry periods. As such, maintenance within the reservoir varies from the standard maintenance activities listed in Section 7, *Park Operation and Management (POM)*. The majority of the Peters Canyon Reservoir is not accessible to the public due to terrain and wet conditions; however, the public can visually observe the reservoir from various viewpoints around the perimeter. Sediment in the basin has not been dredged, although sediment is periodically removed around outlets that discharging into the basin. Increasing sediment levels appear to be a concern, and future research and discussions should determine the preferred "max sediment elevation." Once defined, surveying and monitoring can be conducted to track sediment levels.

During drought periods, the reservoir tends to dry out in the absence of surface flows. Although dry on the surface, it is common to observe water ten inches below ground surface. This subsurface water is an important resource for wetland, riparian and transitional species. The drying of the basin floor provides an opportunity for plant species to take hold and flourish. Unfortunately, the majority of these plant species may be exotic and invasive. Invasives such as tamarisk and thistles can quickly take hold and spread. As such, reservoir maintenance is primarily focused on dry periods. Monitoring of the basin floor

should occur quarterly and exotic vegetation should be removed as resources allows. Additional areas of inspection and maintenance include:

- Outlet discharge locations should be kept clear of debris and sediment
- Maintenance of structures should be completed as necessary
- Peters Canyon Reservoir embankments should be inspected and repaired for rills or washouts
- Exotics and invasives should be removed and coordinated with restoration efforts

Maintenance measures above should be completed when access is available. Public access into the basin floor should be discouraged unless designated trails or boardwalks are constructed to protect sensitive habitat. During wet years and when the basin fills with water, the bulk of maintenance activities will diminish. As the basin fills, the majority of maintenance should be directed to safety and inspections around the perimeter of the reservoir.

3.1.2 Biological Resources

Vegetation communities found within and adjacent to the reservoir include southern cottonwood-willow riparian forest, southern willow scrub, valley freshwater marsh, tamarisk scrub, mule fat scrub, Diegan coastal sage scrub, low-quality Diegan coastal sage scrub, disturbed wetland, disturbed habitat, urban/developed, non-native grassland, and bare ground. The area surrounding the reservoir contains the widest variety of vegetation communities supporting a high diversity of plant and wildlife species that fluctuate along with the reservoir's water levels. During periods of drought when there is no water in the reservoir, vegetation communities such as mule fat scrub grow in areas that are otherwise inundated. Along with different plant communities and species, different wildlife species associated with these habitat types also shift accordingly. For example, when the reservoir is inundated, a wide variety of waterfowl bird species may be found using the reservoir; in drought periods, bird species such as warblers, chats and vireo may be in greater abundance. All biological resources are further discussed in Section 5, *Biological Resource Management*.

3.2 PROPOSED CONDITIONS

Future improvements to the reservoir include the addition of a boardwalk which will connect the Cactus Point Trail to the main parking lot at the northern end of the park. This boardwalk will enhance how park visitors experience the reservoir and offer a new perspective of the park while protecting the reservoir's sensitive biological resources. This new improvement is further discussed in Section 2, *Public Access and Recreation*.

In addition to new public access opportunities, future improvements include the removal of non-native and invasive plant species in and around the reservoir. A large swathe of non-native tamarisk scrub is located along the edge of the reservoir, which ultimately limits the amount of native willow woodland that can grow in the area. By removing this tamarisk scrub, park staff can increase the amount of willow woodland in the area during dry periods, and ultimately improve available habitat for native and sensitive species, such as least Bell's vireo.

3.3 RESERVOIR MANAGEMENT (R) GOALS AND STRATEGIES

Goal R-1: Maintain the historic reservoir as a natural aesthetic park feature that supports native habitat in accordance with management agreements.

Strategy R-1.1: Develop and implement annual maintenance plans for non-native, invasive plant management.

- Inventory all non-native and invasive plants that are present within the reservoir.
- Determine which plants pose the greatest threat to the native vegetation within and around the reservoir, and focus resources on these plants.

Strategy R-1.2: Locate new trails to minimize impacts to reservoir habitats and creek bank erosion.

Strategy R-1.3: Maintain reservoir in accordance with IOD requirements.

- Maintain reservoir water surface elevation at or below 536.8 feet during non-storm conditions.
- Maintain a readily available copy of the dam maintenance MOU between OC Parks & OCPW.
- Determine appropriate maximum sedimentation level.

Strategy R-1.4: Educate park visitors about reservoir history and function.

- Install educational outreach around the reservoir perimeter.
- Provide parks visitors with educational pamphlets or brochures.
- Incorporate reservoir information into public programs.

Goal R-2: Establish procedures to maintain the reservoir in wet and dry conditions.

Strategy R-2.1: Establish access into reservoir for maintenance and water quality BMP requirements.

- Coordinate with Vector Control to provide access to the reservoir for performing pest control BMPs

Strategy R-2.2: Incorporate water quality education and BMPs into public outreach efforts.

Strategy R-2.3: Consult with OC Parks NPDES staff and contractors to conduct BMPs for inspecting, testing and maintaining water quality.

- Conduct water quality monitoring within the park at appropriate intervals for the presence of manmade debris, nutrients, and other non-point source pollutants.

Strategy R-2.4: Define maintenance responsibilities and permitting requirements for each drainage improvement.

- Map all drainages (existing and proposed).
- Identify drainage patterns and parks' responsibility to maintain everything below spillway.
- Obtain necessary permits.

Strategy R-2.5: Partner with OCPW to maintain reservoir for nuisance and storm water drainage purposes.

Strategy R-2.6: Inventory wetlands and identify opportunities for habitat maintenance and enhancement.

Section 4 Cultural & Geological Resource Management (CR)

4.1 EXISTING CONDITIONS

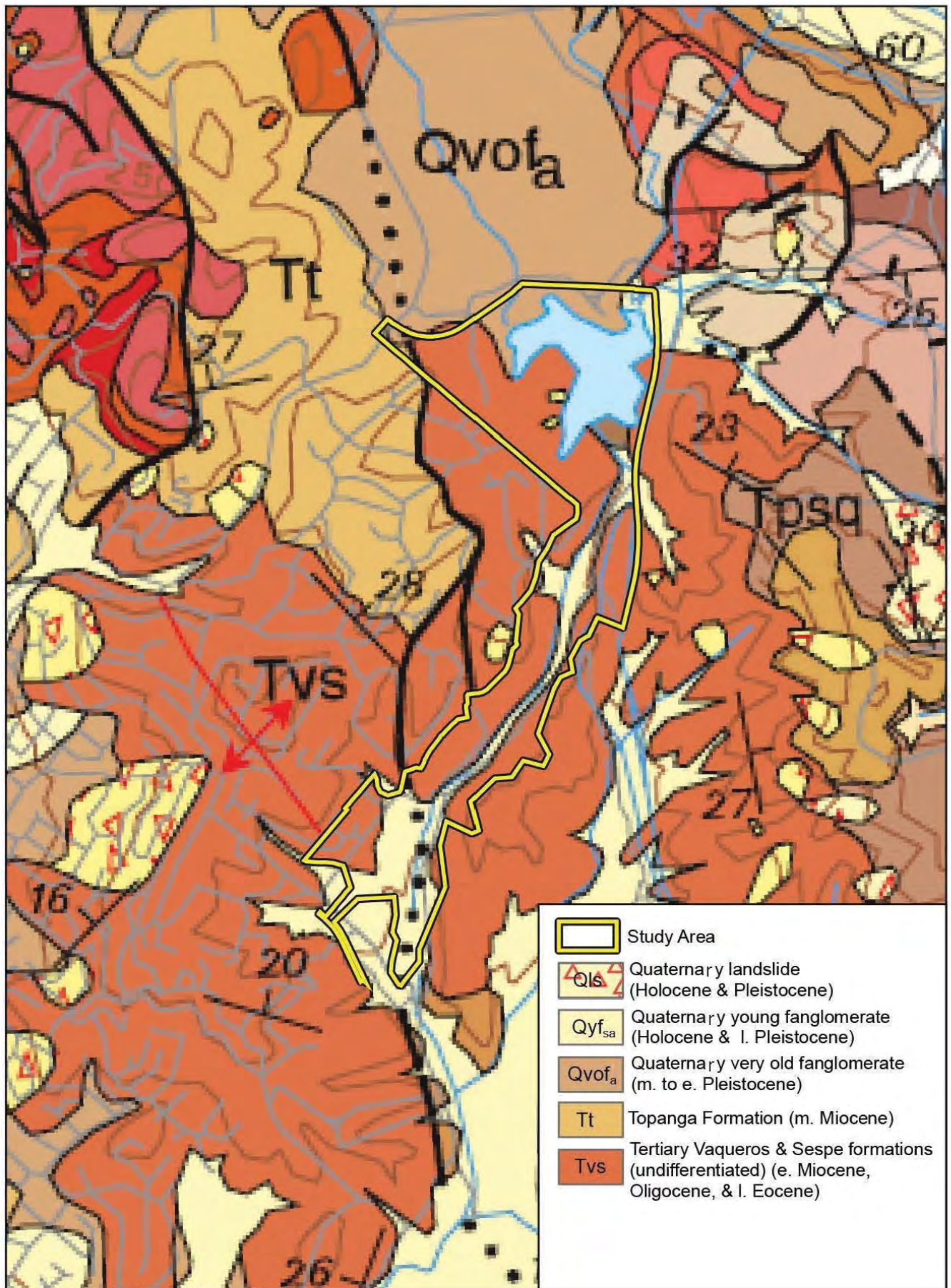
4.1.1 Geology

Peters Canyon Regional Park is located immediately southwest of, and at the foot of the Santa Ana Mountains, in the Peninsular Ranges geomorphic province (CGS 2002; Morton and Miller 2006). The Santa Ana Mountains block is one of several fault-bounded packages of rock defined by internally uniform characteristics (Morton and Miller 2006). The Santa Ana Mountains block is bounded by the Whittier and Elsinore fault zones to the east and the Pacific coast to the west. This broad area encompasses most of Orange County, but also includes parts of Los Angeles, Riverside, and San Diego counties.

Peters Canyon Regional Park lies in the transition area between the western flank of the Santa Ana Mountains, a relatively young range that only emerged within the last four million years, and the less active flat-lying area of the Los Angeles Basin (Grant 2007). Local tectonism is currently uplifting the entire park and thrusting it southwestward, accommodated by the El Modena thrust fault located at the southern end of the park (Grant 2007); however, most sedimentary rocks within the park were deposited prior to the uplift of the Santa Ana Mountains that was initiated in the Pliocene (Morton and Miller 2006).

From the Eocene to the Miocene, the project area and broader region that would eventually become the Los Angeles Basin were at the interface of the ocean and the continent. Alternating depositions of marine and terrestrial sediments occurred as the oceanic shoreline went through natural cycles of retreat and advance, resulting in sedimentary sequences of interbedded marine and terrestrial units (Morton and Miller 2006).. The regionally important Vaqueros and Sespe formations accumulated during this time. During the middle Miocene, tectonic dynamics initiated the Los Angeles Basin proper and sediments (e.g., the Topanga Group, Morton and Miller 2006) began filling this topographic low, still connected to the ocean as a regional embayment, from terrestrial rivers. Terrestrial rivers are still actively depositing sediments in the greater Los Angeles Basin today as uplift of the Santa Ana Mountains continues at a rate of approximately 1.5 feet every 1,000 years (Grant 2007).

The park contains five mapped geologic units including Quaternary landslides (Qls), Quaternary young fanglomerate (Qyfsa), Quaternary very old fanglomerate (Qvofa), undivided Topanga Group (Tt), and undifferentiated Vaqueros and Sespe formations (Tvs) (Morton and Miller 2006). These units are each described in more detail and illustrated on Figure 4-1, *Geologic Map*.



Quaternary landslide (Qls)

Relatively recent landslide features (Holocene and Pleistocene-age movement) in the Santa Ana Mountains are common, particularly in the Sespe and Vaqueros formations. These units consist mainly of unconsolidated silt, sandstone, and conglomerate at dip angles exceeding 20 degrees (Morton and Miller 2006). Only a few small landslide deposits are mapped within the park boundaries.

Quaternary young fanglomerate (Qyfsa)

Holocene and late Pleistocene-age fanglomerates (subscript 'sa' stands for '*surficial alluvium*') occur within the topographically lowest parts of the park, especially along East Ridge View Trail, which traverses from the south end of the reservoir to the south end of the park. These sediments comprise unconsolidated to moderately consolidated silt, sand, pebbly cobbly sand, and boulder alluvial-fan deposits. Young fanglomerates are light tan to brown in color and are slightly to moderately dissected (Morton and Miller 2006). Within the park, these sediments have primarily accumulated within Peters Canyon proper and the flat-lying southern end.

Quaternary very old fanglomerate (Qvofa)

Early to middle Pleistocene-age fanglomerates (subscript 'a' stands for 'alluvium') underlie the park north of the reservoir. These deposits comprise moderately to well consolidated silt, sand, gravel, and conglomerate. These deposits range in color from orange-ish brown to reddish in color and tend to be moderately to well dissected (Morton and Miller 2006).

Pleistocene fanglomerates within the park accumulated in fault-controlled basins and outwash plains on the western flanks of the uplifting Santa Ana Mountains (Morton and Miller 2006).

Topanga Group, undivided (Tt)

The undivided Topanga Group crops out on the north and west flanks of the Santa Ana Mountains, where it consists of a cemented fluvial conglomerate at its base and medium- to coarse-grained tan to gray fluvial and marine sandstone higher up (Morton and Miller 2006). In the vicinity of Peters Canyon, the basal conglomerate is approximately 30 feet thick and the upper sandstones interbed with fine-grained silty sandstones and vitric tuff layers such that the whole unit, including the basal conglomerate, is approximately 40 feet thick (Whistler and Lander 2003). Only a small portion of the Topanga Group is mapped within the northwest corner of the park.

Vaqueros and Sespe formations (undifferentiated) (Tvs)

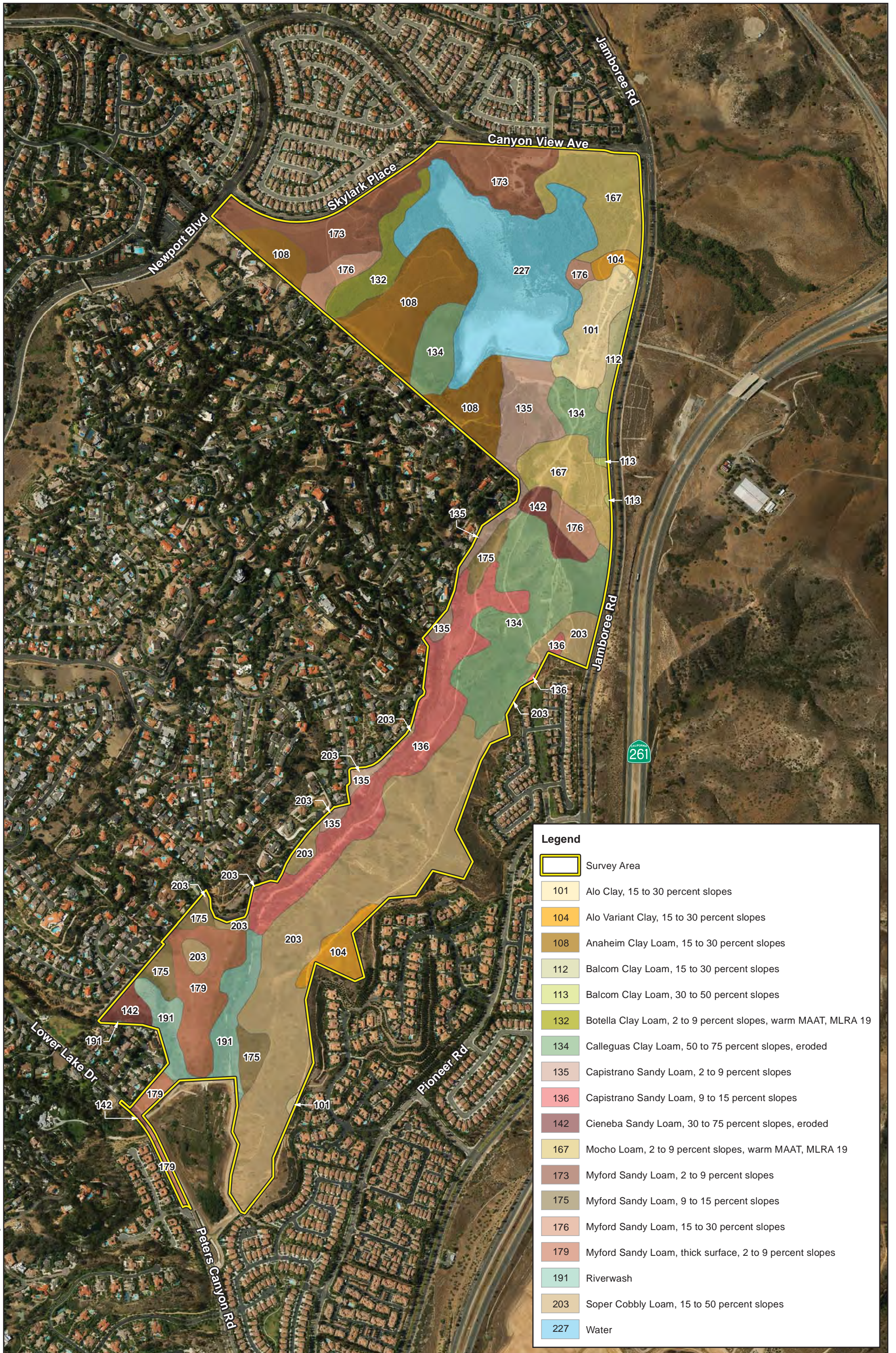
Across much of southern California, the Vaqueros and Sespe formations are easily differentiated by lithology and depositional setting; the Vaqueros Formation comprises predominantly gray-green marine sandstones and the Sespe is a widespread red to varicolored continental pebble and cobble conglomerate (Hamlin 1904; Morton and Miller 2006; Prothero and Donohoo 1997; Schoellhamer et al. 1981; Watts 1897; Whistler and Lander 2003). Within the Santa Ana Mountains and nearby Puente and San Joaquin Hills, these two units interdigitate on a nearly bed-by-bed basis to such a degree that they cannot be separately mapped even at a scale of 1: 24,000 (a scale typically used in local geologic mapping) and so are generally referred to as ‘undifferentiated’ (Morton and Miller 2006; Whistler and Lander 2003). This interdigitation is the result of deposition in an environment in which the shoreline was continually shifting (Campbell et al. 2009). The undifferentiated Vaqueros and Sespe is nearly 4,000 feet thick locally and overlies the lower to middle Eocene Santiago Formation. The Vaqueros-Sespe contacts the overlying lower to middle Miocene Topanga Group (undivided) at an erosional surface (Whistler and Lander 2003). The Vaqueros-Sespe is found in most of the northern and central portions of the park.

Topography and Soils

The general area that PCRP is situated in is characterized by rolling hills and valleys dominated by coastal sage scrub and disturbed areas/non-native grasslands in the uplands, with riparian-scrub and forested corridors lining valley bottoms and surrounding the reservoir. Elevations on-site range from approximately 320 to 700 feet above mean sea level.

On-site and adjoining soils were reviewed prior to the field visits using the USDA, NRCS *Soil Survey for Orange County and Western Part of Riverside County, California* (USDA, NRCS 1978). The following soil types have been mapped within the survey area (see Figure 4-2, *USDA Soils*):

- Alo clay, 15 to 30 percent slopes (101)
- Alo variant clay, 15 to 30 percent slopes (104)
- Anaheim clay loam, 15 to 30 percent slopes (108)
- Balcom clay loam, 15 to 30 percent slopes (112)
- Balcom clay loam, 30 to 50 percent slopes (113)
- Botella clay loam, 2 to 9 percent slopes, warm MAAT, MLRA 19 (132)
- Calleguas clay loam, 50 to 75 percent slopes, eroded (134)
- Capistrano sandy loam, 2 to 9 percent slopes (135)
- Capistrano sandy loam, 9 to 15 percent slopes (136)
- Cieneba sandy loam, 30 to 75 percent slopes, eroded (142)
- Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19 (167)



Legend	
	Survey Area
	101 Alo Clay, 15 to 30 percent slopes
	104 Alo Variant Clay, 15 to 30 percent slopes
	108 Anaheim Clay Loam, 15 to 30 percent slopes
	112 Balcom Clay Loam, 15 to 30 percent slopes
	113 Balcom Clay Loam, 30 to 50 percent slopes
	132 Botella Clay Loam, 2 to 9 percent slopes, warm MAAT, MLRA 19
	134 Calleguas Clay Loam, 50 to 75 percent slopes, eroded
	135 Capistrano Sandy Loam, 2 to 9 percent slopes
	136 Capistrano Sandy Loam, 9 to 15 percent slopes
	142 Cieneba Sandy Loam, 30 to 75 percent slopes, eroded
	167 Mocho Loam, 2 to 9 percent slopes, warm MAAT, MLRA 19
	173 Myford Sandy Loam, 2 to 9 percent slopes
	175 Myford Sandy Loam, 9 to 15 percent slopes
	176 Myford Sandy Loam, 15 to 30 percent slopes
	179 Myford Sandy Loam, thick surface, 2 to 9 percent slopes
	191 Riverwash
	203 Soper Cobbly Loam, 15 to 50 percent slopes
	227 Water

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Myford sandy loam, 2 to 9 percent slopes (173)

- Myford sandy loam, 9-15 percent slopes (175)
- Myford sandy loam, 15 to 30 percent slopes (176)
- Myford sandy loam, thick surface, 2 to 9 percent slopes (179)
- Riverwash (191)
- Soper cobbly loam, 15 to 50 percent slopes (203)

4.1.2 Paleontology

Based on the characteristics of the formations just described and previously reported fossil occurrences within them, each formation can be assigned a paleontological sensitivity rating using the SVP (2010) system. Three of the five units existing within the park have a high sensitivity for paleontological resources.

Quaternary landslide (Qls) and Quaternary young fanglomerate (Qyfsa)

Holocene sediments include units deposited during the past 11,700 years. Holocene alluvium has not produced significant fossil discoveries and is generally considered to have low paleontological sensitivity where it occurs. The young fanglomerate and landslide deposits are considered to have a low sensitivity for paleontological resources at the surface as they are primarily too young (the young conglomerate is mainly middle to late Holocene-age), lack the stratigraphic provenance necessary to adequately contextualize scientifically significant fossils (landslide deposits), and are not known to yield paleontological resources (McLeod 2016). However, at shallow depth (i.e., greater than five feet), both the young fanglomerate and landslide units could be underlain by the older, high sensitivity Pleistocene and Vaqueros-Sespe deposits.

Quaternary very old fanglomerate (Qvofa)

A formal records search of the Natural History Museum of Los Angeles County (LACM) collections recorded two fossil localities in Pleistocene sediments (LACM 4943 and 7897) in the vicinity of Peters Canyon Regional Park (McCleod 2016). Each of these localities contained fossil horse teeth. A search of the online collections database of the University of California Museum of Paleontology (UCMP) of Pleistocene-age deposits in Orange County yielded 101 localities, 98 of which contain only marine invertebrates and three contain vertebrates. Of the three vertebrate localities, 36 of the 38 specimens collected were from the strictly marine Palos Verdes Sand in Newport Beach and only two specimens (individual horse teeth) are from non-marine sediments. Pleistocene marine deposits do not occur within the Peters Canyon Regional Park. A search of the online Paleobiology Database recorded 14 localities within Pleistocene formations in Orange County, none of which occur within Peters Canyon Regional Park. Despite the lack of recorded findings near the park, Pleistocene-age terrestrial sediments are known throughout California to produce fossils and so are considered highly sensitive wherever they occur (Agenbroad 2003; Bell et al.

2004; Jefferson 1985, 1991; Merriam 1911; Reynolds et al. 1991; Savage et al. 1954; Scott and Cox 2008; Springer et al. 2009; Wilkerson et al. 2011; Winters 1954); therefore, Quaternary very old fanglomerates within the park are considered highly sensitive for paleontological resources.

Topanga Group, undivided (Tt)

A search of the Topanga Group in Orange County in the UCMP online collections database yielded two localities containing only microfossils and invertebrates. Additional paleontological literature review revealed four additional localities in the undivided Topanga Group from the Upper Oso Dam area, approximately ten miles to southeast of Peters Canyon Regional Park (Howard and Barnes 1987). These localities contained mixed marine and terrestrial bird fauna including albatross, shearwaters, boobies and gannets, ducks, and auk. A bird sample of this middle Miocene age is rare for Orange County and is the only marine avifauna in California of this age south of the Sharktooth Hill Bonebeds in Kern County (Howard and Barnes 1987).

Vaqueros and Sespe formations (undifferentiated) (Tvs)

A formal records search of the LACM collections showed five localities recorded in V/S deposits (LACM 3983-3985, 6624, and 6666; Table A1; McLeod 2016). These localities yielded an assortment of terrestrial and marine vertebrates including horses, rodents, whales, sharks, and desmostylians (amphibious horse- like animals that resembled hippos). All of these localities were found within just a few miles of the park.

A search of the online collections database of the UCMP recorded no fossil localities within the Sespe Formation and 83 localities within the Vaqueros Formation in Orange County. Of the Vaqueros Formation localities, 82 contained only marine invertebrates and one contained only plants. UC Berkeley's NEOMAP online database search recorded 33 localities from the Sespe Formation and 13 from the Vaqueros Formation in Orange County. From these localities, a total of 237 individually numbered mammalian fossils were recovered, including rodents, rabbits, camels, carnivores, horses, and insectivores. The NEOMAP search largely duplicates the locality list provided in Whistler and Lander (2003). A search of the online Paleobiology Database recorded 34 localities within the Sespe Formation and 30 within the Vaqueros Formation. Of these 64 localities, 14 from the Sespe and 23 from the Vaqueros (37 total) contained only marine invertebrates (Cushman and Leroy 1938; Loel and Corey 1932; Schoellhamer et al. 1981; Van Ee et al. 2012; Zullo 1992).

Additional review of published maps showing fossil localities in this part of Orange County and the LACM records search reveals marine invertebrates from at least three unnumbered localities in Vaqueros-Sespe deposits have been recovered from within the boundaries of the park and at least 13 localities from Vaqueros-Sespe deposits have been found nearby

(McLeod 2016; Prothero and Donohoo 1997; Schoellhamer et al. 1981; Whistler and Lander 2003; Table A1). Although no marine or terrestrial vertebrate fossils have been recovered within the park, at least eight of the aforementioned Vaqueros-Sespe localities are within five miles of the park. The majority of the Vaqueros-Sespe localities were discovered during construction of the Eastern Transportation Corridor (ETC) project in the mid- to late-1990s (Whistler and Lander 2003). One locality, ETC Jamboree Road, occurs approximately 100 feet outside the eastern boundary of the park and revealed the first record of Eocene land mammals in the Vaqueros-Sespe (McLeod 2016; Prothero and Donohoo 1997; Schoellhamer et al. 1981; Whistler and Lander 2003). This locality and the Windy Ridge site, located approximately three miles north of the park, contained the oldest land mammals from the Vaqueros-Sespe in Orange County (Whistler and Lander 2003). All Vaqueros-Sespe deposits are considered highly sensitive for paleontological resources within the park based on past known resources in these deposits.

4.1.3 Cultural Background

Archaeologists have developed chronological sequences to explain prehistoric cultural changes within all or portions of southern California. Early studies and data synthesis led to the development of a prehistoric chronology for the Southern California coastal region comprised of four horizons: Early Man, Milling Stone, Intermediate, and Late Prehistoric. The Early Man Horizon (ca. 10,000 – 6,000 B.C.) was based on a mix of hunting and gathering, along with a focus on the aquatic resources found along the coastal areas. Evidence shows that a warm and dry period began around 6000 B.C., leading to the Milling Stone Horizon (6000 – 3000 B.C). The Milling Stone Horizon was characterized by a greater emphasis on plant foods and small game due to the change in environmental conditions, along with a lack of well-made projectile points. The Milling Stone Horizon was followed by the Intermediate Horizon (3000 B.C. – A.D. 500). The Intermediate Horizon is characterized by a shift towards a hunting and maritime strategy, as well as a greater use of plant foods. This horizon was also characterized by an increased use of and diversity of tool kits for hunting, fishing, and processing food. During the Late Prehistoric Horizon (A.D. 500 – Historic Contact), the diversity of plant food resources and land and sea mammal hunting increased even further than during the Intermediate Horizon. This dramatic change in material culture and subsistence focus is attributed to the westward migration of desert people called Takic, or Numic, Tradition in Los Angeles, Orange, and Riverside counties.

PCRP is located within the traditional territory of the Native American group known as the Gabrielino. The name Gabrielino was given by the Spanish to the natives, however, most contemporary Gabrielino prefer to identify themselves as Tongva. The Tongva territory included the Los Angeles basin and southern Channel Islands as well as the coast from Aliso Creek in the south to Topanga Creek in the north. The Tongva society was organized along patrilineal non-localized clans, and they established permanent villages and small satellite camps throughout their territory. Tongva subsistence was oriented around plants,

large and small mammals, freshwater and saltwater fish, shellfish, birds, reptiles, and insects. They also used a wide variety of tools such as bow and arrows, traps, nets, blinds, throwing sticks and slings, spears, harpoons, and hooks.

The post-contact history of California is generally divided into three timespans: the Spanish period, the Mexican period, and the American period. The beginning of the Spanish Period (1769 – 1822) was marked by the establishment of the first Spanish settlement at Mission San Diego de Alcalá. Between 1769 and 1823, 21 missions had been erected and the initial Spanish settlement of the project vicinity began. The beginning of the Mexican Period (1822 - 1848) began when news of the success of the Mexican War of Independence against the Spanish crown reached California in 1822. The Secularization Act of 1833 federalized mission lands and enabled Mexican governors in California to distribute former mission lands to individuals in the form of land grants. Over 700 land grants were made between 1822 and 1846, including the Rancho Lomas de Santiago land grant which included the present-day cities of Irvine and Tustin as well as Peters Canyon Regional Park. The Mexican Period ended with the U.S. Army and Navy victory in the Battle of the San Gabriel River and the Battle of La Mesa. The American Period officially began with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico \$15 million for conquered territory which included California, Nevada, Utah, Arizona, New Mexico, Wyoming, and parts of Colorado. Many of the old ranchos in Orange County were sold or otherwise acquired by Americans in the mid-1800s, and most were subdivided into agricultural parcels or towns. Agriculture remained the primary economic activity until the 1950s, when the county's agricultural land was replaced with tract housing developments.

The 93,000 acre Irvine Ranch was formed after James Irvine I and his partners, Benjamin and Thomas Flint, and Llewellyn Bixby, purchased Rancho Lomas de Santiago, Rancho San Joaquin, and a portion of Rancho Santiago de Santa Ana, major Spanish-Mexican land grants south of Los Angeles, between the years of 1864 and 1868 (Nelson 2009). Valuable water rights were secured with the purchase of Rancho Lomas de Santiago, as it bordered the Santa Ana River to the north (City of Irvine 2016, Irvine Company 2016).

In 1876, Irvine bought out his partners for \$150k and continued to farm the land (Nelson 2009). He experimented with new methods of cultivation, and sold sheep and cattle for their hides. He drilled water wells and a canal and grew field crops such as lima beans and barley (City of Irvine 2016, Irvine Foundation n.d.).

James Irvine died in 1886, leaving his estate in a trust until his son, James Irvine II, turned 25. The ranch was managed by an uncle, George Irvine, for the interim. In 1887 a subsidiary of the Santa Fe Railroad was granted right of way through the ranch, and a transition from sheep to cattle ranching took place. Five thousand acres were also leased to farmers raising hay and grain (Nelson 2009).

James Irvine II took over operations in 1892, converting the ranch from a basic grazing operation to a more complicated system of field crops, grain, and irrigated orchards (Nelson 2009). He created an agricultural empire with tenant farmers growing a number of crops such as lima beans, black-eyed peas, sugar beets, walnuts, avocados, strawberries, lemons, and oranges. Ranching operations continued, although on a smaller scale (Irvine Company 2016). In the early 1900s gasoline driven and electrical pumping technology became available and allowed water to be obtained from the underground basin of the Agua de las Ranos marshland which was used to irrigate crops. By the 1920s about 1200 wells had been drilled, costing several million dollars (Nelson 2009). In 1930, it was the state forerunner of large-scale agricultural operations, growing a variety of crops such as beans, barley, cauliflower, oranges, grapes, and papayas (City of Irvine 2016). It also boasted roughly 31,000 acres of lima bean fields; the largest in the world (Nelson 2009).

In 1943 the federal government acquired a portion of The Irvine Company's land and constructed the El Toro Marine Corps Air Station and the Tustin Lighter-Than-Air Station for use in World War II (Nelson 2009). The post war economic boom, increased the value of the land as thousands of new residents poured into the state throughout the 1940s and 50s. Southern California experienced tremendous growth and sprawling cities were built on prime agricultural land. The population of Orange County tripled in the 1950s from 216,000 to 703,000, and doubled in the 1960s, bringing it to approximately 1.4 million (Irvine Company 2016). The Irvine Company was compelled to open its ranch land to real estate development; however it employed a more deliberate approach to community planning than neighboring areas had (Irvine Foundation n.d.).

In 1959 the University of California purchased 500 acres of land from The Irvine Company, who in turn donated 1,000 acres and the state bought an additional 500 acres to build a new campus (City of Irvine 2016). In 1960, Ray Watson was hired as The Irvine Company's first planner to guide preparation of the Master Plan for the Irvine Ranch. Watson, a 32-year-old Bay Area architect, worked closely with William Pereira, an architect and urban planner, who had been commissioned to design a community adjacent to the new University of California campus. He was to guide a well-organized development and provide a balance of land uses to support economic growth and encourage a high quality of life. These included residential villages, retail and commercial centers, schools, parks, roads, and utilities. Eleven percent of the land was planned as open space. William Pereira, who is most well-known for his design of San Francisco's iconic Transamerica Building, made the cover of Time Magazine in September 1963 for the Master Plan of The Irvine Ranch (Irvine Company 2016).

Peters Canyon Regional Park was part of the 47,000 acre Mexican land grant made to Teodosio Yorba in 1846, who called the area Rancho Lomas de Santiago, or the Hills of Saint James. The Canon de las Ranos (Canyon of the Frogs) on the Rancho Lomas de Santiago would later become Peters Canyon which was purchased by James Irvine in 1897

along with the rest of the rancho (Lovret 2016). Irvine leased several sections of the canyon to farmers including James Peters who had been raising barley and beans in the lower portion of the canyon near what is today Lower Peters Canyon Retarding Basin and Dam since 1891. Peters built a house in the area and planted a large eucalyptus grove in the lower canyon.

In 1899, several men approached Irvine and requested to lease land from him to construct a nine-hole golf course within the canyon (Lovret 2016). The Santiago Golf Club used Peters Canyon until they moved in 1923.

Beginning in 1931, Irvine constructed two reservoirs within the Canyon to bring irrigation for agriculture. Upper Peters Canyon Reservoir and Dam was the first reservoir to be constructed and was followed by the Lower Peters Canyon Retarding Basin, also referred to as Little Peters Lake, in 1940. The basins regulated the Irvine Company's draft from Santiago Reservoir and conserved water for the orchard farming taking place in the area (Lovret 2016; Nelson 2009).

During World War II, Peters Canyon was used as a training area for the U.S. Army. The training area was established within the eucalyptus grove near Little Peters Lake, here, mock battles were fought between Camp Rathke stationed at Irvine Park and Camp Commander stationed at Peters Canyon Park (Lovret 2016).

From 1952 to 1988, a portion of the canyon of the canyon was maintained by the Boy Scouts as Camp Myford, named for James Irvine II's youngest son (Lovret 2016). Sometime around 1966, the Oranco Bowmen archery range occupied an area north of the Lower Peters Canyon Retarding Basin, though it is unclear when the range was founded or how long it occupied the area (Hafner et al. 1966).

In 1992, the Irvine Company dedicated the 340-acre Peters Canyon to the County of Orange to be preserved as open space (Lovret 2016). Today, the canyon is used recreationally by hikers, mountain cyclists, and equestrians.

4.1.4 Cultural Resources

Peters Canyon Regional Park was surveyed for artifacts, ecofacts, soil discolorations that might indicate presence of cultural midden, soil depressions, and features indicative of the former presence of structures or buildings or historic debris. Four newly recorded resources were identified, and seven previously recorded cultural resources were identified and relocated. Two prehistoric lithic scatters (PCRP-01 and PCRP-02), one historic culvert (PCRP-03), and one isolated prehistoric flake (PCRP-ISO-01) were discovered. Resource PCRP-01 consists of a sparse lithic scatter containing approximately 10 flakes. No subsurface deposit was apparent at the time of the survey, however, there is potential for a

subsurface deposit to be present. Resource PCRP-02 consists of a sparse lithic scatter containing approximately 10 flakes. No subsurface deposit was apparent at the time of the survey, however, there is potential for a subsurface deposit to be present. Resource PCRP-03 consists of a concrete-lined drainage channel, two iron pipe fragments, and one historic glass bottle fragment, which was left in place. Resource PCRP-ISO-01 consists of a single prehistoric flake. No subsurface deposit was apparent at the time of the survey, however, there is potential for a subsurface deposit to be present. In order to protect cultural sites, Figure 4-3, *Cultural Resources*, has been removed from the RMP and is on file with the OC Parks Planning and Design office.

4.1.5 Canyon Fire II

Chambers Group, Inc. (Chambers Group) surveyed the accessible areas of PCRP that were affected by the recent Canyon Fire II, which encompassed approximately 157 acres within PCRP. The fire eliminated ground cover and vegetation, which had previously obscured ground surface visibility during 2016 surveys, thus allowing cultural resources survey crews to revisit previously recorded resources and refine the site boundary as well as identify new resources.

Supplemental surveys addressed areas of PCRP that were affected by the Canyon Fire II (Figure 1). In November 2017, the Canyon Fire II burned the northern portion of the park surrounding the Upper Peters Canyon Reservoir and Dam. The fire entered the park at the corner of Jamboree Road and Canyon View Avenue. It then spread in a southwesterly direction, fed by the wind. The burn area extends from Canyon View Avenue in the north, to the housing development and Brentwood Drive in the west, Jamboree Road in the east and approximately 33 percent of the northern portion of the park toward the south. The entirety of this burn area within PCRP was surveyed.

The supplemental cultural resources survey was conducted between February 5 and 7, 2018, in areas of the park that had been affected by fire. Surface visibility within the survey area was very good (70 to 100 percent). The fire resulted in better ground visibility due to the removal of all vegetation; however, the ground was highly burned, and the ground surface was stained with charcoal, making individual identification of lithic material based on color difficult. The lack of vegetation on slopes and hillsides also caused erosion, which buried previously recorded resources and made updating sites challenging. This erosion also caused artifacts to migrate downhill, essentially increasing the size of one of the site boundaries.

The current survey identified a total of 10 new cultural resources. Six of these resources were associated with previously recorded sites documented in the technical report (Campbell et al. 2016). The other four cultural resources were determined to be isolated artifacts and were recorded as such. All the previously recorded sites were relocated;

however, the burned context and erosion caused by vegetation loss made it difficult to relocate previously recorded artifacts.

4.2 CULTURAL, GEOLOGICAL, AND PALEONTOLOGICAL RESOURCE MANAGEMENT (CR) GOALS AND STRATEGIES

Goal CR-1: Preserve and protect the cultural, geological, and paleontological resources of the park.

Strategy CR-1.1: Provide a detailed map to facility managers identifying significant archaeological/paleontological sites.

- Include consultation with map as first step prior to initiation of any type of ground disturbance.
- Protect information from broader audience.

Strategy CR-1.2: Train park staff and volunteers about the cultural, geological, and paleontological aspects of the park. Encourage, utilize, and support historical research by docents and volunteers.

- Provide the cultural, geological, paleontological resources reports to park staff and volunteers.
- Provide funding and/or support for additional historical research by OC Parks staff or others.

Strategy CR-1.3: Site infrastructure such that it does not impact archeo/paleo sites.

- Refer to the cultural, geological, and paleontological resources reports when establishing new infrastructure and facilities within the park.

Goal CR-2: Provide public access and educational programs to interpret cultural, geological, and paleontological resources.

Strategy CR-2.1: Develop and implement an interpretative program.

Strategy CR-2.2: Create cultural, geological, and paleontological interpretive displays to share information about the park with the public.

- Place interpretive displays at locations within the park that hold some sort of cultural significance, without causing potential harm or damage to these resources.

Strategy CR-2.3: Provide interpretive materials such as signage or brochures for self-guided hikes to inform visitors about the history of the park. Develop locations to display materials or artifacts for public benefit.

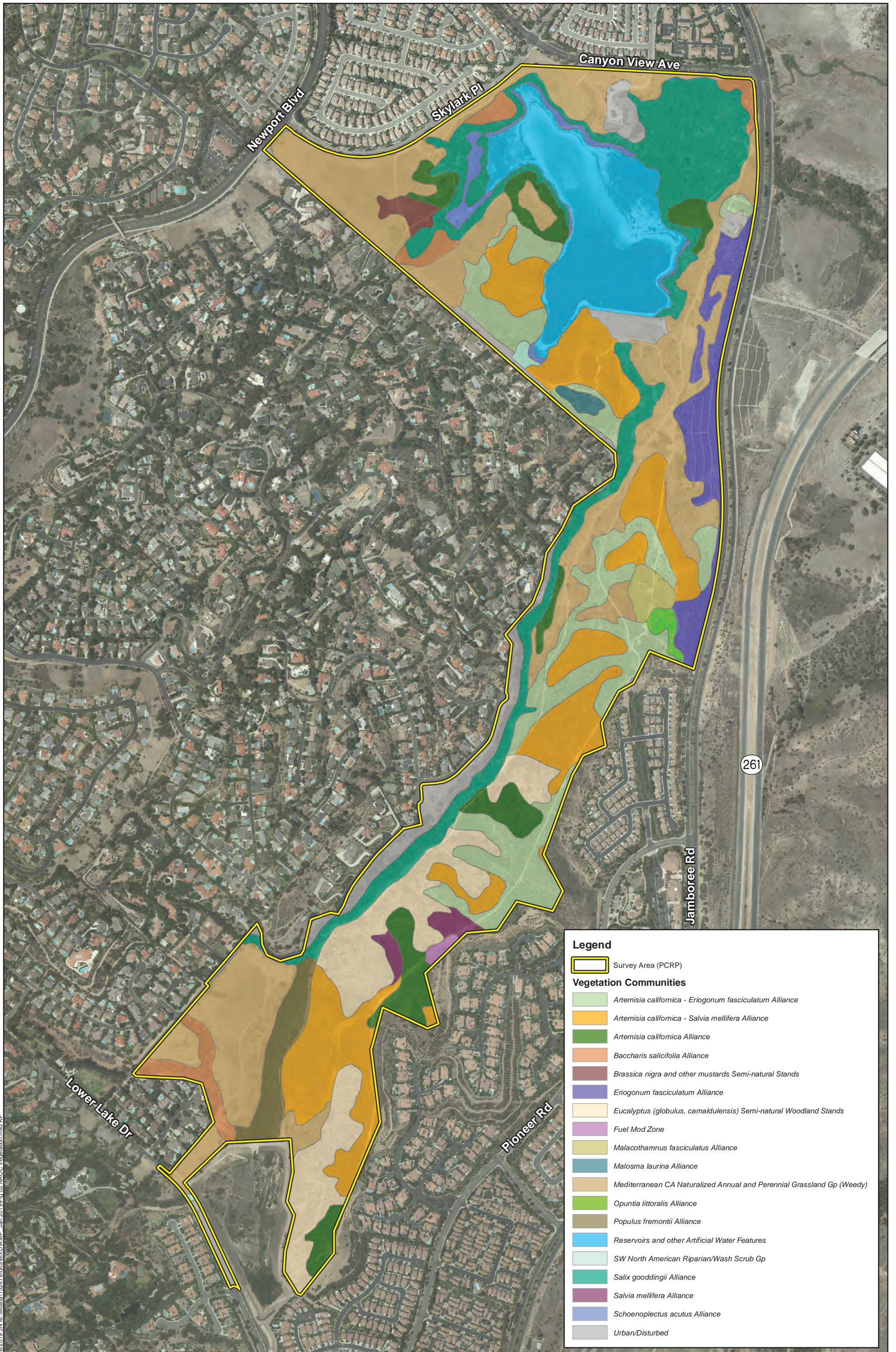
Section 5 Biological Resource Management (BR)

Peters Canyon Regional Park is home to a wide variety of plant and animal species. Among these species are several special status species and plant communities. Although several special status species were observed throughout baseline habitat assessments, further studies could potentially find a greater diversity of special status species within the park. Proper management is critical to the protection of the natural resources within PCRP.

5.1 EXISTING BIOLOGICAL RESOURCES

5.1.1 Vegetation Communities

Several terrestrial vegetation communities were identified on-site during field surveys. Vegetation classification was based on Holland's classification system (1986) and modifications were made based on Oberbauer's system (2008). A complete list of plant species observed during surveys is provided in Appendix A, Documentation. Maps created specifically for the NCCP/HCP using NROC vegetation communities are presented in Figure 5-1, *NROC Vegetation Communities Mapped within NCCP/HCP Reserve*. In addition, maps illustrating the extent of terrestrial vegetation communities, land uses, and locations of special-status plants and wildlife observed in PCRP by Michael Baker are presented as Figures 5-2, 5-3, and 5-4, *Vegetation Communities, Land Uses, and Special-Status Species*, respectively (Michael Baker 2016a). In addition, these maps contain special-status plants and wildlife observed in PCRP during the NCCP/HCP surveys. The vegetation mapping conducted for the NCCP/HCP is very similar to the vegetation mapping done by Michael Baker, but differs from Michael Baker's vegetation mapping conducted in 2016 by implementing the NROC vegetation classification instead of Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California. The vegetation mapping is generally the same, with some areas more detailed than others in both maps. The vegetation mapping within the Michael Baker maps classified the CSS within the park as 'Diegan Coastal CSS', while the NCCP/HCP mapping divided the CSS into 3 alliances. Table 1 provides acreages of each vegetation community and land use on-site, with each discussed in detail.



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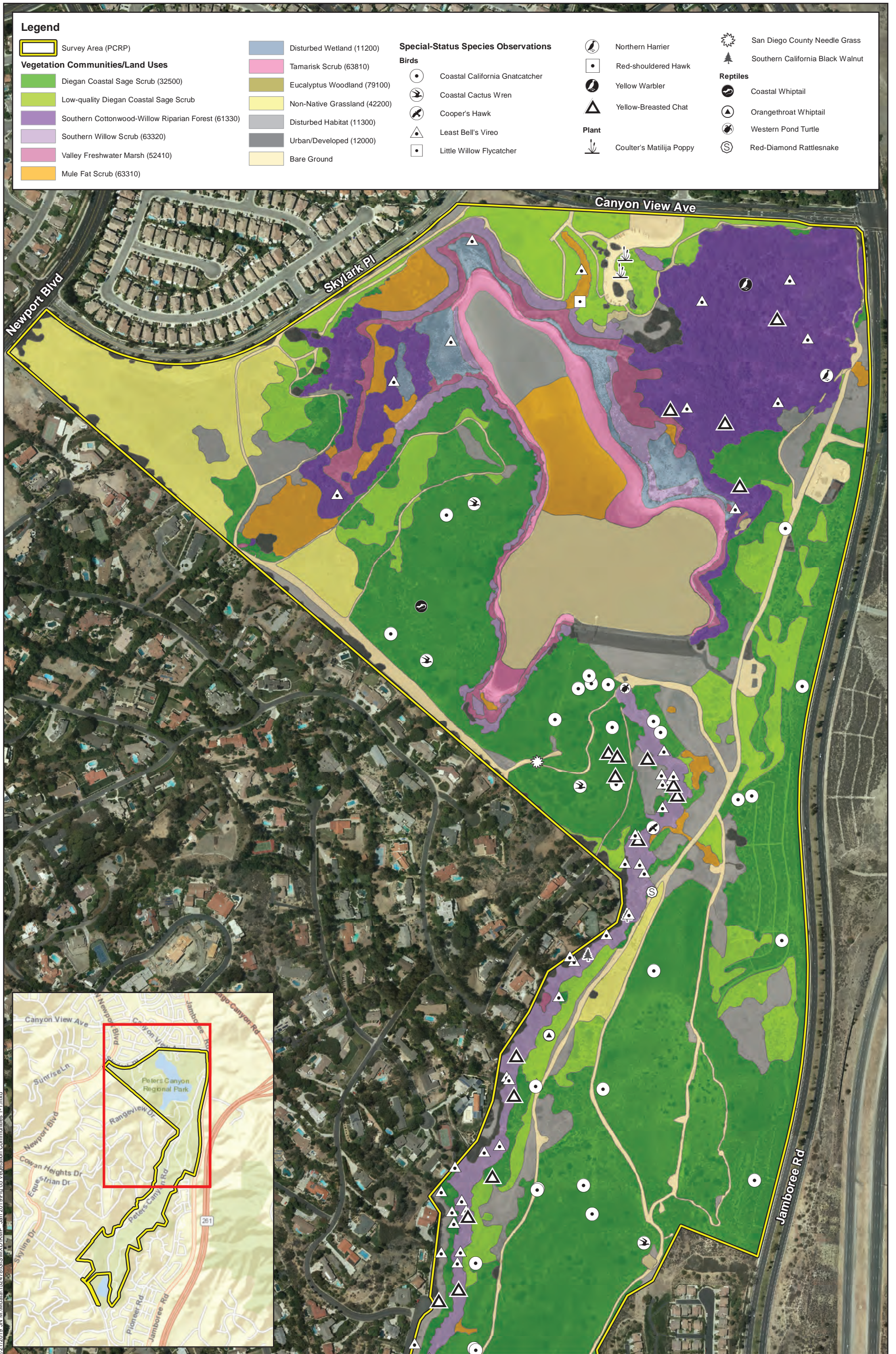
- Survey Area (PCRP)

Vegetation Communities

- Artemisia californica* - *Eriogonum fasciculatum* Alliance
- Artemisia californica* - *Salvia mellifera* Alliance
- Artemisia californica* Alliance
- Baccharis salicifolia* Alliance
- Brassica nigra* and other mustards Semi-natural Stands
- Eriogonum fasciculatum* Alliance
- Eucalyptus (globulus, camaldulensis)* Semi-natural Woodland Stands
- Fuel Mod Zone
- Malacothamnus fasciculatus* Alliance
- Malosma laurina* Alliance
- Mediterranean CA Naturalized Annual and Perennial Grassland Gp (Weedy)
- Opuntia littoralis* Alliance
- Populus fremontii* Alliance
- Reservoirs and other Artificial Water Features
- SW North American Riparian/Wash Scrub Gp
- Salix gooddingii* Alliance
- Salvia mellifera* Alliance
- Schoenoplectus acutus* Alliance
- Urban/Disturbed

PETERS CANYON REGIONAL PARK (PCRP) RESOURCE MANAGEMENT PLAN
NROC Vegetation Communities
 Mapped within NCCP/HCP Habitat Reserve

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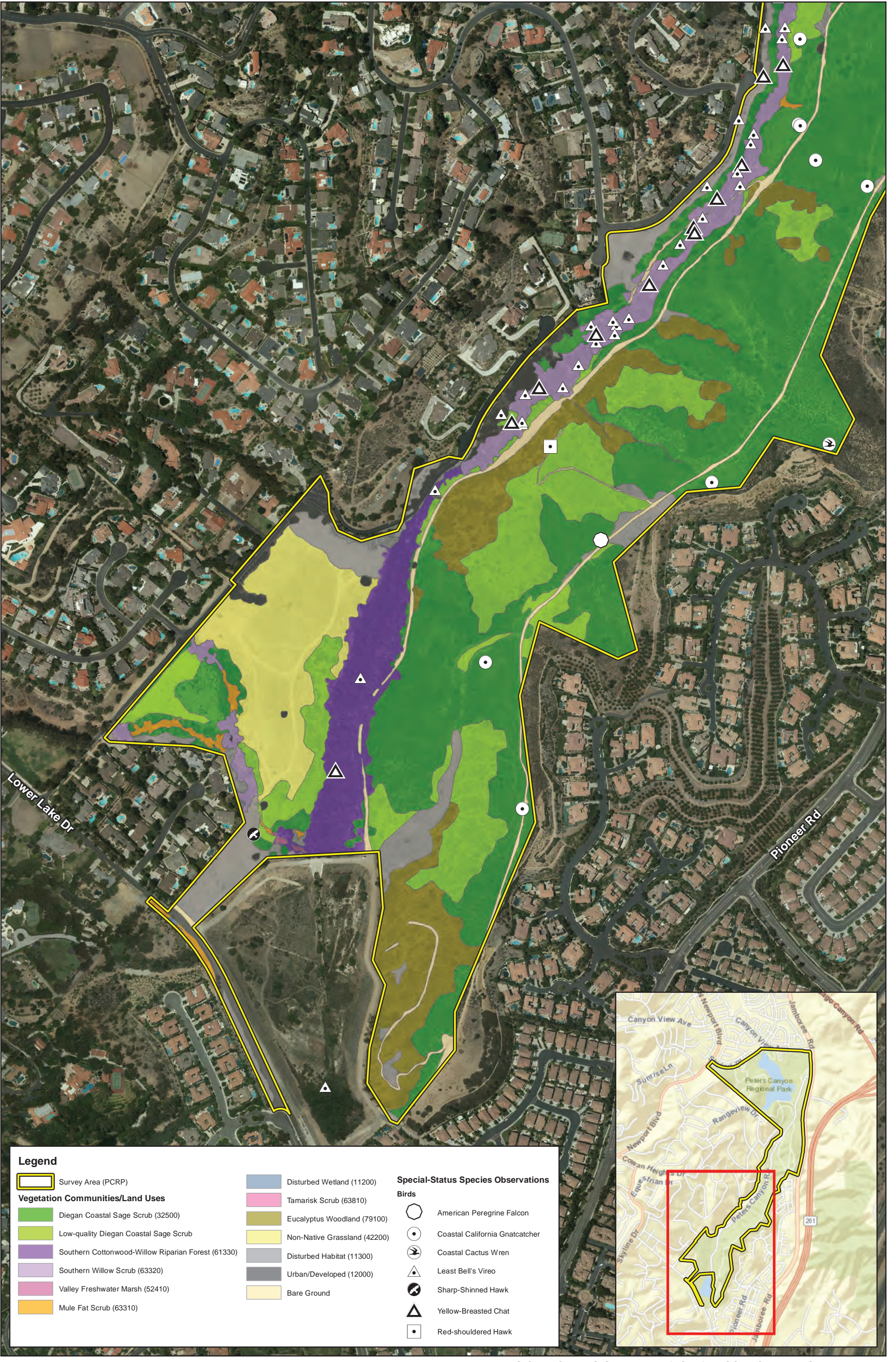
PETERS CANYON REGIONAL PARK (PCRP) RESOURCE MANAGEMENT PLAN
BIOLOGICAL RESOURCES REPORT



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PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN

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Legend

- | | | |
|----------------------------------------------------|------------------------------|--------------------------------------------|
| Survey Area (PCRP) | Disturbed Wetland (11200) | Special-Status Species Observations |
| Vegetation Communities/Land Uses | | |
| Diegan Coastal Sage Scrub (32500) | Tamarisk Scrub (63810) | American Peregrine Falcon |
| Low-quality Diegan Coastal Sage Scrub | Eucalyptus Woodland (79100) | Coastal California Gnatcatcher |
| Southern Cottonwood-Willow Riparian Forest (61330) | Non-Native Grassland (42200) | Coastal Cactus Wren |
| Southern Willow Scrub (63320) | Disturbed Habitat (11300) | Least Bell's Vireo |
| Valley Freshwater Marsh (52410) | Urban/Developed (12000) | Sharp-Shinned Hawk |
| Mule Fat Scrub (63310) | Bare Ground | Yellow-Breasted Chat |
| | | Red-shouldered Hawk |

PETERS CANYON REGIONAL PARK (PCRP) RESOURCE MANAGEMENT PLAN
BIOLOGICAL RESOURCES REPORT

Table 1. Vegetation Communities/Land Uses within the Survey Area

Vegetation Community/Land Use	Acreage
Diegan Coastal Sage Scrub (32500)	127.88
Low-quality Diegan Coastal Sage Scrub	40.32
Southern Cottonwood-Willow Riparian Forest (61330)	31.30
Southern Willow Scrub (63320)	15.82
Valley Freshwater Marsh (52410)	4.94
Mule Fat Scrub (63310)	10.31
Disturbed Wetland (11200)	3.99
Tamarisk Scrub (63810)	5.16
Eucalyptus Woodland (79100)	13.50
Non-Native Grassland (42200)	24.23
Disturbed Habitat (11300)	27.24
Urban/Developed (12000)	9.44
Bare Ground	26.01
TOTAL*	340.00

* Total may not equal to sum due to rounding.

Diegan Coastal Sage Scrub (Holland Code: 32500)

Coastal sage scrub occurs throughout the survey area in various forms and stages. Most coastal sage scrub on-site is relatively intact (i.e., mature with limited disturbance or non-native, invasive species encroachment; mapped as coastal sage scrub).

Some coastal sage scrub restoration areas, including those surrounding the upper reaches of Peters Canyon Creek (PCC), are mature, healthy, and nearly devoid of non-native vegetation (thereby, they are mapped as coastal sage scrub).

The intact coastal sage scrub on-site varies considerably in composition. Dominant shrubs relatively consistent throughout primarily include California sagebrush (*Artemisia californica*), black sage (*Salvia mellifera*), California encelia (*Encelia californica*), purple needle grass (*Stipa pulchra*), California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber*), wild cucumber (*Marah macrocarpa*), and foothill needle grass (*Stipa lepida*). Other dominants present throughout include laurel sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), lemonade berry (*Rhus integrifolia*), white sage (*Salvia apiana*), bush monkeyflower (*Mimulus aurantiacus*), California matchweed (*Gutierrezia californica*), and common sandaster (*Corethrogyne filaginifolia*). Depending upon substrate and/or slope aspect, some coastal sage scrub areas include various combinations of the above-mentioned shrubs, but with a greater component of coast prickly pear (*Opuntia littoralis*) and coastal cholla (*Cylindropuntia prolifera*) on east- and south-facing slopes; poison oak (*Toxicodendron diversilobum*), chaparral mallow (*Malacothamnus fasciculatus*), and giant wild rye (*Elymus condensatus*) on west- and north-facing slopes; and patches of Palmer's

rabbitbrush (*Ericameria palmeri* var. *pachylepis*), coastal goldenbush (*Isocoma menziesii*), or coyote brush (*Baccharis pilularis*) in specific locations.

Low-Quality Diegan Coastal Sage Scrub (Holland Code: 32500)

Several areas surrounding the parking lot, reservoir trail system, and in various areas along Peters Canyon Regional Riding and Hiking Trail within the canyon have undergone limited restoration efforts. These areas primarily consist of widely-spaced container plant installations; however, they appear relatively unmaintained. The installations are small and appear to be struggling, while all areas in between are densely vegetated with non-native, invasive grasses and forbs. In addition, some areas near the southern end of PCRP consist of relatively intact coastal sage scrub vegetation but include scattered individuals and remnant snags of red gum (*Eucalyptus camaldulensis*) that provide advantageous perching for raptors and corvids and thereby preclude various wildlife species such as the coastal California gnatcatcher. These areas have been mapped as low-quality coastal sage scrub.

Areas that consist of a mosaic of scattered, intact coastal sage scrub shrubs with interstitial spacing dominated by non-native grasses and forbs were mapped as low-quality coastal sage scrub as these areas appear to be recovering from previous disturbances.

Southern Cottonwood-Willow Riparian Forest (61330)

The Upper Peters Canyon Reservoir (UPCR) basins and inlets that are subject to reservoir-influenced hydrology primarily consist of mature southern cottonwood-willow riparian forest vegetation dominated by Goodding's black willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), red willow (*Salix laevigata*), and sandbar willow (*Salix exigua*), with mule fat (*Baccharis salicifolia*) primarily located along the fringes. Understory is relatively absent in the western inlets, whereas California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), California wild grape (*Vitis californica*), California wild rose (*Rosa californica*), and stinging nettle (*Urtica dioica*) dominate the understory in the eastern basin of UPCR. Various portions of the eastern basin are highly disturbed with the presence of Mexican fan palm (*Washingtonia robusta*), common fig (*Ficus carica*), tamarisk (*Tamarix ramosissima*), and Canary Island date palm (*Phoenix canariensis*), poison hemlock (*Conium maculatum*), smilo grass (*Stipa miliacea* var. *miliacea*), and milk thistle (*Silybum marianum*). Alkali mallow (*Malvella leprosa*) occurs in some locations on the outer margins of mule fat.

Peters Canyon Creek (PCC) primarily consists of mature southern cottonwood-willow riparian forest vegetation dominated by Goodding's black willow, Fremont cottonwood, western sycamore, red willow, and isolated patches of sandbar willow. Within the upper reaches of the creek, stream banks are dominated by black cottonwood (*Populus trichocarpa*), with California mugwort (*Artemisia douglasiana*) along the fringes closer to the

UPCR dam. The lower reaches of PCC include an understory dominated by yerba mansa (*Anemopsis californica*), California bulrush (*Schoenoplectus californicus*), and Spanish false fleabane (*Pulicaria paludosa*), with non-natives such as Mexican fan palm, shamel ash (*Fraxinus uhdei*), and Chinese elm (*Ulmus parvifolia*) scattered throughout. Southern California black walnut (*Juglans californica*; CRPR 4.2) occurs in a few locations within the middle reaches, with an understory of common tule (*Schoenoplectus acutus*) pockets and California blackberry.

Southern Willow Scrub (63320)

Vegetation surrounding UPCR (adjacent to upland habitat), including swaths and patches of vegetation within the reservoir basin/inlets and throughout PCC, consist of southern willow scrub vegetation dominated by red willow; these areas are relatively absent of the black willow, sycamore, and cottonwood that typically comprise a woodland or forest classification.

Valley Freshwater Marsh (52410)

Pockets of native freshwater marsh vegetation are present throughout the survey area. Specifically, swaths of California bulrush line the reservoir margins, with stands of California bulrush dominating portions of the reservoir basin and inlets and sections of Peter Canyon Creek. Few areas within the basin and along PCC also include stands of broadleaf cattail (*Typha latifolia*). Further, isolated pockets of Mexican rush (*Juncus mexicanus*) occur within the reservoir inlets, with common tule, American bulrush, and California bulrush dominating small portions of PCC.

Mule Fat Scrub (63310)

Mule fat scrub occurs as dense, mostly monotypic thickets of mule fat (*Baccharis salicifolia*) along the reservoir margins between the riparian woodland and upland surroundings, in patches within the reservoir basin and inlets, in the center of the dry reservoir (extensive expansion has occurred since the reservoir dried), and along the canyon, primarily on the edges of the riparian corridor.

Disturbed Wetland (11200)

Within several of the areas described as mule fat scrub above, tamarisk is equally prevalent, displacing the dominant native riparian vegetation, mule fat. These areas are transitional between intact mule fat scrub and tamarisk scrub, described below.

Tamarisk Scrub (63810)

Based on review of aerial photograph timelines on Google Earth Pro (2016), extensive stands of tamarisk that were not present when the reservoir held water or was inundated

appears to have established along the inner rims of the reservoir, including portions of the inlets.

Eucalyptus Woodland (79100)

Along the southernmost end of the survey, an historic eucalyptus woodland dominated by red gum covers the eastern slopes, with an understory either absent or dominated by non-native grasses such as common ripgut grass (*Bromus diandrus*) and foxtail chess (*B. rubens*). A few portions of scattered red gum trees are dead or struggling, increasing in number to the north. Relatively intact coastal sage scrub vegetation exists in the understory and are mapped as low-quality coastal sage scrub. Several ornamental blue gum (*Eucalyptus globulus*) are scattered along or line the western side of PCC adjacent to residences, but do not constitute a woodland.

Non-Native Grassland (42200)

Non-native grassland vegetation was mapped west of UPCR and in the northwest and southwest corners of the survey area. These areas were highly disturbed and are now dominated by various non-native grasses, primarily common ripgut grass, foxtail chess, wild oat (*Avena fatua*), and rattail fescue (*Festuca myuros*).

Disturbed Habitat (11300)

Disturbed habitat on-site consists of areas subjected to substantial disturbance, either through frequent and repeated activities such as grading or compaction, or domination by non-native, annual, opportunistic weed species that preclude reestablishment by native vegetation communities.

Urban/Developed (12000)

Developed portions of the survey area include buildings and other structures, the reservoir side of the dam, and various ornamental trees, shrub, and ground cover associated with adjacent residential properties that are either overhanging property lines or encroaching within PCRCP.

Bare Ground

Bare ground mapped on-site includes unpaved parking areas, access roads, and trails maintained to be devoid of vegetation.

5.1.2 Special-Status Species

A total of 31 special-status plant species and a total of 46 special-status wildlife species were observed within PCRCP. Special-status species are species considered sufficiently rare

to require special consideration and/or protection. These species should be or have been listed as rare, threatened, or endangered by the Federal and/or State governments. Many of the special-status species with documented occurrences that were not observed during surveys and assessed as having “Low” or “Not Expected” potential for occurrence are not discussed further. Species determined to have a “Moderate” or “High” potential for occurring, and those observed on-site during the surveys, including species not previously documented in the area by California Natural Diversity Database (CNDDDB) or (CNPS), are discussed. All special-status species documented on-site are presented in Figure 5-5, *Special-Status Biological Resources*. The CNDDDB allows users to search via quadrats, preventing searches specific to the boundaries of PCRCP.

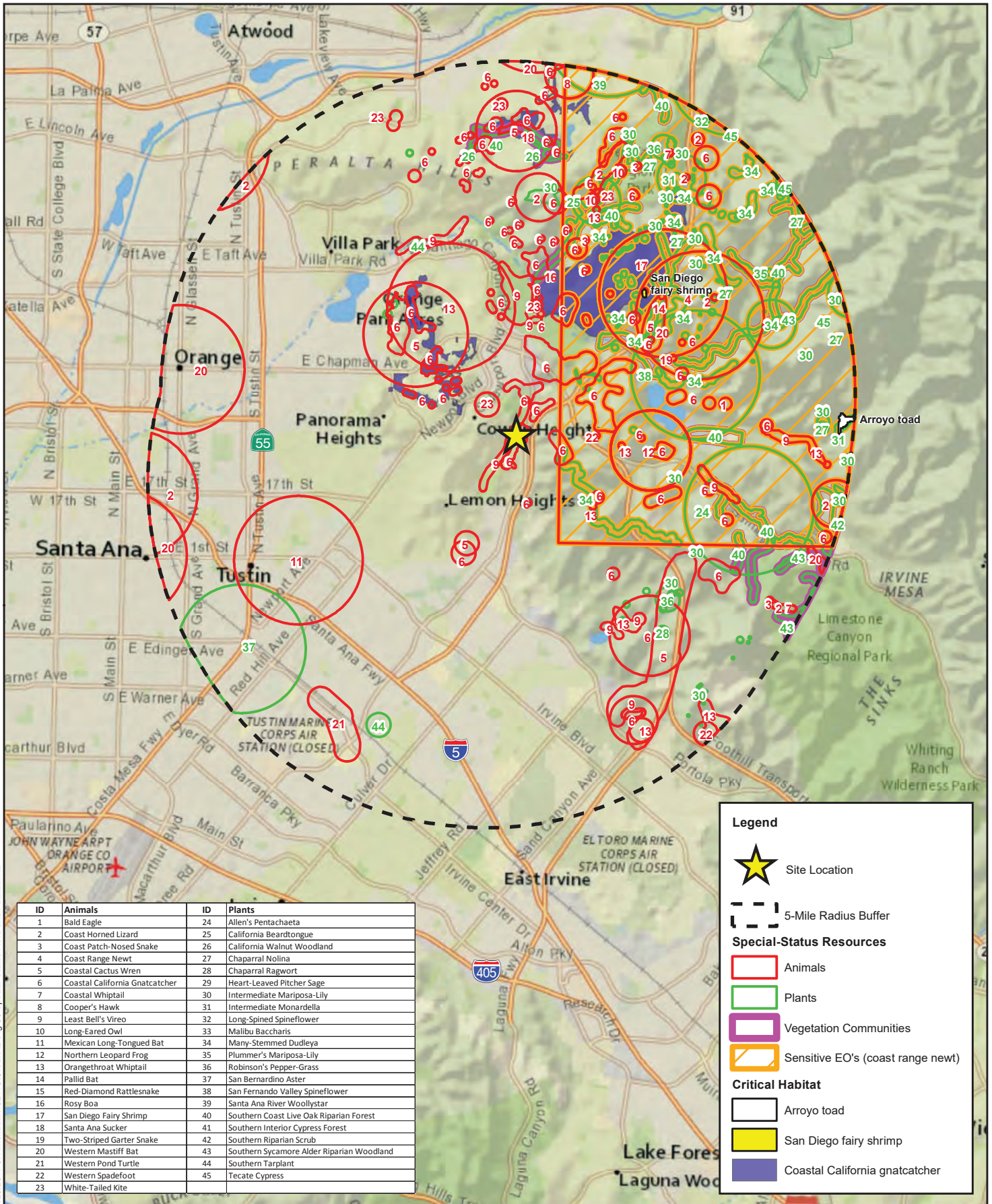
Four special-status plant species and 12 special-status wildlife species were identified on-site during the surveys. In addition, based on the literature review and database searches and on-site habitat suitability assessment, it was determined the survey area also contains suitable habitat for eight additional special-status plant species and 11 additional special-status wildlife species.

Special-Status Plant Species

Special-status plants species observed on-site include the following:

- Catalina mariposa lily (*Calochortus catalinae*; CRPR 4.2) - Dozens of individuals were observed near the north end of the eucalyptus woodland surrounding the eastern half of Scout Trail, which connects East Ridge View Trail with Peters Canyon Regional Riding and Hiking Trail.
- Southern California black walnut (*Juglans californica*; CRPR 4.2) - A few mature individuals were observed within the middle to upper reaches (i.e., northern end) of PCC. No other special-status plant species were observed within the survey area during the surveys.
- Coulter’s matilija poppy (*Romneya coulteri*; CRPR 4.2) - Several individuals were observed at the main PCRCP entrance north of UPCR, adjacent to (east of) the parking area; however, these individuals appear to have been installed as part of native (ornamental) restoration efforts.
- San Diego County needle grass (*Stipa diegoensis*; CRPR 4.2) - Several individuals were observed along the Lakeview Trail where it connects to a Scenic Overlook spur trail southwest of UPCR.

No additional special-status plant species were observed during the 2016 spring/summer surveys. However, it was determined that the following special-status plant species have a moderate or high potential for occurring within the survey area: Plummer’s mariposa-lily (*Calochortus plummerae*; CRPR 4.2), intermediate mariposa-lily (*Calochortus weedii* var.



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PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN

Special-Status Biological Resources Documented within a 5-Mile Radius



Source: CNDDDB, U.S. Fish and Wildlife Service, ArcGIS Online

Figure 5-5

intermedius; CRPR 1B.2), Lewis' evening-primrose (*Camissoniopsis lewisii*; CRPR 3), Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*; CRPR 4.3), Allen's pentachaeta (*Pentachaeta aurea* ssp. *allenii*; CRPR 1B.1), white rabbit-tobacco (*Pseudognaphalium leucocephalum*; CRPR 2B.2), chaparral ragwort (*Senecio aphanactis*; CRPR 2B.2), and San Bernardino aster (*Symphyotrichum defoliatum*; CRPR 1B.2).

Plummer's mariposa-lily, intermediate mariposa-lily, Lewis' evening-primrose, Allen's pentachaeta, and chaparral ragwort are typically found in openings and/or dry, sandy soils in coastal sage scrub and grasslands that are present on-site. White rabbit-tobacco and San Bernardino aster are also found in coastal sage scrub in addition to riparian areas similar to those areas throughout the survey area.

Special-Status Plant Communities

The CNDDDB records search revealed a total of ten special-status habitats / vegetation communities (refer to Figure 6 of the *Biological Resources Report* [MBI 2016a] for those documented within a 5-mile radius of PCR). Present throughout the survey area in PCC and surrounding UPCR are areas mapped as southern cottonwood-willow riparian forest (G3/S3.2), southern riparian scrub (i.e. mule fat scrub; G3/S3.2), and southern willow scrub (G3/S2.1). Although southern California black walnut was observed within PCC, these scattered individuals do not meet the California Walnut Woodland classification.

While not listed in the CNDDDB as a special-status habitat/vegetation community, coastal sage scrub is considered a "rare and worthy of consideration" plant community by CDFW due to loss and fragmentation along the foothills in southern California. Additionally, the County NCCP/HCP primarily focuses on protection of coastal sage scrub and organisms that depend on it for continued survival. Coastal sage scrub is found throughout the survey area in various forms and stages.

OC Parks presently has approximately 33-acres of authorized CSS take within the reserve.

No other special-status habitats/vegetation communities were observed within the survey area.

Special-Status Wildlife Species

Special-status wildlife species observed on-site include the following:

- Least Bell's vireo (FE/SE) – A focused survey conducted by MBI began in April 2016 and was completed on May 24, 2016. Fourteen territories of least Bell's vireos were detected (including seven additional territory males detected by Harmsworth during avian surveys conducted later in the season) throughout the southern willow scrub and southern cottonwood-willow riparian forest from the lower detention basin, up

- through the majority of PCC, and throughout the basin and inlets surrounding UPCR. Details regarding locations and distribution within and surrounding PCRCP are included in the Appendix A, *Documentation, LBVI Focused Survey* dated July 26, 2016.
- Cactus wren (*C. b. sandiegensis* is SSC) – A focused survey was conducted from April 2016 to May 25, 2016. Two cactus wren territories were detected by MBI within the survey area, one south of Gnatcatcher Trail and west of East Ridge View Trail and the other west of UPCR and south of the southern portion of Cactus Point Trail, both pairs nesting in coastal cholla (*Cylindropuntia prolifera*). Details regarding locations and distribution within PCRCP are included in the Appendix A, *Documentation, CACW Focused Survey* dated July 26, 2016. Avian surveys conducted later in the season by Harmsworth identified two additional pairs of cactus wren, one west of the pair observed near Cactus Point Trail at Lakeview Trail and the other south of the pair near Gnatcatcher Trail along the ridgeline and east of East Ridge View Trail (refer to Appendix A, *Documentation*).
 - Coastal California gnatcatcher (FT/SSC) – A protocol-level survey was conducted in April 2016 through August 1, 2016. A total of 14 pairs of coastal California gnatcatcher were detected throughout suitable coastal sage scrub habitat on-site during the 2016 surveys. Details regarding locations and distribution within PCRCP are included in the Appendix A, *Documentation, CAGN Focused Survey* dated August 2016.
 - Little willow flycatcher (*Empidonax traillii* cf. *brewsteri*; SE) – An individual was detected in mule fat scrub southwest of the main PCRCP parking lot north of UPCR.
 - Cooper's hawk (WL) – An individual was observed flying within and around the southern willow scrub near the northern reaches of PCC.
 - Sharp-shinned hawk (*Accipiter striatus*; WL) – An individual was observed attempting to forage on trapped brown-headed cowbird (*Molothrus ater*) individuals at the southern end of the survey area west of PCC.
 - Northern harrier (*Circus cyaneus*; SSC) – An individual was observed flying near the basin east of UPCR.
 - American peregrine falcon (*Falco peregrinus anatum*; FP) – An individual was observed flying over the East Ridge View Trail in the southern half of PCRCP.
 - Yellow-breasted chat (*Icteria virens*; SSC) – A total of seven individuals were observed throughout the southern cottonwood-willow riparian forest and southern willow scrub surrounding UPCR and PCC.

- Yellow warbler (*Setophaga petechia*; SSC) – Several individuals were observed throughout the southern cottonwood-willow riparian forest and southern willow scrub surrounding UPCR and PCC.
- Orangethroat whiptail (*Aspidoscelis hyperythra*; SSC) – A few mature and juvenile individuals were observed within disturbed areas and areas being restored to coastal sage scrub along the eastern terraces of the upper-mid reaches of PCC.
- Coastal whiptail (*Aspidoscelis tigris stejnegeri*; SSC) – An individual was observed within coastal sage scrub vegetation near Cactus Point Trail.
- Red-diamond rattlesnake (*Crotalus ruber*; SSC) – An individual was observed near the upper reaches of PCC where Gnatcatcher Trail and Peters Canyon Regional Riding and Hiking Trail meet.
- Western pond turtle (*Emys marmorata*; SSC) – A few mature individuals were observed in the culvert outlet of the UPCR dam; carapaces only (deceased) were observed in the western portion of the dried UPCR and upper (northern) reach of PCC.

An additional six wildlife species recognized as special-status by other entities or interest groups were detected on-site. No other special-status wildlife species were observed during the surveys. However, it was determined that the following special-status wildlife species have a moderate or high potential for occurring within the survey area: Crotch bumble bee (*Bombus crotchii*¹), coast horned lizard (*Phrynosoma blainvillii*; SSC), coast patch-nosed snake (*Salvadora hexalepis virgultea*; SSC), great blue heron (*Ardea herodias*), long-eared owl (*Asio otus*; SSC), white-tailed kite (*Elanus leucurus*; FP), pallid bat (*Antrozous pallidus*; SSC), Mexican long-tongued bat (*Choeronycteris mexicana*; SSC), western mastiff bat (*Eumops perotis californicus*; SSC), and Yuma myotis (*Myotis yumanensis*).

Crotch bumble bee is known to occur in the vicinity of the survey area and food plants are abundant on-site. Coast horned lizard and coast patch-nosed snake are typically found in coastal sage scrub, grassland, and/or riparian woodland similar to areas mapped as such throughout the survey area. Great blue heron, long-eared owl, and white-tailed kite are known to occur in marshes and riparian areas, along riparian margins, and in adjacent grasslands found throughout the survey area. Foraging habitat such as grasslands, shrublands, and/or riparian woodlands and forests suitable to support pallid bat, Mexican long-tongued bat, western mastiff bat, and Yuma myotis are present throughout the survey area; however, suitable roosting habitat (e.g., rocky cliffs and caves), except for trees suitable for roosting western mastiff bats, is not present on-site.

¹ Note: Special-status wildlife species not showing a designated status following the scientific name do not have USFWS or CDFW rating, rather only Global and State Ranks as per as per NatureServe and CDFW's CNDDDB RareFind5.

5.1.3 Jurisdictional Aquatic Features

On-site, jurisdictional features include a man-made reservoir (UPCR) at the northern end, which is surrounded by associated wetland and riparian vegetation, including two basins and approximately seven inlets. The UPCR is fed by Santiago Creek, urban runoff, and direct rainfall, and drains through existing improvements on the northwestern portion of the basin. All jurisdictional features documented on-site are presented in Figure 5-6, *Jurisdictional Resources*.

Downstream of the dam, flows enter PCC, an intermittent stream, via groundwater from UPCR and by direct rainfall. PCC consists of a wetland/riparian corridor that conveys flows along the western side of the canyon (adjacent to residences), with relatively steep upland slopes to the east. At the southern end, the creek conveys flows into a detention basin, which detains most waters. The basin inundates depending on the frequency of storm events but remains dry for most of each year. The lower basin consists of a flood spillway that discharges extraordinary flows into a box culvert and the local storm drain system. Further, there are eight ephemeral drainage features and eight culverts throughout PCRP that convey flows primarily from off-site sources and are tributary to UPCR and PCC.

It should be noted that an 84" outlet associated with the Santiago Hills Phase II development is proposed on the reservoir's eastern site. The outlet would be constructed in jurisdictional area; permitting approvals would be the responsibility of the developer, and an easement and maintenance agreement would be prepared by the developer and approved by OC Parks.

For details regarding the results of the jurisdictional delineation and total areas on-site subject to jurisdiction of each regulatory agency, refer to the *Jurisdictional Delineation Report* (MBI 2016d) in Appendix D.

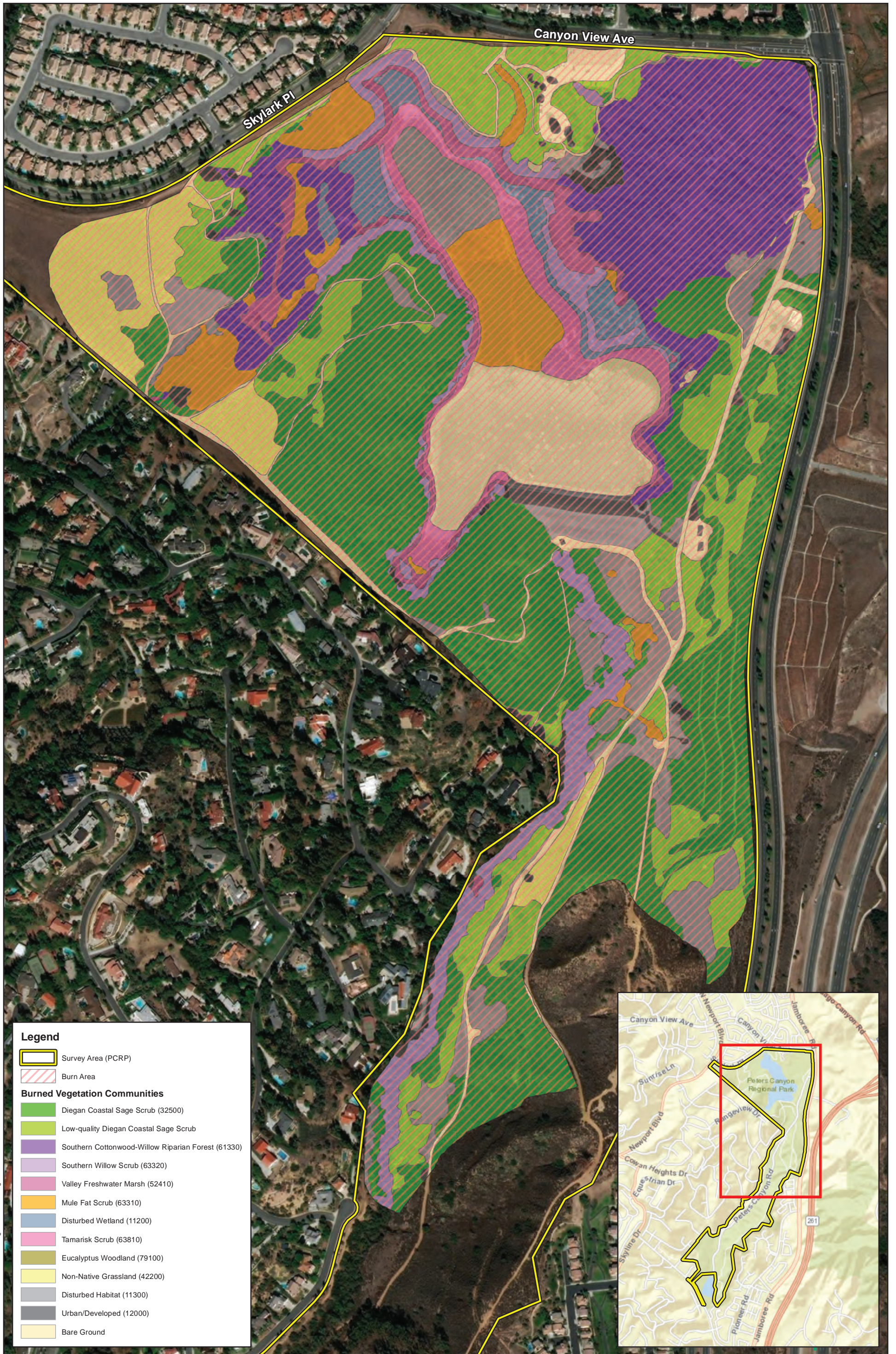
5.1.4 Canyon Fire II

On April 23, 2018 Michael Baker biologists and regulatory specialists Ryan Phaneuf and Stephen Anderson conducted an intensive pedestrian survey of the Canyon Fire II burn area within the boundaries of PCRP. Weather consisted clear skies, a temperature of approximately 85 degrees Fahrenheit, and winds approximately 0 to 2 miles per hour. The survey was conducted by traversing the study area on foot (and using binoculars for areas inaccessible) documenting all vegetation communities impacted by the fire using Figure 5-2, 5-3, and 5-4, *Vegetation Communities, Land Uses, and Special-Status Species* of the Resource Management Plan and photographing existing site conditions. Refer to Figure 5-7, *Burn Area Vegetation Communities*

The study area consists of the northern end of PCRP near the reservoir, with a small portion south of the reservoir within and around Peters Canyon Wash, comprised of Bare Ground,

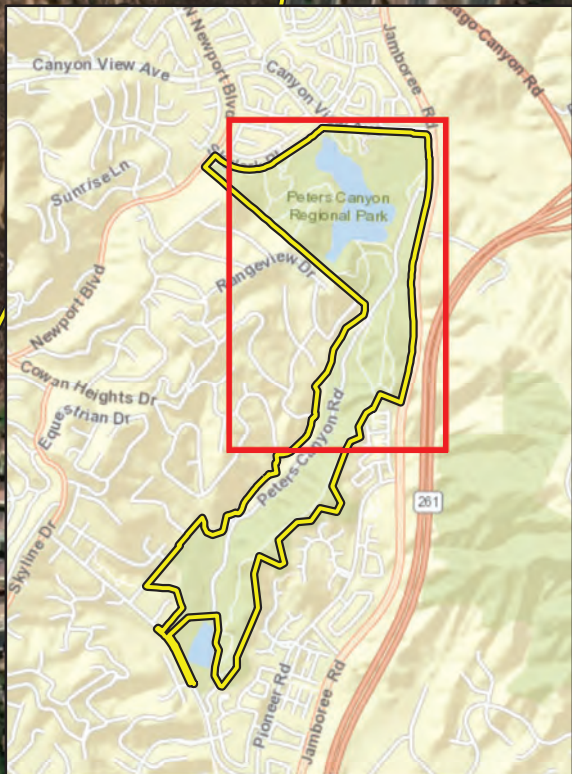


7/26/2017, J.N. M. Madaal, 152478(GIS)MXD, Fig 05 Potential Jurisdictional Resources RMP.mxd



Legend

- Survey Area (PCRP)
- Burn Area
- Burned Vegetation Communities**
- Diegan Coastal Sage Scrub (32500)
- Low-quality Diegan Coastal Sage Scrub
- Southern Cottonwood-Willow Riparian Forest (61330)
- Southern Willow Scrub (63320)
- Valley Freshwater Marsh (52410)
- Mule Fat Scrub (63310)
- Disturbed Wetland (11200)
- Tamarisk Scrub (63810)
- Eucalyptus Woodland (79100)
- Non-Native Grassland (42200)
- Disturbed Habitat (11300)
- Urban/Developed (12000)
- Bare Ground



PETERS CANYON REGIONAL PARK RESOURCE MANAGEMENT PLAN
POST FIRE UPDATE

Burned Vegetation Communities

Figure 5-7

Diegan Coastal Sage Scrub, Disturbed Habitat, Low-Quality Diegan Coastal Sage Scrub, Mule Fat Scrub, Non-Native Grassland, Southern Cottonwood-Willow Riparian Forest, Southern Willow Scrub, Tamarisk Scrub, Urban/Developed, and Valley Freshwater Marsh (refer to Figure 5-6, *Burn Area Vegetation Communities*).

Table 2 below provides the acreages of each vegetation community/land use affected by Canyon Fire II.

Table 2. Vegetation Communities and Land Uses Affected by Canyon Fire II (acres)

Vegetation Community	Acreage
Bare Ground	19.90
Diegan Coastal Sage Scrub	55.34
Disturbed Habitat	20.54
Low-Quality Diegan Coastal Sage Scrub	20.85
Mule Fat Scrub	9.40
Non-Native Grassland	8.90
Southern Cottonwood-Willow Riparian Forest	24.02
Southern Willow Scrub	10.16
Tamarisk Scrub	5.16
Urban/Developed	3.67
Valley Freshwater Marsh	4.88
TOTAL	182.82

5.2 PROPOSED BIOLOGICAL RESOURCE MANAGEMENT

5.2.1 Park Improvement Zone Biological Surveys

A biological survey to determine existing biological resources should be conducted as part of any future park improvement plans. The survey(s) would include a detailed description of existing plant communities and the presence of any species or communities of special concern. The recent biological survey conducted by MBI on March 29, 30, and 31, 2016, may be referred to for immediate improvement projects within the park, but future projects may require additional biological surveys due to the possibility of altered or changed conditions. Following completion of construction activities, two (2) surveys per year to update the baseline biological studies should be conducted. The *Biological Resources Report* in Appendix B should be referenced when conducting new surveys. The surveys would provide an update to existing conditions as well as recommendations to protect park resources and limit impacts with a proposed action. Focused surveys for the least Bell's vireo, the coastal California gnatcatcher, and the cactus wren should be conducted prior to any construction activities to determine their presence within the project area. Least Bell's vireo is a migratory species that only resides in Southern California during the breeding

season (April-August). Such measures may include construction outside of the nesting season (i.e. March through September) or setbacks to buffer resources from noise, dust, traffic, etc. In addition, it is recommended that all BMPs be implemented when working near or potentially impacting western pond turtle and their habitat. All new trails and maintenance roads within the park should be minimized to the greatest extent possible and provide and maintain buffers between turtle habitat. Any projects occurring near turtle habitat should evaluate the opportunity to create or enhance habitat for turtles within and/or near the project site. If de-water, dredging, or filling a waterbody within the park, relocation may be necessary, and the appropriate permits must be obtained. All potential western pond turtle habitat within the park can be identified via referencing the vegetation map. Further, impacts to special-status species, habitat, and sensitive resources should be addressed before implementing any park improvements suggested within the GDP. Based on the plans, impacts to habitat associated with coastal California gnatcatcher and least Bell's vireo are expected.

5.2.2 Exotic Species

There is an abundance of exotic and invasive grasses, shrubs, and trees found throughout PCRCP. Some of the more notable infestations include swathes of non-native grasses located at the northern and southern ends of the park, the eucalyptus grove found along the canyon, and large bands of tamarisk found within the reservoir. The tamarisk infestation increases as the reservoir dries during drought conditions and is expected to continue with prolonged drought. The eucalyptus grove directly adjacent to coastal sage scrub habitat is impacting growth, which provides critical habitat for the coastal California gnatcatcher.

It is recommended to participate in an Early Detection/Rapid Response (EDRR) Program for mapping and treating emergent invasive plants. EDRR is a management approach that focuses on effectively identifying and eradicating emerged invasive plant populations when they are small. Managers may fully eradicate if a new invasive species or population from an area is detected before it has a chance to spread or build a large seed bank.

Eucalyptus Trees

Removal of mature eucalyptus trees requires mechanical removal of the roots and above-ground portion of the plant or cutting and applying herbicide to the stump. Smaller, less mature trees may be removed by hand. Due to the allelopathic chemicals within eucalyptus leaves, native plant growth is often limited underneath eucalyptus canopies. Removal of understory leaf litter and plant material will help avoid further seed re-sprouting and allow native vegetation to re-occupy the area. Removal of large trees should be done outside of nesting season (March through August) in consultation with a qualified ornithologist. Removal of the eucalyptus followed by restoration of coastal sage scrub will likely result in an increase in the park's coastal California gnatcatcher population.

Tamarisk

Removal of tamarisk within the reservoir is recommended due to its ability to establish deep roots and lower the water table, thus causing other species nearby to die off due to lack of available water. Tamarisk, also known as salt cedar, increases surface soil salinity and fire potential while displacing native vegetation.

Non-native Grasslands

The non-native grasslands should be converted to native vegetation due to their ability to spread rapidly and out-compete native grasses and shrubs.

Exotic Plant Management Plan

An Exotic Plant Management Plan (EPMP) identifies and prioritizes invasive species of concern, identifies threats posed by the invasive species, methods of control, includes up-to-date research of invasive species control programs, and describes monitoring methods, success criteria, and reporting.

The use of volunteers to help eliminate non-native vegetation throughout the park would involve the public and offset removal costs.

5.2.3 Existing/Ongoing Restoration and Mitigation

Various restoration sites have been established and maintained throughout the park. Downstream of the dam, restoration plantings have been established along PCC. This restoration includes restoration of coastal sage scrub just outside of the riparian corridor, as well as some associated riparian vegetation. Further establishment of coastal sage scrub species and riparian species has occurred along the southern portion of PCC. Along the northern end of the site, plantings of native prickly pear cactus and scrub species have occurred; however, these plantings are heavily inundated by non-native grasses which inhibit the natural recruitment of further individuals. This includes the Peters Canyon Wash Mitigation Program implemented by Psomas (formerly BonTerra consulting).

5.2.4 Invasive and Pest Species Control Recommendations

Cowbirds

Brown-headed cowbirds are present at PCRCP. Brown-headed cowbirds reproduce and raise their young via brood parasitism. Two host species impacted by cowbirds are the protected least Bell's vireo and the coastal California gnatcatcher. Portable brown-headed cowbird traps are present at the park, and it is recommended that traps continue to be set to promote successful breeding of protected bird species. Techniques to deter brown-headed cowbirds from the park include covering trash cans so food is not available, keeping the park clean of horse droppings, and not plating turf in PCRCP due to its attraction to cowbirds.

Polyphagous Shot Hole Borer

Polyphagous shot hole borer (PSHB) beetles have been identified in PCRP, as well as at Santiago Oaks and Irvine Regional Parks, and the park should be monitored regularly to detect further infestation. All locations of PSHB conducted within the most recent surveys can be seen on Figure 5-8, *Polyphagous Shot Hole Borer Surveys*. PSHB infests trees, shrubs, and invasive plants like castor bean and tamarisk, thus making invasive removal a high priority within the park. The PSHB can be spread by the transport of infested wood material; moving firewood from one area to another is common way that many wood-boring pests are spread. Beetles can also emerge from infested material weeks after branches or trees have been removed. If infested wood cannot be treated on-site, all infested wood chips and logs should be covered when transporting them to another area or facility for treatment. Methods for treating infested materials include solarization, composting, kiln-drying, and biodegradation. The Fusarium fungi is what is responsible for plant dieback, not the beetle itself. PSHB naturally produce the Fusarium fungi, which then infects the host plant and eventually kills it. Poor pruning practices can cause the spread of plant disease due to the ability of Fusarium fungi to travel on tools, equipment, and even through soil. Any tools used for pruning or sampling infected wood should be sterilized before being used again. It is recommended that when managing tree removals, all uninfested trees should be cut first, then infested trees, in order to prevent cleaning of tools until the end of the day (See Appendix A, *Documentation*). The latest PSHB study implemented by OC Parks should be utilized as a result of ever-changing conditions.

In addition to OC Parks, the University of California Division of Agriculture and Natural Resources and UC Cooperative Extension academics and researchers are leading the current research on PSHB infestations within OC Parks. Their work includes conducting weekly surveys from February through October within OC Parks facilities. Chemical lures are used to detect beetle infestation and are monitored monthly. New PSHB and Fusarium fungus infestations are verified through UC Riverside's Eskalen Lab. High-resolution aerial imagery (remote sensing) is also used to detect infestations. Aerial imagery is used to identify stressed trees in un-surveyed or less accessible areas. Areas subject to infestation are investigated via ground surveys, if possible.

Argentine Ants

Argentine ants have not been recorded at PCRP. It is recommended park staff avoid long-term irrigation in fuel management zones and ensure all container plants brought into the park for revegetation or habitat restoration projects are sterile and free of Argentine ants.

If any Argentine ants are found within the park, the county agricultural commissioner and vector control should be contacted as soon as possible to eradicate the pests in the most environmentally appropriate method.



2/8/2019, JIN M:\Data\152478\GIS\MXD\RMP Jan 2019\Fig 04 Polyphagous Shot Hole Borer Surveys.mxd RP



Invasive Plant Management Methods

When deciding which invasive plant control methods to utilize, wildland managers must consider many factors, including potential impacts to native plants and wildlife, workers, and the public, while ensuring that the method chosen will achieve the desired result. In cases where an invasive plant population is low, eradication of the species may be an attainable goal, while in other cases, suppression or containment may be the goal. Preferred methods of eradication are manual, mechanical, and chemical; grazing, prescribed fire, and biocontrols are less common.

Mechanical techniques include pulling, cutting, excavating, or physically damaging plants. Depending on the target species and size of infestation, equipment used for mechanical removal may range from hand saws, pruners, weed wrenches, and spades to chainsaws, power mowers, tillers, excavators, and backhoes. Mechanical removal is the most commonly used method for invasive removal. However, some plants are difficult to remove or control using mechanical methods because they can re-sprout from roots or reproduce from fragments left behind. Using heavy machinery can also cause soil disturbance, which favors conditions for invasive plants to re-grow or re-invade.

Chemical control involves applying herbicide to target invasive plant species. Chemical control is used for its ability to avoid ground disturbance or other physical impacts to the habitat, its low risk of injury to workers, its effectiveness in killing target species, and its cost effectiveness. Chemical herbicide application in Orange County requires a prescription from a state-licensed Pest Control Advisor and application must meet expertise, capacity, and legal mandates.

Grazing by cattle, sheep, or goats can be successful depending on the invasive plant species and animal being used, duration, stocking rate, and intensity of grazing. Grazing is typically used in areas that no longer have native animals that were once part of the ecological balance and requires high densities of animals focused in an area. In some cases, grazing may increase infestations when weed seeds or other propagules are accidentally spread by livestock transported from infested areas to non-infested areas. Improper grazing management can also result in degradation of native habitat and erosion issues.

Prescribed burning is the intentional use of fire in a specified time and location to kill unwanted species, remove the thatch of dead plants, recycle nutrients, and stimulate desirable plant species. Fire can be used to deliberately trigger germination in order to control a species strategically, or to destroy the seedbank of a specific species. This can also cause germination of invasive species unintentionally. Equipment used to control prescribed burns often spread weeds when not cleaned properly. Prescribed burns can only be conducted after obtaining necessary permits and under specific weather conditions due

to fire safety and air-quality concerns. Due to these concerns, prescribed burning is not commonly used and rarely used near heavily populated areas.

Biological controls, or biocontrols, use the natural enemies of target plant species. The USDA oversees the collection of organisms like insects or pathogens from the native range of an invasive plant, and then conducts extensive tests to judge their effectiveness and rule out possible effects on non-target plants, a process that takes years. When a biocontrol passes all USDA tests, it can then be released into populations of the target invasive plant. Biocontrols typically require a balance that keeps the pest species suppressed while still maintaining sufficient target pest populations to allow the continued survival of the biocontrol species. Although biological control methods can be highly effective, they are extremely expensive to research, test, and implement, and can also fail to establish populations and be ineffective.

5.2.5 Vegetation Management Recommendations

Integrating prevention BMPs into vegetation management can greatly minimize the introduction and spread of invasive plants. For example, scheduling vegetation management activities prior to seed production can reduce the spread of invasive plants. Mowing after seed production will greatly increase the chance of seed dispersal and increase the size of infestation. The opposite should be done with native plants desired within the Reserve. Mowing, clearing, trimming, or grazing of desirable plants should be scheduled for after seed maturation, ensuring the desirable plants will grow unrestricted and produce seeds. Native plants should not be mowed down to a height less than six inches. Mowing too low during the growing season will increase soil exposure to the sun, increasing soil temperatures and erosion risks, and encouraging invasive plant growth.

Existing desirable vegetation and canopy should be retained. Desirable vegetation within the reserve should be identified and protected to increase competition with invasive plants. All staff should be trained to identify invasive and non-invasive plants via classroom training and/or identification guides. Clearing large amounts of vegetation and canopy cover should be minimized. Soil disturbances increasing sunlight and bare ground creates suitable habitats for invasive plant germination. Proper equipment that minimizes vegetation disturbance should be utilized.

Equipment Cleaning BMPs

Tools, equipment, and vehicles used for land management activities are potential vectors for invasive plant spread. Equipment used at a site infested with non-native plants can collect and transfer seeds to another site. Areas should be designated for cleaning tools, equipment, and vehicles. These areas should be easily accessible for monitoring and control, away from waterways, and areas of sensitive habitats or species, near areas already infested with invasive plants, contained with silt fences or soil berms, and ideally,

have paved or sealed surfaces to avoid re-accumulation of soil and plant material on cleaned vehicles and equipment. Tools, equipment, and vehicles should be inspected before entering and leaving worksites. Inspection may vary from site to site depending on the extent of infestation at a worksite. Staff, contractors, and volunteers should be trained to inspect for seeds, seed heads, plant material, soil, and mud. Using flashlights and portable lights is necessary for night-time inspections. Equipment cleaned with water should be washed on a paved surface to avoid creating mud. Waste and splash waters should be contained to prevent invasive plant parts and seeds from spreading via runoff. Placing berms or silt fences along the perimeters of work areas can aid in preventing the spread of contaminated materials outside the cleaning area.

Waste Disposal BMPs

After invasive plants are removed, land managers need to determine how to dispose of the resulting plant biomass. This waste includes all invasive plant materials and contaminated materials such as soil and mulch. If left viable and uncovered, or transported without containment, these materials may spread invasive species. Disposal areas where viable invasive plant materials will be contained, buried, or destroyed, should be designated. Any plant material with the ability to re-sprout or spread should not be disposed of at a facility that produces mulch or chipped products. In addition, soil, seeds, and plant material must not be disposed of down a storm drain to prevent the spread of invasive plants downstream. When invasive plant material is kept on-site, it must be rendered nonviable. Composting will render invasive plant material nonviable only if compost piles reach very high temperatures, and the resulting compost should be monitored for invasive plant emergence. Another method of rendering plants nonviable is to contain them in plastic bags and tightly secure them. The bagged material should be monitored to ensure the plants do not escape through rips, tears, or seams in the plastic. All methods of on-site eradication should ensure the invasive species does not reestablish within the site or in other natural areas.

Restoration and Mitigation Sites

There are many potential habitat restoration opportunities within PCRCP. Exotic plant species are widespread throughout the entire park, and removal of these species provides opportunity for mitigation (Figures 5-9, 5-10, 5-11, *Potential Habitat Restoration Sites*). Within and along the edges of the reservoir there are large patches of non-native tamarisk beginning to establish. Removal of tamarisk within the reservoir qualifies as habitat enhancement. Along the reservoir edges, removal of tamarisk could be followed by the restoration of freshwater marsh habitat, providing a large opportunity for mitigation. This opportunity also extends to all drainage structures connected to the reservoir. Along the eastern side of PCC, a large grove of non-native eucalyptus trees is surrounded by coastal sage scrub habitat. If these eucalyptus trees were to be removed, the area could be restored to coastal sage scrub habitat, thus increasing potential habitat for sensitive species



Legend

- Survey Area (PCRP)
- Diegan Coastal Sage Scrub
- Native Grassland
- Southern Willow Scrub
- Valley Freshwater Marsh

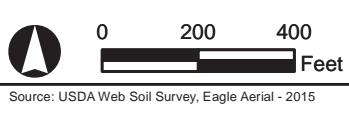
7/26/2017 J:\M:\data\152478\GIS\MXD\Fig_XX_Potential Mitigation Sites.mxd



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Legend

- Survey Area (PCRP)
- Diegan Coastal Sage Scrub
- Native Grassland
- Southern Willow Scrub



Source: USDA Web Soil Survey, Eagle Aerial - 2015

PETERS CANYON REGIONAL PARK (PCRP) RESOURCE MANAGEMENT PLAN

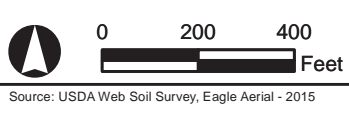
Potential Habitat Restoration Sites

Figure 5-10



Legend

- Survey Area (PCRP)
- Diegan Coastal Sage Scrub
- Native Grassland
- Southern Willow Scrub



Source: USDA Web Soil Survey, Eagle Aerial - 2015

7/26/2017 J:\M\Media\152478\GIS\MXD\Fig_XX_Potential Mitigation Sites.mxd

such as the coastal California gnatcatcher. Any removal of large trees must be done outside of bird nesting season.

It should be noted that there is a difference between voluntary restoration and legally-required mitigation, implemented to off-set impacts elsewhere. While both types are encouraged, OC Parks staff should closely track the types, locations, and progress of each restoration project. Mitigation includes formal measures and conditions required by state and federal regulatory agencies. More importantly, mitigation sites often have strict requirements for preservation, sometimes excluding public trails and access, and obligations for long-term management. A formal database and GIS files would assist with showing restoration opportunities and tracking existing projects within PCRP. Current restoration efforts are depicted under Figure 5-12, *Current PCRP Restoration Efforts*. Refer to 10.2.3 for additional detail on reporting.

Revegetation and Landscaping

Revegetation and landscaping work is often derived from different needs and carried out by different staff or contractors. Revegetation is the process of replanting and rebuilding the vegetated community on disturbed land. Landscaping modifies land to meet functional, aesthetic, and regulatory requirements. Although different, both revegetation and landscaping may share a fundamental goal of creating weed-resistant plant communities. An in-depth understanding site ecology is essential in creating weed-resistant plant communities. This includes evaluation of existing soil condition, hydrology, gradient exposure, existing plant communities and habitat, invasive plant presence, human impact, and the surrounding environment.

Plant selection may be the most important aspect of a successful revegetation project. Revegetation and landscaping with desirable native plants suitable for local conditions can create weed-resistant communities that prevent or slow the establishment, growth, and reproduction of invasive plants. Areas where revegetation or landscaping is needed to improve invasive plant resistance of plant communities should be identified.

After determining the goal of the vegetation coverage and planting, the site should be evaluated annually for three years to determine if vegetation establishment is successful. Existing soil type, texture, and health should be evaluated in order to determine vegetation selection, fertilization, and maintenance needs. Healthy topsoil, compost, and/or fertilizer should be added to improve unhealthy soil. Fertilization may promote weed growth and reduce the ability of native plants to establish if done improperly. Areas treated with compost should not be treated with fertilizer, the compost will provide the plants with the necessary micro-nutrients to support healthy growth. In addition to healthy soils, a plant palette that will occupy various planting zone/ecological niches should be developed in order to create a weed-resistance landscape. Plants should be selected based on existing soil conditions,



2/8/2019, JIN M. Mdaah, 152478.GIS\SWD\DRMP - Jan. 2019\Fig. 03 Current Restoration Efforts.mxd RP

Legend

- Survey Area (PCRP)
- PCRPs Restoration Projects
- Mitigation Polygons
- Plantings
- Weed Abatement Area
- Tree Modification
- Burn Areas



drainage patterns, amount of rainfall or irrigation available, exposure, and adjacent environment. Passive regeneration of native plant cover should be encouraged where site conditions permit, and where the risk of introducing invasive plants is low.

Plant materials should be acquired locally and verified that the species used are not non-native or invasive. Weed-free locally appropriate seed mixed that will occupy various niches in order to create weed-resistant plant communities should be used. Seeds from local native ecotypes should be used. Identical species grown in another region may not establish as well as seeds from species grown locally. Never plant invasive plants, verify that plant lists do not contain invasive plant species by checking Cal-IPC's invasive plant inventory (www.cal-ipc.org/ip/inventory/weedlist) and the local Agricultural Commissioner's Office. Confirmation should be made that only selected plant species are used in the planting, especially when naming inconsistencies are possible. It should be assumed that 20-30% of the container plants will not survive, so extra plant materials should be on hand.

Disturbed soils should be revegetated and/or covered with mulch as soon as possible in order to reduce the likelihood of invasive plant establishment. Disturbed areas, as well as new forest openings, should be revegetated with local native plants. Using proper horticultural practices will help promote healthy root and foliage growth that will aid in the vegetation's ability to withstand adverse conditions and to compete with invasive plant growth. In situations where revegetation is not possible, limited use of paving/hardscape or protecting the site using weed-free materials (gravel, logging slash, long-fiber mulch, decomposed granite), deep mulching, or using a soil stabilizer should be considered. When using mulch, weed-free mulch should be applied, and the fire risk at the application site should be assessed. Certain long-fiber mulches, such as shredded redwood bark, are highly flammable.

Restoration Reports

All habitat enhancement, creation, and restoration work, whether voluntary restoration or mitigation, should be monitored, with reports produced with written and photographic documentation of each project.

Voluntary restoration within the park should be documented separately from mitigation needed to satisfy regulatory permit conditions. Although both types of restoration are important and considered equal, voluntary restoration is often conducted by park staff, community members and other stakeholders. The restoration can vary in size and there are lesser requirements when restoring areas within PCR. P.

Restoration as part of compensatory mitigation should be tracked closely and documented pre-, during-, and post-implementation, following the project habitat mitigation and monitoring plan (HMMP) and all requirements of associated regulatory permitting. The

HMMP dictates specific criteria such as species, quantities, and irrigation layout, as well as defining project success criteria/metrics. Mitigation sites are qualitatively and quantitatively monitored for several years so that adaptive management can be undertaken as needed and success criteria achieved. Annual reporting is submitted to regulatory agencies permitting each project until success criteria are achieved. In some cases, regulatory agencies may require reporting on site status and long-term maintenance activities in perpetuity. Site may also have strict preservation requirements, often requiring a conservation easement, deed restriction, or restrictive covenant to be placed over the limits of the restoration. Prior to moving forward with the preparation of an HMMP, the GDP and RMP should be reviewed to ensure consistency with the proposed mitigation site location. This is especially important in areas where utilities or easements are present as overlaps with mitigation and other encumbrances should be avoided.

5.2.6 Nesting Bird and Wildlife Movement Recommendations

Proposed project activities should avoid the general bird breeding season (typically January through July for raptors and February through August for other avian species), if feasible. If breeding season avoidance is not feasible, a qualified biologist should conduct a pre-construction nesting bird survey to determine the presence/absence, location, and status of any active nests on or adjacent to the project site. The extent of the survey buffer area surrounding the site should be established by the qualified biologist to ensure that direct and indirect effects to nesting birds are avoided. To avoid the destruction of active nests and to protect the reproductive success of birds protected by MBTA and the CFGC, nesting bird surveys shall be performed twice per week during the three weeks prior to the scheduled vegetation clearance. In the event that active nests are discovered, a suitable buffer (distance to be determined by the biologist or overriding agencies) should be established around such active nests and no construction within the buffer allowed until the biologist has determined that the nest is no longer active (i.e., the nestlings have fledged and are no longer reliant on the nest). No ground disturbing activities shall occur within this buffer until the biologist has confirmed that breeding/nesting is completed, and the young have fledged the nest. Nesting bird surveys are typically not required for construction activities occurring September through December.

5.3 BIOLOGICAL RESOURCE MANAGEMENT (BR) GOALS AND STRATEGIES

Goal BR-1: Preserve, protect and enhance the biological resources of the park in balance with providing public access and recreation.

Strategy BR-1.1: Identify all habitat restoration opportunities.

- Map existing, proposed, reserved, and potential habitat mitigation sites. Keep a readily available copy of agreements with requirements for mitigation sites.
- Map and prioritize potential habitat restoration sites and match mitigation, stewardship activities, partnership opportunities, and/or grants as appropriate.
- Incorporate any new data collected from mitigation or special projects into existing park GIS database. This includes any new vegetation types that emerge due to restoration/mitigation activities, or any new special status species that are identified within restoration/mitigation sites.
- Areas degraded by heavy trail use and/or areas heavily infested by non-native species should be focus areas for habitat restoration and enhancement. Refer to vegetation map to determine these areas.

Strategy BR-1.2: Protect habitat for wildlife and nesting values.

- Periodically monitor the park for sensitive plant and animal species.
- Consider seasonal trail closures to avoid disturbance of nesting areas for sensitive bird species.

Strategy BR-1.4: Manage the park in accordance with NCCP specifications to maintain habitat values.

- Review NCCP habitat quality specifications and determine if these specifications are met within the park.
- Meet with NCC and NCCP/HCP Land Managers and partners associated with PCRCP.
- Discuss current resource management strategies, and develop new strategies and activities that help protect and enhance biological resources within the park.

Strategy BR-1.5: Educate the public about biological resources and stewardship opportunities.

- Post stewardship opportunities at the park, as well as online.
- Organize guided nature hikes led by volunteers or OC Parks staff which educate participants on natural resources found within the park.

Strategy BR-1.6: Develop and implement BMPs to minimize resource impacts to the park by operations, visitors and non-native species.

Strategy BR-1.8: Determine effective measurements of biological resource management activities and implement appropriate monitoring.

Strategy BR-1.9: Locate and design facility improvements and infrastructure supporting improvements to minimize disturbance and impacts to sensitive resources.

- Where impacts to sensitive vegetation cannot be avoided due to projects, include revegetation within the project improvement plans.

Strategy BR-1.10: Determine and implement measures to monitor recreation impacts to natural resources and thresholds of tolerance. Utilize adaptive management to respond to undesirable trends.

- Periodically monitor trails to determine visitor impacts on surrounding natural resources. Any use of unauthorized areas, especially areas of sensitive resources, should be noted and resolved.

Strategy BR-1.11: Leave brush piles, snags, and fallen trees in areas where they do not pose a fire hazard or visual blight, to provide cover and nesting sites for animals and return nutrients to the system.

Strategy BR-1.12: Evaluate wildlife habitat values associated with man-made structures before altering or removing them and avoid or minimize impacts.

- Survey man-made structures prior to removal, particularly for sensitive species or nesting birds. Remove of such structures outside of the nesting bird season.

Strategy BR-1.13: Manage the reservoir as a natural feature to benefit native wildlife.

- Perform weed abatement activities in years where the reservoir is dry.

Goal BR-2: Manage pests, including plant diseases and non-native plant species, to protect native biological diversity and critical ecosystem functions.

Strategy BR-2.1: Develop long-term management plans to control non-native plant and animal species.

- Manage non-native species in natural areas and set priorities for control based on potential risks to native habitat, sensitive native species and loss of native biodiversity.
- Use brown-headed cowbird monitoring data to determine if control efforts are needed to protect sensitive native species.

- If eradication of a pest is not feasible, apply measures to achieve containment, sustained control, reduction in pest's rate of spread, and/or minimization of damage.
- Reference the vegetation map and Biological Resources Report to determine extent of non-native plant and wildlife species within the park.
- Species that are invasive, or are known to spread quickly and outcompete native species should be targeted first.

Strategy BR-2.2: Formalize annual non-native, invasive plant management program in coordination with NCC and land management partners.

- Participate in California Native Plant Society (CNPS) Early Detection, Rapid Response Program to manage emergent invasive plant species.
- Participate in Five-year Weed Management Plan created in partnership with NCC and land management partners.
- Increase weed mapping, treatment, and reporting tools.

Strategy BR-2.3: Map shot hole borer sites, monitor borer levels over time, track management activities, and coordinate with partner efforts.

- Determine baseline extent of shot hole borer infestation, if any.
- Conduct monitoring to detect and treat beetle infestations per OC Parks protocol.
- Annually update protocols and BMPs to reflect the most current scientific information.

Strategy BR-2.4: Coordinate with OCVCD to monitor mosquito control within the reservoir and associated drainages in the park.

Strategy BR-2.5: Develop and implement BMPs and plans to reduce spread of invasive plants, shot hole borer infestations, etc.

- Coordinate with NCC and land management partners.
- Develop plans to detect, report, and monitor areas infested by high priority insects and diseases: Train staff and educate the public on BMPs; Support research to guide land management decisions.
- Use as a reference: Weed control in Natural Areas in the Western United States by Weed Research Info Center and University of California. This reference includes

preventing the spread of invasive plants, BMPs for land managers and BMPs for wildlife when using herbicides for invasive plant management.

Strategy BR-2.6: Manage pests in buildings to support existing uses, while also protecting human health and surrounding natural resources.

- Contact OCVCD when any infestation is found within an existing facility, and coordinate with them to manage pests while protecting natural resources.

Strategy BR-2.7: Manage non-native species in natural areas and set priorities for their control based on the potential risk to sensitive native species and loss of native biodiversity.

- Any areas with sensitive natural resources should take priority in natural resource protection.

Strategy BR-2.8: Monitor brown-headed cowbirds to determine if control efforts are needed to protect sensitive native species.

- Continue brown-headed cowbird trapping to determine their presence and population size within the park.

Strategy BR-2.9: If eradication of a pest is not feasible, apply measures to achieve containment, sustained control, slow down a pest's rate of spread, or minimize pest damage.

Goal BR-3: Identify all habitat restoration opportunities.

Strategy BR-3.1: Restoration planning efforts, including voluntary restoration, should be developed in coordination with a qualified restoration ecologist with five or more years of experience implementing and overseeing native plant restoration.

Strategy BR-3.2: Restoration plans that articulate the goal of the restoration effort, and implementation and maintenance methods, will be prepared for all restoration (including voluntary restoration) performed within PCRP.

Strategy BR-3.3: Plant stock used for revegetation and habitat restoration within PCRP shall be derived from native sources growing as close as practicable to PCRP and ideally from plants growing within cismontane southern California no more than 15 miles from PCRP.

Strategy BR-3.4: OC Parks staff shall identify proposed restoration projects within PCRP in its Annual Work Plan and coordinate proposed restoration effects with NCC to review consistency of the proposed restoration with the NCCP/HCP Habitat Restoration and

Enhancement Plan. Cooperative proposals for state or federal funding should be pursued with NCC or possibly other local partners, as appropriate.

Strategy BR-3.5: The location of all restoration and habitat enhancement implemented within PCRCP shall be mapped within a GIS database and monitored to track implementation success.

Strategy BR-3.6: Within the first five years of implementation, annual reporting on the status and success of restoration efforts will be included in OC Parks' Annual Report to NCC.

Section 6 Fire Management (F)

Historically, fire is a natural occurrence within the native plant communities of PCRP and played an important role in maintaining biodiversity within the Park's ecosystem. This RMP describes existing and future fire management plans and provides recommendations for a comprehensive fire management program for the park.

Fire reduces dense vegetation and thatch buildup, allowing younger vegetative growth and germination of the soil seed bank. Following a fire, native shrubs and trees often recover quickly through a process of crown-sprouting. Once a shrub or tree loses its above-ground biomass, buds in the root crown quickly sprout using the existing root systems. In addition, fire contribute to nutrient-rich soils, which aid in the fast regrowth of affected plant material and germination of seeds stored in the soil. With increased access to sunlight due to loss of canopy, and increased soil nutrients from fire ash, seeds can germinate and establish quickly.

Historically, Peters Canyon was part of Irvine Ranch where fire management consisted of disking (plowing) a wide strip of land along the edge of the ranch property adjacent to homes. This method was derived from the historic agricultural activities on the ranch. Although this method provides immediate reduction of fire risk, disking produces negative long-term consequences that can increase fire hazards within the park. Disking by the Irvine Company prior to the transfer of Peters Canyon to the County in 1992 led to the conversion of fire-resistant native perennial grasses and shrubs to fire-prone, non-native annual grasses and forbs.

6.1 EXISTING FIRE MANAGEMENT PROGRAMS

In 1997, the County of Orange and the Orange County Fire Authority worked together to develop a fire management program for PCRP. The purpose of the fire management program was to bring together fire officers, park rangers, and resource ecologists to improve public safety and resource management in the park. The program is operated by OC Parks staff with on-the-ground fire and resource management responsibility for PCRP. The program is implemented following the principles of the NCCP/HCP.

In order to provide a more effective method of fire management, it was agreed that the fuel modification zones along the western park boundary would be maintained by following Best Management Practices for Vegetation Management in the Stakeholder Implementation Guide. Mowing grasses and forbs along the western boundary provides protection from fire in two ways. First, it reduces the height of the fuel bed, which results in lower flames, and slows the spread of fire. Second, mowing promotes faster decomposition of dead vegetation, which decreases fire fuel. Mowing should also be timed to prevent the spread of

invasive species into PCRP and equipment should be subject to sanitation BMPs. All defensible space zones are identified in Figure 6-1, *Fuel Modification Areas*.

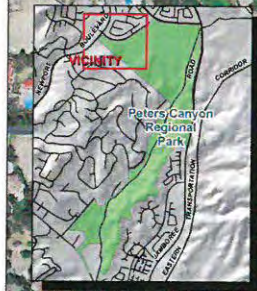
The fire management program within Peters Canyon includes the restoration of fire-tolerant native vegetation within the park, both in and out of the defensible space zones. Along with restoration, the PCRP's historic eucalyptus groves are actively managed as part of the program. This consists of removing dead and dying trees, selectively harvesting living trees to improve the overall health of the groves and providing a natural 'fire break' along PCC by restoring native riparian vegetation. The eucalyptus trees should be managed to decrease the amount of dead woody material and fuel within the park. The program includes increased fire prevention patrols by park rangers and the park's volunteer trail assistance unit to detect fires earlier and discourage activities that cause wildfires (such as smoking). Public education is incorporated into the program via regulatory signage at all park trailheads to enforce restrictions regarding smoking and fire use within the park.

Peters Canyon is located within Fire Management Units (FMU) 8.01 and 8.02 of the County of Orange Central/Coastal NCCP/HCP Wildland Fire Management Plan (WFMP). The WFMP provides an analysis of FMUs throughout the Central and Coastal Reserves, and focuses on: 1) anticipated fire risk, 2) potential hazards, and 3) development of potential hazard reduction measures. To determine potential hazards and reduction measures, the WFMP provides a review of vegetation (fuels), terrain, weather influence, ignition sources, biological and cultural assets, off-site adjacent private assets, and fire response capabilities. The WFMP also provides a quick-reference for responding firefighters and resource managers by defining the suppression activities recommended for each FMU as well as providing vegetation, sensitive species, and important management issues/priorities needed for making informed decisions. In addition, the WFMP provides a brief natural resources reference for use in pre-fire, during, and post-fire incident resource management. Potential fire hazard reduction measures within FMU 8.01 and 8.02 are identified in Figure 6-2, *Potential Fire Hazard Reduction Measures*.

6.1.1 Canyon Fire II

The Canyon Fire II provided OC Parks with the opportunity to see how effective their fire prevention measures are within PCRP, and what changes should be made to these measures. In addition, areas affected by the fire that were previously dominated by non-native grasslands can be converted into native fire-tolerant vegetation types.

Portions of PCRP that were affected by the fire were previously managed as defensible space zones. This area mainly includes the northern area of the park near the reservoir that is immediately adjacent to the surrounding residential development. These areas should be



DESIGNED AND PRODUCED BY:
 LOCAL
 DATE SOURCE:
 DATE: August 11, 2009



- Fuel Modification Area
- Park Boundary
- NCCP Reserve

Portion of
**Peters Canyon
 Regional Park**
 Fuel Modification Areas
 County of Orange, California



Fig 6-2: Potential Fire Hazard Reduction Measures - NROC

FMU 8.01



FMU Treatments

- Fuel Modification for Structures
- Minor Roadside Treatments
- Eucalyptus
- Fire Management Units
- NROC Reserve Boundaries
- Ownership

Treatment Acres

Fuel Modification for Structures (in reserve)	2.24 acres	Existing Fuel Modification (in reserve)	58.87 acres
Fuel Modification for Structures (in FMU)	0.78 acres	Existing Fuel Modification (in FMU)	1.30 acres








Fig 6-3: Potential Fire Hazard Reduction Measures - NROC

FMU 8.02



FMU Treatments

-  Fuel Modification for Structures
-  Eucalyptus
-  Fire Management Units
-  NROC Reserve Boundaries
-  Ownership

Treatment Acres

- Fuel Modification for Structures (in reserve) 0.76 acres
- Fuel Modification for Structures (in FMU) 6.77 acres



continued to be managed as defensible space zones, as well as converting some adjacent areas to defensible space zones. The non-native grassland within the northeastern portion of the park has a high potential to be converted into a defensible space zone, as well as converted into a native vegetation community.

In response to The Canyon Fire II, PCRCP was temporarily closed. All parks under OC Parks jurisdiction require temporary closure after a fire has occurred within park boundaries. This is done to assess any potential risks and damage done to the facilities and natural resources within the park, and to determine when it is safe to open the park back to the public. Within PCRCP, multiple fences and large stand of vegetation were destroyed by the fire, allowing visitors to access areas that were previously inaccessible and off-limits. Once the burn area was properly assessed and the park was deemed safe for visitors, PCRCP was re-opened to the public.

6.2 PROPOSED FIRE MANAGEMENT

When setting overall priorities for invasive plant management programs, wildfire implications should be considered. Areas most susceptible to future wildfires should be identified, and invasive plant populations within these areas should be identified. The likely effects of wildfire on invasive plant populations and invasive plants on wildfires should be evaluated within these identified areas. In addition, high-potential wildfire areas where prescribed burns can be used to benefit native plant communities and species while proactively reducing the threat of invasive plant spread following a wildfire in that area should be evaluated.

It is recommended that invasive plant prevention be integrated into fire management plans. An interdisciplinary team should be used when developing fire management plans in order to address preventing the spread of invasive plants. Invasive plant prevention priorities identified in land management plans should be included when developing fire management plans. These priorities should ideally be coordinated with existing local invasive weed committees and incorporated into an Integrated Pest Management (IPM) plan. Actions to prevent invasive plant spread in all levels of fire and fuel planning documents should also be included where appropriate. In order to deter invasive species and promote healthy native vegetation, sound forestry and range management practices should be encouraged to maintain healthy, vigorous overstory vegetation (where appropriate).

Invasive plant awareness and prevention should be included in existing fire and vegetation management training. This information can be included in regular trainings such as employee orientation and annual refresher courses.

Mulching may be desired for erosion control following fires. Weed-free materials should be utilized for post-fire soil stabilization activities. Development of as-needed contracts for

weed-free materials should be considered, as contracting for specialized weed-free materials can take weeks to months. This timeframe exceeds most fire emergency rehabilitation and suppression repair projects. If contracts are in place prior to fire suppression, it is more likely that weed-free materials can be effectively acquired. As-needed contracts are commonly used in other fire management activities (e.g. water tankers, helicopters, vegetation management crews). Native and appropriate native seed should be stockpiled for use in post-fire activities. Like weed-free materials, the time needed for contracting and acquisition of seed can exceed the timeframe of most fire emergency rehabilitation and suppression repair projects.

Vegetation management in defensible space zones is also recommended. Vegetation management is designed to change future fire behavior, to contain fires, or to reverse negative ecosystem changes. Vegetation management activities typically involve the thinning or removal of understory vegetation and the rearrangement or removal of surface fuels. Prescribed fire, mechanical or hand thinning, mechanical mastication, machine piling, pile burning, and chipping are all methods used in vegetation management. It is important to include an assessment of the potential for the introduction, establishment, and spread of invasive plants following vegetation management activities.

Considerations of native wildlife and native and non-native vegetation should be incorporated when developing vegetation management plans. An interdisciplinary team should be used when developing vegetation management plans in order to address preventing the spread of invasive plants. A wide variety of disciplines should be included, such as botanists, endangered species specialists, soil scientists, hydrologists, and GIS specialists that are knowledgeable about invasive plants and native plant life histories. Invasive plants should be surveyed in order to create baseline data for fuel treatment. Survey data from local and state resource agencies should be available and integrated. A set of clear target conditions should be developed for vegetation and fuel. The effects of both fuel treatments on invasive plants and native plants, and the effects of invasive plants on fuel treatments should be considered when developing these target conditions. Human-caused factors that influence invasive plant spread should be assessed when developing vegetation management plans. These factors include fuel break construction methods, the scale of fuel breaks, maintenance methods, maintenance frequency, connectivity to roads and trails, extent of private inholdings in a given area, and fire regime changes. Environmental conditions should be assessed in addition to human-caused factors. These conditions include proximity to populations of invasive plants, overstory canopy cover, litter cover, rock cover, duff depth, bare ground, vegetation type, elevation, slope, fire regime, and climate change. For fuel treatment projects where the potential for introduction of spread is moderate to high as a result of implementation, remove high risk areas from the project footprint, develop a pre-fire treatment prescription, or incorporate project design features to reduce the risk of spreading or introducing invasive plants. Outreach and

education information for adjacent property owners and fire safety councils about the effects of fuel treatments on invasive plants, and BMPs to reduce the spread of invasive plants on their own property and nearby wildlands should be developed.

When implementing vegetation management activities, disturbances should be reduced to a minimum. Where appropriate, shaded fuel breaks should be maintained in key fire suppression areas in order to reduce the need for bulldozing and cutting operations during emergency fire suppression. The minimum amount of vegetation and ground cover should be removed to accomplish the vegetation management and resource objects in order to prevent the spread of invasive plants. Fuel breaks should be constructed no wider than necessary to accomplish fuel reduction and resource objectives, and vegetation adjacent to prescribed fire control lines should be removed only as needed to prevent additional fire spread or for safety and access. Thinning techniques that do not result in ground disturbance (e.g. hand thinning, thinning using a chainsaw, mowing, or mastication) should be favored over techniques that result in ground disturbance (e.g. grapple piling or blading). Vegetation in the fuel break should be thinned to a minimum level in order to meet fuel objectives, providing a potential vegetation barrier to reduce the spread of invasive plants across the fuel break. In situations where fuel reduction and resource objectives necessitate ground disturbance and soil exposure, or substantial ground cover and canopy removal, appropriate revegetation or invasive plant management strategies should be included in the fuel treatment plan. These strategies include, but are not limited to, rehabilitation/restoration of disturbed areas after vegetation management activities and conduction of follow up monitoring on these areas susceptible to invasive plant spread, and covering and reducing exposure of bare ground.

Fire control methods will help to minimize fire impacts and cause the least amount of damage to PCRNP natural resources while still protecting the park. Fire control methods currently used within the park should remain. Areas currently being mowed for fire control should be considered for conversion into cactus scrub habitat. This would not only restore these areas to native vegetation, but also increase available habitat for cactus wren. In addition, cactus scrub habitat requires less maintenance over time while continuing to provide fuel modification function.

Existing defensible space zones along the park boundary should be maintained. Additional defensible space zones within and around the park should be created if required. If new defensible space zones are added, a biological inventory should be conducted within the proposed areas to determine the method with the least environmental impacts for reducing fuel loads. Additional measures to prevent fire should be implemented, such as the replacement of eucalyptus with native species.

6.3 FIRE MANAGEMENT (F) GOALS AND STRATEGIES

Goal F-1: Prevent fire in the park.

Strategy F-1.1: Develop and implement BMPs for low impact, sustainable, non-invasive vegetation installation and maintenance in defensible space as appropriate.

Strategy F-1.2: Develop and implement protocols with the Natural Resources Management Group, OCFA, NCC and other land management partners for pre-fire planning, fire response and post-fire assessment and activities.

- Map and create and maintain a geodatabase of existing sensitive biological and cultural resources.

Strategy F-1.3: Coordinate with Orange County Fire Authority (OCFA) and NCC on defensible space zone plans adjacent to residential communities.

Strategy F-1.4: Check Emergency Access Plan in RMP and update on an annual basis.

Strategy F-1.5: Conduct annual inspections of defensible space zones and park boundaries to monitor defensible space zone limits, erosion, and non-native plant and animal species including feral domestic animals.

- Defensible space zones should be monitored concurrently with other biological or maintenance monitoring duties.

Strategy F-1.6: Incorporate and implement recommendations from the NCCP Wildland Fire Management Plan.

- Review NCCP Wildland Fire Management Plan and periodically review and revise recommendations as conditions change.
- Incorporate recommendations that apply to Peters Canyon Regional Park.

Strategy F-1.7: Develop park map showing park boundaries, defensible space zone boundaries, and the NCCP/HCP Reserve boundary to minimize impacts to natural resources when maintaining fire management areas.

Strategy F-1.8: Ensure emergency roads, gates, etc. are maintained annually.

- Include fire safety maintenance actions in annual maintenance plan.
- Inspect all emergency roads and access points within the park to ensure that local Fire Department vehicles have access.

Strategy F-1.10: Document the location, dates, and ignition sources of wildfire occurrences using GIS mapping techniques. Coordinate mapping with OC Parks GIS Section and distribute as required.

- In coordination with OCTA and NCC, conduct a site visit post-fire to determine the ignition sources and location of the wildfire occurrence.

Goal F-2: Minimize impacts of fire suppression activities during fire.

Strategy F-2.1: Reduce impacts to natural resources during fire suppression activities.

- Remove the minimal amount of vegetation necessary to access active burn areas or to isolate burn areas via a fire break.
- Suppress active burn areas as quickly as possible to limit the destruction of natural resources.

Strategy F-2.2: Reduce impacts to cultural resources during fire suppression activities.

- If possible, actively avoid areas where known cultural resources have been documented during fire suppression.

Goal F-3: Assist with post-fire habitat recovery.

Strategy F-3.1: Develop and implement post-fire evaluation and guidelines for appropriate rehabilitation measures to address erosion, revegetation, non-native species, trail stability, security, public safety and cultural resources following fires.

- Conduct a post-fire walk through the park to determine the impacts the fire has made on the vegetation within the park.
- Note areas that may be subject to erosion or slope failure due to the absence of vegetation in areas that were previously vegetated.

Strategy F-3.2: Conduct a post-fire cultural resource assessment in coordination with OCFA.

- Review the latest Cultural Resources Report prepared at the park, and do a post-fire assessment of any resources within the park.

Section 7 Park Operation and Management (POM)

General maintenance activities within PCRP occur on a weekly, bi-weekly, monthly, quarterly, bi-annual, or annual basis (refer to Table 2, sourced from *Peters Canyon Annual Facility Inspection Schedule 2016*). These maintenance activities include doggie bag inspection, restroom inspection, fire extinguisher inspection, AED inspection, trash can inspection, ladder inspection, doggie drinking fountain inspection, cable tightness on parking lot posts inspection, water conservation inspection, foot bridge inspection, gate/pull post paint inspection, loose bridge boards inspection, parcel inspection weed abatement, bench and table inspection, weed abatement inspection, building structured inspection, log pole/chain fencing inspection, wheel stops inspection, grading inspection, kiosk inspection, trail brushing inspection, sewer inspection, sign inspection, backflow inspection, deck inspection, handicap parking area inspection, facility inspection, ditch cleaning inspection, storm drain inspection, storm prep inspection, and an annual disaster kit inspection.

As required by the NCCP/HCP, all resource management activities will be monitored to directly assess their effectiveness in meeting the overall goal of the NCC to promote biodiversity, increase habitat for all target species, and increase habitat value. General maintenance activities within the park will also be implemented in order to preserve the natural resources within the park. Monitoring reports will be prepared for all resource management programs including fire management, public access and recreation, habitat restoration, exotic plant control, and pest vertebrate species control.

7.1 EXISTING PARK OPERATIONS AND MANAGEMENT

PARK ADMINISTRATION, MANAGEMENT, AND OPERATIONS

Operations

1. Park Hours

Park hours are 7:00 a.m. to sunset. Temporary trail and parking area closures may occur following a significant storm event or during periods of excessive fire danger. Closures are identified on the PCRP webpage, via the phone system, through social media, and through physical closure identified with signage at the front entry and access points.

2. Special Permits

Special permits may be issued by the OC Parks headquarters office for organized events, such as school groups for educational purposes, research by authorized individuals or groups, and fund-raising efforts.

3. Prohibited Activities

Prohibited activity within PCRP includes any activity that may result in loss or degradation of park resources and/or facilities. Cultural artifact, plant, and animal collecting is prohibited. Other prohibited activities include operation of motorized vehicles within the park by the public, public boating, cattle grazing, swimming and wading, possession or use of firearms or weapons, all fires, fishing, consumption of intoxicants, Drones (unmanned aerial vehicles), and unleashed dogs.

Administration and Management

PCRCP is located in the eastern part of the OC Parks regional parks system and is classified as a regional park. The East Orange Operations Groups is responsible for the maintenance of not only PCRCP, but also Santiago Oaks Regional Park and Irvine Regional Park. The main maintenance and operational hub for this Group is located in the Irvine Regional Park maintenance facility.

The East Operations Group consists of a (1) Supervising Park Ranger, (2) Senior Park Ranger(s), (3) Park Rangers, (4) Maintenance Crew Supervisors, (5) Park Maintenance Workers, and (6) Groundskeepers. The current staffing at PCRCP consists of a Senior Park Ranger on the weekdays and a Park Ranger on the weekends. The Senior Park Ranger is responsible for coordinating all administrative services, which includes budget preparation, purchase requests, work requests, contract services, maintenance projects, park amenities inventory, reports, coordination of environmental studies, and development of an interpretive program. The park office is located adjacent to the parking area located at the northern end of the park. Current on-site vehicles for maintenance/operations include a full size 4x4 Ford Ranger truck for patrol and inspection needs.

The park will continue to be maintained and operated out of the East Orange Operations Group and is subject to change.

The operation and management of PCRCP will be provided through a combination of OC Parks staff and contracted resources. The operation and maintenance facilities are proposed to be newly constructed as part of the GDP, and these improvements include: a small park office with associated maintenance/storage yard; and restoration of the main entrance including parking layout, pay stations, small picnic shelters, arrival area, and multi-use trail heads.

Resource Protection

Resource protection is a very important responsibility of the park staff. Resource protection within PCRP is possible via county peace officers working cooperatively with the NCC, California Department of Fish and Wildlife, and other resource/regulatory agencies. Establishing a Natural Resources Specialist to oversee and implement the recommendations and guidelines of the RMP is essential to effectively manage the resources within the park. Reviewing all habitat enhancement plans and specifications to ensure compliance with the NCCP/HCP and the park goals and objectives of the RMP is a key component of resource protection within the park.

Budget

The budget for PCRP varies annually, depending on proposed/planned maintenance and improvement projects within the park. Work orders are placed for specific projects needed within the park, and the budget is planned accordingly.

Law Enforcement

Visitor safety and security is typically provided through collaboration between OC Parks staff, local law enforcement, and local emergency services providers. Orange County Park Rangers are Peace Officers, trained to encourage voluntary compliance with The Codified Ordinances of the County of Orange through progressive enforcement measures.

OC Parks has designated 2 rangers to oversee PCRP and ensure the safety of all visitors of the park. In addition, the OC Sheriff's department and local agencies such as the cities of Tustin or Orange Police Department have the responsibility of responding to any immediate emergencies occurring within the boundaries of the park.

Medical emergencies are addressed by Park Rangers and other staff trained as first-responders, and by various fire agencies. OC Parks participates in a sophisticated dispatch network which ensures timely response to both public safety and health incidents within the park.

The current trailer which serves as a park office is locked when there is no Ranger present. The proposed park office building and maintenance/storage yard security will be addressed during the Concept Development Phase of that facility.

Jurisdiction

All areas of PCRP are under the management of OC Parks. In addition, the OC Sheriff's Department assists OC Parks in policing within the park, the OCFA assists in maintaining fuel modification zones, OCPW operates the reservoir, and the OC Vector Control District has jurisdiction within the park.

Utilities

PCRP holds several water and sewer utilities. These utilities have easements, rights-of-way, and access rights to maintain and operate within the park. A 24-inch sewer conveyance system runs through the entire length of the park. This sewer main is serviced by Irvine Ranch Water District (IRWD). IRWD also operates a number of underground water pipelines that traverse the park. These water pipelines include both domestic and recycled water lines. An additional water pipeline within the park belongs to East Orange County Water District. Electric lines are present along the eastern and northern boundaries of the park, along with an extension entering the park at the upstream end of the dam and at the northern parking area.

Other agencies that have public utility lines running through the park with recorded easements include, but are not limited to:

- Irvine Ranch Water District (water)
- East Orange County Water District (water)
- Metropolitan Water District Orange County (water)
- El Toro and Los Alisos Water Districts (Santiago Aqueduct) (water)
- Municipal Water District of Orange County (Allen-McColloch Pipeline) (water)
- City of Orange (stormwater and public utilities)
- Southern California Edison (electricity)
- Golden State Water District (water)

Existing Facilities and Operations

Within the park there are facilities that are owned and operated by other agencies. The Lower Peters Canyon Reservoir (LPCR), which adjoins PCRP's southern boundary, is owned and operated by the Orange County Flood Control District. The Upper Peters Canyon Reservoir (UPCR) is owned by the County of Orange and is jointly maintained through a Memorandum of Understanding (MOU) by OC Parks and Orange County Public Works (OCPW). Water is supplied by rain falling directly onto the reservoir and through storm water drainage structures.

OCPW and the Orange County Fire Authority came together and decided the western boundary of the park would be maintained by mowing, thus creating a fuel modification zone. The Orange County Mosquito and Vector Control District (OCMVCD) is currently responsible for applying mosquito larvicide to UPCR. The larvicide contains a naturally occurring bacteria that targets mosquito larvae and prevents them from developing into adults. The larvicide acts only upon mosquito larvae and will not harm people, pets, plants, or wildlife. Any facilities and operations within PCRP must not violate the South Coast Air

Quality Management District's requirements for odor control. Any odors that provide a nuisance to park visitors is not permitted.

Operation and Maintenance

Operation and Maintenance (O/M) activities for current and future facilities are allowed within facility easements. Activities that require impacts to vegetation are conducted outside of the breeding/nesting season for birds. These activities include road maintenance, regular patrol and inspection, facility operations, necessary clearing and weed abatement around facilities, and activities mandated by regulation or law affecting public health, safety, and welfare.

Emergency Procedures and Policies

In emergency situations, immediate repairs are permitted in accordance within specific policies and procedures to ensure the protection of both the public and the natural resources within PCRP. Conditions that require emergency action will be completed consistent with normal practices. Upon completion of repairs, the extent of the disturbed area is determined, and revegetation plans are prepared, implemented, and monitored by the project proponent in accordance with the emergency standards and requirements. Revegetation is limited to the disturbed area.

Monitoring Park Use

The County of Orange NCCP/HCP for the Central and Coastal subregion includes access and recreation use policies which are intended to define recreational uses within the reserve in a manner that is compatible with CSS protection and management and to provide for management and monitoring of such uses for habitat protection purposes. Public access and "passive" recreational uses is defined as hiking, equestrian, and mountain bike uses on designated and existing truck trails, picnicking in areas designated by the adopted RMP, nature interpretation, vehicular parking in areas designated in adopted RMPs and staging areas serving existing truck trails.

Public access is carefully monitored by the respective reserve owner/managers and managed to avoid significant degradation of biological resources within PCRP. Monitoring and management includes utilizing existing truck trails whenever possible, thus minimizing the need for new trail construction, closing unneeded truck trails and restoring the impacted habitat to natural conditions, and restricting public access in areas that are unsafe for users or where it is necessary to minimize impacts to sensitive habitat and natural resources.

To ensure that overuse for recreation does not create problems leading to impacts on "Target Species" or sensitive habitat, ongoing use and maintenance of trails within the reserve are monitored. This includes prohibiting the use of equestrian and mountain bike

trails for appropriate periods following heavy rains to avoid trail damage and subsequent effects on adjacent habitat, seasonal trail re-routes in order to protect sensitive species from significant adverse user impacts during nesting or other sensitive periods, monitoring off trail use, and implementation of docents/educational programs to help communicate to trail users and other public users the importance of restricting recreational use to designated trails.

Reserve managers are active in appropriately managing recreation uses within PCRP in order to minimize impacts of recreation use on the habitat values within the reserve. In order to increase enforcement capabilities, reserve managers encourage trail user groups to participate in “self monitoring and policing” programs to minimize instances of off-trail activities and other abuses to habitat resources within the reserve, give park rangers the authority to issue citations for misuse of trail or other park facilities, issue fines for abuse to park facilities resulting in harm to species or sensitive habitat to discourage repeat occurrences, and close trails due to repeated offenses by multiple users.

Annual Report

An annual report is prepared by PCRP reserve owners/managers which includes the results of recreational use monitoring (e.g., trail conditions, adverse habitat impacts, etc.), specific recommendations involving modifications to existing management practices aimed at minimizing adverse impacts on biological resources resulting from recreational use, and recommendations to initiate new management programs in response to changing circumstances/conditions (e.g., educational programs, trail patrols, etc.).

Infrastructure Maintenance

Public infrastructure necessary for public health and safety or economic reasons are permitted within PCRP. These facilities include arterial or other identified roads, water lines, the reservoir and associated facilities, sewer lines and pump stations, electric facilities, telephone facilities, cable television facilities, natural gas facilities, storm drain and flood control facilities, and landfill gas recovery facilities, borrow sites, access roads, monitoring wells, and maintenance facilities.

Operation and maintenance of existing and future infrastructure facilities is a permitted use within PCRP and is included as authorized Incidental Take under the NCCP/HCP. To the extent possible, siting of new infrastructure within the Reserve System should minimize impacts to CSS, other habitat, and “Target Species”. The identified loss of habitat and take of species associated with the new infrastructure facilities sited within PCRP is mitigated under the subregional NCCP/HCP. Other permitted uses within PCRP include those activities or facilities that are necessary to carry out activities in accordance with other governmental regulations affecting public health, safety, and welfare.

7.2 EXISTING PARK MAINTENANCE AND MONITORING PROGRAM

General maintenance activities within PCRP occur on a weekly, bi-weekly, monthly, quarterly, bi-annual, or annual basis (refer to Table 2, sourced from *Peters Canyon Annual Facility Inspection Schedule 2016*). These maintenance activities include doggie bag inspection, restroom inspection, fire extinguisher inspection, AED inspection, trash can inspection, ladder inspection, doggie drinking fountain inspection, cable tightness on parking lot posts inspection, water conservation inspection, foot bridge inspection, gate/pull post paint inspection, loose bridge boards inspection, parcel inspection weed abatement, bench and table inspection, weed abatement inspection, building structured inspection, log pole/chain fencing inspection, wheel stops inspection, grading inspection, kiosk inspection, trail brushing inspection, sewer inspection, sign inspection, backflow inspection, deck inspection, handicap parking area inspection, facility inspection, ditch cleaning inspection, storm drain inspection, storm prep inspection, and an annual disaster kit inspection.

Table 3. Maintenance Activity Schedule

Maintenance Task	Weekly	Bi-Weekly	Monthly	Quarterly	Bi-Annually	Annually
Doggie bag inspection	X					
Restroom inspection		X				
Fire extinguisher inspection			X			
AED inspection			X			
Trash can inspection				X		
Ladder inspection						X
Doggie drinking fountain inspection			X			
Cable tightness on parking lot posts inspection				X		
Water conservation inspection			X			
Foot bridge inspection						X
Gate/pull post paint inspection						X
Loose bridge boards inspection				X		
Weed abatement						X
Bench and table inspection					X	
Weed abatement inspection					X	
Building structures inspection						X
Log pole/chain link fencing inspection						X
Wheel stops inspection					X	
Grading inspection					X	
Kiosk inspection					X	
Trail brushing inspection					X	
Sewer inspection						X
Sign inspection						X
Backflow inspection						X
Deck inspection						X
Handicap parking area inspection						X
Facility inspection						X
Ditch cleaning inspection						X
Storm drain inspection						X
Storm prep inspection						X
Annual disaster kit inspection						X

7.3 PROPOSED MAINTENANCE AND MONITORING

All resource management activities should be monitored in order to determine whether or not the goal of increased biodiversity, increased habitat for target species, and increased habitat value is being met, as required by the NCCP/HCP. Any fire management, habitat, restoration, enhancement, or creation, exotic plant control, pest invertebrate species control, and public access/recreational use should have on-going monitoring with annual reporting.

General Public Access

Public access should be limited to sanctioned trails within the park, as well as access from adjacent residential developments. Off-trail use by the public should be prevented, and unapproved trail creation by the public should be monitored and eliminated as soon as possible via signage or temporary fencing. Public trail recreation within PCRCP will be expanded with the creation of new trails throughout the park. The creation of new trails for public recreation and interpretation should not interfere with or degrade protection, enhancement, and/or environmental restoration activities. Any sensitive habitat or species within the park should be monitored in order to determine the effects of public use, if any.

Detailed professional engineering and landscape architectural plans should be prepared prior to construction of trails, staging areas, or any other park improvements. Projects shall also include detailed planting plans, which would include species, quantities, plant type (i.e. seed, cutting, container), and watering requirements (irrigation layout if required). Revegetation plans should also be prepared to mitigate the loss of existing native vegetation due to routine facility operation, maintenance, and repairs.

Annual Reports

Section 5.8.3 of the NCCP/HCP requires annual work plan and progress reports be prepared which include the results of recreation use monitoring trail conditions, adverse habitat impacts, erosion issues, etc. Trails should be monitored for soil erosion, multiple tread, excessive root exposure, excessive width, wet or muddy soils, or any standing water on the Treadway. Adaptive management should be implemented to decrease impacts on biological resources from recreational use. Annual reports should be submitted to the USFWS and CDFW by December 31 of each year.

Trails

Trails used by hikers, equestrians, and mountain bikers should be prohibited for periods following a significant storm event in order to avoid damage to trails and damage to adjacent habitats. Temporary closures shall be monitored until conditions, such as mud and ponding, are reduced. Trail use should be monitored in order to identify overuse and potential impacts of sensitive species or habitat, as well as off-trail use.

Emergency Repairs

If immediate repairs are required and immediate action is necessary, a biologist is not required to be present. Following the work, the disturbed area should be determined, and revegetation plans should be prepared, implemented, and monitored. If eight or more hours are available before emergency work will commence, the area should be delineated and a biological assessment should be implemented, followed by revegetation. Pre-project

photographs are encouraged. Photographs document the emerging condition and assist stakeholders review upon post-project.

Administration and Management

Staffing and equipment within PCRP should be expanded. Future staffing should include a maintenance worker on weekdays, Senior Park Ranger on weekdays, Park Ranger on weekends, two groundskeepers (one on weekdays and one on weekends), and a Natural Resources Specialist. Identifying new equipment, ensuring that optimal equipment inventory is maintained, and developing an equipment replacement schedule are important issues for park maintenance. Even in cases of a well-equipped fleet with well-maintained equipment, there is the need to continually plan for replacements. Future on-site vehicles for maintenance and operations should include a full size 4x4 maintenance truck for patrol and inspection needs, a full size 4x4 Ranger truck, and utility vehicle.

7.4 PARK OPERATION AND MANAGEMENT (POM) GOALS AND STRATEGIES

Goal POM-1: Provide sufficient staff resources to support park programs, operations, and maintenance, including visitor safety and services, recreational amenities, stewardship, and infrastructure.

Strategy POM-1.1: Provide sufficient park ranger staff to adequately operate, manage, maintain and monitor the park. Budget and provide for additional future ranger staff, including 1 Senior Park Ranger for weekdays and 1 Park Ranger II for weekends.

- If possible, increase maintenance and monitoring activities with increased park staff.

Strategy POM-1.2: Provide sufficient park maintenance staff to adequately operate, manage, maintain and monitor the park. Budget and provide for additional future maintenance staff, including 1 Maintenance Worker for weekdays and 2 groundskeepers (1 for weekdays and 1 for weekends).

- Determine which units are short-staffed, and plan accordingly.

Strategy POM-1.3: Assign a Natural Resource Specialist to the park to adequately manage, maintain and monitor natural resource BMPs and education and outreach programs and guide RMP implementation.

- If budget and work flow allows, hire a new Natural Resource Specialist specifically to Peters Canyon Regional Park.

Goal POM-2: Conduct park operations and maintenance activities in accordance with OC Parks Strategic Plan, park RMP, NCCP, and IOD.

Strategy POM-2.1: Develop and implement annual work plans with associated budgets and input into CMMS.

Strategy POM-2.2: Coordinate with GIS Section to develop a map that shows all existing easements.

- Obtain easement data if not readily available.

Strategy POM-2.3: Develop and implement BMPs to reduce impacts of routine maintenance to park resources.

- Review trail maintenance guides and/or natural resource reports for BMPs.
- Educate maintenance workers on proper BMPs.

Strategy POM-2.4: Provide resource protection measures with park permits.

Strategy POM-2.5: Practice adaptive management by annually reviewing all goals and updating BMPs and strategies.

- Note changes to natural resources within the park annually, and manage those resources accordingly.
- Applicable goals, BMPs, and strategies will change depending on park use and environmental conditions annually.

Strategy POM-2.6: Maintain a safe environment for all park visitors and staff.

- Pest management

Strategy POM-2.7: Coordinate with Natural Resource Specialist to prepare work plans and annual progress reports to describe trail, habitat, erosion, non-native plant, and pest conditions.

Goal POM-3: Develop and provide training on BMPs for regular and unique events (e.g. SHBs, removal of non-natives, etc.).

Strategy POM-3.1: Engage in collaborative partnerships with NCC, IRC, and other natural resource partners to establish consistent BMPs and accomplish broader goals across OC Parks lands.

Strategy POM-3.2: Train park staff on annual plans for habitat restoration and control of pests, non-native, invasive plant species, diseases, etc.

- Focus specifically on maintenance staff and how they can implement BMPs during routine park maintenance.

Strategy POM-3.3: Train appropriate park staff on CMMS.

Strategy POM-3.4: Incorporate OC Parks IPM Policy and Guidelines into operation and maintenance programs.

Strategy POM-3.5: Incorporate OC Parks Regulatory Field Guide and Manual into maintenance program.

Strategy POM-3.6: Train park staff on BMPs to contain/minimize spread PSHBs, including education of maintenance staff regarding pest identification, pruning of infested areas, equipment sanitation, proper disposal methods, etc.

- Keep track of new developments in PSHB eradication and protection as techniques are currently being developed and tested.

Strategy POM-3.7: Train park staff on differences between an Encroachment Permit and a permit issued through OC Parks and Easements. Include field strategies, photo documentation, or templates that will streamline permit implementation.

Section 8 Public Outreach and Volunteer Management (POV)

Public outreach and education of park visitors is one of the most critical elements of the resource management program. An interpretive program would center around the idea that PCRCP is the core of a larger ecosystem that is dependent on maintaining biodiversity and ecological stability within the park. Educating the public on the potential impacts they can have on the park is vital to protecting natural resources. The proposed interpretive programs will educate the public on sensitivity and value of the resources within the park through organization of docent-led tours and programs, park ranger talks, new nature trails, presentations, hands-on experiences, signage, and park resource take-home materials and information.

Academic outreach should be encouraged as well as volunteer programs including park docents, ranger reserves, OC Parks volunteers, and non-profit organizations. In addition to volunteer programs, a community outreach program will provide information to local residents about the implications of living in close proximity to a regional park.

Interpretive programs that foster an understanding of human roles in preserving the park's natural balance are vital to its success as a healthy, natural system. In particular, educating the public on the potentially profound effect of inappropriate human intrusion in the park is critical.

Tools for outreach and education include park staff, signage, park brochures and literature, exhibits and displays, nature trails, academic outreach, volunteer programs, and a good neighbor program.

8.1 EXISTING PUBLIC OUTREACH AND VOLUNTEER OPPORTUNNITIES

PARK STAFF

County park rangers will work cooperatively with the NCC and the Irvine Company, California Department of Fish and Wildlife, and other resource agencies. Park staff will be educated on the NCCP/HCP program and will use this RMP as reference.

SIGNAGE

Park staff will be actively involved in the maintenance and establishment of signage throughout the park. Information found on signage throughout PCRCP includes directions, regulations, interpretation, and identification. Directional signage will be placed throughout the park in order to identify trail and park facility locations, and trail mileage. Regulatory

signage defines the rules and regulations of the park and are located at trail heads and access points to the park. Interpretive signage will include educational materials regarding vegetation, habitat, and wildlife, and strategically placed exhibits throughout the park will feature unique flora and fauna species to be enjoyed by visitors.

PARK MEDIA

Park literature and PCRCP brochure include maps and information about park regulations and hours of operation, park access and recreation, plant communities, wildlife habitat, history and pre-history, environmental restoration programs, resource conservation issues, and educational programs offered by the park. The park brochure can be found at the park, as well as online as a digital copy.

The OC Parks website contains the park brochures, trail maps, park rules, park amenities, and historical information on all of their parks, including PCRCP. The website includes information on different activities available at PCRCP, current events happening within and around the park, and information on special events that the public can participate in.

The Peters Canyon General Development plan also contains valuable information about the park.

EXHIBITS/DISPLAYS

Exhibits and displays at kiosks at staging areas include resource related educational information. Displays are rotated to encourage continuing public interest and can often be seasonal to depict the current setting within the park. Displays focus on the park's role in NCCP/HCP, particular plants, plant communities, resource protection underway in the park, park animals, as well as stories of early human use of the park's lands. Staging area displays emphasize those resources which are associated with that particular staging area and include general park resource information.

NATURE TRAILS

Self-guided nature trails currently exist at PCRCP. Additional self-guiding nature trails should be provided within the park. Additional interpretive information at trailheads, along existing trails, and in staging areas should also be provided.

VOLUNTEER PROGRAMS

In order to become an OC Parks volunteer, volunteers must be at least 18 years of age or 16 with parent permission, commit 36 hours per year, complete a background check, and fill out a volunteer interest form. If accepted, the volunteer must complete a series of trainings

to prepare for volunteer work with the public. This training includes program orientation, a public interaction workshop, and first aid and CPR training.

Currently, a volunteer restoration program exists that occurs on every 3rd Sunday of the month. This restoration program allows volunteers to help park rangers remove invasive and non-native plants to keep the native habitat healthy, in turn helping the wildlife thrive. This program not only helps conserve the natural resources in the park, but also provides an opportunity to educate park visitors. The OC Parks Volunteer Program provides a variety of volunteer services throughout all regional parks, wilderness parks, historical parks, trails, beaches, and open space. This program allows the public to volunteer as an education docent, historic docent, nature center volunteer, or program guide, as well as assist with habitat monitoring, restoration, trail work, park maintenance, and visitor services.

8.2 PROPOSED PUBLIC OUTREACH AND VOLUNTEER OPPORTUNITIES

Academic Outreach

Academic outreach could not only help park staff better understand the park, but also help local students get involved. Park staff should identify contacts in pertinent departments at local colleges and universities to assist with research on park resource issues. Academic research could be conducted in biological, earth and ecological sciences, archaeology, paleontology, history, recreation, education, and social sciences.

Academic internships and programs related to park resources should be made available on the basis of park needs. Interns should work directly with park staff. PCRPP offers a wide variety of opportunities for interns, such as monitoring visitor impacts on natural resources, trails and other high use areas; research and development of interpretive displays; documentations of plant and animal species occurring in the park, including the preparation of herbarium samples; research on habitat restoration techniques; documentation on wildlife corridors; and presentation of interpretive talks.

Volunteer Program

Additional volunteer programs to help conserve natural resources within the park and to help educate park visitors on wildlife preservation and conservation issues within the park are recommended. Further utilizing volunteers to help with invasive plant removal would help enhance and preserve the natural resources within the park.

Efforts of professional researchers, interns, and volunteers should be coordinated by OC Parks staff. This will enable information to be compiled into a common data base to be shared, as well as help get a better understanding of the natural resources within the park.

Docent Program

Along with an intern program and interpretive materials, setting up a docent program could also benefit the park. Park docents could be used to help educate the public on the importance and sensitivity of the park's natural resources via interpretive hiking tours. By helping the public understand and appreciate the importance of the park's ecosystem, it is more likely future visitors will protect the park's natural resources.

Non-Profit Organizations

Collaboration with non-profit organizations dedicated to the creation, maintenance, and preservation of trails throughout Southern California, would be a great way to improve the natural resources of PCRP and get the public involved in volunteer work within the park. These organizations provide financial support for trail projects throughout Orange County and provide grants to purchase trail building tools and materials.

Good Neighbor Program

Currently, a Good Neighbor Program does not exist at PCRP. Community outreach is essential to provide local residents with information about the responsibilities and benefits of living in close proximity to a wilderness park. Educating local residents about invasive landscape plants, non-point source pollution, impacts of domestic pets on wildlife, and wildlife prevention is needed to help protect the natural resources within the park.

8.3 PUBLIC OUTREACH AND VOLUNTEER (POV) GOALS AND STRATEGIES

Goal POE-1: Expand the volunteer program to support park staff efforts in achieving habitat restoration, non-native species control, trail etiquette signage, and trail maintenance.

Strategy POE-1.1: Employ a Natural Resource Specialist who can coordinate with PIO and Natural Resource Manager for volunteer and outreach projects.

- Consult with Natural Resources Management Group to develop habitat restoration and enhancement program for volunteers.
- Consult with Natural Resources Management Group to develop a volunteer program for removal of non-native invasive species.

Strategy POE-1.2: Consult with OC Parks Planning & Design Division to develop a well-designed interpretive and trail signage system.

- Using the OC Parks Signage and Master Plan as a basis for signage design, prepare a signage plan for the park, including detailed specifications for design of all signs.

Strategy POE-1.3: Develop interpretive program to educate visitors about biological, cultural, and historical aspects of the park, including docent-led tours, information and literature, signage and public outreach to emphasize interpretation as a management tool.

- Incorporate educational signage within existing and proposed park access points and rest areas.
- Use RMP as a reference and guide to creating educational signage or interpretive programs.

Strategy POE-1.4: Volunteer trail management program.

Goal POE-2: Increase public understanding, appreciation and participation in environmental and cultural stewardship and education.

Strategy POE-2.1: Develop and implement a comprehensive Interpretive Plan for the park that includes recommendations for interpretive trails and displays, enhancement of existing facilities and displays, interpretive programming, and interpretive methods, such as live programs, brochures, maps, social media, and school programs.

- Incorporate interpretive displays and educational material within newly proposed trails within the General Development Plan.

Strategy POE-2.2: Train volunteers using the Irvine Ranch Conservancy Land Steward Manual as a guide.

Strategy POE-2.3: Coordinate with local agencies and organizations, especially schools to use the park for environmental education.

- Provide environmental education programs and materials to schools, groups and organizations.
- Allow park staff to interact with and help create programs for schools, groups, and organizations.

Strategy POE-2.4: Develop land stewardship and interpretive volunteer opportunities that highlight biological, cultural, and/or historical aspects of the park as part of the volunteer activity.

- Utilize volunteers to help create educational events or other materials within the park that highlight the natural resources within the park.

Strategy POE-2.5: Employ a Natural Resource Specialist to undertake increased interpretation scope and effort.

Goal POE-3: Increase public outreach.

Strategy POE-3.1: Support and/or participate in special events and programs that foster public knowledge and appreciation of the open space and park resources (hikes, 5Ks, school science programs etc.).

- Participate in events at local universities, which may include educating students on the natural resources within the park, or recruiting possible volunteers or interns.
- Organize educational hikes within the park.

Strategy POE-3.2: Participate in multi-agency forums to share information and resources and explore partnership opportunities.

- Attend conferences and conventions

Strategy POE-3.3: Develop and implement outreach opportunities to gain public support for resource management goals and strategies.

Strategy POE-3.4: Employ a Natural Resource Specialist to undertake increased outreach scope and effort.

Section 9 References

- Agenbroad, L.D. 2003. *New localities, chronology, and comparisons for the pygmy mammoth (Mammuthus exilis)*. In J. Reumer (ed.): *Advances in Mammoth Research, Proceedings of the 2nd International Mammoth Conference*, Rotterdam, the Netherlands. DEINSEA 9:1-16.
- ArcGIS. 2016. Federal Emergency Management Agency – 100 Year Flood Zones. Accessed on March 15, 2016: <http://www.arcgis.com/home/webmap/viewer.html?webmap=e9aa2179f31b4b9cbe5c7f8b1b91cea3>
- Bell, C.J., E.L. Lundelius, Jr., A.D. Barnosky, R.W. Graham, E.H. Lindsay, D.R. Ruez, Jr., H.A. Semken, Jr., S.D. Webb, and R.J. Zakrzewski. 2004. *The Blancan, Irvingtonian, and RanchoLabrean Mammal Ages*. In Woodburne, M.O. (ed.) *Late Cretaceous and Cenozoic Mammals of North America: Biostratigraphy and Geochronology*. Columbia University Press, New York, pp. 232-314.
- California Geologic Survey (CGS). 2002. *California Geomorphic Provinces*. Note 36.
- Cal-IPC. 2012. *Preventing the Spread of Invasive Plants: Best Management Practices for Land Managers* (3rd ed.). Cal-IPC Publication 2012-03. California Invasive Plant Council, Berkeley, CA. Available at www.cal-ipc.org.
- Cal-IPC. 2015. *Best Management Practices for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management*. Cal-IPC Publication 2015-1. California Invasive Plant Council, Berkeley, CA. Available: www.cal-ipc.org
- Campbell, R.H., T.H. McCulloh, and J.G. Vedder. 2009. *The Miocene Topanga Group of southern California: A 100 year history of changes in stratigraphic nomenclature*. U.S. Geological Survey, Open-File Report 2007-1385, version 1.1, revised 2009.
- County of Orange Public Facilities and Resources Department. 1998. *Laguna Coast Wilderness Park Resource Management Plan*.
- Cushman, J.A. and L.W. Leroy. 1938. *A microfauna from the Vaqueros Formation, Lower Miocene, Simi Valley, Ventura County, California*. *Journal of Paleontology* 12(2):117-126.
- Hafner, Bakker, McKinney, and Fritsche. 1966 Resource Record for P-30-000184. On file at the South Central Coastal Information Center, California State University, Fullerton.

- Harmsworth Associate, Inc. 2015. *Natural Communities Coalition Exotic Plant Control Program*.
- Harmsworth Associates, Inc. 2016. *California Gnatcatcher Report for Peters Canyon Regional Park*. August 2016.
- Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento.
- Howard, H. and L.G. Barnes. 1987. *Middle Miocene marine birds from the foothills of the Santa Ana Mountains, Orange County, California*. Natural History Museum of Los Angeles County Contributions in Science 383:1-9.
- Irvine, City of. 2016 “History of the City.” <https://legacy.cityofirvine.org/about/history.asp>. Accessed 5/19/2016.
- Irvine Company. 2005. *Santiago Hills Phase II Planned Community and East Orange Planned Community Area 1 Runoff Management Plan*.
- Irvine Company. 2016 Good Planning. “Irvine Ranch.” <http://www.goodplanning.org/irvine-ranch/> Accessed 5/19/2016.
- James Irvine Foundation, The. n.d. “About Irvine - History of Irvine” – History. <https://www.irvine.org/about/history> Accessed 5/19/2016.
- Jefferson, G.T. 1985. *Review of the Late Pleistocene avifauna from Lake Manix, central Mojave Desert, California*. Contributions in Science, Natural History Museum of Los Angeles County, 362:1-13.
- Loel, W. and W.H. Corey. 1932. *The Vaqueros Formation, Lower Miocene of California (Part 1)*. University of California Publications, Bulletin of the Department of Geological Sciences 22(3):31-410.
- Lovret, Juanita. 2016 Peters Canyon was Once Canyon of the Frogs. Tustin News. Accessed online, <http://www.tustinhistory.com/articles/peters-canyon2.htm>.
- Merriam, J.C. 1911. *The Fauna of Rancho La Brea; Part I: Occurrence*. Memoirs of the University of California, 1(2):197-213.
- Morton, D.M. and F.K. Miller. 2006. Geologic map of the San Bernardino and Santa Ana 30’X60’ quadrangles, California. U.S. Geological Survey, Open-File Report 2006-1217. Map scale 1:100,000.

- Nelson, Carl. 2009 A History of Water Resources Development on the Irvine Ranch, Orange County, California. Written to Support Recognition of the Irvine Ranch Irrigation System as a Historic Civil Engineering Landmark by the American Society of Civil Engineers.
- Oberbauer, T., M. Kelly, and J. Buegge. 2008. *Draft Vegetation Communities of San Diego County*. March. Based on “*Preliminary Descriptions of the Terrestrial Natural Communities of California*”, R.F. Holland, 1986.
- Prothero, D.R. and L.L. Donohoo. 2001. *Magnetic stratigraphy of the lower Miocene (Early Hemingfordian) Sespe-Vaqueros formations, Orange County, California*. In D.R. Prothero (ed.) *Magnetic Stratigraphy of the Pacific Coast Cenozoic*. Pacific Section SEPM (Society for Sedimentary Geology), Book 91, pp. 242-253.
- Reynolds, R.E., R.L. Reynolds, and A.F. Pajak, III. 1991. Blancan, Irvingtonian, and RanchoLabrean(?) *land mammal age faunas from western Riverside County, California*. In *Inland southern California: the last 70 million years*. M.O. Woodburne, R.E. Reynolds, and D.P. Whistler (eds.) *San Bernardino County Museum Association Quarterly*, 38(3-4):37-40.
- Savage, D.E., T. Downs, and O.J. Poe. 1954. *Cenozoic land life of southern California*. in R.H. Jahns ed., *Geology of southern California*. California Division of Mines and Geology, 170, Ch III, pp. 43-58.
- Schoellhamer, J.E., J.G. Vedder, R.F. Yerkes, and D.M. Kinney. 1981. *Geology of the northern Santa Ana Mountains, California*. U.S. Geological Survey, Professional Paper 420-D.
- Scott, E. and S.M. Cox. 2008. *Late Pleistocene distribution of Bison (Mammalia; Artiodactyla) from the Mojave Desert of southern California and Nevada*. In X. Wang and L.G. Barnes (eds.) *Geology and vertebrate paleontology of western and southern North America: Contributions in Honor of David P. Whistler*. Natural History Museum of Los Angeles County, Science Series, 41:359-82.
- Society of Vertebrate Paleontology (SVP), 2010. *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources*. Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee.
- Springer, K., E. Scott, J.C. Sagebiel, and L.K. Murray. 2009. *The Diamond Valley Lake local fauna: Late Pleistocene vertebrates from inland southern California*. In Albright, L.B. III (ed.), *Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne*. Museum of Northern Arizona Bulletin 65:217-36.

- Van Ee N.J., K.E. Cooper, D.S. Kaufman, and G.P. Eberli. 2012. *Evaluation of amino acid racemization variability in Quaternary corals. Proceedings of the 12th International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012.* 8D Effects of ocean acidification. 5 pp.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 1978. *Soil Survey for Orange County and Western Part of Riverside County, California.*
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2015. *National Hydric Soils List.* <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>
- Whistler, D.P. and E.B. Lander. 2003. *New Late Uintan to Early Hemingfordian land mammal assemblages from the undifferentiated Sespe and Vaqueros formations, Orange County, and from the Sespe and equivalent marine formations in Los Angeles, Santa Barbara, and Ventura counties, southern California.* Bulletin American Museum of Natural History No. 279, Chapter 11, pp. 231-268.
- Wilkerson, G., T. Elam, and R. Turner. 2011. *Lake Thompson Pleistocene mammalian fossil assemblage, Rosamond.* In Reynolds, R.E. (ed.) *The Incredible Shrinking Pliocene: The 2011 Desert Symposium Field Guide and Proceedings.* California State University Desert Studies Consortium, Pp. 88-90.
- Winters, H.H. 1954. *The Pleistocene fauna of the Manix Beds in the Mojave Desert, California.* Master's Thesis, California Institute of Technology. 71 pp.
- Zullo, V.A. 1992. *Revision of the balanid barnacle genus Concavus Newman, 1982, with the description of a new subfamily, two new genera, and eight new species.* The Paleontological Society Memoir 27:1-46.