



DRAFT CITY OF SAN DIEGO VERNAL POOL HABITAT CONSERVATION PLAN

Vernal Pool Management and Monitoring Plan

September 2016

City of San Diego
Planning Department
1010 Second Avenue, Suite 1200, MS 413
San Diego, California 92101



DRAFT
CITY OF SAN DIEGO
VERNAL POOL HABITAT CONSERVATION PLAN
MANAGEMENT AND MONITORING PLAN

City of San Diego
Planning Department
1010 Second Avenue, Suite 1200, MS 413
San Diego, California 92101

Contact: Jeanne Krosch

September 2016

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
PREFACE	iii
1.0 INTRODUCTION	1
2.0 ADAPTIVE MONITORING AND MANAGEMENT CONCEPT	4
2.1 Vernal Pool Monitoring and Management Conceptual Model.....	4
2.2 Overview of Adaptive Management.....	4
3.0 VPMMP STANDARDS	7
4.0 OVERVIEW OF VPHCP MONITORING AND MANAGEMENT STRATEGY	8
4.1 Monitoring Approach.....	10
4.1.1 Monitoring Overview.....	13
4.1.2 Baseline Hydrologic Surveys.....	17
4.1.3 Qualitative Monitoring Methods.....	17
4.1.4 Quantitative Monitoring Methods.....	20
4.2 Management Approach.....	23
4.2.1 Management Action Triggers	24
4.2.2 Management Actions	26
5.0 VPMMP DATA COLLECTION, ANALYSIS, AND REPORTING	36
6.0 FUTURE REGIONAL POPULATION TREND ANALYSIS	37
7.0 REFERENCES	38
APPENDICES	
A Vernal Pool Complex Management Levels	
B Site-specific Management Sheets	
C Example Monitoring Form	

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
2-1 Vernal Pool Conceptual Model.....	5
2-2 HCP Adaptive Management Feedback Loop	6
4-1 VPHCP Management and Monitoring Levels and Triggers.....	9
4-2 VPHCP Monitoring and Management Level Flow Chart.....	15

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1-1 VPHCP Conservation Objectives	2
4-1 Monitoring Methods, Frequency, and Sample Size.....	14
4-2 Example Annual Schedule of Site Visits for Level 1 Monitoring and Management (Stewardship)	18
4-3 Monitoring Level 1 Example Vernal Pool Complex Sampling Selection.....	23
4-4 Weather Station and Mean Rainfall Information (1983 through 2013).....	24
4-5 Quantitative Management Triggers	24
4-6 Management Actions by Level	27

PREFACE

The City of San Diego (City) Vernal Pool Habitat Conservation Plan (VPHCP) is intended to provide an effective framework to protect, enhance, and restore vernal pool resources in specific areas of San Diego, while improving and streamlining the environmental permitting process for impacts to threatened and endangered species associated with vernal pools. The City developed this VPHCP to provide for the long-term conservation, management, and monitoring of these species and avoid costly delays and uncertainty associated with a project-by-project approach toward vernal pool conservation. Implementation of the VPHCP will preserve a network of vernal pool habitat in a matrix of open space; protect the biodiversity of these unique wetlands; and define a formal strategy for their long-term conservation, management, and monitoring.

The VPHCP is a conservation plan for vernal pools and seven threatened and endangered covered species that do not have federal coverage under the City's Multiple Species Conservation Program (MSCP) Subarea Plan (SAP), including five plant and two crustacean species (i.e., covered species):

- Otay Mesa mint (*Pogogyne nudiuscula*, PONU)
- San Diego mesa mint (*Pogogyne abramsii*, POAB)
- Spreading navarretia (*Navarretia fossalis*, NAFO)
- San Diego button-celery (*Eryngium aristulatum* var. *parishii*, ERAR)
- California Orcutt grass (*Orcuttia californica*, ORCA)
- Riverside fairy shrimp (*Streptocephalus woottoni*, RFS)
- San Diego fairy shrimp (*Branchinecta sandiegonensis*, SDFS)

The VPHCP will expand the City's existing Multi-Habitat Planning Area (MHPA) established in the MSCP SAP to conserve additional lands with vernal pools that are occupied with the vernal pool covered species.

This document serves as the Vernal Pool Management and Monitoring Plan (VPMMP) and outlines the VPHCP management and monitoring strategy, which will be implemented by the City. This VPMMP is a framework plan that outlines site-specific management and monitoring actions for the vernal pool complexes that will be managed to achieve the VPHCP objectives. The VPMMP will apply within the MHPA Preserve.

This page intentionally left blank.

1.0 INTRODUCTION

The MHPA is characterized as a mixture of vernal pool resources in a matrix of urbanized and future urbanizing lands. While several larger intact blocks of vernal pool series and native open space remain (e.g., Del Mar Mesa, Otay Lakes, Proctor Valley), numerous other conserved pools are within a heavily urbanized landscape (e.g., Mira Mesa, Kearny Mesa, and Otay Mesa). As a result, long-term management and monitoring of conserved lands are critical in maintaining the persistence of vernal pool resources.

Management and monitoring of the vernal pool resources must be both proactive and continuous to achieve the goal and objectives of the VPHCP (see Chapter 5 of the VPHCP). The biological goal of the VPHCP is to contribute to the recovery of the VPHCP covered species and ensure continued persistence of the covered vernal pool species populations identified in the VPHCP. This goal will be achieved by implementing the VPHCP conservation strategy, which includes both habitat-based (vernal pool) and species-specific objectives (Table 1-1) that are consistent with the U.S. Fish and Wildlife Service (USFWS) Recovery Plan (1998) for Vernal Pools of Southern California (Recovery Plan).

The specific conservation goals of the VPHCP are as follows:

1. Provide for the conservation and management of covered species addressed by the VPHCP (covered species);
2. Preserve vernal pool resources through conservation partnerships between federal, state, local agencies, and private development partnerships;
3. Allow for appropriate and compatible economic growth and development that is consistent with applicable laws;
4. Provide a basis for permits necessary for lawful incidental take of vernal pool covered species;
5. Provide a comprehensive means to coordinate and standardize mitigation and compensation requirements of FESA, CESA, the California Environmental Quality Act (CEQA), the California Natural Community Conservation Planning (NCCP) Act of 1991, and the National Environmental Policy Act (NEPA) within the VPHCP Plan Area;
6. Provide a more efficient project review process that results in greater conservation values than project-by-project, species-by-species review; and

7. Provide clear expectations and regulatory predictability for persons carrying out covered activities within the VPHCP Plan Area.

**Table 1-1
VPHCP Conservation Objectives**

Objectives	Conserve	Manage¹	Restore²
Vernal Pools Objectives (Habitat Based)	Conserve in perpetuity at least 2,409 vernal pools (totaling approximately 37.5 acres of basin surface area) at 68 vernal pool sites (within 53 vernal pool complexes) in the MHPA in a configuration that maintains long-term viability of the VPHCP covered species.	Manage in perpetuity 59 vernal pool sites within the MHPA through implementation of the VPHCP Vernal Pool Management and Monitoring Plan or Site-Specific Management Plans (that are consistent with the VPHCP goals and objectives).	Restore 19 vernal pool sites (within 12 complexes) to a “Level 1” (stewardship) management condition within the MHPA through implementation of the VPHCP Management and Monitoring Plan or Site-Specific Management Plans (that are consistent with the VPHCP goals and objectives).
Species-Specific Objectives	Conserve occupied complexes identified in Appendix A to stabilize covered species’ populations.	Manage specific sites identified in Appendix A consistent with this VPMMP to maintain the covered species populations.	Restore specific complexes identified in Appendix A to enhance covered species populations to ensure long-term viability.
Otay Mesa Mint	Conserve 369 vernal pools occupied by Otay Mesa mint within four sites.	Manage all conserved complexes/sites identified in Appendix A consistent with this VPMMP.	Establish viable populations of Otay Mesa mint within the J13; J16–18, J20–21, J27, and J28 complex series.
San Diego Mesa mint	Conserve 335 vernal pools occupied by San Diego mesa mint within 19 sites.	Manage 12 sites as identified in Appendix A consistent with this VPMMP.	Restoration is not necessary for this covered species as the populations of this species are adequately conserved under the VPHCP.
Spreading navarretia	Conserve 94 vernal pools occupied by spreading navarretia within seven sites.	Manage all conserved complexes/sites identified in Appendix A consistent with this VPMMP.	Establish viable populations of spreading navarretia within J11E, J11W, J12, J13, J16–18, J20–21, J27, J28, and R1.
San Diego button-celery	Conserve 722 vernal pools occupied by San Diego button-celery within 24 sites.	Manage 22 sites identified in Appendix A consistent with this VPMMP.	Establish a viable population of San Diego button-celery within J13.
California Orcutt grass	Conserve 58 vernal pools occupied by California Orcutt grass within three sites.	Manage all conserved complexes/sites identified in Appendix A consistent with this VPMMP.	Establish viable populations of California Orcutt grass within J11E, J11W, J12, J13E, J14, J16-18, J20–21, J21, J27, and J28E.
Riverside fairy shrimp	Conserve 131 vernal pools occupied by Riverside fairy shrimp within 7 sites.	Manage all conserved complexes/sites identified in Appendix A consistent with this VPMMP.	Establish viable populations of Riverside fairy shrimp within J11E, J11W, J12, J13E, J14, J16-18, J20–21, J21, J27, and J28E.

Objectives	Conserve	Manage ¹	Restore ²
San Diego fairy shrimp	Conserve 465 vernal pools occupied by San Diego fairy shrimp within 38 sites.	Manage 33 sites as identified in Appendix A consistent with this VPMMP.	Restoration is not necessary for this covered species as the populations of this species are adequately conserved under the VPHCP.

¹ In addition to conservation, includes active management of sites at Level 1, as well as sites at Levels 2 and 3. The 9 vernal pool sites that will not be conserved and not actively managed under the VPMMP are either privately held (but may seek development entitlement in the future, at which point the City shall ensure the property owner implements the recommended management in the VPMMP) or have been developed pursuant to prior approval by City and no management was required at that time, nor is any management being required as part of the VPHCP.

² Restoration shall occur at specific vernal pool complexes to establish populations of covered species, consistent with the Recovery Plan (USFWS 1998). Restored populations shall also be conserved and managed consistent the VPHCP objectives listed in this table.

A strategic approach is necessary to implement an adaptive framework where information collected over time is used in future decisions (Atkinson et al. 2004), while at the same time utilizing available funds effectively and efficiently (refer to Chapter 10 of the VPHCP for further detail regarding implementation costs and funding).

This VPMMP uses a tiered three-level approach to adaptive monitoring and management that is applied to individual vernal pool complexes. The levels are linked to the VPHCP objectives and levels of monitoring and maintenance are assigned at the complex level based on evaluation of the existing habitat conditions and population status of the seven covered species within a complex. Table A-1 of Appendix A includes the required management levels for each managed vernal pool complex under the framework VPMMP. Site-specific management plans prepared for each complex are included in Appendix B, consistent with the requirements and regulations in the VPHCP and City Land Development Manual (LDM) Biology Guidelines. The site-specific management actions included in Appendix B will be reevaluated annually as site conditions change and updated (where applicable).

For existing preserves under City control, the approved management plans will be updated, as applicable, to reflect goals and objectives of the VPHCP. Privately held lands that have an existing conservation or management plan that was approved prior to the adoption of the VPHCP would be grandfathered into the Preserve management program under their existing plan, as long as management activities are consistent with stewardship (Level 1) management outlined in the VPMMP. No additional monitoring activities beyond those required in existing plans for private lands would be required; however, opportunities to incorporate private lands into regional monitoring effort would be considered (see Section 6.0).

2.0 ADAPTIVE MONITORING AND MANAGEMENT CONCEPT

2.1 Vernal Pool Monitoring and Management Conceptual Model

Unlike a conceptual model constructed to explore the biological and ecological mechanisms underpinnings of a natural system or species, conceptual models for monitoring and management are focused and tailored to address specific management issues (Lewison et al. 2012). The challenge in the development of management and monitoring models is the identification of specific threats/stressors and the appropriate response variables to management actions that can be measured. As with any model, the creators of the model must balance the complexity of a natural system with parsimony.

Figure 2-1 illustrates a conceptual model for the City's vernal pools. Although the model is simplified, it identifies the key stressors/threats and natural history variables associated with vernal pools and this assists in the understanding of monitoring and management issues.

2.2 Overview of Adaptive Management

The Habitat Conservation Planning and Incidental Take Permit Processing Handbook (USFWS 1996a) and its Addendum (USFWS 2000) encourages the use of an adaptive management approach for implementation of HCPs. Adaptive management is a cyclic, goal-driven process. It continually tests one's conceptual understanding of complex systems through an iterative, learning-based, decision-making process (Figure 2-2). This approach requires the establishment of (1) a conceptual model (Figure 2-1), (2) goals and objectives (Chapter 5 of the VPHCP), (3) a management and monitoring strategy, (4) an analysis of actions based on monitoring observations, and (5) adaption for future management actions. As Bormann et al. (2007) state, "*Formalized learning and adaptive steps is deemed essential to shifting the reliance on general data and scientists' opinion to site-specific knowledge and data.*"

For the VPHCP, the following terminology is used in reference to management and monitoring:

- *Stewardship Management*: General land management for which clearly identified actions for the protection of vernal pool resources are implemented and for which there is a high certainty of success. These management actions do not need an experimental approach; however, documentation of their effectiveness is required. Examples include installing signage, fencing, and interpretative features to preclude anthropogenic impacts, as well as actions to prevent trespass and damage from unwanted access.

**Figure 2-1
Vernal Pool Conceptual Model**

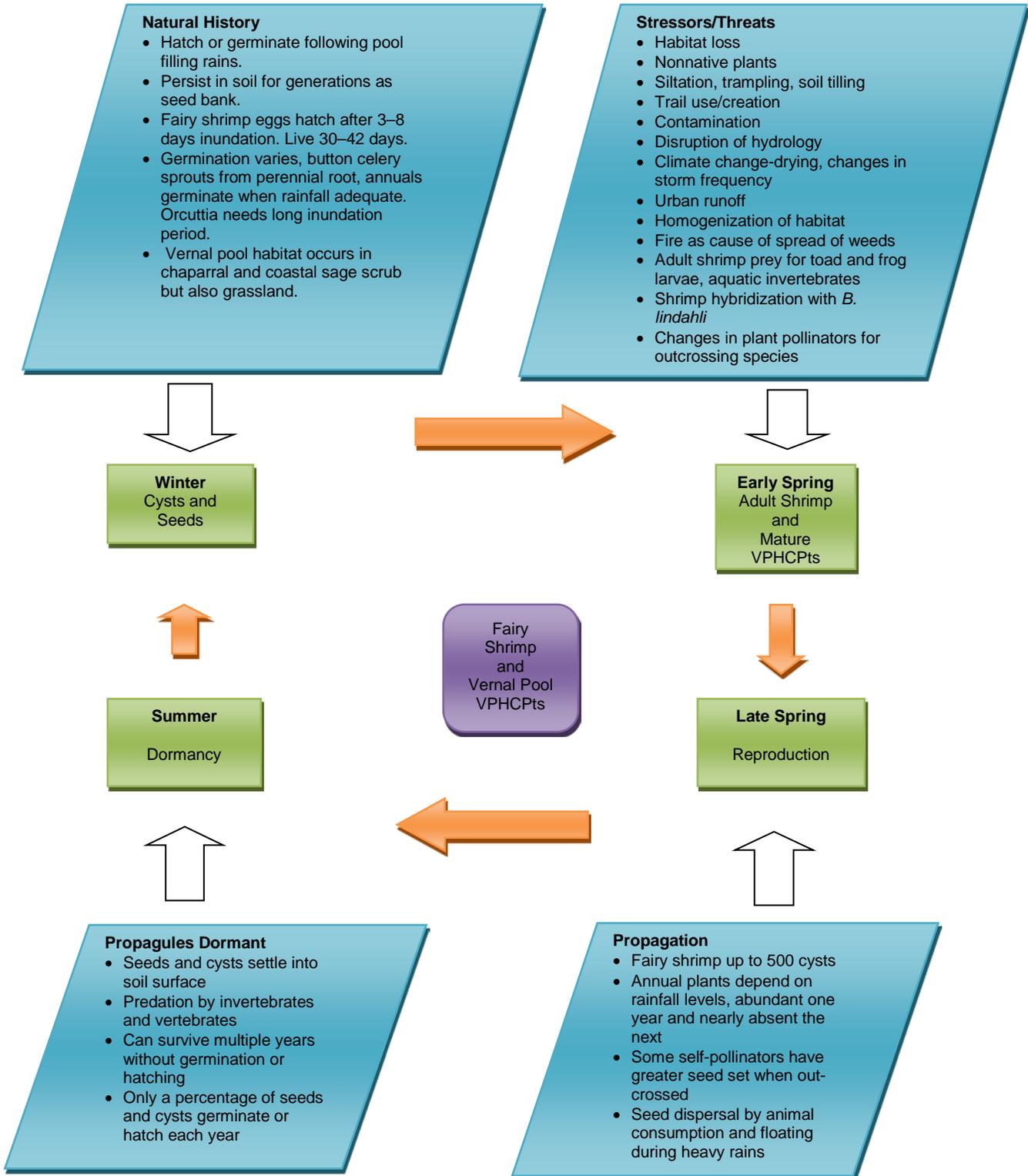
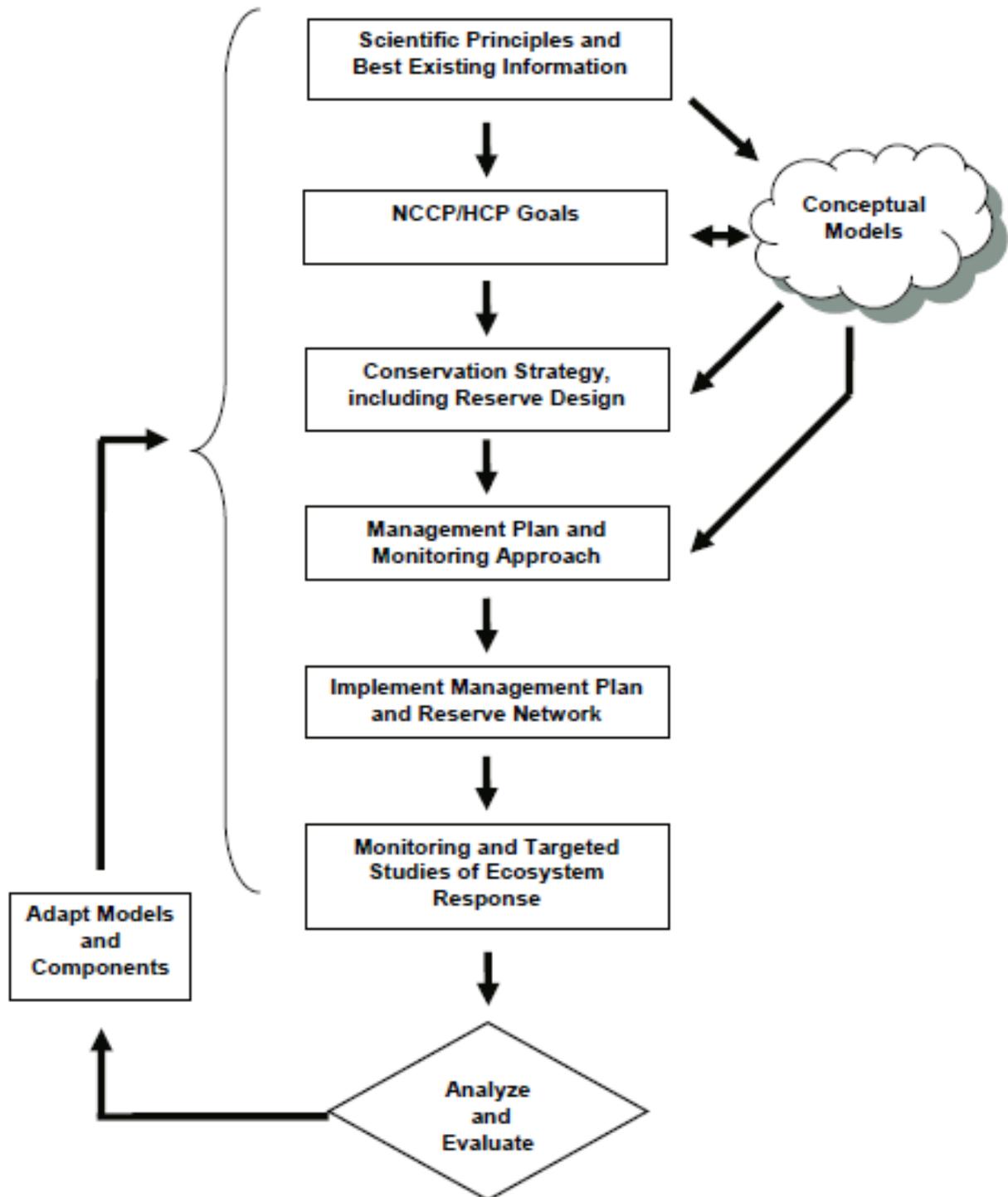


Figure 2-2
HCP Adaptive Management Feedback Loop
(Atkinson et al. 2004)



- *Adaptive Management*: A scientific approach to resource management that rigorously combines management, monitoring, and research to effectively manage complex ecosystems in the face of uncertainty (Atkinson et al. 2004). In a practical sense, it utilizes monitoring to assess the status of a species or habitat and, if the status is declining, it proposes active management remedies through an iterative process in which management actions are refined utilizing new monitoring and other scientific information.
- *Research*: Areas of potential academic and management research to increase the understanding of vernal pool functions and covered species and their management. The VPHCP does not require research, but the City will promote and collaborate with researchers studying vernal pools where possible and where funding may be available via grants or other non-City funding sources.

3.0 VPMMP STANDARDS

To achieve the VPHCP objectives, complex-specific management actions are required to be implemented via this framework VPMMP. To assess the status and need for complex-specific management actions, the following standards will be implemented and monitored. These standards were developed using the “SMART” method: **S**pecific, **M**easurable, **A**chievable, **R**esults-oriented, and **T**ime-fixed (Adamcik et al. 2004). The VPMMP standards for management and monitoring at each vernal pool complex that will be managed are:

- Annually identify threats (invasive species, trampling, OHV activity, etc.) to all pools monitored, as well as to overall watershed integrity, and implement actions to prevent or reduce those threats.
- Prevent an average decline of at least one cover class¹ of any covered plant species over 3 years for years having at least 55% average rainfall.
- Prevent a 20% decline in the density of the covered shrimp species over 3 years (average within complex).
- At complexes with 10% or greater average total nonnative species cover, prevent an increase in one cover class for nonnative cover over 3 consecutive years, regardless of rainfall.
- Maintain vernal pool watershed and hydrological network (i.e., inlet and outlet features) and water storage (maximum depth within +/-10% of baseline) functions.

¹ Cover classes are adapted from California Native Plant Society (CNPS) plant cover methodology and are defined as a range of estimated percentage of plant cover. The cover classes are as follows: <1%, 1–5%, 5–10%, 10–25%, 25–50%, 50–75%, and 75%+. See also Section 7.5.4.

These standards will be monitored under the tiered adaptive monitoring and management approach to assess the success of complex-specific management actions and inform adaptive management decisions.

4.0 OVERVIEW OF VPHCP MONITORING AND MANAGEMENT STRATEGY

This VPMMP uses a tiered three-level approach to adaptive monitoring and management that is applied to individual vernal pool complexes. The levels are linked to the VPHCP objectives and monitored via the VPMMP standards (Chapter 3.0). Levels of monitoring and maintenance are assigned at the complex level based on evaluation of the existing habitat conditions and population status of the seven covered species within a complex. The objectives of complex-wide management and monitoring at each level are as follows:

- Level 1 – *maintain* existing habitat conditions and covered species populations within conserved complexes (as defined in Table 1-1). This level is considered Stewardship.
- Level 2 – *stabilize* covered species population status by enhancing habitat conditions to a level that can support existing populations to achieve the VPHCP habitat and species-specific objectives (as defined in Table 1-1).
- Level 3 – *restore* habitat conditions to a level that can increase covered species populations identified in the species-specific objectives (as defined in Table 1-1).

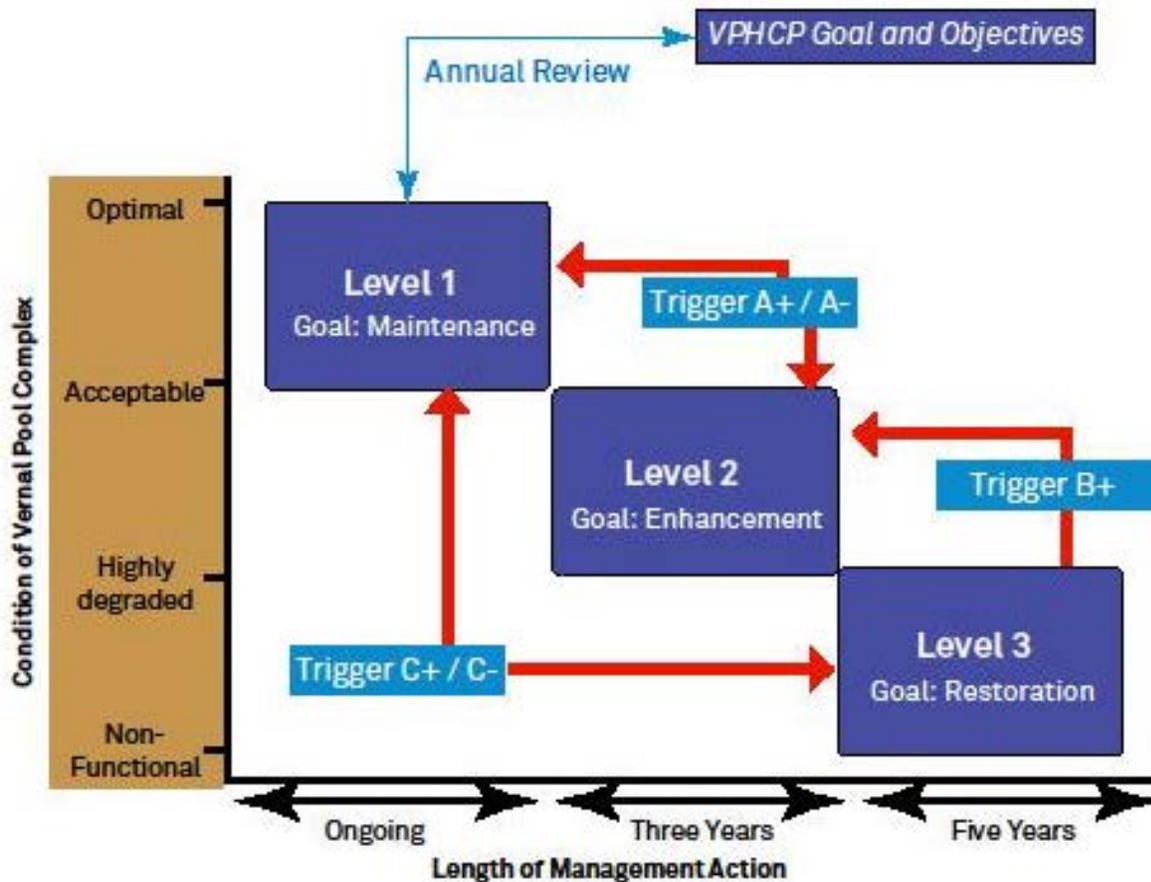
Specific monitoring and management actions are identified in Sections 4.1 (Monitoring Approach) and 4.2 (Management Approach), respectively, for each of the three levels to achieve the VPHCP objectives. The monitoring and management actions have been developed to address the threats/stressors identified in the conceptual model.

The monitoring and management actions required at each level are determined by achievement of the VPMMP standards, which are directly tied to the VPHCP objectives. Management levels are implemented complex-wide and apply to particular population conditions within the complex. For example, a complex with a stable or increasing covered species population will be maintained in that condition, requiring Level 1 monitoring and management effort (i.e., Stewardship). A covered species population within a particular complex that is threatened by increased weed cover, for example, will need enhancement (Level 2). Finally, a population that has been impacted severely due to habitat loss will need restoration (Level 3). Certain complexes require species-specific efforts (e.g., seed bulking, translocation) to achieve the VPHCP objectives outlined for each species in Table 1-1.

Monitoring within a complex will occur to determine changes in the status of the complex condition. Specific triggers linked to the VPMMP standards have been identified that could increase or decrease the management and monitoring level and thus the effort required. This is illustrated conceptually in Figure 4-1. The City’s 2004 Vernal Pool Inventory (City of San Diego 2004) will serve as the baseline for comparison to achievement of VPMMP standards at each complex. In the future, where/if more recent data exist and are available, the more recent data will be used as the baseline for comparison to the VPMMP standards.

The overall goal of the VPHCP will be achieved if all habitat and species-specific objectives are accomplished and complexes managed under the framework VPMMP are maintained at a Level 1 condition in perpetuity as required under the existing State NCCP Permit, Section 10.6 of the MSCP Implementing Agreement, and the VPHCP.

Figure 4-1
VPHCP Management and Monitoring Levels and Triggers



4.1 Monitoring Approach

The monitoring methods and sampling design for this VPMMP were developed with the intent to collect data necessary to determine the complex-level condition of vernal pools and determine if VPMMP standards have been met or if a change in management actions is needed. The VPMMP monitoring methodology described herein allows for time- and cost-effective monitoring and data collection that evaluates and adaptively revises management actions based on the VPMMP standards. The data collected under this VPMMP are intended to efficiently inform management decisions with the ultimate purpose of achieving the VPHCP objectives. The monitoring methods may change over time and will be coordinated closely with the regional monitoring efforts. Any new methods should provide comparable data for evaluating achievement of the VPMMP objectives and should be comparable in cost.

Several key methods have been used or proposed for use in monitoring vernal pool habitat, including the Hydrogeomorphic Model (HGM), California Rapid Assessment Method (CRAM), and USFWS protocols. Applicable elements from each of these methods have been adapted and integrated into the monitoring approach, as discussed below.

The Hydrogeomorphic Model

Developing assessment methods that are both accurate and practical in application is challenging due to the variability of wetlands, including vernal pool habitat. Many methods for assessing wetlands are relatively rapid but often lack the resolution necessary to detect significant changes in wetland functions. To achieve an appropriate level of detail in a short time frame, a more restrictive set of data needs to be considered. This is the primary goal of the HGM classification: to identify the most useful data for a comprehensive evaluation. The HGM classification method identifies groups of wetlands that function similarly using three criteria: geomorphic setting, water source, and hydrodynamics. Geomorphic setting refers to the landform and position of the wetland in the landscape. Water source refers to the primary water source in the wetland, such as precipitation, groundwater, or overland flow. Hydrodynamics refers to the level of energy and the direction that water moves through the wetland (Bauder et al. 2009).

The HGM approach has been applied to a wide range of wetland habitat types to develop functional indices to assess wetland functions and health (Brinson 1993; Smith et al. 1995). Recently, an HGM model was developed specifically for the vernal pool ecosystems in southern California (Bauder et al. 2009). With this methodology, users can assess the functional capacity of the selected wetlands and also assess them using a regional guidebook that offers standardized methods and evaluation protocols.

The HGM approach was originally conceived for use in a regulatory context, but it also has a variety of other potential applications, including evaluation of ecosystem restoration and preserve management. The HGM approach can also be applied as part of an overall planning context where it can be used to measure impacts to existing wetlands, locate and evaluate potential restoration sites, or evaluate the effectiveness of habitat management efforts and suggest corrective actions. However, the HGM approach is not necessarily practical for implementation of VPHCP monitoring for the following reasons:

- The HGM's five direct Function Indices measure and analyze data that are difficult to associate with real-world observations and conditions. Real-world observations and conditions are the best indicators for habitat health and focal species population viability. Data collection and analysis for habitat and species population conditions should be practical yet still provide the information necessary for management decisions. Once data are subjected to more complicated analyses, the information becomes more difficult to interpret in reference to habitat conditions, species health, and the management that should be applied. Data collection and analysis do not have to be complicated or highly technical to provide valuable input for management decisions.
- The type of monitoring and analysis prescribed in the HGM approach requires advanced technical skill and is time-intensive, and, thus, costly.
- The HGM's five indirect Function Indices provide a qualitative and efficient method for monitoring, but are based on substantial assumptions, the results of which are too inconclusive to use to adequately identify management needs.
- The primary parameter for Function 4 (Maintain Characteristic Plant Community) is diversity of native plants in the pools. HGM does not provide any methods to collect data on the percent cover or the population size, both of which are valuable parameters for tracking the health of the focal plant species.
- Similar to Function 4, the primary parameter for Function 5 (Maintain Characteristic Faunal Community) is crustacean species diversity. There is no parameter for overall population size and health. In addition, data collection for the faunal components requires extensive wet season sampling that is prohibitive for annual monitoring requirements in terms of cost and resources.
- While the HGM methods, analysis, and Function Indices are based on 10 years of scientific effort, that effort was limited to sampling a very small number of pools for each function. For Functions 1 and 2, a total of 45 pools were analyzed; for Function 4, 61 pools were assessed; and for Function 5, only 28 pools were analyzed.

Certain aspects of the HGM approach are useful in the context of the VPHCP because the fundamental evaluation criteria are based on the geomorphic and hydrologic setting of vernal pools (i.e., the vernal pool complex). The purpose of the VPHCP monitoring approach is to evaluate vernal pool habitat and focal species at a complex level to inform management decisions. Two of the HGM functions, Function 1 (Surface and Sub-Surface Water Storage) and Function 2 (Hydrological Networks), have been adapted for use in the VPHCP monitoring approach. The hydrological network features (basin inlets/outlets) and certain hydrological features relating to water storage (depth) for each vernal pool are monitored as part of the VPHCP.

California Rapid Assessment Method for Wetlands

CRAM requires collecting coarse data for monitoring wetland conditions. CRAM has been in development over the last 5-plus years in collaboration with the resource agencies and scientists throughout California. The overall goal of CRAM is to “provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and related policies, programs, and projects throughout California.” Vernal Pool Systems and Individual Vernal Pools are two wetland subtypes that have developed field books under CRAM (California Wetlands Monitoring Workgroup 2012a, b, c).

A CRAM score, regardless of wetland type, is composed of four main attribute scores: buffer and landscape context, hydrology, physical structure, and biotic structure. The attributes are divided into metrics and submetrics that are scored based on defined conditions. The metrics, submetrics, and condition scores vary based on the wetland type being assessed (some submetrics do not apply to all wetland types). The final CRAM score is the sum of the four attributes scores, which is then converted to the percentage of the maximum score achievable, theoretically ranging from 0 to 100%. The overall CRAM score is often less informative than the more specific metric and attribute scores when interpreting site conditions.

CRAM has been calibrated throughout California and in various wetland types. Therefore, CRAM scores can be compared for sites across California within the same wetland type. CRAM is designed to collect a coarse assessment of the site’s ambient condition, but can also be used to measure progress toward meeting success criteria established for wetland function/condition. However, similar to HGM, CRAM in its full application is not practical for a Preserve-wide monitoring program; it is time-consuming and requires advanced technical skill, and does not adequately track population viability over time. Many of the issues associated with the use of CRAM are similar to those discussed above under the HGM approach. However, the qualitative monitoring in the VPHCP does incorporate some of the parameters used in CRAM, such as disturbance types and general habitat conditions.

USFWS Protocol Assessments

USFWS has specific methods and guidance for conducting assessment for the focal crustacean species (San Diego fairy shrimp and Riverside fairy shrimp). Currently, all wet season surveys for the focal crustacean species must be conducted by a permitted biologist and pursuant to the Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods (USFWS 1996b). USFWS protocols for shrimp surveys primarily capture presence/absence data for the focal shrimp species. Currently, the protocol requires a rough qualitative estimation of population size (USFWS 2008).

According to the USFWS protocol, following the conclusion of fairy shrimp surveys, all of the pools within a project area must have been subject to either one wet season survey or one dry season survey, at a minimum. If winter rains are insufficient to inundate vernal pools, dry season surveys can also be completed. Dry season sampling follows the Andrew Bohonak method of extracting DNA from shrimp cysts (Vandergast et al. 2009). Dry season cyst sampling is incorporated into the VPMMP as a method for measuring shrimp density.

4.1.1 Monitoring Overview

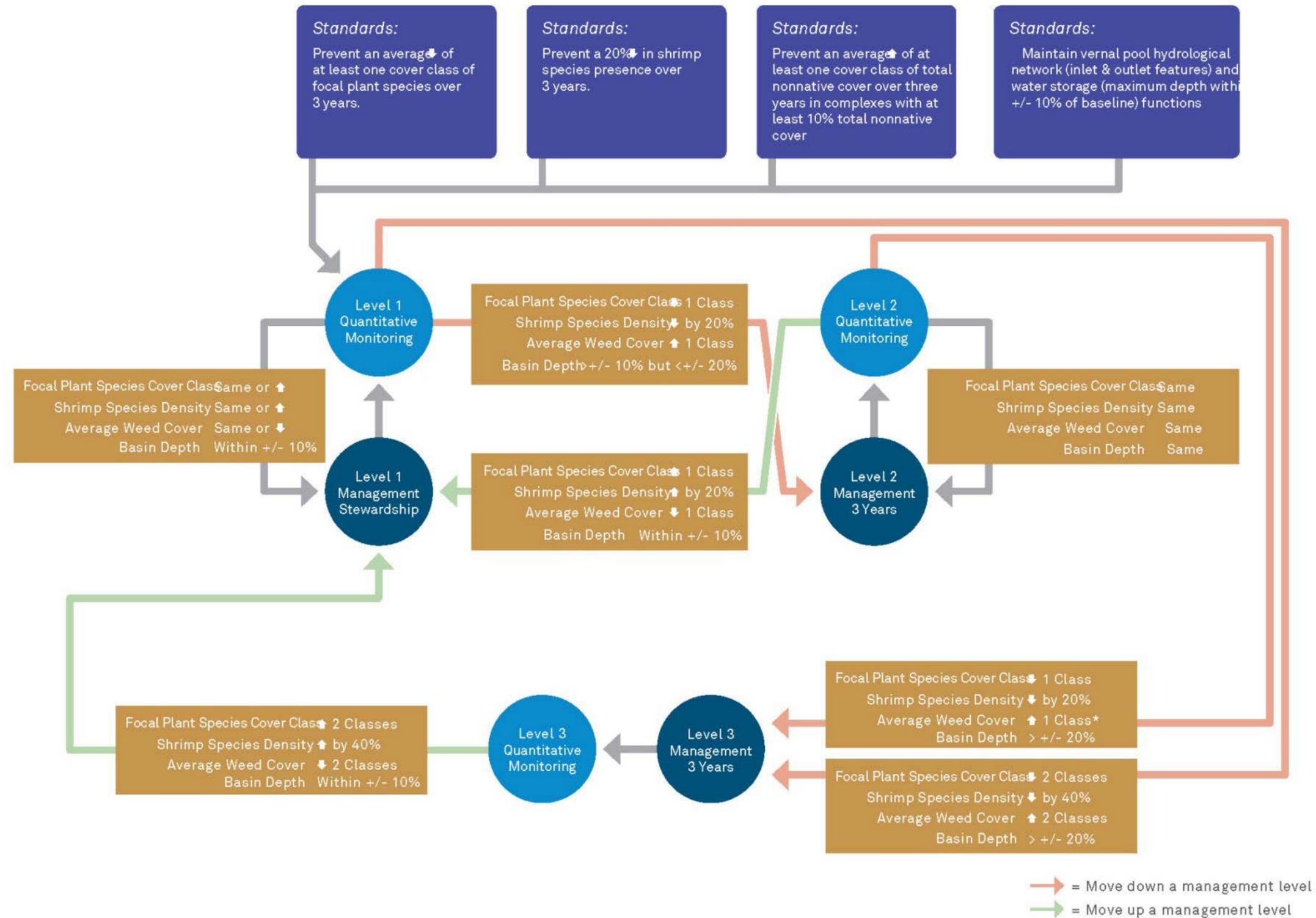
The tiered three-level monitoring approach requires both qualitative and quantitative monitoring at vernal pool complexes that will be managed under the framework VPMMP (Table 4-1). Monitoring shall be performed on City-owned lands, lands that the City has a legal access to manage and monitor, and vernal pool sites conserved through the VPHCP. Specific complexes that will be monitored under the VPHCP are included in this framework VPMMP (Appendix A). Monitoring would be conducted by City staff, paid consultants, nonprofits, or other trained individuals that have been approved by the City and Wildlife Agencies, provided that all follow a standard monitoring protocol consistent with the VPMMP and coordinated via the City's MSCP program. Monitoring would be coordinated with regional efforts conducted by other entities (e.g., USFWS, San Diego Management and Monitoring Program).

Table 4-1 provides an overview of the VPMMP monitoring methods and sample size for each level of monitoring (qualitative and quantitative). More detail is provided in the sections below on the monitoring methods associated with each of the three monitoring levels. The decision to move to a different monitoring level is based on triggers directly tied to the VPMMP standards identified in Chapter 3.0. Figure 4-2 illustrates the decision process for determining the appropriate monitoring and management level, based on the VPMMP standards applied at each level.

**Table 4-1
Monitoring Methods, Frequency, and Sample Size**

Survey Type	Frequency and Timing	Monitoring Method	Sample Size (based on Monitoring and Management Level)
Qualitative			
Threat assessment, pool inundation verification, and verification of fairy shrimp viability and reproduction	Three visits annually during wet season	Visual assessment.	All basins in complex (all Levels)
Quantitative			
Baseline hydrologic survey	One time (within 5 years of VPHCP permit approval for all complexes being managed under the VPMMP)	Measure maximum pool depth, pool inlet and outlet, and geomorphic setting of complex.	All basins in complex (all Levels)
Covered plant surveys	Annually, spring	Collection of cover class data of each covered plant species and each nonnative plant species. Nonnative species shall be aggregated into one cover class estimate for comparison to the triggers. Individual nonnative species and problematic invasive exotics shall be listed on the monitoring form (Appendix C) to direct management actions for nonnatives.	Level 1: 10% of occupied pools in each complex OR if complex has <10 pools for each covered species, survey at least one pool for each covered species known to occur Level 2 and 3: All pools in complex with covered plant species
Fairy shrimp density surveys	As-needed based on qualitative observations (see above)	Dry season sampling with genetic identification of cysts.	Level 1: Only conduct if a notable change to hydrology or other vernal pool functions is observed, that would trigger a Level 2 or 3 management response Level 2: Up to 10 pools or 10% of pools with covered shrimp species, whichever is greater Level 3: Up to 10 pools or 20% of pools with covered shrimp species, whichever is greater
Topographic disturbance assessment	As needed, if topographic and/or hydrologic disturbance is observed during qualitative monitoring	Maximum basin depth shall be measured and inlet and outlet locations shall be recorded for comparison against baseline hydrologic data. If basin reconstruction is required to address topographic disturbance, then monitoring shall be performed to determine if restored hydrological function is achieved (measured by maximum pool depth and inlet/outlet location; refer to VPMMP Standard “E”).	Topographically and/or hydrologically disturbed basins (all Levels)

Figure 4-2
VPHCP Monitoring and Management Level Flow Chart



This page intentionally left blank.

Table 4-2 illustrates an example of the annual monitoring cycle for Level 1 (Stewardship). As shown, each vernal complex managed under this framework VPMMP would receive at least 10 monthly visits during a year. Vernal pool complexes on Otay Mesa and Del Mar Mesa would be visited monthly throughout the year.

4.1.2 Baseline Hydrologic Surveys

Baseline hydrologic surveys will be conducted for all vernal pools within complexes managed under this framework VPMMP, regardless of the assigned VPMMP monitoring and management level. Baseline surveys will be based on the HGM Guidebook (Bauder et al. 2009), and will involve measuring maximum basin depth, and basin inlet and outlet locations using a laser transit. Baseline hydrologic data will serve as a benchmark from which to evaluate potential topographic and/or hydrologic disturbance observed during monitoring. Baseline hydrologic data will be used to guide management decisions at Levels 2 and 3 to repair observed topographic and/or hydrologic disturbance and restore hydrologic function.

4.1.3 Qualitative Monitoring Methods

Qualitative monitoring corresponds to documenting observations during annual site visits, as well as incidental observations during management activities (e.g., weed control). Annual qualitative monitoring shall be conducted at each applicable vernal pool complex managed under this framework VPMMP, regardless of the designated monitoring level. General site assessment information shall be collected, including current or potential threats (such as invasive plants, dumping, OHV activity, and trampling), and recommendations for management shall be generated.

Each complex shall be assessed for the following conditions and threats:

- Fencing and Signage: The conditions of fencing or other site protection measures shall be checked to verify that the site is secured and that appropriate signage is in place.
- Edge Effects: Each complex shall be inspected for edge effects from landscaping (irrigation runoff, invasive species, herbicide application, etc.), water drainage (water quality, increased ponding, etc.), dust production, dumping, and other issues within the complex or on adjacent properties.

**Table 4-2
Example Annual Schedule of Site Visits for Level 1 Monitoring and Management (Stewardship)**

Task	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Overview of Annual Site Visits												
MONITORING LEVEL 1												
Qualitative Visit												
Quantitative Floral Surveys												
Quantitative Shrimp Surveys												
Ponding Verification												
MANAGEMENT LEVEL 1												
Access Control Patrol/Access Repair												
Trash and Debris Removal (if needed)												
Edge Effect Repair (if needed)												
General Weed Control Level 1												
Vernal Pool Weed Control Level 1												
Maintenance Oversight												

 Site visit
 Site visit for complexes on Otay Mesa and Del Mar Mesa because monthly visits are required by USFWS

- Fire and Fire Suppression: Evidence of fire or disturbance from fire suppression shall be evaluated for impacts to the site (loss of native habitat, weed invasion, erosion, etc.).
- Trespass: Each complex shall be inspected for signs of trespass or illegal OHV activity.
- Topographic Disturbance: Each complex shall be evaluated for topographic disturbance or altered hydrology from vehicle damage, illegal trespass, or other landscape-damaging impacts. The qualitative assessment of topographic disturbance shall evaluate the following:
 - Pool integrity and hydrologic function
 - Shape and size of the disturbance and the overall pool
 - Depth and duration of ponding
 - Need for hand work or mechanical equipment for repairs
 - Need for watershed analysis and/or microtopographic plans
- Invasive Species: A general assessment of nonnative plant and animal invasion shall be made during each qualitative survey for the vernal pool and upland areas. Observations of invasive plant species and invasive wildlife presence shall be noted.
- Inundation: A visual check for pool inundation shall be performed; inundation of at least 1.5 inches in depth shall be noted.
- Other: Any additional observed disturbances that could affect habitat quality shall be noted.

In addition, the overall disturbance category of the complex shall be identified, based on the disturbance categories defined in the HGM Manual (Bauder et al. 2009). The categories range from minimal/no disturbance to severe disturbance.

Qualitative surveys shall also evaluate the presence of fairy shrimp (visual survey) and verification of fairy shrimp viability and reproduction (i.e., observation of gravid females).

Visits should occur in the winter and spring seasons (generally February through May). Qualitative monitoring can be conducted in conjunction with the quantitative monitoring (Section 4.1.4). An example of a combined qualitative and quantitative monitoring form that can be used for data collection is included as an attachment (Appendix C). This form incorporates disturbance categories from the HGM Manual (Bauder et al. 2009).

In addition to an annual threat assessment, each vernal pool complex shall be visited up to three times a year during the wet season to check for pool inundation. These visits shall be timed, when feasible, to occur following a large rain event when inundation of the pools is expected.

4.1.4 Quantitative Monitoring Methods

Quantitative monitoring involves activities such as mapping and estimation of species cover, population size/density, and presence/absence at each complex. Quantitative monitoring requirements vary based on the three levels of monitoring, with higher levels collecting more data with greater precision to inform management actions. More data collection requires greater effort and cost. The sample size for covered plant and shrimp species monitoring will depend on the assigned monitoring level (see Table 4-1).

Annual quantitative monitoring shall be conducted at each vernal pool complex managed under the framework VPMMP. Surveys should be timed to coincide with the appropriate ecological conditions for the target species at a specific complex. For the covered plant species, timing should coincide with the optimal flowering time later in the season when detection and identification of both early and late vernal pool plant species are possible. For the covered shrimp species, cyst collection visits should occur during the dry season.

Monitoring for floral and faunal components shall be conducted from the pool margins so that trampling of vernal pool resources and the inadvertent transferring of vernal pool propagules (plant seeds and shrimp cyst) are minimized.

Covered Shrimp Species Monitoring

Wet season sampling and/or dry season sampling of cysts with genetic identification to species shall be used to monitor the covered shrimp species.

An estimate of density for each covered shrimp species can be calculated as the number of cysts per volume of soil. The change in density can be tracked over time as an indicator of the population size of the pool. If the average cyst density is stable or increases across the occupied pools in a complex, it can be inferred that the population is stable or increasing at that complex. To verify that shrimp cysts are viable and that reproduction is occurring, a visual assessment during the wet season is required to observe hatched cysts and gravid females. These wet season verifications should be timed to occur in conjunction with inundation surveys performed as part of qualitative monitoring (Table 4-2).

Sampling for shrimp cyst density and identification shall be done in accordance with the USFWS protocol, as modified by Andrew Bohonak, PhD, at San Diego State University (USFWS 1996a; Bohonak and Simovich 2011), using the following guidelines:

- Samples should be collected within 1.0 meter from each pool's lowest point where shrimp cyst densities are the highest.
- Set up two perpendicular transects so that they intersect in each pool's deepest spot, and one transect should pass over the pool's second deepest point.
- Five core samples (2 inches in diameter and 2 inches deep) should be collected per pool as follows: one in the pool center, and one radiating out 1.0 meter in each of the four transect line directions, for a total of five samples per pool. The five samples shall be combined to determine the average density in the pool.
- The core samples should be taken when each pool's sediments are completely dry at the surface and subsurface.
- Core samples should be processed in the laboratory using standard washing protocol and cysts should be removed from the damp soil by trained personnel under a dissecting microscope.

If the average cyst density decreases across the occupied pools in a complex, it can be inferred that the covered shrimp population is decreasing at that complex. A reduction in shrimp population is likely the result of an indirect impact, such as change in pool inundation resulting from an impact to watershed hydrology or nonnative plant invasion. Thus, a decrease in a shrimp population would trigger additional monitoring, for instance to detect topographical or hydrological disturbance (Table 4-2).

If topographic or hydrologic disturbance is observed in a vernal pool, then maximum basin depth shall be measured, and inlet and outlet locations shall be recorded for comparison against baseline hydrologic data (Section 4.1.2). If topographic reconstruction is required, then monitoring shall be performed (Level 2 or 3) to determine if restored hydrological function achieves the VPMMP Standard "E" (Chapter 3.0).

Covered Plant Species Monitoring

Monitoring shall include cover estimates within the pool basins using a modification of cover classes taken from the California Native Plant Society's (CNPS) plant cover methodology. The City began using the CNPS cover class methodology in 2006 to collect data on vernal pools following the McEachern et al. (2006) MSCP rare plant monitoring protocol. This methodology was also used during the Vernal Pool Inventory of the City's vernal pool complexes (City of San Diego 2004). With the modified CNPS methodology that will be used under the VPHCP, some cover classes have been combined (the cover classes <1%, 1–5%, 5–10% are combined into one cover class <10%, and cover classes of 50–75% and 75%+ are combined to one cover class of

50%+) because the resolution of the cover classes below 10% and above 50% are not necessary to inform management decisions (e.g., need for weed control or remedial seeding). Therefore, estimated absolute percent cover of each covered plant species in a pool is grouped in the following classes to track changes in cover over time to inform management decisions: <10%, 10–25%, 25–50%, 50%+. Use of this modified class system allows for valuable data collection without the time required for other types of vegetation assessments (transects, plot-frames, etc.). In addition to the covered plant species, other native and nonnative vegetative cover can be estimated with this modified CNPS class system.

At Monitoring Level 1, quantitative monitoring shall be performed for a subset of the vernal pools containing covered plant species at each applicable complex. Using the CNPS cover class system described above, 10% of the vernal pools with covered plant species shall be assessed quantitatively. If a complex has less than 10 pools for a particular covered species, survey shall take place for at least one pool where that covered species is known to occur. Only the covered species shall be assessed in each pool. Pools in a given complex with more than one covered species shall be preferentially chosen to reduce the total number of pools required for sampling. These intentionally chosen pools are considered sentinel pools. If all covered plant species in a complex do not co-occur in the same pools, the remaining needed pools shall be chosen randomly in each complex to meet the 10% criterion. The sentinel pools and the randomly chosen pools shall then be sampled every year to provide greater precision in changes observed in cover class estimates. While not random, the use of sentinel pools with multiple covered plant species, as well as the use of permanent sampling, shall increase the efficiency and precision of monitoring at Level 1.

The following is a hypothetical example that demonstrates the application of the 10% sample size and sentinel/random pool selection methods. Table 4-3 also details this example. A complex is known to contain 100 pools. Of those, 30 pools have San Diego button-celery, 20 pools have San Diego mesa mint, and five pools have spreading navarretia. Some pools contain more than one covered species. Based on the 10% rule, three of the 30 San Diego button-celery pools and two of the 20 San Diego mesa mint pools should be monitored. One of the five spreading navarretia pools in this complex should be monitored, since fewer than 10 pools have this particular covered plant species. If two pools in the complex contain all three species, these two pools would be preferentially chosen to be monitored and serve as sentinel pools. A third pool containing San Diego button-celery would be chosen randomly from the 30 pools known to contain San Diego button-celery to complete the required monitoring at this example complex. In this hypothetical monitoring year, three pools would fulfill the requirement for monitoring under Level 1, and these three pools would then be sampled every year that this hypothetical complex is at Monitoring Level 1.

At Levels 2 and 3, monitoring shall be conducted in all vernal pools occupied by covered plant species. At Levels 2 and 3, the covered plant species are declining (Level 2) or extirpated (Level 3) from a complex. Therefore, more intensive monitoring of occupied, or previously occupied, pools is necessary to determine the cause of the population decline and to determine where management actions should be focused.

**Table 4-3
Monitoring Level 1 Example Vernal Pool Complex Sampling Selection**

Complex Characteristics	Number of Pools¹	Sample Size (10% of occupied pools or at least 1 pool if <10 occupied pools)	Permanent Pool Selection²
Number of pools out of 100 with all 3 covered plant species	2	-	2 (Preferential selection of these two sentinel pools would satisfy sample size requirements for Otay Mesa mint and spreading navarretia, and 2 of 3 San Diego button-celery pools).
San Diego button-celery pools	30	3	1 (Randomly select 1 additional pool from these 30 to satisfy requirement for 3 total occupied San Diego button-celery pools.)
Otay Mesa mint pools	20	2	-
Spreading navarretia pools	5	1	-
Pools with no covered species	45	-	-
TOTAL	100	6	3

¹ Based on the number of occupied pools detected the previous monitoring year, or, for the first year of monitoring, based on the City’s vernal pool database (2012).

² Pools for permanent sampling shall be selected for each complex the first year a complex is part of Monitoring Level 1.

4.2 Management Approach

The tiered monitoring program described in Section 4.1 will be used to evaluate site conditions for each complex managed under this framework VPMMP to determine the appropriate management level.

Rainfall amounts will determine whether the vernal pool flora and fauna are adequately expressed to determine covered species population status. The benchmark for annual survey assessments comparable to the VPMMP standards shall be 55% of the average rainfall for the VPHCP Plan Area, as recorded at two weather stations in the Central and South VPHCP planning units (Table 4-4). According to the HGM approach, approximately 55% of normal

rainfall should be considered the minimum to express the full ecological parameters required for vernal pools in southern California (Bauder et al. 2009). For the VPMMP, the minimum rainfall required for adequate assessments is 55% of normal rainfall for the appropriate region for the period of July through June. The 55% of average rainfall years do not need to be sequential. Quantitative monitoring shall be conducted annually, regardless of rainfall; however, only those years with 55% average rainfall will be compared to the VPMMP standards described in Chapter 3.0.

**Table 4-4
Weather Station and Mean Rainfall Information (1983 through 2013)**

VPHCP Planning Unit	Regional Precipitation Station	Mean Rainfall (30 Years)	55% of Normal Rainfall (July through June)
North/Central	Miramar/ Montgomery Field	11.4 inches	6.3 inches
South	Brownfield	9.6 inches	5.3 inches

Source: <http://www.wrh.noaa.gov/sgx/obs/rtp/rtpmap.php?wfo=sgx> and San Diego County Department of Public Works

4.2.1 Management Action Triggers

The required management level (Level 1, 2, or 3) for each complex managed under this framework VPMMP is determined by evaluating monitoring results against the VPMMP standards. The triggers to move between management levels are outlined in Table 4-5 and illustrated in Figure 4-2.

**Table 4-5
Quantitative Management Triggers**

Management Trigger	Monitored Vernal Pool Resource	Monitoring Observation Compared to VPMMP Standards
A- (Level 1 to Level 2)	Covered Plant Species	An average decline of one cover class for any covered plant species present in the pools assessed over 3 years <u>with adequate rainfall</u> , OR An average increase of one cover class in combined nonnative cover in the vernal pools over 3 years, regardless of rainfall. This trigger only applies to complexes with at least 10% total nonnative cover.
	Covered Shrimp Species	A 20% decline in species density in the covered shrimp species present in the pools assessed over 3 years.
	Hydrologic Function	A change in the vernal pool hydrological network (i.e., inlet and outlet features) and water storage function such that the maximum depth of ponding is changed (increased or decreased) by more than +/-10% but less than +/-20% from the baseline recorded for the basin.

Management Trigger	Monitored Vernal Pool Resource	Monitoring Observation Compared to VPMMP Standards
A+ (Level 2 to Level 1)	Covered Plant Species	An average increase of one cover class for ALL target covered plant species present in the pools assessed over 3 years with <u>adequate rainfall</u> , OR An average decrease of one cover class in combined nonnative cover in the vernal pools over 3 years, regardless of rainfall.
	Covered Shrimp Species	A 20% increase in species density in the covered shrimp species present in the pools assessed over 3 years.
	Hydrologic Function	Through active restoration and enhancement (i.e., topographic recontouring), a reestablishment of the baseline vernal pool hydrological network and water storage function to within +/-10% of the baseline recorded for the basin.
B+ (Level 2 to Level 3)	Covered Plant Species	An average decline of two cover classes for any covered plant species present in the pools assessed over 3 years with <u>adequate rainfall</u> , OR An average increase of two cover classes in combined nonnative cover in the vernal pools over 3 years, regardless of rainfall. This trigger only applies to complexes with at least 10% total nonnative cover.
	Covered Shrimp Species	A 40% decline in species density in the covered shrimp species present in the pools assessed over 3 years. Additionally, if a complex has remained at Level 2 for 3 years with at least 55% of average rainfall, the complex would be elevated to Level 3 monitoring and management.
	Hydrologic Function	A change in the vernal pool hydrological network (i.e., inlet and outlet features) and water storage function such that the maximum depth of ponding is changed (increased or decreased) by +/-20% or more from the baseline recorded for the basin.
C- (Level 1 to Level 3)	Covered Plant Species	An average decline of two cover classes for any covered plant species present in the pools assessed over 3 years with <u>adequate rainfall</u> , OR An average increase of two cover classes in combined nonnative cover in the vernal pools over 3 years, regardless of rainfall. This trigger only applies to complexes with at least 10% total nonnative cover.
	Covered Shrimp Species	A 40% decline in species density in the covered shrimp species present in the pools assessed over 3 years. Additionally, if a complex has remained at Level 2 for 3 years with at least 55% of average rainfall, the complex would be elevated to Level 3 monitoring and management.
	Hydrologic Function	A change in the vernal pool hydrological network (i.e., inlet and outlet features) and water storage function such that the maximum depth of ponding is changed (increased or decreased) by +/-20% or more from the baseline recorded for the basin.
C+ (Level 3 to Level 1)	Covered Plant Species	An average increase of two cover classes for ALL target covered plant species present in the pools assessed over 3 years with <u>adequate rainfall</u> , OR An average decrease of one cover class in combined nonnative cover in the vernal pools over 3 years, regardless of rainfall.
	Covered Shrimp Species	A 40% increase in species density in the covered shrimp species present in the pools assessed over 3 years with at least 55% of average rainfall.
	Hydrologic Function	Through active restoration and enhancement (i.e., topographic recontouring), a reestablishment of the baseline vernal pool hydrological network and water storage function to within +/-10% of the baseline recorded for the basin.

4.2.2 Management Actions

Management levels were assigned to each complex in this framework VPMMP based on a review of existing available quantitative and qualitative data to site-specific management needs, and have been vetted with the Wildlife Agencies. The assigned management level for each complex is listed in Table A-1 of Appendix A.

Level 1 is considered the stewardship-level requirement for monitoring and management. A complex will remain at Level 1 in perpetuity unless the Management Triggers to move to Level 2 or Level 3 are met, as outlined in Table 7-5. Because of seasonal climate variability and resulting effects on the expression of both invasive species (weed germination, flowering, and seed-set; dispersal of invasive animals; etc.) and covered species (plant germination, flowering, and seed-set; shrimp hatching, development, and reproduction; etc.), management activities shall be applied for a minimum of 3 years for Level 2 and 5 years for Level 3. If, after 3 or 5 years of implementation of Management Level 2 or Level 3, respectively, the complex is not achieving the VPMMP standards to elevate to the next management level, then the respective management level will continue to be implemented until the VPMMP standards are achieved.

The following describes the overall desired activity for each management level. General management activities that will be required at each Management Level are described in Table 4-6.

Management Level 1

The objective of Level 1 is to *maintain* existing habitat conditions and existing covered species population status. Level 1 complexes are deemed functioning at an acceptable to optimal condition. The required management actions are expected to result in maintenance of those conditions. In general, the management can be characterized as stewardship where little maintenance is needed to achieve the habitat and species-level VPHCP objectives. It is assumed that routine access patrol and enforcement will occur at all Level 1 sites. Access patrol visits shall occur annually, at a minimum, at each site, or more frequently (e.g., monthly, weekly) as deemed appropriate by the City and Wildlife Agencies. An example annual management schedule for a Level 1 complex is provided in Table 4-3.

Management Level 2

The objective of Level 2 is to *stabilize* habitat conditions and covered species populations. Level 2 complexes are deemed functioning at an unacceptable condition and are perceived as declining in habitat quality and/or covered species persistence. In general, the management can be characterized as enhancement where maintenance is needed to achieve the habitat and species-

level VPHCP objectives. Management Level 2 includes all activities listed for Management Level 1, plus the additional activities listed in Table 4-6. The required management actions are expected to result in an improvement in those conditions to Level 1.

**Table 4-6
Management Actions by Level**

Level	Management Action	Management Requirement
Level 1	Trash and Debris Removal	All complexes will be kept free of trash and debris through annual or as-needed removal.
	Fencing and Signage Maintenance	Every complex will be protected with site-appropriate fencing, vehicle barriers, and/or other access controls. Any complex without adequate protection will be fenced or protected by other types of access barriers. Status of access restrictions will be documented as part of the qualitative monitoring. If problems are identified, recommendations for repair or replacement will be made and implemented (e.g., replacement of locks, gates, signs, or fence repairs).
	Edge Effects Maintenance	Recommendations for addressing edge effects that are noted during qualitative monitoring will be implemented. This may include changes in irrigation designs or schedules, modification of landscape species, erosion-control measures, dust-suppression measures, and other adaptive efforts. If problems are being caused by adjacent land use and management, the City or other land manager will contact adjacent property owners/managers to address the issues.
	Fire and Fire Suppression Damage Repair	If a complex is affected by fire, there are general expectations for recovery and invasion by weeds. Following a fire, quantitative data should be carefully evaluated to identify short- and long-term impacts. Any damage resulting from fire suppression (fencing damage, vehicle damage, contamination from fire suppressant chemicals, etc.) will be addressed immediately.
	Trespass Damage Repair	During qualitative assessment, any signs of trespass will be assessed for damage. Unauthorized trails will be closed and signage installed, where appropriate. Damage that alters hydrology will be assessed and measures will be implemented to resolve the problem.
	Topographic Disturbance Repair	Qualitative assessment of topographic and/or hydrologic disturbance will include recommendations for repair measures, as appropriate. If damage occurs during the wet season, it may be necessary to postpone repair measures until the site is dry. Minor topographic damage (e.g., footprints, small tire ruts) will be repaired with hand tools.
	Covered Vernal Pool Weed Control	Covered Vernal Pool Weed Control Level 1 (two visits per spring) will be performed in vernal pools occupied by covered species to maintain acceptable nonnative cover levels.
	General Weed Control	The purpose of General Weed Control Level 1 (two visits per spring) is to target invasive nonnative species identified during qualitative monitoring in non-covered species vernal pools and/or associated upland watersheds. The primary goals are to prevent spread of invasive nonnative species into covered species pools and eradicate problematic invasive species upon detection.

Level	Management Action	Management Requirement
Level 2	Trash and Debris Removal	Same as Level 1.
	Fencing and Signage Maintenance	Same as Level 1.
	Edge Effects Maintenance	Same as Level 1.
	Fire and Fire Suppression Damage Repair	Same as Level 1.
	Trespass Damage Repair	Same as Level 1.
	Topographic Reconstruction	Moderate topographic disturbance that affects pool integrity, ponding potential (depth and duration), or overall size will require microtopographic repair involving mechanized equipment and hand work. Where necessary, ponding characteristics, flow patterns, and other hydrological functions will be reestablished to within $\pm 10\%$ of the baseline conditions (as determined during the baseline hydrogeological surveys). These involve measuring maximum basin depth and inlet and outlet locations using a laser transit. Baseline hydrologic data will be used to guide management decisions to repair observed topographic and/or hydrologic disturbance and restore hydrologic function. A more detailed plan may be necessary for grading if equipment is used.
	Dethatching	Dethatching is recommended prior to other types of weed control. Although some complexes may require weed control without dethatching, this will be evaluated on a complex-by-complex basis. For example, dethatching is not needed to treat invasive forbs at a complex with limited thatch. For most complexes, dethatching will be applied to the basins and in a 20-foot (on average) watershed buffer around each basin. The actual buffer for each vernal pool will be determined on a site-specific basis, based on weed conditions. Thatch and nonnative seed control is important for both the pool and the upland watershed, as the watershed can be a major source of weed seed and nonnative thatch input.
	Covered Vernal Pool Weed Control	Covered Vernal Pool Weed Control Level 2 (two visits per spring) will be conducted in vernal pools with covered species plus an average 20-foot watershed buffer. An average 20-foot buffer around a pool is approximately equivalent to a 5:1 watershed-to-vernal pool area ratio (based on the average size of vernal pools managed under the framework VPMMP that have covered species). Management of the upland watershed habitat at this ratio is considered appropriate when the site needs stabilization of habitat and covered species populations. The actual buffer for each vernal pool will be determined on a site-specific basis, based on weed conditions. Weed control includes all aspects of invasive plant control such as hand weeding, mechanical weeding, and herbicide use.
	General Weed Control	Same as Level 1 except three visits per spring.
	Seed Collection, Bulking, and Redistribution	At Management Level 2, the seed bank is assumed intact but may be declining for certain covered species. Seed collection, bulking, and redistribution may be implemented for declining covered plant species to enhance existing covered species seed banks.
Shrimp Cyst Collection and Reinoculation	If quantitative monitoring indicates a decline in density of one or both covered fairy shrimp species, additional monitoring will be necessary to determine the cause of population decline (e.g., hydrological disturbance resulting from edge effects). Once the cause is addressed, shrimp cyst soil may be collected from other occupied pools in the same complex for reinoculation into impacted pools. Shrimp cyst soil will only be collected from pools that do not contain versatile fairy shrimp. Cyst collection from off-site sources may be considered if the potential cyst bank on-site is gone or too limited for collection.	

Level	Management Action	Management Requirement
Level 3	Trash and Debris Removal	Same as Level 1.
	Fencing and Signage Maintenance	Same as Level 1.
	Edge Effects Maintenance	Same as Level 1.
	Fire and Fire Suppression Damage Repair	Same as Level 1.
	Trespass Damage Repair	Same as Level 1.
	Pool Restoration	Existing pools will be restored where needed to increase the population of covered species in a complex. Restored pools will not impact the watersheds of extant pools except as appropriate to establish hydrological connections between restored and extant pools (see topographic reconstruction below).
	Topographic Reconstruction	Extensive topographic disturbance that affects pool integrity, ponding potential (depth and duration), or overall size will require microtopographic repair involving mechanized equipment and hand work. Where necessary, ponding characteristics, flow patterns, and other hydrological functions will be reestablished using hand tools and/or equipment, as appropriate. Hydrological function must be reestablished to within +/-20% of the baseline conditions to elevate from Management Level 3 to Management Level 2, and within +/-10% of the baseline conditions to elevate to Management Level 1. A more detailed plan may be necessary for grading if equipment is used.
	Dethatching	Same as Level 2, except assume an average 35-foot watershed buffer around each pool.
	Covered Vernal Pool Weed Control	Covered Vernal Pool Weed Control Level 3 (four visits per spring) will be conducted on the vernal pools with covered species plus a 35-foot watershed buffer. An average 35-foot buffer around a pool is approximately equivalent to a 10:1 watershed-to-vernal pool area ratio (based on the average size of vernal pools managed under the framework VPMMP that have covered species). Management of the upland watershed habitat at this ratio is considered appropriate when the site needs stabilization of habitat and covered species populations. The actual buffer for each vernal pool will be determined on a site-specific basis, based on weed conditions. Weed control includes all aspects of invasive plant control such as hand weeding, mechanical weeding, and herbicide use.
	General Weed Control	The purpose of General Weed Control Level 3 (four visits per spring) is to target invasive nonnative species identified during qualitative monitoring in non-covered species vernal pools and/or associated upland watersheds. The primary goals are to prevent spread of invasive nonnative species into covered species pools and eradicate problematic invasive species upon detection.
	Seed Reintroduction	At Management Level 3, certain covered species may be absent from the seed bank. Seed will be collected from off-site genetically appropriate populations, bulked in a greenhouse, and redistributed to restore covered species seed banks.
Shrimp Cyst Collection and Reinoculation	Same as Level 2.	
Container Plant Production/Installation	Under Management Level 3, container plant production will be conducted for the annual covered plant if timing is appropriate.	

Management Level 3

The objective of Level 3 is to *restore* habitat conditions and covered species populations. Level 3 complexes are deemed highly degraded and need restoration to meet the habitat and species objectives of the VPHCP. Management Level 3 includes all activities listed for Management Level 1, plus the additional activities discussed in Table 4-6. The required management actions are expected to result in an improvement in those conditions to Level 1.

Where required, project-specific vernal pool restoration plans for Level 2 or 3 sites will be consistent with the general requirements outlined in the City's LDM Biology Guidelines, as applicable. General conditions specific to vernal pool restoration/enhancement/preservation and perpetual management and monitoring plans are as follows:

1. The project proponent shall submit a vernal pool restoration/enhancement/preservation plan to the City (Development Services Environmental Analysis Section and Planning Department MSCP Staff) and Wildlife Agencies for approval as part of the development review process and the plan shall be included as an attachment to the project's CEQA document. The restoration plan shall be consistent (as applicable) with the restoration plan outline included in Attachment B of the City's LDM Biology Guidelines. The plan must be approved and implemented prior to or concurrent with project impacts. In addition, the restoration plan shall include the following information and conditions:
 - a. Implementation of the enhancement/restoration shall be conducted under the direction of a qualified biologist (vernal pool restoration specialist) with at least 3 years of vernal pool restoration experience, to be approved by the City and Wildlife Agencies.
 - b. To avoid impacts to any extant vernal pools, all conservation measures required at the project construction site to avoid and minimize impacts to adjacent vernal pools and their watersheds shall also be implemented at the restoration site and thus specified in the restoration plan.
 - c. All vernal pools to be avoided and their watersheds shall be enhanced as deemed appropriate by the City and Wildlife Agencies to achieve the same success criteria or better as the restored pools and surrounding uplands. Enhancement activities will include addition of vernal pool plant species and addition of appropriate upland habitat (e.g., coastal sage scrub, native grassland and/or chaparral) compared to the surrounding uplands. All plant material used for enhancement will be collected from local sources (i.e., as close to the site as reasonably feasible). This establishment can be accomplished by redistributing topsoil containing seeds, spores, bulbs, eggs, and other propagules from affected pools and adjacent vernal pool and upland habitats; by the translocation of propagules of individual species from off-site habitats; and by the

- use of commercially available native plant species and/or any vernal pool inoculum or plant material from an off-site source approved by the Wildlife Agencies. Topsoil and plant materials from the native habitats to be affected on-site will be applied to the watersheds of the enhanced and restored pools to the maximum extent practicable. Nonnative invasive weed control shall be implemented within the restoration areas to protect and enhance habitat remaining on-site.
- d. All restoration/enhancement/preservation activities shall commence the first summer-fall season prior to, or concurrently with, the initiation of project impacts.
 - e. Discussion and a table on the exact activities that shall occur at each restored or enhanced vernal pools. The discussion and table shall also include the initial and planned conditions of the pools (i.e., basin size, average depth, ponding duration), existing native and nonnative cover and presence of listed species.
 - f. All final specifications and topographic-based grading, planting and watering plans shall have 0.5-foot contours for the vernal pools, watersheds, and surrounding uplands (including adjacent mima mounds) at the restoration sites. The basis for this fine-scale resolution is the micro-depth (i.e., several inches) of the vernal pools that shall be restored. The grading plans shall also show the watersheds of extant vernal pools, and overflow pathways that hydrologically connect the restored pools in a way that mimics natural vernal pool complex topography/hydrology.
 - g. A hydraulic analysis (i.e., surface and/or subsurface flow, where applicable) that shows each vernal pool proposed for restoration and its watershed, and hydrologic connection between the pools is required. The restored pools and their watersheds shall not impact the watersheds of any extant pools except where needed to establish hydrologic connections.
 - h. As a last resort and after approval by the Wildlife Agencies, additional inoculum from donor vernal pools as close to the project site as possible may be used to supplement the inoculum collected at the project impact site. If inoculum is used for restoration and enhancement, the plan shall identify any proposed donor pools and include documentation that they are free of versatile fairy shrimp (*Branchinecta lindahli*). No more than 10% of the basin area of any donor pool shall be used for collection of inoculum. Collection of inoculum from donor pools shall be coordinated with the Wildlife Agencies.
 - i. Inoculum and planting shall not be installed until the City and Wildlife Agencies have approved habitat restoration site grading. All planting shall be installed in a way that mimics natural plant distribution, and not in rows. Inoculum shall not be introduced into the restored or enhanced pools until after they have been demonstrated to retain

water for the appropriate amount of time to support the targeted vernal pool species (i.e., at least 21 to 28 days for San Diego fairy shrimp or 30 to 60 days for Riverside fairy shrimp) and have been surveyed for versatile fairy shrimp to the satisfaction of the City and Wildlife Agencies. If versatile fairy shrimp are detected in the restored or enhanced pools, inoculum shall not be introduced until appropriate measures to address versatile fairy shrimp are approved by the City and Wildlife Agencies. Inoculum shall be spread evenly over the surface, no more than 0.25 inch deep. If any ponding water is present at the time of soil inoculation, the soil shall only be placed on the wet soil adjacent to the ponded areas. Inoculum shall be placed into the bottoms of the restored/enhanced pools in a manner that preserves, to the maximum extent possible, the orientation of the fairy shrimp cysts and plant seeds within the surface layer of soil (e.g., collected inoculum shall be shallowly distributed within the pond so that cysts have the potential to be brought into solution upon inundation).

- j. Plant palettes (species, size, and number/acre) and seed mix (species and pounds/acre) shall be included in the restoration/enhancement plan. The plant palette shall include native species specifically associated with the on-site habitat type(s) and should be from a local source. The source and proof of local origin of all plant material and seed shall be provided.
- k. Native plants and animals shall be established within the restored/enhanced pools, their watersheds, and surrounding uplands. This can be accomplished by redistributing topsoil containing seeds, spores, bulbs, eggs, and other propagules from affected pools and adjacent vernal pool and upland habitats; by the translocation of propagules of individual species; and by the use of commercially available native plant species. Any vernal pool inoculum or plant material from an off-site source must be approved by the City and Wildlife Agencies. Topsoil and plant materials from the native habitats to be affected on-site shall be applied to the watersheds of the enhanced and restored pools to the maximum extent practicable. Exotic weed control shall be implemented within the restoration/enhancement areas to protect and enhance habitat remaining on-site.
- l. In the event that natural rain is inadequate to support plant establishment, artificial watering of the restored/enhanced pools and their watersheds may be done upon approval by the City and Wildlife Agencies in order to establish plants but not hydrate shrimp. Any artificial watering shall be done in a manner that prevents ponding in the pools. Any water to be used shall be identified and documented to be free of contaminants that could harm the pools.
- m. All weeding within and immediately adjacent to the enhanced/restored pools shall be performed by hand. All workers conducting weed removal activities shall be educated

- to distinguish between native and nonnative species so that local native plants are not inadvertently killed by weed removal activities.
- n. All herbicide and pesticide use shall be under the direction of a licensed pest control advisor and shall be applied by a licensed applicator, under the supervision of a vernal pool restoration specialist. Glyphosate-based herbicides, such as RoundUp or Aquamaster, shall be applied on all areas that have been dethatched. Herbicide shall only be applied when wind speed is less than 5 miles per hour, and spray nozzles shall be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to nontarget plants. A 10-foot buffer shall be maintained between concentrations of any sensitive plant species. Application of herbicide shall not occur if rain is projected within 24 hours of the scheduled application. When vernal pools are ponding or close to saturation, only hand herbicide application (i.e., saturated glove technique) shall be used in and around the edges of pools by specially trained herbicide applicators under the direct supervision of the vernal pool restoration specialist. When vernal pools are not ponding or close to saturation, herbicide may be sprayed but applicators must stay at least 3 feet from the edge of the pools.
 - o. A final implementation schedule shall be included that indicates when all vernal pool impacts, as well as vernal pool restoration/enhancement grading and planting, shall begin and end. A temporal loss of vernal pools should be avoided by initiating the restoration work prior to or concurrent with impacts. This shall minimize the length of time inoculum is kept in storage and ensure that there is appropriate habitat for translocation.
 - p. A minimum of 5 years of monitoring shall be conducted to ensure that success criteria are achieved. Success criteria for vernal pool and upland habitat restoration/enhancement areas shall include quantitative hydrological, vegetation transects, fairy shrimp protocol surveys, or other measurements as approved by the City and Wildlife Agencies (e.g., viable cyst, hatched fairy shrimp, and gravid female measurements), floral and faunal inventories; and photographic documentation. To minimize impacts to the vernal pool's soil surface during restoration, enhancement, and monitoring, cobbles shall be oriented within the restored vernal pools to serve as stepping stones. Reference data shall be established from a vernal pool reference or control site located within each of the three VPHCP subareas (North, Central, South). The vernal pool control sites shall be approved by the City and Wildlife Agencies.
 - q. Restoration success for fairy shrimp shall be determined by measuring the ponding of water, and density of viable cysts, hatched fairy shrimp, and gravid females, within the restored pools. Water measurements shall be taken in the restored pools to determine the depth, duration, and quality (e.g., pH, temperature, total dissolved

solids, and salinity) of ponding. Dry samples shall be taken in the restored and reference pools to determine the density of viable cysts in the soils. Dry sampling shall occur in the first year of the restoration monitoring program to establish a baseline, and the last year to identify changes to viable cyst density. Wet samples shall also be taken in the restored and reference pools to determine the density of hatched fairy shrimp and gravid females. The pools must pond for a period of time similarly to reference vernal pools during an average rainfall year and at an appropriate depth and quality to support fairy shrimp. The hatched fairy shrimp and gravid female density of the restored pools must not differ significantly ($p < 0.05$) from reference pools for, at least, three wet seasons before a determination of success can be made. The average viable cyst density of the restored pools must not differ significantly ($p < 0.05$) from reference pools at the end of the monitoring period before a determination of success can be made. Vernal pools selected as reference or control pools for evaluating restoration success shall be identified and described in the restoration plan. Alternate methods of determining success may be used upon approval by the City and Wildlife Agencies.

- r. To ensure that the construction and operation of the project do not adversely affect the vernal pools on-site, post-construction monitoring shall be conducted throughout the rainy season of an adequate rainfall year (i.e., 55% of average rainfall) to verify that avoidance measures were successful and determine whether the project is changing the hydrology of, or causing erosion and sediment delivery to, these vernal pools (based on pre-construction conditions). Monitoring shall occur for 3 years following project construction. In the event that sufficient rainfall to demonstrate adequate ponding does not occur during the 3 years following project construction, monitoring shall continue in 1-year increments, to a maximum of 5 years. A monitoring report shall be submitted to the City and Wildlife Agencies by September 1 following each monitoring season. The monitoring program shall be described in the final vernal pool restoration/enhancement plan. If monitoring detects impacts to the adjacent vernal pools from construction and/or operation of the proposed project (e.g., from changes in hydrology) within the monitoring period, remediation shall be required.
- s. Monitoring and success criteria for vernal pool and upland restoration/enhancement areas shall include coastal sage scrub, native grassland and chaparral species richness and cover criteria for all 5 years of monitoring. Success criteria for weed cover shall be as follows: 0% cover for weed species categorized as High or Moderate in the Cal-IPC Invasive Plant Inventory, and relative cover of all other weed species is no more than 5% and 10% coverage in the pools basins and watersheds, respectively, for other exotic/weed species for all 5 years of the monitoring period. Container plant survival success criteria shall be 80% of the initial plantings for the first 5 years. At the first

- and second anniversaries of plant installation, all dead plants shall be replaced unless their function has been replaced by natural recruitment. The method used for monitoring shall be described and a map of proposed sampling locations shall be included. Photo points shall be used for qualitative monitoring and stratified-random sampling shall be used for all quantitative monitoring.
- t. Verification that restoration/enhancement of vernal pools is complete shall require written sign-off by the City and Wildlife Agencies. If a performance criterion is not met for any of the restored/enhanced vernal pools or upland habitat in any year, or if the final success criteria are not met, the project proponent shall prepare an analysis of the cause(s) of failure and, if deemed necessary by the City or Wildlife Agencies, propose remedial actions for approval. If any of the restored/enhanced vernal pools or upland habitat has not met a performance criterion during the initial 5-year period, the project proponent's maintenance and monitoring obligations shall continue until the City and Wildlife Agencies deem the restoration/enhancement successful. Contingency measures may be required by the City or Wildlife Agencies. Restoration/enhancement shall not be deemed successful success criteria are achieved. If contingency measures are required, restoration/enhancement shall not be deemed successful until at least 2 years after any required contingency measures are implemented, as determined by the City and Wildlife Agencies.
 - u. Annual reports shall be submitted to the City and Wildlife Agencies by December 1 of each year that assess both the attainment of yearly success criteria and progress toward the final success criteria. The reports shall also summarize the project's compliance with all applicable mitigation measures and permit conditions.
2. The project proponent shall ensure the long-term management of the on-site areas shall occur in perpetuity (see Chapter 7). Each project proponent shall implement a perpetual long-term management, maintenance, and monitoring plan (e.g., Habitat Management Plan) for their respective biological conservation easement areas. The Plan, which shall be approved by the City or Wildlife Agencies and the funding source must be established prior to, or concurrent with, impacts. The plan should include, but not be limited to, the following: method of protecting the resources in perpetuity (i.e., covenant of easement dedication to the City, or a deed restriction or other conservation mechanism consistent with California Civil Code Section 815, et seq. and/or Government Code Section 65870, and acceptable to the Wildlife Agencies; monitoring schedule; measures to prevent human and exotic species encroachment; funding mechanism; and contingency measures should problems occur. In addition, the plan shall include the proposed land manager's name, qualifications, business address, and contact information. The project proponent shall also establish a nonwasting endowment or similar secure funding method in an

amount approved by the City and the Wildlife Agencies based on a Property Analysis Record (PAR; Center for Natural Lands Management ©1998), or similar cost estimation method, to secure the ongoing funding for the perpetual long-term management, maintenance, and monitoring of the biological conservation easement area by an agency, nonprofit organization, or other entity approved by the City and the Wildlife Agencies.

3. In the event that a new occurrence of a covered species is identified (i.e., previously undocumented) within an area to be impacted by a covered project or covered activity, mitigation shall be required in the form of salvage and restoration for the impact to the new occurrence. Mitigation shall occur consistent with Conditions 1 and 2 above, as well as the City's LDM Biology Guidelines.

5.0 VPMMP DATA COLLECTION, ANALYSIS, AND REPORTING

Over time, the understanding of the status and conditions of the vernal pools and covered species, and ability to manage stressors will increase. Following the Atkinson et al. (2004) model for adaptive management (Figure 4-2), the monitoring data will be collected, analyzed, and then used in the decision-making on next steps and any necessary revisions to the VPHCP objectives, conceptual models, management actions, survey protocols, and/or triggers.

The City shall be responsible for determining how the monitoring data are collected on an annual basis. Monitoring data shall be collected by qualified City staff, consultants, nonprofits, or other trained individuals that have been approved by the City and Wildlife Agencies. Collection of the information shall be done in a standardized method, consistent with the VPMMP, and would include sufficient information needed to determine the status of a complex. The following actions would occur under the VPHCP:

- Within 1 year of Permit issuance, City departments that manage lands identified in the VPMMP shall coordinate with the Planning Department on implementation of the VPMMP.
- Each spring, all conserved vernal pool complexes managed under the VPMMP shall be monitored where legal access is available to the City.
- By July 31 of each year, the City's Planning Department shall gather the management and monitoring data collected by the various parties, including private land managers as required by their development permit approvals. The monitoring results shall be summarized into a report along with information on any associated management activities.

- By September 30 of each year, the City shall provide the summarized results² to the Wildlife Agencies for review and analysis. The Wildlife Agencies may choose to use outside assistance to analyze the data and formulate changes to the management and monitoring strategy.
- Each December, the Wildlife Agencies and the City shall meet to discuss the results of the monitoring and analysis. The parties shall also discuss any necessary adaptations to ongoing vernal pool management and monitoring.

Data shall be provided annually to the San Diego Management and Monitoring Program, a science-based program seeking to provide a coordinated approach to management and biological monitoring of conserved lands in San Diego County.

6.0 FUTURE REGIONAL POPULATION TREND ANALYSIS

Monitoring methods for this VPMMP are designed to identify trends in population decline and habitat degradation at the individual basin and complex level, which is tied directly to the VPHCP goals and objectives (see Table 1-1). Since many of the complexes are geographically isolated from each other, monitoring and management will be implemented specific to an individual complex. If, at some point, all of the complexes are stable and maintain Level 1 (Stewardship) status, then it will be assumed that the covered species populations are stable the City may elect to track the covered species' populations regionally. However, evaluation of regional population trends for the covered species is not an objective identified in the VPHCP and, therefore, is not a component of the VPMMP. However, qualitative and quantitative data collected for each complex can be aggregated as part of a regional trend analysis performed by the Wildlife Agencies or others.

² This summary could be included as an attachment to the City of San Diego required annual reporting on the implementation of the VPHCP due on March 15 of every year.

7.0 REFERENCES

Adamcik, R. S., E. S. Bellantoni, D. H. DeLong, Jr., J. H. Schomaker, D. B. Hamilton, M. K. Laubhan, and R. L. Schroeder.

2004 *Writing Refuge Management Goals and Objectives: A Handbook*. Washington, D.C.: U.S. Fish and Wildlife Service, National Wildlife Refuge System.

Atkinson, A. J., P. C. Trenham, R. N. Fisher, S. A. Hathaway, B. S. Johnson, S. G. Torres, and Y. C. Moore

2004 *Designing Monitoring Programs in an Adaptive Management Context for Regional Multiple Species Habitat Conservation Plans*. USGS Western Ecological Research Center, Sacramento, CA.

Bauder, E. T., A. J. Bohonak, B. H., M. A. Simovich, D. S., D. G. Jenkins, and M. Rains.

2009 *A Draft Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Vernal Pool Depressional Wetlands in Southern California*. San Diego State University, San Diego, CA.

Bohonak, A. J. and M. A. Simovich

2011 Development of a Monitoring Protocol to Quantify Population Sizes for the San Diego Fairy Shrimp. Final Section 6 Grant Report to the California Department of Fish and Game and the U. S. Fish and Wildlife Service.

Bormann, B. T., R. W. Haynes, and J. R. Martin

2007 Adaptive Management: Did Some Rubber Hit the Road? *BioScience* 57.

Brinson, M.M.

1993 A hydrogeomorphic classification for wetlands. WRP-DE-4. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

California Wetlands Monitoring Workgroup (CWMW)

2012a California Rapid Assessment Method (CRAM) for Wetlands and Riparian Areas, Version 6.0, pp. 95.

2012b California Rapid Assessment Method (CRAM), Vernal Pool Systems Field Book, Version 6.0 pp. 42

2012c California Rapid Assessment Method (CRAM), Individual Vernal Pools Field Book, Version 6.0 pp. 31

City of San Diego

- 2004 *City of San Diego Vernal Pool Inventory*. Planning Department, San Diego, California.

Lewison, R. L., D. H. Deutschman, E. Marnocha, C. Tredick, and P. McIntyre

- 2012 *Developing Conceptual Models: Translating Knowledge into Action*. Building and Implementing an Integrated Framework for Monitoring and Management in San Diego County. May 4.

McEachern, K., B. Pavlik, J. Rebman, and R. Sutter

- 2006 *San Diego Multiple Species Conservation Plan Rare Plant Monitoring Program Review and Revision*. Technical report prepared for California Department of Fish and Game. Western Ecological Research Center, U.S. Geological Survey, Mills College, San Diego Natural History Museum, and The Nature Conservancy.

Smith, R. D., A. Amman, C. Bartoldus, and M. M. Brinson

- 1995 An approach for assessing wetland functions based on hydrogeomorphic classification, reference wetlands, and functional indices. WRP-DE-9. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

U.S. Fish and Wildlife Service (USFWS)

- 1996a *Habitat Conservation Planning Handbook*. November.
- 1996b Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods
- 1998 *Recovery Plan for Vernal Pools of Southern California*. U.S. Department of the Interior, Fish and Wildlife Service, Region One, Portland, Oregon.
- 2000 *Habitat Conservation Planning Handbook Addendum*. June.
- 2008 *5-Year Review for San Diego Fairy Shrimp (*Branchinecta sandiegonensis*)*. September.

Vandergast, D., D. A. Wood, M. Simovich, and A. J. Bohonak

2009 Identification of co-occurring *Branchinecta* fairy shrimp species from encysted embryos using multiplex polymerase chain reaction. *Molecular Ecology Resources* 9:767-770.

APPENDIX A

**VERNAL POOL COMPLEX
MANAGEMENT LEVELS**

Appendix A
City of San Diego VPHCP Vernal Pool Complex Management and Monitoring Levels

Complex Series	Site Name	Planning Unit	Inside or Outside VPHCP Plan Area	Number of Conserved Pools Occupied by Focal Species							Management Responsibility	Existing (Baseline) Management & Monitoring Level	VPHCP Required Management & Monitoring Level in VPMMP
				PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS			
B 11	Mesa Norte	North	Inside	0	12	0	10	0	0	24	Private	Level 1/SSMP	Level 1
B 5	Tierra Alta	North	Inside	0	0	0	0	0	0	1	Private	Level 1/SSMP	Level 1
B 6	Lopez Ridge (CDFW)	North	Inside	0	1	0	0	0	0	0	State	Level 1	Level 1
B 7-8	Crescent Heights	North	Inside	0	0	0	0	0	0	1	City	Level 1/SSMP	Level 1
	Lopez Ridge (City)	North	Inside	0	10	0	1	0	0	2	City	Level 1	Level 1
C 10-16	Winterwood	North	Outside	0	27	0	7	0	0	2	School District	SSRP	N/A
C 17-18	Fieldstone	North	Inside	0	8	0	0	0	0	0	Private	None	None ₂
C 27	Mira Mesa Market Center	North	Inside	0	1	0	0	0	0	1	Private	None	None
D 5-8	Carroll Canyon	North	Inside	0	42	1	65	0	0	5	City	Level 1/SSRP ₃	Level 1
	Parkdale Carroll Canyon	North	Inside	0	0	0	0	0	0	0	City	Level 1/SSRP ₃	Level 1
F 16-17	MCAS Miramar	North	Outside	0	0	0	0	0	0	0	Federal	N/A	N/A
	Menlo KM Parcel	Central	Outside	0	0	0	0	0	0	0	Private	None	Level 1
	Menlo KM Parcel	Central	Outside	0	0	0	0	0	0	0	State	N/A	N/A
H 1-10, 13-15, 18-23, 24-26	Del Mar Mesa (City)	North	Inside	0	3	0	49	0	0	8	City	Level 1	Level 1
	Del Mar Mesa (County)	North	Outside	0	2	0	12	0	0	0	County	None	N/A
	Del Mar Mesa (Private)	North	Inside	0	0	0	2	0	0	1	Private	None	Level 1 ₁
	Del Mar Mesa (Caltrans)	North	Outside	0	0	1	2	0	0	1	State	None	N/A
	Del Mar Mesa (State/Federal)	North	Outside	0	56	0	122	0	0	16	State/Federal	Level 1	Level 1
	Rhodes	North	Inside	0	7	0	6	0	0	8	Private	SSRP ₃	Level 1
H 17	Shaw Lorenz	North	Inside	0	0	0	0	0	0	8	Private	Level 1/SSMP	Level 1
H 33	East Ocean Air Drive	North	Inside	0	0	0	2	0	0	0	Private	None	None ₂
	SDG&E Substation	North	Outside	0	0	0	4	0	0	0	Federal	N/A	N/A
H 38	Carmel Mountain	North	Inside	0	0	0	0	0	0	2	City	SSRP	Level 1
H 39	Greystone Torrey Highlands	North	Inside	0	5	0	3	0	0	0	City	Level 1/SSMP	Level 1
I 1	Arjons	North	Inside	0	22	0	15	0	0	1	Private	None	None ₂
I 12	Pueblo Lands (South)	North	Inside	0	0	0	0	0	0	6	City	Level 1	Level 1
I 6 B	Ford Leasing (Bob Baker)	North	Inside	0	7	0	0	0	0	3	Private	None	None ₂
I 6 C	Facilities Development (Eastgate Miramar Associates)	North	Inside	0	11	0	2	0	0	6	Private	None	None ₂
J 11 E	Slump Block Pools	South	Inside	0	0	0	0	0	0	0	Private	None	Level 2 ₁
J 11 W	J 11 West	South	Inside	0	0	0	0	0	1	1	Private	None	Level 3 ₁
J 12	J 12	South	Inside	0	0	0	0	0	0	0	Private	None	Level 3 ₁
J 13 E	South Otay J 13 East	South	Inside	0	0	0	1	0	0	0	Private	None	Level 3 ₁
J 13 N	South Otay 1 acre (City)	South	Inside	0	0	1	1	1	0	0	City	None	Level 3
J 13 S	Bachman	South	Inside	0	0	0	0	0	0	0	Private	None	Level 3 ₁
	South Otay J 13 S	South	Inside	0	0	0	7	0	0	0	Private	None	Level 3 ₁

Appendix A
City of San Diego VPHCP Vernal Pool Complex Management and Monitoring Levels

Complex Series	Site Name	Planning Unit	Inside or Outside VPHCP Plan Area	Number of Conserved Pools Occupied by Focal Species							Management Responsibility	Existing (Baseline) Management & Monitoring Level	VPHCP Required Management & Monitoring Level in VPMMP
				PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS			
J 14	<i>Anderprises (Caltrans)</i>	<i>South</i>	<i>Outside</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>4</i>	<i>State</i>	<i>SSRP</i>	<i>N/A</i>
	Anderprises (City)	South	Inside	0	0	0	0	0	0	0	City	Level 1	Level 1
	Bachman	South	Inside	0	0	0	0	0	0	0	Private	None	Level 3 ₁
	Brown Field Basins	South	Inside	0	0	0	0	0	0	0	City/Airports	None	None
	Cal Terraces (South)	South	Inside	63	0	6	55	5	26	32	City	SSRP	Level 1
	Handler	South	Inside	0	0	0	0	0	0	0	Private	Level 1/SSMP	Level 3 ₁
J 15	<i>Arnie's Point</i>	<i>South</i>	<i>Outside</i>	<i>15</i>	<i>0</i>	<i>10</i>	<i>61</i>	<i>3</i>	<i>30</i>	<i>56</i>	<i>Federal</i>	<i>SSMP</i>	<i>N/A</i>
J 16-18	Goat Mesa (City)	South	Inside	0	0	0	4	0	1	0	City	Level 1	Level 1
	<i>Goat Mesa (Federal)</i>	<i>South</i>	<i>Outside</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>Federal</i>	<i>None</i>	<i>None</i>
	Goat Mesa (Private)	South	Inside	0	0	0	0	0	0	0	Private	None	Level 1 ₁
	Wruck Canyon	South	Inside	0	0	0	0	0	0	0	City	Level 1	Level 1
J 2	Cal Terraces (North), Otay Mesa Road Parcels	South	Inside	286	0	79	275	52	93	209	City	Level 1	Level 1
	Clayton Parcel	South	Inside	0	0	0	1	0	0	2	City	Level 1	Level 1
	St. Jerome's	South	Inside	0	0	0	0	0	3	1	Private	None	Level 3 ₁
J 20-21	La Media ITS	South	Inside	0	0	0	0	0	0	6	Private	None	Level 3 ₁
J 21	La Media Swale South	South	Inside	0	0	0	0	0	0	0	Private	None	Level 3 ₁
J 27	Empire Center	South	Inside	0	0	0	9	0	0	0	Private	None	None ₂
J 28 E	La Media Swale North	South	Inside	0	0	0	0	0	0	0	Private	None	Level 3 ₁
J 29	<i>Lonestar W (Caltrans)</i>	<i>South</i>	<i>Outside</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>0</i>	<i>1</i>	<i>4</i>	<i>State</i>	<i>SSMP</i>	<i>N/A</i>
J 3	<i>J3</i>	<i>South</i>	<i>Outside</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>State</i>	<i>None</i>	<i>N/A</i>
J 30	<i>Lonestar E (Caltrans)</i>	<i>South</i>	<i>Outside</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>35</i>	<i>50</i>	<i>State</i>	<i>SSMP</i>	<i>N/A</i>
	Lonestar E (Private)	South	Outside	1	0	0	32	0	0	0	Private	SSMP	N/A
J 31	<i>Dennery West</i>	<i>South</i>	<i>Outside</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>38</i>	<i>State</i>	<i>SSMP</i>	<i>N/A</i>
	Hidden Trails	South	Inside	0	0	0	0	0	0	1	City	Level 1	Level 1
J 32	<i>West Otay A (State)</i>	<i>South</i>	<i>Outside</i>	<i>7</i>	<i>0</i>	<i>3</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>8</i>	<i>State</i>	<i>SSRP</i>	<i>N/A</i>
	<i>West Otay A (Private)</i>	<i>South</i>	<i>Inside</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>Private</i>	<i>None</i>	<i>None</i> ₂
	West Otay B	South	Inside	0	0	0	0	0	0	0	City	SSRP	Level 1
	West Otay C	South	Inside	0	0	0	1	0	0	0	City	Level 1	Level 1
J 33	<i>Sweetwater High School</i>	<i>South</i>	<i>Outside</i>	<i>5</i>	<i>0</i>	<i>3</i>	<i>2</i>	<i>0</i>	<i>3</i>	<i>8</i>	<i>School District</i>	<i>SSRP</i>	<i>N/A</i>
J 34	Bachman	South	Inside	0	0	0	0	0	0	1	Private	None	Level 3 ₁
	Candlelight	South	Inside	0	0	0	0	0	1	1	Private	SSRP	Level 1
J 35	Brown Field	South	Inside	0	0	0	0	0	0	0	City	None	Level 3/SSRP
J 36	Southview	South	Inside	0	0	0	0	0	0	8	Private	None	Level 3 ₁
J 4-5	California Crossing	South	Inside	0	0	0	0	0	0	5	Private	None	N/A
	Robinhood Ridge	South	Inside	19	0	4	46	0	6	41	City	Level 1	Level 2
K 5	Otay Lakes	Central	Inside	0	0	2	46	0	0	6	Cornerstone Lands	Level 1	Level 1
KK 2	Pasatiempo	Central	Inside	0	0	0	0	0	0	0	City	Level 1	Level 1

Appendix A
City of San Diego VPHCP Vernal Pool Complex Management and Monitoring Levels

Complex Series	Site Name	Planning Unit	Inside or Outside VPHCP Plan Area	Number of Conserved Pools Occupied by Focal Species							Management Responsibility	Existing (Baseline) Management & Monitoring Level	VPHCP Required Management & Monitoring Level in VPMMP
				PONU	POAB	NAFO	ERAR	ORCA	RFS	SDFS			
MM 1	Marron Valley	South	Inside	0	0	0	0	0	0	5	Cornerstone Lands	SSRP	Level 1
N 1-4	Teledyne Ryan	Central	Inside	0	1	0	0	0	0	11	Private	None	Level 2 ₁
N 5-6	Montgomery Field	Central	Inside	0	129	0	0	0	0	24	City	Level 1	Level 1/SSRP
N 7	Serra Mesa Library	Central	Inside	0	0	0	0	0	0	0	City	Level 1	Level 1
N 8	General Dynamics	Central	Inside	0	20	0	2	0	0	6	City	Level 1/SSMP	Level 1
NC	Li Collins	North	Inside	0	0	0	0	0	0	0	Private	None	None
	Kelton	South	Inside	0	0	0	0	0	0	0	City	None	None
OO	Salk Institute	North	Inside	0	0	0	0	0	0	0	Private	Level 1/SSMP	Level 1
Q2	Mission Trails Regional Park	Central	Inside	0	0	0	0	0	0	6	City	Level 1	Level 1
	Mission Trails Regional Park School District	Central	Outside	0	0	0	0	0	0	0	School District	None ₁	N/A
Q 3	Castlerock	North	Inside	0	0	0	0	0	0	0	Private	SSRP	Level 1
QQ	Tecolote Canyon	Central	Inside	0	0	0	0	0	0	0	City	None	None
R 1	Proctor Valley	South	Inside	0	0	0	0	0	0	3	Cornerstone Lands	Level 1	Level 1
U 15	SANDER	Central	Inside	0	1	0	0	0	0	2	City	Level 1	Level 2 ₁
U 19	Cubic	Central	Inside	0	1	0	2	0	0	6	Private	None	Level 1 ₁
X 5	Nobel Drive	North	Inside	0	0	1	0	0	0	6	City	Level 1	Level 1
X 7	Nobel Research	North	Inside	0	0	0	0	0	0	1	City	Level 1/SSMP	Level 1

SSRP= Site-specific restoration plan

SSMP=Site-specific management plan or requirements

1= These sites may seek development entitlement in the future. During the development entitlement process, the City will ensure the project is consistent with the VPHCP, ESL, Biology Guidelines and required VPMMP Management Level.

2= As separate funding becomes available (e.g., grant funds) the City may work with the owner to implement additional recommended management as identified on the site specific VPMMP management

3= Restoration is currently in progress as part of a separate permit requirement (not required by the VPHCP). Following completion of restoration, the site will be managed at Level 1, consistent with the

Yellow	City-owned or State/Fed owned. Subject management under VPHCP.
Peach	Privately owned and managed under VPHCP, City responsible for enforcing management.
Purple	Private-owned. Management required with development under VPHCP.
Green	Private, conserved pre-MSCP, so no management required.
Blue	Public and conserved. No management required and none recommended.
Gray	Private and conserved. No management required and none recommended.
Red	Outside VCHCP (Not a Part)

APPENDIX B

**SITE-SPECIFIC
MANAGEMENT SHEETS**

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
B 5 (Tierra Alta)

Species-Specific Objectives: None

Management Level: Level 1

Ownership: Private (Newland Communities)

Management Responsibility: Private (Tierra Alta Home Owner's Association)

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Site-specific Management Plan.

Complex Description

Tierra Alta (B 5) is located north of Calle Cristobal near its intersection with Camino Santa Fe in the Los Peñasquitos area, and is adjacent to an existing residential development. The Tierra Alta development (LDR No 98-0782) was approved in 2001 but has not yet been constructed. This site is privately owned and will be maintained by the Tierra Alta Home Owner's Association. This area is zoned Residential, and surrounding land uses include Los Peñasquitos Canyon Open Space Preserve, Lopez Ridge and Crescent Heights vernal pool sites, and residential neighborhoods.

The project would conserve 2.56 acres as open space, including an 0.33-acre vernal pool preserve area. A single vernal pool was mapped at Tierra Alta, and San Diego fairy shrimp have been recorded. The chamise chaparral and nonnative grasses at the site grow in Redding gravelly loam soils.

Although considered separately here due to ownership and conservation status, the Tierra Alta, Crescent Heights, and Lopez Ridge vernal pools are geographically related and are part of the same complex and series.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the B 5 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Tierra Alta	100	1	0.01	NONE	NONE
Baseline	Tierra Alta	0	1	0.01	NONE	NONE
Expanded Alternative	Tierra Alta	100	1	0.01	NONE	NONE

Threats

Edge Effects

The site is approximately 49 feet from a nearby residential development and will be further isolated upon the development of Tierra Alta. The site is fenced, therefore there is minimal potential for the site to be impacted by litter, night-lighting, and ornamental vegetation from nearby homes.

Fire/Fire Suppression

The Tierra Alta vernal pool is adjacent to the Los Peñasquitos Canyon open space and might be impacted in the case of fire in the canyon. Due to the on-site fencing, the possibility of impacts from suppression activities is limited.

Trespass

The site is separated from nearby housing by two fences, a locked gate along the common area fence, and a 6-foot-high chain-link fence around the vernal pool and its watershed. Impacts from trespass are expected to be limited, with the possible exception of vandalism.

Litter

The site has minimal potential to be impacted by litter.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Vegetation is generally native, with some nonnative grasses.

Current Management Activities

The vernal pool area was fenced as a requirement of the Mitigation, Monitoring, and Reporting Program (MMRP) for LDR 98-0792.

Vernal Pool HCP Management Requirements¹

Upon issuance of the grading permit and in accordance with the MMRP for LDR 98-0792, a Vernal Pool Management Plan shall be implemented that requires the Permittee to provide, in perpetuity, the following maintenance activities:

- Weed control
- Trash removal
- Repair and replace fence, as needed
- Annual monitoring reports to the City
- Signage

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
B 7-8 (Crescent Heights and Lopez Ridge [City])

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery and San Diego mesa mint within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis. (Lopez Ridge [City])
2. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis. (Crescent Heights)

Management Level: Level 1: Lopez Ridge [City]

Level 1: Crescent Heights

Ownership: City of San Diego: Crescent Heights, Lopez Ridge [City]

Management Responsibility: City of San Diego Park and Recreation Department: Crescent Heights,
City of San Diego Environmental Services Department and City of San Diego Park and Recreation Department: Lopez Ridge [City]

Management Goal

The management goal for Lopez Ridge [City] is to *maintain* existing habitat conditions and focal species population status consistent with the Management Recommendations by conducting all Management Level 1 recommended activities. The management goal for Crescent Heights is to *maintain* existing habitat conditions and focal species population status consistent with the *Vernal Pool Management Plan for the Crescent Heights Residential Development Project* ((July 2011) in order to conduct all Management Level 1 recommended activities.

Complex Description

This complex was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) by the adopted *Recovery Plan of Vernal Pools in Southern California* (USFWS 1998). All future management actions, including species reintroduction, should give priority to the maintenance and long-term viability of these populations.

Crescent Heights

Crescent Heights (B 7-8) is 150-acre site located on the south rim of Los Peñasquitos Canyon in Mira Mesa. This conserved site is adjacent to the Lopez Ridge Vernal Pool Preserve, and to the MHPA as adjusted per LDR 99-0635. The southern boundary of the site is the road cut for Calle Cristobal. The area is zoned single-family residential, and nearby land uses include open space, transportation, residential, and neighborhood parks.

Seven natural vernal pools, one containing San Diego fairy shrimp, were mapped within approximately 2.42 acres of the larger Crescent Heights site. Redding gravelly loam underlays the vernal pools and upland vegetation is characterized by sparse Diegan coastal sage scrub. No other sensitive vernal pool species were present in 2003.

Although considered separately here due mitigation status, the Crescent Heights, Tierra Alta, and Lopez Ridge vernal pools are geographically related and are part of the same complex and series.

Lopez Ridge (City)

The Lopez Ridge (B 7-8) site is a 15.7-acre site composed of two parcels. One is an 8.7-acre parcel (APN 308-040-18) purchased with the Vernal Pool Preservation Fund in 1989 (R-89-2533) and owned by the Parks and Recreation Department. The other is a 5.6-acre mitigation site preserved as a condition of U.S. Fish and Wildlife Service Biological Opinion 1-1-83-F-29R for a prior City project proposal at the SANDER site which was not constructed. This Section 7 consultation regarded the transfer of the SANDER parcel from the Navy to the City of San Diego. This area is located north of Calle Cristobal and south of Los Peñasquitos Canyon Preserve. The Lopez Ridge vernal pools are within the MHPA and are zoned Open Space; surrounding land uses include residential and transportation development and open space.

Ten vernal pools were mapped at Lopez Ridge and they occur in Redding gravelly loam. Coastal sage scrub is the primary upland vegetation community. San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) were observed in 2003.

Impacts to 20 vernal pools (two containing *P. abramsii*) at the SANDER site were permitted by Biological Opinion 1-1-83-F-29R. Although the mitigation requirements of the permit were fulfilled (i.e., preservation of Lopez Ridge), the proposed off-site project was never constructed and therefore no impacts occurred. Calle Cristobal (LDR 86-0449) was aligned to avoid impacts to these vernal pools. The Lopez Ridge pools were illegally impacted during construction activities for the Tierra Mesa project (LDR 86-0514), necessitating restoration activities and reinstallation of fencing (see *Emergency Fill Removal Plan for the Brown Parcel* [RECON 1992]). Indirect impacts from the construction of Calle Cristobal were mitigated according to the *Vernal Pool Rehabilitation Plan for the Alignment of Calle Cristobal through the BaB Pool Series on Lopez Ridge* (RECON 1988).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the B 7-8 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Crescent Heights	100	7	0.04	SDFS (1)	SDFS
	Lopez Ridge (City)	100	10	0.38	POAB (10) ERAR (1) SDFS (2)	SDFS
Baseline	Crescent Heights	100	7	0.04	SDFS (1)	SDFS
	Lopez Ridge (City)	100	10	0.38	POAB (10) ERAR(1) SDFS (2)	SDFS
Expanded Alternative	Crescent Heights	100	7	0.04	SDFS (1)	SDFS
	Lopez Ridge (City)	100	10	0.38	POAB (10) ERAR (1) SDFS (2)	SDFS

SDFS = San Diego fairy shrimp
ERAR = San Diego button-celery
POAB = San Diego Mesa mint

Threats

Crescent Heights

Edge Effects

Indirect impacts occurred during construction of Calle Cristobal, and they were mitigated on Lopez Ridge (RECON 1988). Potential edge effects could occur from Calle Cristobal and the adjacent development but none have been documented to date.

Fire and Fire Suppression

The Crescent Heights vernal pools are located between two large, vegetated open space areas. A fire in Lopez Canyon or Los Peñasquitos Canyon might impact this vernal pool site. The developed nature of much of the surrounding area would necessitate stringent fire-fighting measures; however, existing barriers would minimize this potential threat to the vernal pool preserve area by blocking fire equipment access.

Trespass

A 6-foot-high chain-link fence along a portion of the southern property and the existing road cut provide a barrier between the vernal pools and the sidewalk along Calle Cristobal, and block walls have been installed between the vernal pool conservation areas and Crescent Heights development consistent with the Specific Management Plan dated July, 2011. Trespass that could occur is generally limited to foot traffic as off-road vehicle activity is limited in this area.

Litter

The site may be impacted by litter from car and foot traffic along Calle Cristobal. Occurrences of trash dumping are limited in this locality.

Topographic Disturbance

There are currently no issues with topographic disturbance. Project fencing and signage have been installed consistent with the Site-specific Management Plan dated July, 2011.

Invasive Species

Upland vegetation is generally native, with limited nonnative and/or naturalized species. In accordance with the Specific Management Plan dated July, 2011, any new invasion by non-native weed and/or exotic species shall be controlled and the weedy species eradicated.

Lopez Ridge (City)

Edge Effects

Lopez Ridge is bordered by both developed and open space areas. Impacts from nearby development are minor with regards to litter from car and foot traffic along Calle Cristobal and residential neighborhoods (i.e., deflated balloons and sports balls). Trespass by humans and domestic animals have minor effects. Fencing and signage have been installed pursuant to the mitigation plans and are working well to reduce edge effects.

Fire and Fire Suppression

The Lopez Ridge vernal pools are located adjacent to expansive vegetated open space areas. Fires in Lopez Canyon or Los Peñasquitos Canyon might impact this vernal pool site. The developed nature of much of the surrounding area would necessitate stringent fire-fighting measures; however, existing barriers would minimize this threat by blocking fire equipment access.

Trespass

Impacts from off-road and construction vehicles occurred prior to development of the surrounding area. Fencing and signage were installed in an effort to minimize trespass. However, a low potential remains for trespass from the residents of nearby residential developments.

Litter

Threats from litter are very minor, despite the proximity to housing.

Topographic Disturbance

Illegal impacts to basin topography that occurred during construction of Tierra Mesa were restored (*Emergency Fill Removal Plan for the Brown Parcel* [RECON, 1992]), and there are currently no issues with topographic disturbance.

Invasive Species

Vegetation at Lopez Ridge is generally native and minimal impacts from invasive species were observed. Erodium is abundant; however, it does not seem to inhibit the natives.

Current Management Activities

Crescent Heights

The vernal pools and their watersheds including critical habitat totals 2.43 acres. The site has been fenced in accordance with requirements of the Crescent Heights development approval (LDR 99-0635, PTS 88530 [post-Coastal Commission SCR]).

In analyzing the Crescent Heights property for the Section 404 Permit ((2004-00239-MBS)), the U.S. Army Corps of Engineers requested an Informal Section 7 Consultation from the U.S. Fish and Wildlife Service. The Biological Opinion, dated November 7, 2008, concludes that the “proposed project is not likely to adversely affect designated critical habitat for the San Diego fairy shrimp” (FWS-SDG-08B0409-08I0438).

The site is managed according to Attachment 1 of the Informal Section 7 Consultation and the *Vernal Pool Management Plan for Crescent Heights Residential Development Project* (Glenn Lukos Associates, 2011).

As required by the U.S. Army Corps of Engineers Section 404 Permit (2004-00239-MBS), a conservation easement was recorded on September 15, 2011 (2001-079409) and fencing has been installed along the backs of lots adjacent to designated open space for long-term protection of the vernal pools, their associated watershed and the fairy shrimp (Glenn Lukos, 2011).

The Center for Natural Lands Management conducted a Property Analysis Record, PAR ID: 163-61PI for project manager Glenn Lukos Associates, Inc. on July 6, 2011. Funding for long-term management of the vernal pool habitat was identified within the PAR Analysis for a non-wasting endowment account and Pardee Homes submitted funds totaling \$122,189 to the City for a non-wasting endowment. The owner will implement the Site-specific Management Plan pursuant to their federal/state permit until such time that all excess mitigation for the project is used and City of San Diego Parks and Recreation Open Space Division accepts dedication of open space parcels.

In addition, the following on-going management actions are required per U.S. Army Corps of Engineers Section 404 Permit (2004-00239-MBS), U.S. Fish and Wildlife Service Biological Opinion (FWS-SDG-08B0409-08I0438), and *Vernal Pool Management Plan for Crescent Heights Residential Development Project* (Glenn Lukos Associates, 2011).

- Quarterly and/or annual site inspection
- Repair of permanent fencing and signage as needed
- Weed control as needed
- Annual progress report submitted to City and/or third-party easement holder and Wildlife Agencies with the MSCP Annual Report

Lopez Ridge (City)

This site has been managed by the City’s Environmental Services Department according to the requirements of the U.S. Fish and Wildlife Service Biological Opinion 1-1-83-F-29R, the *Emergency Fill Removal Plan for the Brown Parcel* (RECON 1992) and the *Vernal Pool*

Rehabilitation Plan for the Alignment of Calle Cristobal through the B-Series Pools on Lopez Ridge (RECON 1992). All of the requirements listed below were one-time requirements, which have been completed.

- 1) U.S. Fish and Wildlife Service Biological Opinion 1-1-83-F-29R required:
 - Acquisition of Lopez Ridge
 - Creation of 0.4 acres of vernal pool basin area
 - Restoration of Lopez Ridge vernal pools, including litter removal, reshaping of vernal pool basins impacted by mechanized vehicles, and uplands restoration where necessary
 - Installation of a permanent 6-foot fence along the eastern, southern and western boundaries
 - Installation of appropriate signage
 - Maintenance and monitoring of the site at regular intervals
 - Designation of a \$50,000 endowment fund for management activities

- 2) *Emergency Fill Removal Plan for the Brown Parcel* (RECON No. 2472B)
 - Removal of illegally dumped soils from vernal pool basins using mechanized equipment for all fill not within one inch of the natural basin; remaining fill to be removed by hand by a qualified vernal pool biologist

- 3) *Vernal Pool Rehabilitation Plan for the Alignment of Calle Cristobal through the Bab Pool Series on Lopez Ridge* (RECON No. R-1646B)
 - Soil de-compaction and re-vegetation of vernal pool basins impacted by illegal trespass

Annually, Environmental Services Department thins annual grasses along the eastern boundary of the site to reduce threats to the adjacent development. This practice is limited to 100 feet from the edge of the existing structures in accordance with the City's Brush Management Regulations. The Environmental Services Department is conducting maintenance and monitoring of the site at regular intervals.

Vernal Pool HCP Management Requirements¹

Crescent Heights

The following tasks in Management Level 1 are required for the site:

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

- Conduct all Management Level 1 activities, including targeting serious invasive problems (plants or animals), trash removal, and other general management activities.
- Implement all management activities in accordance with the *Vernal Pool Management Plan for the Crescent Heights Residential Development Project* (Glenn Lukos Associates, 2011).

Lopez Ridge (City)

The following task in Management Level 1 is required for the site:

- Conduct all Management Level 1 recommended activities, including targeting serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

Crescent Heights and Lopez Ridge (City)

- The two sites should be managed together and internal fencing assessed for removal.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
B 11 (Mesa Norte)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint, and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 1

Ownership: Private

Management Responsibility: Private (Cousins Market Centers, Inc.)

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the *Mesa Norte Vernal Pool Mitigation Plan* (Helix 1998) in order to conduct all Management Level 1 recommended activities.

Complex Description

Mesa Norte (B 11) is a 5-acre site located in northwestern Mira Mesa on Prairie Wood Drive. Mesa Norte has been conserved as partial mitigation for the Mira Mesa Market Center project in 1997 (see U.S. Fish and Wildlife Service Biological Opinion 1-6-98-F-23). The preserved area is bounded by a paved roadway, an elementary school, and residential development. Mesa Norte is owned by a private entity. This site is preserved via conservation easement, is zoned Open Space, and is not within the MHPA. . The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the prior approvals, no development would be allowed within this site.

The predominant soil type is Redding gravelly loam and the site supports sparse chamise chaparral. Sensitive species observed on-site include San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*). Approximately 27 of the 44 vernal pools were restored as part of the mitigation plan, which also included fencing, trash and weed removal, restoration of existing basins, upland revegetation,

and a 5-year monitoring plan. Pursuant to the mitigation requirements, 0.58 acre of vernal pool basins were restored on-site.

Prior to preservation, the mima mounds and vernal pool basins were used by neighborhood children as bicycle jumps; by the mid-1990s, many of the pools were severely degraded (Helix 1996). Management issues at Mesa Norte such as dumping, foot and vehicle traffic, and vegetation removal (Bauder 1986; Helix 1997) were addressed by fencing, monitoring, and weed removal mandated in the restoration plan.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*), by the adopted *Recovery Plan of Vernal Pools in Southern California* (USFWS, 1998). All future management activities should promote the stabilization and recovery of these species.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the B 11 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Mesa Norte	100	44	0.60	POAB (12) ERAR (10) SDFS (24)	NONE
Baseline	Mesa Norte	100	44	0.60	POAB (12) ERAR (10) SDFS (24)	NONE
Expanded Alternative	Mesa Norte	100	44	0.60	POAB (12) ERAR(10) SDFS (24)	NONE

POAB = San Diego Mesa mint
ERAR = San Diego button-celery
SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Mesa Norte vernal pool preserve may be negatively affected by edge effects.

Control Fire and Fire Suppression

While the Mesa Norte vernal pools are not located near open space areas, the developed nature of much of the surrounding area would necessitate fire-fighting measures if a fire threatened adjacent homes or the school.

Trespass

Fencing and signage were installed as part of the restoration program. Fences also separate the school and residential developments from the preserve.

Litter

Litter from adjacent residential development has the potential to affect the vernal pool watershed area. Litter may also collect in vernal pool basins following storm events.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Mesa Norte was actively weeded throughout the 5-year restoration program. Some non native species occur at the site, including *Eucalyptus* spp. along the border by the school.

Current Management Activities

Mesa Norte was preserved as partial mitigation for the Cousins/Mira Mesa Market Center project (LDR No. 96-7371). The U.S. Fish and Wildlife Service issued Biological Opinion 1-6-98-F-23 regarding the project, which required the preservation of 23 existing vernal pools and restoration of a minimum of 0.20 acre of vernal pool habitat. The *Mesa Norte Vernal Pool Mitigation Plan* (Helix 1998), approved by the permitting agencies, details required management at this site and implements condition 2 of the U.S. Army Corps of Engineers (ACOE) Nationwide Permit 26A.

The *Mesa Norte Vernal Pool Mitigation Plan* required the creation of 10,151 square feet of vernal pool basin area at the Mesa Norte site (Helix 1998). The plan also describes protective fencing and 5 years of active management and monitoring by the site manager. Permit required long term management. The site was fenced in 1998 and 25,298 square feet of vernal pool basin area, including preserved pools, was mapped in 2003. Annual monitoring of the site was conducted by Helix Environmental, Inc., from 1998 through 2003.

Funding for the requirements set forth in the *Mesa Norte Vernal Pool Mitigation Plan* is provided by Cousins Market Centers, Inc.

Management Requirements

Management Level 1 and the following list of tasks are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting serious invasive problems (plants or animals), trash removal, and other general management activities.
- City to work with property owner to assess implementation of the *Mesa Norte Vernal Pool Mitigation Plan* and provide annual reporting.

Management Recommendations

None.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
C 17-18 (Fieldstone)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego mesa mint within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private (Fieldstone Company)

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Fieldstone (C 17-18) is located in northwestern Mira Mesa along Sunny Meadow Street. This 4.3-acre site was conserved via conservation easement through a U.S. Fish and Wildlife Service Biological Opinion (1-1-84-F-50) and is currently held in private ownership. In 2003, nine vernal pools were mapped at the site, which is zoned Open Space and is within the MHPA. The Fieldstone site is adjacent to open space, roads, and residential development.

The vernal pools at Fieldstone are of natural origin and occur within Redding gravelly loam soils. Upland vegetation is primarily chamise chaparral. San Diego mesa mint (*P. abramsii*) occurs in the Fieldstone pools.

The site was conserved in the mid-1980s and, although surrounded by development on three sides, shows minimal signs of impacts from invasive species, trespass, trash, and other edge effects. The site was fenced as a condition of the Biological Opinion.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the C 17-18 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Fieldstone	100	9	0.32	POAB (8)	NONE
Baseline	Fieldstone	100	9	0.32	POAB (8)	NONE
Expanded Alternative	Fieldstone	100	9	0.32	POAB (8)	NONE

POAB = San Diego Mesa mint

Threats

Edge Effects

The Fieldstone vernal pools are bounded on three sides by development. Impacts may occur from litter, unauthorized access, trash, etc. The site is fenced and appears to have been subject to only slight disturbance over the 20 years of conservation.

Fire and Fire Suppression

Given the developed surroundings, it is unlikely that wildfire or fire suppression activities pose a threat to the Fieldstone vernal pools.

Trespass

While trespass does not appear to be a current issue, the adjacent development may create issues with foot traffic accessing the canyon or park areas.

Litter

Occurrences of trash dumping are limited in this locality, but this remains a threat with the adjacent road and homes.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Eucalyptus spp. has been planted along the boundary of the site in several places.

Current Management Requirements

The privately-owned site was fenced as a requirement of the Biological Opinion issued for this preserve (1-1-84-F-50). Preservation via a conservation easement at this site was also required pursuant Biological Opinion (1-1-84-F-50). This site is inside the MHPA; however, the discretionary project was approved prior to the adoption of the MSCP. No long-term management was required as Biological Opinion, nor is any management being required as part of VPHCP. The City may approach the property owner to discuss the management recommendations below.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required at that time, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

Management Recommendations²

Management Level 1 and the following list of tasks are recommended for the sites:

- Conduct all Management Level 1 recommended activities, including targeting serious invasive problems (plants or animals), trash removal, and other general management activities.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
Mira Mesa Market Center (C 27)

Species-Specific Objectives:

None.

Management Level: None

Ownership: Private

Management Responsibility: Privately owned (Garden Communities)

Management Goal

None.

Complex Description

Mira Mesa Market Center (C 27) is located along Hillery Drive, southwest of the Interstate 15/Mira Mesa Boulevard intersection. The basin and watershed of one vernal pool were conserved during development of the Mira Mesa Market Center (LDR 96-7371) and is owned and managed by the home owners association. The U.S. Fish and Wildlife Service issued Biological Opinion 1-6-98-F-23 regarding Mira Mesa Market Center, which did not require any on-site preservation; however, the conservation of this single basin was included as a condition of permit approval by the City of San Diego. The site is zoned Residential and is not within the MHPA; surrounding land uses include transportation, commercial, residential, and undeveloped land.

The vernal pool at Mira Mesa Market Center is of natural origin and occurs in Redding gravelly loam. Coastal sage scrub species have been planted in the vernal pool watershed; San Diego mesa mint (*P. abramsii*) and San Diego fairy shrimp (*B. sandiegonensis*) were observed in 2003.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the C 27 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Mira Mesa Market Center	100	1	0.06	POAB (1) SDFS (1)	NONE
Baseline	Mira Mesa Market Center	100	1	0.06	POAB (1) SDFS (1)	NONE
Expanded Alternative	Mira Mesa Market Center	100	1	0.06	POAB (1) SDFS (1)	NONE

POAB = San Diego Mesa mint
SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Mira Mesa Market Center vernal pools are bounded on all sides by development. Impacts may occur from litter, unauthorized access, trash, etc.

Fire and Fire Suppression

Given the developed surroundings, it is unlikely that this area would be impacted by wildfire or fire suppression activities.

Trespass

Fencing and signage were installed as part of the restoration program, but trespass from adjacent homes and development may be a threat.

Litter

Litter may be a problem for this site due to nearby residential development.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Ornamental plantings may invade the preserved area from nearby landscaping.

Current Management Activities

The current management activities discussed in this section are conditions of project approval for the Mira Mesa Market Center project (LDR 96-7371). The U.S. Fish and Wildlife Service

Biological Opinion 1-6-98-F-23 assumed no on-site preservation. A single basin was preserved and fenced per the request of the City Council during the project hearing.

The Mira Mesa Market Center pool has been fenced, and interpretive signage has been installed. The owner is maintaining the site.

Vernal Pool HCP Management Requirements¹

None.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
D 5-8 (Carroll Canyon; Parkdale Carroll Canyon)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis. (Carroll Canyon)
2. Protect and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis. (Carroll Canyon; Parkdale Carroll Canyon)

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status by conducting all Management Level 1 recommended activities.

Complex Description

Carroll Canyon

Carroll Canyon is a 19.1-acre site located at the southern terminus of Parkdale Avenue in Mira Mesa. A portion of this site (14.4 acres) was conserved as mitigation for the Bob Baker development (LDR No. 88-0612) pursuant to the requirements of U.S. Fish and Wildlife Service Biological Opinions 1-1-82-F-108 and 1-1-82-F-108R, and the remaining 4.7 acres were purchased by the City of San Diego with money from the Vernal Pool Preservation Fund. It is dedicated open space and is owned by the City of San Diego Park and Recreation Department.

Carroll Canyon is within the MHPA and surrounding land uses include transportation, residential development, and open space.

In 2003, 119 vernal pools were mapped at Carroll Canyon. The pools at Carroll Canyon North are of natural origin and are underlain by Redding gravelly loam. Upland areas are dominated by chamise chaparral. This is only one of two areas in the City of San Diego where San Diego button celery (*E. aristulatum*), spreading navarretia (*N. fossalis*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) occur at a single site. It is also one of three sites in the City of San Diego where spreading navarretia (*N. fossalis*) occurs north of Otay Mesa.

This site was preserved and a maintenance fund established as mitigation for the Bob Baker development (LDR No. 88-0612), with additional restoration commencing in 2014 as part of SDUSD's Salk Elementary School mitigation project. Fencing and maintenance were required at the time of preservation. Due to the location of residential development next to the preserve, impacts such as invasive species, litter, and illegal trespass have been reported at infrequent intervals. The site has been maintained per the requirements of U.S. Fish and Wildlife Service Biological Opinions 1-1-82-F-108 and 1-1-82-F-108R (for Bob Baker mitigation) and 08B0402-12F0555 (for Salk Elementary mitigation) and the *Vernal Pool Management Plan* (City of San Diego 1996). Carroll Canyon was identified as necessary to stabilize populations of San Diego button celery (*E. aristulatum*) and San Diego mesa mint (*P. abramsii*) by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998).

Parkdale Carroll Canyon

Parkdale Carroll Canyon is located adjacent to the Carroll Canyon Vernal Pool Preserve at the southern terminus of Parkdale Avenue in Mira Mesa. It was historically distinguished from Carroll Canyon by mitigation and conservation status; however, with the implementation of the Salk Elementary School mitigation project, the internal fencing has been removed and the sites are now managed jointly. Parkdale Carroll Canyon is within the MHPA, and surrounding land uses include transportation and residential development and open space.

The four vernal pools (83.55 square meters of total basin area [0.02 acre]) at Parkdale Carroll Canyon are of natural origin and are underlain by Redding gravelly loam. Upland areas are dominated by chamise chaparral. A single vernal pool indicator, *Psilocarphus brevissimus*, was observed in 2003; no sensitive plant or animal species occur at this site.

The adjacent site (Carroll Canyon) was preserved in 1991 and a fence was installed around the entire parcel. Minimal impacts were observed at Parkdale Carroll Canyon during surveys in 2003.

Both Carroll Canyon and Parkdale Carroll Canyon site have been used as a mitigation site for impacts to vernal pools at the Salk Elementary school project. The mitigation requirements include topographic reconstruction, weed control, seed and cyst bank reestablishment, monitoring of vernal pool and upland resources, and long-term management (*Final Vernal Pool Restoration/Enhancement Plan as Mitigation for the Jonas Salk Area Elementary School Project*, AECOM September 2012; *Final Long-term Management Plan for the Jonas Salk Area Elementary School Vernal Pool Mitigation Sites, San Diego, California*, AECOM October 2012).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the D 5-8 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Carroll Canyon	75	4	0.01	NONE	NAFO SDFS
		100	115	1.17	POAB (42) NAFO (1) ERAR (65) SDFS (5)	NAFO SDFS
	Parkdale Carroll Canyon	100	4	0.02	NONE	NAFO SDFS
Baseline	Carroll Canyon	75	4	0.01	NONE	NAFO SDFS
		100	115	1.17	POAB (42) NAFO (1) ERAR (65) SDFS (5)	NAFO SDFS
	Parkdale Carroll Canyon	100	4	0.02	NONE	NAFO SDFS
Expanded Alternative	Carroll Canyon	75	4	0.01	NONE	NAFO SDFS
		100	115	1.17	POAB (42) NAFO (1) ERAR (65) SDFS (5)	NAFO SDFS
	Parkdale Carroll Canyon	100	4	0.02	NONE	NAFO SDFS

POAB = San Diego Mesa mint
 NAFO = Spreading navarretia
 ERAR = San Diego button celery
 SDFS = San Diego fairy shrimp

Threats

Carroll Canyon

Edge Effects

The Carroll Canyon vernal pools are adjacent to residential development. Impacts may occur from litter, unauthorized access, dumping, invasive species, etc.; however, these are minimized by perimeter fencing.

Fire and Fire Suppression

In 1992, fire and fire suppression activities impacted basins at the nearby Carroll Canyon site. Restoration details and advance planning efforts with the San Diego Fire Department were included in *Further Recommendations for Management of the Carroll Canyon Vernal Pool Site* (Zedler 1992).

Trespass

Currently, no trespass issues are apparent, but adjacent housing continues to present a threat.

Litter

Currently, no litter issues exist. However, litter remains a threat due to the adjacent housing.

Topographic Disturbance

There are currently no issues with topographic disturbance; the site was graded in the past (1980s) and topographic restoration was included in the Salk Elementary School mitigation project (AECOM, 2012).

Invasive Species

Site is currently being treated for arundo (re-infestation following treatments 5+ years ago) and stinkwort. Stinkwort was first observed in 2010 and had spread rapidly in 2011; treatments began prior to seed set in 2011.

Parkdale Carroll Canyon

Edge Effects

The Parkdale Carroll Canyon vernal pools are adjacent to residential development. Impacts may occur from litter, unauthorized access, trash, etc. The site is fenced and impacts appear to be minimal. The site is contiguous with the Carroll Canyon site, which minimizes possible effects of isolation.

Fire and Fire Suppression

Fire as a naturally occurring ecological cycle would not be a management threat. The site is fenced and managed; therefore, the risk of disturbance from fire suppression activities is low.

Trespass

Currently, no trespass issues are apparent, but adjacent housing continues to present a threat.

Litter

Currently, no litter issues exist; however, due to the adjacent housing litter remains a threat.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Invasive species do not appear to be a major threat; however, species from adjacent residential communities may colonize the site.

Current Management Activities

Carroll Canyon

Based on the requirements of U.S. Fish and Wildlife Service Biological Opinion 1-1-82-F-108R and City of San Diego requirements for the Bob Baker mitigation acquisition area, these management actions are required and enforced by the City of San Diego, Park and Recreation Department's Open Space Division:

- Maintenance of existing fences to restrict illegal trespass
- Public access to the preserve is prohibited
- Signs shall be posted to indicate preserve boundaries and prohibit trespass
- Annual removal of trash and dumping materials
- Restoration of any areas damaged by illegal or legal (i.e. fire-fighting) activities
- Four site inspections per year
- Maintenance of existing fire breaks and brush management areas
- Consultation with qualified biologist prior to alteration or expansion of brush management activities
- The use of herbicides and pesticides is prohibited within Preserve boundaries

Management activities have included quarterly site visits, fence repair, code compliance issues, removal of fill in vernal pool basins, litter collection, and removal of *Dittrichia graveolens* and *Arundo donax*.

Carroll Canyon and Parkdale Carroll Canyon

The management actions listed below are requirements of U.S. Fish and Wildlife Service Biological Opinions 1-1-82-F-108R and 08B0402-12F0555 and the *Final Long-term Management Plan for the Jonas Salk Area Elementary School Vernal Pool Mitigation Sites, San Diego, California* (AECOM October 2012) for the Salk Elementary School project. SDUSD provided \$2,482,370 to the City of San Diego to fund these actions in perpetuity:

- Annual weed control
- Annual habitat enhancement (as needed)
- Annual exotic and feral animal control (as needed)
- Quarterly maintenance of existing fences, signs and other access control (as needed)
- Quarterly erosion control (as needed)
- Quarterly trash removal (as needed)
- Monthly general site patrol
- Annual qualitative spring site visits
- Fairy shrimp cyst sampling every three years using dry-season sampling method
- Annual vernal pool vegetation monitoring
- Annual vernal pool hydrology monitoring
- Bi-annual upland vegetation monitoring
- Annual wildlife monitoring
- Annual edge effects monitoring
- Annual reporting

Vernal Pool HCP Management Requirements¹

Carroll Canyon

The following task in Management Level 1 shall be required for the site:

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Parkdale Carroll Canyon

The following task in Management Level 1 shall be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

Carroll Canyon

None.

Parkdale Carroll Canyon

None.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
F 16-17 (Menlo KM Parcel)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

The Menlo KM site is located between Highways 52 and 163 at the northeastern terminus of Kearny Mesa Road in Kearny Mesa. This privately owned parcel is outside the MHPA and is not conserved. The site is zoned Industrial and Business Parks, and surrounding land uses include military, transportation, and industrial. The site was subdivided in 2015 by the State of California into two parcels. The State is owns and is developing the eastern 5.02 acres (APN No. 369-082-3100). This area is outside to the City’s jurisdiction and is not part of the VPHCP. The remaining 2.56 acres of the parcel (APN No. 369-082-3000) continues to be in private ownership within the City’s jurisdiction. The site is proposed to be sold for future mitigation and is proposed to be added to the expanded MHPA as 100% conserved.

Due to the presence of vernal pools and to the “Necessary to Declassify” designation by the U.S. Fish and Wildlife Recovery Plan, this site is recommended for conservation through public acquisition or private mitigation. The site is also nearby large military open space areas and

within 0.5 kilometers of the SANDER and Cubic vernal pool sites. However, development is not precluded; if all or portions of the site are conserved through acquisition or on-site mitigation for development, the following recommendations shall be implemented.

Fourteen vernal pools occur at the Menlo KM complex. Redding gravelly loam underlies the vernal pools, which are surrounded by disturbed coastal sage scrub and chamise chaparral.

During the 1970s, this site supported San Diego mesa mint (*P. abramsii*), San Diego button celery (*E. aristulatum*), and Spreading navarretia (*N. fossalis*). In the 1980s the site was disturbed by the building of SR-52 and the only focal plant species that remained was San Diego mesa mint. San Diego fairy shrimp (*B. sandiegonensis*) was present in 2003.

Although considered separately here due to ownership and conservation status, the Menlo KM site is geographically related to vernal pools at SANDER, Cubic, Magnatron, and MCAS Miramar.

The complex was identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary for the reclassification of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the F 16-17 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Menlo KM Parcel	100	12	0.14	SDFS (1)	NONE
Baseline	Menlo KM Parcel	0	12	0.14	SDFS (1)	NONE
Expanded Alternative	Menlo KM Parcel	75	12	0.14	SDFS (1)	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

The site is adjacent to roadways and industrial developments. Impacts may occur from unauthorized access, trash, etc., although these may be minimized by existing fencing.

Fire and Fire Suppression

The Menlo KM vernal pools are located between MCAS Miramar and business park developments. The site might be disturbed as a result of fire suppression activities in the event of a fire at Miramar, and the developed nature of the surrounding area would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited given the site access, although the area was impacted by off-road vehicles and grading historically.

Litter

The site may be impacted by wind-blown trash and litter from trespassers.

Topographic Disturbance

The vernal pool at this complex has suffered substantial off-road and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at Menlo KM.

Current Management Activities

There are currently no management activities occurring.

Vernal Pool HCP Management Requirements¹

This site is privately held and the owner may seek to sell the site for future mitigation.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Management Recommendations²

Site-specific vernal pool restoration and long-term management plans would be required at the time the site was approved for future mitigation. The extent of the restoration area would be dependent on the amount of mitigation acreage required. Any mitigation requirements would be consistent with the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and the VPHCP. The long-term management plan would include all Management Level 1 activities in accordance with the VPHCP.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
H 1-10, H 13-15, H 18-23, H 24-26
(Del Mar Mesa (City, State/Federal); Del Mar Mesa (Private/Catholic Diocese);
and (Private/Rhodes)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis. (Del Mar Mesa [City], Del Mar Mesa [State/Federal]Del Mar Mesa [Private], and Rhodes [Private])
2. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego mesa mint within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Del Mar Mesa [City], and Rhodes)

Management Level: Level 1: (Del Mar Mesa [City, State/Federal], Del Mar Mesa [State/Federal], Del Mar Mesa [Private], Rhodes [Private/following implementation of restoration plan])

Ownership: City, USFWS, and CDFW
Private – Catholic Diocese, Rhodes)

Management Responsibility: City of San Diego Park and Recreation Department,
Public Utilities Department/Waste Water Division,
California Department of Fish and Wildlife,
U.S. Fish and Wildlife Refuge,
Private, Catholic Diocese, Keith Rhodes

Management Goal

The Management Goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations by conducting all Management Level 1 required activities.

Complex Description

Del Mar Mesa (City, State/Federal)

Del Mar Mesa is a 694-acre open space preserve made up of acquisition and mitigation lands owned by the City of San Diego, County of San Diego, California Department of Fish and Game, and U.S. Fish and Wildlife Service. It is located south of SR-56, east of the developments of The Preserve, Duck Pond Ranch, and Bougainvillea, and north of Los Penasquitos Canyon in the Del Mar Mesa Community Planning Area. This site is within the MHPA and is zoned Open Space. Surrounding land uses include open space, residential, and transportation. The County of San Diego is not subject to the City's jurisdiction and is not part of the VPHCP. Therefore, lands owned by the County are not subject to the City's Vernal Pool Management and Monitoring Plan.

Two hundred and fifty-two vernal pools were mapped within Del Mar Mesa and the Rhodes site. The vernal pools are underlain by Redding gravelly loam and upland vegetation is characterized by late successional stage chamise chaparral. Robust populations of San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) were recorded on Del Mar Mesa in 2003.

Prior to preservation, some areas were impacted by off-road vehicles. The site is currently used for passive recreation, and official trails will be installed to limit impacts to natural resources. Preserve management will follow the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (RECON 2005, updated City 2011).

The site was identified as necessary to stabilize populations of *E. aristulatum*, *P. abramsii*, and *B. sandiegonensis* by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998).

Del Mar Mesa (Private)

A *Resource Management Plan* was developed for the Our Lady of Mount Carmel Catholic Church project (PTS No. 2752) by Dudek & Associates, Inc. in August 2003. The *Resource Management Plan* focuses on two major management issues of overall habitat health, including exotics species invasion control and trespassing and encampment control (Dudek, 2003). Other management issues addressed include brush management, vector control, and recreational use. The *Resource Management Plan* assigned monitoring responsibility to the Church Facilities Manager to be communicated on an ongoing basis to the City of San Diego, Developmental

Services Department. If a different project is proposed for the site, the City will ensure that Management Level 1 activities are required as part of any future discretionary project approval.

Rhodes Crossing (Private/Keith Rhodes)

The Rhodes vernal pool site covers 102 acres southwest of the intersection of SR-56 and Carmel Mountain Road, adjacent to the Del Mar Mesa open space area. A total of 141 vernal pools were mapped within the Rhodes project boundary with an overall surface area of approximately 0.7 acre (Rhodes Crossing EIR 2003). This privately owned site is being developed as the Rhodes Crossing project (PTS No. 3230); the watersheds and basins of the vernal pools were preserved through the permitting process (see “Development” below for additional information). The vernal pools are on land zoned Residential and Commercial; adjacent land uses include MHPA/open space, residential, transportation, and commercial retail.

Vernal pools occur at this site within the Redding gravelly loam soil series. Upland vegetation surrounding the vernal pools includes Diegan coastal sage scrub, southern mixed chaparral, chamise chaparral, and nonnative grasslands. San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) have been recorded at Rhodes.

Prior to the current project approval, portions of the site were used for agriculture. The Rhodes vernal pools are generally natural in origin, although impacts have occurred from off-road vehicles, pedestrians, and geologic borings. The vernal pools and their watersheds would be conserved by a COE as part of the Rhodes project approval; vernal pools will be managed according to the approved *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the H-15 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Del Mar Mesa (City)	100	92	0.54	POAB (3) ERAR (49) SDFS (8)	SDFS
	Del Mar Mesa (Private)	100	5	0.26	ERAR (2) SDFS (1)	SDFS
	Del Mar Mesa (State/Federal)	100	244	4.68	POAB (56) ERAR (122) SDFS (16)	SDFS
	Rhodes	0	19	0.13	SDFS (2)	SDFS
		100	137	0.65	POAB (7) ERAR (6) SDFS (2)	SDFS
Baseline	Del Mar Mesa (City)	100	92	0.54	POAB (3) ERAR (49) SDFS (8)	SDFS
	Del Mar Mesa (Private)	100	5	0.26	ERAR (2) SDFS (1)	SDFS
	Del Mar Mesa (State/Federal)	100	244	4.68	POAB (58) ERAR (122) SDFS (16)	SDFS
	Rhodes	0	19	0.13	SDFS (2)	SDFS
		100	137	0.65	POAB (7) ERAR (6) SDFS (2)	SDFS
Expanded Alternative	Del Mar Mesa (City)	100	92	0.54	POAB (3) ERAR (49) SDFS (8)	SDFS
	Del Mar Mesa (Private)	100	5	0.26	ERAR (2) SDFS (1)	SDFS
	Del Mar Mesa (State/Federal)	100	244	4.68	POAB (56) ERAR (122) SDFS (16)	SDFS
	Rhodes	0	6	0.02	SDFS (4)	SDFS
		100	150	0.62	POAB (7) ERAR (6)	SDFS

SDFS = San Diego fairy shrimp
ERAR = San Diego button-celery
POAB = San Diego mesa mint
NAFO = Spreading navarretia

Threats

Del Mar Mesa

Edge Effects

While some portions of the complex are near housing development, most of the pools are well nested within open space. These areas are large in size with substantial buffer for most of the vernal pools.

Fire and Fire Suppression

Del Mar Mesa is part of several large, interconnected open space areas where fire is an important part in the natural ecologic regime. At other vernal pool sites in San Diego, comparisons of pre- and post-fire surveys do not support the assumption of long-term damage to sensitive species or their physical habitat. Therefore, fire does not appear to threaten species presence or abundance at vernal pool ecosystems.

During an emergency, this site may be used for fire suppression activities. A fire management plan has been prepared for this site and is included in the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015). Section 10, entitled Fire Management, includes information on fire history and the ecological role of fire, objectives, and fire management units, as well as requirements for reporting, extinguishing, and reviewing fires that occur on Del Mar Mesa.

Trespass

The public is allowed limited, non-motorized access to Del Mar Mesa per the adopted trail plan in the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015). Trespass by off-road vehicles has been significantly reduced following the installation of a guardrail on State of California land by the City of San Diego but trespass may still occur in rare instances. Gates and access barriers have been installed across major routes accessible by vehicles, and fencing was required for many of the mitigation sites.

Litter

Litter has not been identified as a problem at this complex but with the high level of foot, bike, and equestrian traffic, it will remain a threat.

Topographic Disturbance

While many of the vernal pools at this complex are protected from topographic disturbance, off-road activity and access for utility maintenance has created topographic disturbance at some pools. In some cases, this topographic disturbance may have impacted the watershed and ponding characteristics of some of the pools.

Invasive Species

Vegetation species at Del Mar Mesa are primarily native; however, some nonnative grasses and *Erodium* spp. occur.

Rhodes Crossing (Private/Rhodes)

Edge Effects

The majority of the Rhodes vernal pools will be surrounded by development. Edge effects will be minimized through implementation of the *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015), proximity to the Del Mar Mesa vernal pools, and management in perpetuity.

Fire and Fire Suppression

The conserved areas may be impacted if used as staging area during a fire suppression event.

Trespass

Trespass by off-road vehicles has been significantly reduced following the installation of a guardrail on State of California land by the City of San Diego in 2010. In addition, the fencing and walls required as part of the development project may further reduce trespass.

Litter

Litter has not been identified as a problem at this complex, but any issues are expected to be alleviated through regular trash removal as required by the habitat management plan.

Topographic Disturbance

Many of the pools in the Rhodes property have substantial topographic disturbance from historic activities which may have impacted the watershed and ponding characteristics of some of the pools. However, project mitigation will reverse this damage through restoration of 0.30 acre of vernal pool basin and enhancement of 0.7 acre of vernal pool basin (Biological Opinion FWS-SD-08BO401-12FC078 and *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015).

Invasive Species

Nonnative species occur in the disturbed and ruderal portions of the Rhodes site which will be managed through implementation of the *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015).

Current Management Activities

Del Mar Mesa (City, State, Federal)

Several parcels have been purchased as mitigation for off-site development impacts, including:

- City of San Diego Public Utilities Metropolitan Wastewater Division
 - APNs 306-050-2100, 306-050-0700
- Lands previously managed by The Environmental Trust (now owned and managed by City of San Diego, Park and Recreation); mitigation for the Laguna Nigel and La Jolla Crossroads (LDR 99-0647) projects
 - APN 306-050-2900
- Mira Mesa Market Center (LDR 96-7371, USFWS BO 1-6-98-F-23), dedicated to the City of San Diego
 - APN 309-010-0200
- City of San Diego Environmental Services Department
 - APN 306-050-1100
- California Department of Transportation (Caltrans); mitigation (including creation of 40 pools) for I-15 and extension of SR-52, dedicated to the California Department of Fish and Wildlife
 - APNs 309-010-0400, 309-010-0700, 309-010-0800, 309-010-0900, 309-010-1000, 309-010-2200, 309-010-2300, 309-010-2500, 309-010-2700, 309-010-2900, 309-010-3000, 309-010-3100, 309-010-3200, 309-010-3300, 309-010-3400, 309-010-3500

Caltrans initiated vernal pool restoration and habitat enhancement as mitigation for the park-and-ride facility in 2012. The project was implemented consistent with the Del Mar Mesa and Nobel Vernal Pool Mitigation Sites Project Description (December 2012) prepared by Caltrans and included recontouring, weeding & dethatching, upland watershed restoration, hydrological monitoring, and fencing.

The City of San Diego MSCP Subarea Plan states, “If possible, the Del Mar Mesa area should be managed as a single unit rather than split into separate entities according to ownership (County, various City departments, easements).” Therefore, all maintenance and management activities (excluding project-specific mitigation requirements) for the Del Mar Mesa site will be conducted in accordance with the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (RECON 2005, updated City 2011), which creates a complete action plan for the area.

The Resource Management Plan has specific guidance for maintenance activities that include trail maintenance, weed control, public outreach, and additional access control, as well as conceptual restoration plans for vernal pools and upland habitats.

Vernal Pool HCP Management Requirements¹

Del Mar Mesa (City, State, Federal)

- Conduct all Management Level 1 activities, including targeting the serious invasive problems (plants or animal), trash removal, and other general management activities.
- Implement *Carmel Mountain and Del Mar Mesa Management Plan* (City 2015), including the following actions:
 - If any additional vernal pool preserve areas on Del Mar Mesa (e.g. Rhodes Crossing, Our Lady of Mount Carmel, others) are transferred to the City of San Diego in the future, the properties will be incorporated into the *Carmel Mountain and Del Mar Mesa Management Plan* at the Plan's next scheduled update per Park & Recreation Department protocol.

Del Mar Mesa (Private/Catholic Diocese)

- Implement the required *Resource Management Plan* (August 2003) upon development of the Our Lady of Mount Carmel Catholic Church project (PTS No. 2752), including:
 1. Control of exotics species
 2. Trespassing and encampment control
 3. Implementation of brush management
 4. Reporting.

This site may or may not be developed with a church: If a different project is proposed for the site, the City will ensure that Management Level 1 activities are required as part of the discretionary project approval.

Rhodes Crossing (Private/Keith Rhodes)

- Implement the required permit/mitigation measures for the Vernal Pool Areas in accordance with the City approval of the Rhodes Crossing project (PTS No. 3230) and the Biological Opinion (FWS-SD-08BO401-12FC0578) issued by U.S. Fish and Wildlife Service, including:
 1. Placement of Covenant of Easements (COE) over vernal pool lots
 2. Implementation of *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015) (7 years) - vernal pool enhancement activities including pool recontouring, removal of trash, weeding of pools and watershed enhancement

¹ Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

activities including control of invasive non-natives, and supplemental seeding and planting of native upland species

3. Implementation of long-term management and protection per the *Rhodes Crossing Mitigation and Habitat Management Plans* (Alden, 2015). The costs associated with these required management activities, including a one-time endowment to fund long-term management needs, are the responsibility of the project applicant. The *Habitat Management Plan* includes directives for trash removal, weed control, topographic reconstruction, reintroduction of sensitive species, and upland watershed restoration.

Management Recommendations²

Del Mar Mesa (City/State/Federal)

Site-specific Management Actions: remove rebar, stakes and “chicken wire” fencing around vernal pools, which were installed in historic studies and were abandoned at the end of the survey. The metal has rusted and may be affecting the pH and soil composition in vernal pools and these studies are no longer active.

Provide follow-up studies on the created vernal pools on Del Mar Mesa (see Black and Zedler 1998).

Del Mar Mesa (Private/Catholic Diocese), Rhodes Crossing (Private/Keith Rhodes)

None.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
H 17 (Shaw Lorenz)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: Private

Management Responsibility: Private (Pardee Homes)

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the *Vernal Pool Management Plan Shaw-Lorenz Project* (Natural Resource Consultants 2004) in order to conduct all Management Level 1 recommended activities as described below under Current Management Activities.

Complex Description

The Shaw Lorenz (H 17) site is located west of the Del Mar Mesa open space area and adjacent to the Del Mar National Golf Course. This privately owned site covers approximately 278 acres of historic agricultural land. It is partially within the MHPA and is being developed into residential units as the Shaw Lorenz project (PTS No. 2873); the U.S. Fish and Wildlife Service prepared a revised Biological Opinion FWS-SD-08B0023/08F0016R001 (formerly known as 1-6-06-F-4005R1) in regard to this project. The watersheds and basins of the vernal pools at this site were preserved through the permitting process (see “Development” below for additional information). Shaw Lorenz is zoned Residential and Open Space; adjacent land uses include MHPA/open space, residential development, and golf courses.

A total of 28 vernal pools are mapped for this site. The vernal pools were historically of natural origin but were impacted by intensive agriculture prior to 1995 and today, in many cases, the basins are of anthropogenic origin. The site is within the Redding gravelly loam soil series.

Upland vegetation communities include native grassland; coastal sage scrub; scrub oak, chamise and southern mixed chaparral; eucalyptus woodlands, and ruderal. Sensitive vernal pool plant species were not observed during either the 2001 or 2003 surveys; *Branchinecta* spp. was observed during both surveys.

Prior to the current construction, the site was used for agriculture. It has been used for passive recreation and minimal off-road vehicle activities in the interval between agricultural and residential development.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the H 17 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Shaw Lorenz	100	28	0.24	SDFS (8)	NONE
Baseline	Shaw Lorenz	100	28	0.24	SDFS (8)	NONE
Expanded Alternative	Shaw Lorenz	100	28	0.24	SDFS (8)	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Shaw Lorenz vernal pools are bounded on all sides by development. Edge effects such as trespass, trash, and weed invasion, will be minimized by management in perpetuity.

Fire and Fire Suppression

The site might be disturbed as a result of fire suppression activities in the event of a fire following the construction of defensible structures.

Trespass

The public is allowed limited, non-motorized access to Shaw Lorenz. Trespass by off-road vehicles has been reduced but may occur in rare instances. Gates have been installed across major routes accessible by vehicles, and fencing was required for many of the mitigation sites.

Litter

Litter has not been identified as a problem at this complex but with the high level of foot and bike traffic, it will remain a threat.

Topographic Disturbance

While the vernal pools at this complex are now protected from topographic disturbance, past off-road activity and access for utility maintenance have created topographic disturbance in some pools. In some cases, this topographic disturbance may have impacted the watershed and ponding characteristic of some of the pools.

Invasive Species

Nonnative species occur in the disturbed and ruderal portions of the Shaw Lorenz site.

Current Management Activities

The management requirements discussed in this section are permit conditions associated with City of San Diego approval of the Shaw Lorenz project (PTS No. 2873). Specific details are available in the *Vernal Pool Management Plan Shaw-Lorenz Project* (see Appendix B of the *Biological Resources Assessment of the Approximately 278-acre Shaw-Lorenz Site* [Natural Resource Consultants 2004]). The costs associated with these required management activities are the responsibility of the developer (Pardee Construction Company) and subsequently the home owners association. The management activities include weed control, access control, topographic reconstruction, public outreach, and litter removal. All of these activities have been implemented at some level.

- Invasions of nonnative species into the conserved areas will be removed using non-mechanized means. Herbicide use is not permitted within the conservation areas.
- Signage, barriers and fencing sufficient to protect the vernal pools will be installed and maintained.
- Lighting will not be installed within conserved areas and, in adjacent lots, will be shielded to direct spillage away from vernal pool areas.
- Grading, development, and landscape irrigation will be completed in a manner to avoid unnatural drainage to vernal pools during and after construction.
- A public information brochure will be provided to buyers with specific information on vernal pools, the lots containing these features within the development, and appropriate uses of adjacent lands (i.e. noninvasive landscaping, minimizing irrigation runoff, etc.)
- Trails to be developed with this project have been sited and fenced, where necessary, to avoid impacts to vernal pools.
- Trash removal will occur at regular intervals or as necessary.

The U.S. Fish and Wildlife Service Biological Opinion required a Vernal Pool Restoration and Enhancement Plan. A minimum of 2 square feet was required to be enhanced and restored for every 1 square foot lost for a minimum restoration of 0.12 acre of surface ponding area of vernal pool habitat suitable for, and occupied by, the San Diego fairy shrimp. Additional surface area was also accepted if and where appropriate. Additional measures for the Vernal Pool Restoration and Enhancement Plan are included in the U.S. Fish and Wildlife Service Biological Opinion FWS-SD-08B0023/08F0016R001.

Vernal Pool HCP Management Requirements¹

The vernal pools and their watersheds have been conserved by a conservation easement as part of the Shaw Lorenz project (PTS No. 2873) and U.S. Fish and Wildlife Service Biological Opinion 1-6-06-F-4005.4 and will be managed according to the *Vernal Pool Management Plan Shaw-Lorenz Project* (Natural Resource Consultants 2004).

The private owner will implement the Site-specific Management Plan pursuant to their existing City, State and Federal permits. For projects that were approved prior to the adoption of the VPHCP, no additional management and monitoring activities beyond what was included in the existing City, State, and Federal permits shall be required.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
H 33 (East Ocean Air Drive)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private (Torrey Hills Master Association)

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

H 33 is located west of East Ocean Air Drive near the intersection of Vereda Mar del Sol in Torrey Hills. Adjacent uses include open space, transportation, and residential development. The site is zoned Communications and Utilities, and is outside the MHPA. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the prior approvals, no development would be allowed within this site.

Two vernal pools occur at H 33 and these vernal pool basins are underlain by Redding gravelly loam and occur within nonnative grassland uplands. San Diego button celery (*E. aristulatum*) was observed.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the H 33 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	East Ocean Air Drive	100	2	0.03	ERAR (2)	NONE
Baseline	East Ocean Air Drive	100	2	0.03	ERAR (2)	NONE
Expanded Alternative	East Ocean Air Drive	100	2	0.03	ERAR (2)	NONE

ERAR = San Diego button-celery

Threats

Edge Effects

The pools are adjacent to the SDG&E substation and housing so there is a threat from adjacent landscaping and land management.

Fire/Fire Suppression

There is a relatively low threat of impacts from fire and/or fire suppression due to the localized elevation difference and the location of nearby defensible structures.

Trespass

The vernal pools are difficult to access and are isolated from public view; therefore, impacts from trespass are minimal.

Litter

The vernal pools are difficult to access and are isolated from public view; therefore, impacts from litter are minimal.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

The site is characterized by nonnative grasses and other weeds and this may be a major factor in the lack of sensitive vernal pool plant species.

Current Management Activities

This site was conserved through a building restricted easement pursuant to VTM No. 95-0554 prior to approval of MSCP and has been included within the proposed VPHCP preserve area. No vernal pool management was required as part of the project approval, nor is any management being required as part of VPHCP.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required as part of the project approval, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

Management Recommendations²

Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities plus the following Management Level 2 activities:

- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct a seed collection/bulking program.
- Conduct cyst collection and inoculation as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
H 38 (*Carmel Mountain*)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Site-specific Management Plan by conducting all Management Level 1 recommended activities.

Complex Description

Carmel Mountain (H 38) is a 300-acre preserve area that was acquired by the City of San Diego for open space in 1998. It is located south of SR-56 in the Carmel Mountain Community Planning Area and surrounds the Neighborhood 10 Community Park on the east, west, and north. The site, which is partially within the MHPA and is zoned Open Space, is owned and managed by the City of San Diego, Park and Recreation Department.

Thirty-four vernal pools, including both natural vernal pools and road ruts, were mapped at Carmel Mountain (City Surveys 2003, 2004). Soils include Redding gravelly loam, Carlsbad gravelly loamy sand, and Huerhuero complex loamy alluvial land. Upland vegetation is characterized by chamise chaparral with herbaceous cover such as *Erodium* spp. San Diego fairy shrimp (*B. sandiegonensis*) within the vernal pool habitat at Carmel Mountain; no sensitive vernal pool plant species have been reported from this site.

Prior to preservation, the site was impacted by off-road vehicles; gates were installed following acquisition of the site for open space. It is currently used for passive recreation, and official trails have been designated to minimize impacts to on-site resources. The preserve is managed in conformance with the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the H 38 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Carmel Mountain	100	64	0.61	SDFS (2)	SDFS
Baseline	Carmel Mountain	100	64	0.61	SDFS (2)	SDFS
Expanded Alternative	Carmel Mountain	100	64	0.61	SDFS (2)	SDFS

SDFS = San Diego fairy shrimp

Threats

Edge Effects

While much of the vernal pool complex at Carmel Mountain is surrounded by open space, some of the pools are adjacent to housing development at the southern end of the site. Where adjacent development exists, threats of edge effects will occur.

Fire and Fire Suppression

Carmel Mountain is part of several large, interconnected open space areas where fire plays an important role in the natural ecology. Portions of the site burned in 1986 and during the 1990s, although the vernal pool basins did not burn. At other vernal pool sites in San Diego, comparisons of pre- and post-fire surveys do not support the conclusion of long-term damage to sensitive species or their physical habitat. Therefore, fire does not appear to threaten species presence or abundance of vernal pool ecosystems.

During an emergency, this site may be used for fire suppression activities. A fire management plan has been prepared and is included in the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015). Section 10 of the plan, entitled Fire Management, includes information on fire history and the historic role of fire, objectives, and fire management units, as well as requirements for reporting, extinguishing and reviewing fires that occur on Carmel Mountain.

Trespass

The public is allowed limited, non-motorized access to Carmel Mountain. Trespass by off-road vehicles may occur in unlikely instances. Gates have been installed across vehicle access routes.

Litter

Litter has not been identified as a problem at this complex; however, with the high level of foot, bike, and equestrian traffic, litter will remain a threat.

Topographic Disturbance

While many of the vernal pools at this complex are now protected from topographic disturbance, off-road activity and access for utility maintenance have created some past topographic disturbance. In some cases, this topographic disturbance may have impacted the watershed and ponding characteristics of some of the pools. An on-going project by the Chaparral Lands Conservancy with funding from TransNet and USFWS has restored much of this disturbance (Carmel Mountain Vernal Pool and Uplands Habitat Restoration Plan, September 2012).

Invasive Species

Vegetation species at Carmel Mountain are primarily native; however, some nonnative grasses and *Erodium* spp. occur.

Current Management Activities

Maintenance and management activities are conducted by the City of San Diego Parks and Recreation Department in accordance with the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015), which creates a complete action plan for the area. The Resource Management Plan has specific guidance for maintenance activities that include trail maintenance, weed control, public outreach, and additional access controls. Additional management actions, including fencing, signage, topographic restoration, and educational programs, were implemented as part of a Chaparral Lands Conservancy project funded by TransNet and USFWS in 2013-2016 (*Carmel Mountain Vernal Pool and Uplands Habitat Restoration Plan*, September 2012; see also *Carmel Mountain Vernal Pool and Uplands Habitat Restoration Projects Annual Monitoring Report* for 2013, 2014 and 2015 prepared by The Chaparral Lands Conservancy and Rocks Biological Consulting).

Vernal Pool HCP Management Requirements¹

Management pursuant to the *Carmel Mountain and Del Mar Mesa Resource Management Plan* (City 2015).

Management Recommendations²

Management Level 1 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
H 39 (Greystone Torrey Highlands)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery and San Diego mesa mint within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 1

Ownership: City

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Site-specific Management Actions by conducting all Management Level 1 recommended activities.

Complex Description

Greystone Torrey Highlands (H 39) is a 3.5-acre vernal pool preserve and creation site located within a residential development of the same name. The site borders Camino del Sur and SR-56, and is accessed via Torrey Meadows Drive and Torrey Gardens Place. This area was restored and conserved as mitigation for construction of SR-56 and the Greystone Torrey Highlands project (LDR 98-0392). The site was preserved via conservation easement (File No. 2001-0069428), recorded on February 6, 2001, and dedicated to the City of San Diego in fee title after completion of the 120-day restoration establishment period. The site is zoned Open Space and is outside the MHPA; surrounding land uses include transportation, residential neighborhoods, and educational facilities. Greystone Torrey Highlands is included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP with 100% conservation consistent with prior conservation actions.

This site has 19 vernal pools: three are natural, 16 have been restored. The basins occur in Olivenhain cobbly loam soil. San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) occur at Greystone Torrey Highlands. Uplands surrounding the vernal pools have been restored to coastal sage scrub.

Impacts to approximately 89 square meters (m²) of vernal pools and 11 m² of road ruts were approved as part of the Greystone Torrey Highlands project, and 809 m² of impacts were approved for the construction of SR-56.

Prior to preservation and vernal pool restoration, the site was impacted by agriculture, off-road vehicle use, and illegal dumping. However, natural basins and coastal sage scrub vegetation remained in several areas. The site is currently fenced; the restoration process began in 2002 and was completed in 2009.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the H 39 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Greystone Torrey Highlands	100	19	0.68	POAB (5) ERAR (3)	NONE
Baseline	Greystone Torrey Highlands	100	19	0.68	POAB (5) ERAR (3)	NONE
Expanded Alternative	Greystone Torrey Highlands	100	19	0.68	POAB (5) ERAR (3)	NONE

POAB = San Diego Mesa mint

ERAR = San Diego button-celery

Threats

Edge Effects

The restoration site was designed to minimize impacts from edge effects such as litter and artificial night-lighting; however, proximity to development may result in impacts from litter and domestic animals. Litter removal, fencing, and signage are included in the site maintenance required by the restoration plan.

Fire and Fire Suppression

Given the developed surroundings, it is unlikely that wildfire or fire suppression activities pose a threat to the vernal pools.

Trespass

Off-road vehicles were a major threat prior to restoration of the site and development of the surrounding area. Fencing and signage were installed as part of site restoration in an effort to minimize trespass. However, the potential remains for trespass from the residents of the nearby development.

Litter

Occurrences of trash dumping are limited in this locality, but this remains a threat because of the adjacent road and homes.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Prior to restoration, nonnative invasive species were introduced through disturbance associated with off-road vehicle use, etc. Both uplands and vernal pools were revegetated in accordance with the accepted *Detailed Vernal Pool Restoration Plan for the City of San Diego/Greystone Homes Vernal Pool Preserve* (KEA Environmental 2001) and invasive species removal is required from both upland and vernal pool habitats.

Current Management Activities

The City Park and Recreation Department is responsible for management of H 39. Pursuant to the U.S. Fish and Wildlife Service Biological Opinion 1-6-00-F-36, issued through a Section 7 consultation for a U.S. Army Corps of Engineers 404 permit, mitigation and management activities were required as conditions of incidental take of San Diego fairy shrimp (*Branchinecta sandiegonensis*) resulting from the Greystone Torrey Highlands project (LDR 98-0392).

The *Detailed Vernal Pool Restoration Plan for the City of San Diego/Greystone Homes Vernal Pool Preserve* (KEA Environmental 2001) was accepted by the permitting agencies as mitigation for vernal pool impacts. Implementation of the restoration plan included a 120-day establishment period, followed by 5 years of monitoring and maintenance, including trash removal, weed control, hydrological/topographical modification, fence repair, and any necessary remedial measures, under the supervision of a revegetation specialist.

As part of the mitigation plan, the site has been fenced with permanent, 6-foot-high material selected to prevent off-road vehicle and pedestrian access. “No Trespassing” signs have also been placed around the preserve.

Funding for the long-term management requirements set forth in the *Detailed Vernal Pool Restoration Plan for the City of San Diego/Greystone Homes Vernal Pool Preserve* is provided by an endowment fund in the amount of \$30,000 and General Funds as needed to meet annual maintenance costs. These funds provide for long-term management and monitoring activities including trash removal, fence and signage repair, invasive control within basin through hand removal, weed control in surrounding uplands, trespass control, erosion control. Qualitative monitoring focuses on soil conditions, plant health, presence of native and non-native species, significant disease or pest problems, trash removal, illegal trespass, and erosion problems.

Vernal Pool HCP Management Requirements¹

The following tasks in Management Level 1 are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Implement Site-specific Management Plan as required (refer to Current Management Activities above).

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
I 1 (Arjons)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint, and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Arjons (I 1) is an 8.7-acre parcel located south of Carroll Canyon along Arjons Drive in Mira Mesa. This site is privately owned and was preserved as mitigation for Miralani Business Park (EIR 80-0341 and Addendum 84-0372, U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-48) and Miramar Point PID (EIR 90-0431); however, a conservation easement was not required and a portion of the site was impacted when a grading permit was subsequently issued in error by the City of San Diego (LDR No. 99-0508, grading permit no. W48163). The site is zoned as open space, and adjacent land uses include transportation and industrial development. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the prior approvals, no development would be allowed within this site.

A total of 34 vernal pools were mapped at Arjons in 2003 (see also *Arjons Road Vernal Pool Evaluation and Management Recommendations* [Dudek 1996]). These basins are natural in origin and are underlain by Redding gravelly loam. Chamise chaparral is the dominant

vegetation community in the vernal pool watersheds and other upland areas. Sensitive vernal pool species at Arjons include San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*).

Historically, vernal pool basins at Arjons were impacted by off-road vehicles and construction debris. Following utilization of the site as mitigation for the Miralani Business Park (EIR 80-0341) and Miramar Point PID (EIR 90-0431), Arjons was fenced and regular maintenance was performed by the property owner, including litter and debris removal and fence maintenance. A 1996 report noted ice plant and eucalyptus colonizing the preserve from the eastern property boundary and runoff from adjacent irrigation (Dudek 1996). In 1999, the City of San Diego erroneously issued a grading permit for Arjons (LDR No. 99-0508, grading permit no. W48163). This resulted in impacts to approximately one-third of the site, including eight vernal pools.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the I 1 complex.

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Arjons	100	34	0.73	POAB (22) ERAR (15) SDFS (1)	NONE
Baseline	Arjons	100	34	0.73	POAB (22) ERAR (15) SDFS (1)	NONE
Expanded Alternative	Arjons	100	34	0.73	POAB (22) ERAR (15) SDFS (1)	NONE

POAB = San Diego Mesa mint
ERAR = San Diego button-celery
SDFS = San Diego fairy shrimp

Threats

Edge Effects

Arjons is located within a developed area with small pockets of open space. Although fencing has added a measure of protection, edge effects such as runoff and nonnative species have been noted.

Fire and Fire Suppression

The site might be disturbed as a result of fire suppression activities in the event of a fire; however, wildfire is unlikely due to the developed nature of the area.

Trespass

While trespass does not appear to be a current issue, the adjacent development may create issues where foot traffic may impact the site.

Litter

Occurrences of trash dumping are limited in this locality; however, this remains a threat with the adjacent development.

Topographic Disturbance

As discussed above, illegal impacts to approximately one-third of the site, including eight vernal pools, has occurred. These impacts resulted in artificial changes to the watershed, ponding characteristics, and flow patterns.

Invasive Species

Eucalyptus and ice plant occur along the eastern property boundary.

Current Management Activities

The on-site preservation option in U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-48 included the following requirements for the site:

- Invasive species shall not be used for slope stabilization on cut slopes adjacent to the preserve.
- Installation and maintenance of fencing to exclude trespass and construction activities.

Preservation at this site was required pursuant EIR 80-0341 and Addendum 84-0372, U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-48 for Miralani Business Park and EIR 90-0431 for Miramar Point PID. This site is outside the MHPA and does not have a conservation easement recorded over the site. This area has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP. No long-term management was required as part of the discretionary project approval or Biological Opinion, nor is any management being required as part of VPHCP. The City may approach the property owner to discuss the management recommendations below.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required at that time, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

Management Recommendations²

- The City will work with the property owner to gain legal access and to record a covenant of easement against the title of the property.
- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
I 6 B (Ford Leasing [Bob Baker])

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego mesa mint and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *stabilize* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Ford Leasing (referred to as “Bob Baker” in the *2002–2003 Vernal Pool Inventory* [City of San Diego 2004]) (I 6 B) is a 0.5-acre parcel located northeast of the intersection of Miramar Road and Miramar Mall Road in University City. This site is located outside of the MHPA, is zoned Light Industrial, and is privately owned. Although this area is not conserved via conservation easement, the U.S. Fish and Wildlife Service issued a Biological Opinion 1-1-80-F-71 which required on-site preservation of 0.56 acre as part of the 15.9-acre development project by the Ford Leasing Development Company in 1980. Surrounding land uses include transportation, military operations, commercial, and light industrial. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the Biological Opinion no development would be allowed within this site.

Eight vernal pools were mapped at Ford Leasing in 2003. These basins are natural, although damage from off-highway vehicles is evident (i.e., ruts). The basins are underlain by Redding

gravelly loam; disturbed chamise chaparral occurs in the limited watershed/upland area. Sensitive vernal pool species at Ford Leasing include San Diego mesa mint (*P. abramsii*) and *Branchinecta* spp.

Impacts to approximately 70 vernal pools were permitted in 1980 (see U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-71). Bauder (1986) noted disturbance from dumping and landscaping irrigation, and trash was observed in 2003 (City of San Diego 2004). The site was not fenced in 2003.

The site was identified as necessary to reclassify the populations of San Diego button celery (*E. aristulatum*) and San Diego mesa mint (*P. abramsii*) by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the I 6 B complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Ford Leasing	100	8	0.08	POAB (7) SDFS (3)	NONE
Baseline	Ford Leasing	100	8	0.08	POAB (7) SDFS (3)	NONE
Expanded Alternative	Ford Leasing	100	8	0.08	POAB (7) SDFS (3)	NONE

POAB = San Diego Mesa mint
SDFS = San Diego fairy shrimp

Threats

Edge Effects

This site is in a developed area with small pockets of open space, and edge effects such as run-off, nonnative species, and trash have been noted.

Fire and Fire Suppression

The site might be disturbed as a result of fire suppression activities in the event of a fire; however, wildfire is unlikely due to the developed nature of the area.

Trespass

While trespass does not appear to be a current issue, the adjacent development may create issues that can lead to a threat to the complex.

Litter

Historical occurrences of trash dumping have occurred at this locality, but the site has been fenced and litter does not currently appear to be an issue.

Topographic Disturbance

This site has some historical off-road damage and this damage may have created issues with hydrology, flow patterns, or ponding characteristics.

Invasive Species

Nonnative herbaceous species are prevalent at the Ford Leasing site.

Current Management Activities

The on-site preservation option in U.S. Fish and Wildlife Service BO 1-1-80-F-71 included the following requirements:

- Installation and maintenance of suitable fencing and/or barriers
- No invasive exotic species may be used in project landscaping adjacent to the preserve
- Design of project and preserve to divert run-off away from the vernal pools
- All fire control measures (i.e. brush management or disking for fire breaks) shall be approved by U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service
- One-time removal of litter and dumping materials
- Preparation of a written plan demonstrating project compliance

Preservation at this site was required pursuant to Biological Opinion 1-1-80-F-71. This site is outside the MHPA and has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP. No long-term management was required as part of the Biological Opinion, nor is any management being required as part of VPHCP.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required at that time, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Management Recommendations²

Management Level 2 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Reintroduce *N. fossalis* and *E. aristulatum*, which historically occurred at this location in 1980 (see Biological Opinion 1-1-80-F-71).
- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct cyst collection and inoculation if basins are shown to not have San Diego fairy shrimp (*B. sandiegonensis*).
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
I 6 C (Facilities Development [Eastgate Miramar Associates])

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint, and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *stabilize* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Facilities Development (referred to as “Bob Baker 2” in the City’s *Vernal Pool Inventory* [2004]) (I 6 C) is a 0.95-acre parcel located at the northwest intersection of Miramar Road and Miramar Mall Road in University City. This site is located outside of the MHPA and is privately owned. This area is not conserved via conservation easement. However, the U.S. Fish and Wildlife Service issued Biological Opinion 1-1-80-F-90 which included a “no jeopardy” opinion requiring restoration and preservation of the site in response to illegal grading in March 1980. The “no jeopardy” opinion did not include the impacts from the illegal grading. The site is zoned Light Industrial, and surrounding land uses include transportation, military operations, commercial, and light industrial. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the Biological Opinion no development would be allowed within this site.

Fifteen vernal pools were mapped at Facilities Development in 2003. Prior to grading and fill activities in 1980, all basins were natural vernal pools. Existing basins include both natural, highly disturbed basins and vernal pools created pursuant to U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-90. The basins are underlain by Redding gravelly loam; the limited watershed/upland area is vegetated by disturbed chamise chaparral. Sensitive vernal pool species at Facilities Development include San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and *Branchinecta* spp.

The U.S. Fish and Wildlife Service issued Biological Opinion 1-1-80-F-90 in consultation with the U.S. Environmental Protection Agency, which pursued legal action against the landowner in *United States of America v. Eastgate Miramar Associates*. The suit was resolved through an out-of-court settlement under the following conditions within Civil No. 80-0756-E(M): (1) fencing (concrete block retaining wall and wire cable) around the preserve perimeter, (2) preparation of a restoration and preservation plan, including restoration and inoculation of vernal pool basins, and (3) deposit of \$20,000 to fund a study on the success of restoration actions (see *Recovery of Vernal Pools and Their Associated Plant Communities Following Surface Disturbance* [Scheidlinger et al. 1987] and *An Overview of 15 Years of Vernal Pool Restoration and Construction Activities in San Diego County, California* [Black and Zedler 1998]). The site is currently fenced but there are no long-term management activities occurring at this site.

These populations of sensitive species were identified as necessary to reclassify *E. aristulatum* and *P. abramsii* by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the I 6 C:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Facilities Development	100	15	0.24	POAB (11) ERAR (2) SDFS (6)	NONE
Baseline	Facilities Development	100	15	0.24	POAB (11) ERAR (2) SDFS (6)	NONE
Expanded Alternative	Facilities Development	100	15	0.24	POAB (11) ERAR (2) SDFS (6)	NONE

POAB = San Diego mesa mint; ERAR= San Diego button-celery; SDFS= San Diego fairy shrimp

Threats

Edge Effects

This site is in a developed area with small pockets of open space. Although fencing has added a measure of protection, edge effects such as runoff and nonnative species have been noted.

Fire and Fire Suppression

The site might be disrupted as a result of fire suppression activities in the event of a fire; however, wildfire is unlikely due to the developed nature of the area.

Trespass

While trespass does not appear to be a current issue, the adjacent development may create issues that can lead to a threat to the complex.

Litter

Historical occurrences of trash dumping have occurred at this locality, but the site has been fenced and litter does not appear to be an issue currently.

Topographic Disturbance

This site has some historical off-road damage and this damage may be creating issues with hydrology, flow patterns, or ponding characteristics.

Invasive Species

Nonnative herbaceous species are prevalent at this complex.

Current Management Activities

The on-site preservation per the U.S. Fish and Wildlife Service Biological Opinion 1-1-80-F-90 included the following requirements:

- Fencing
- Experimental restoration, including creation of twelve vernal pool basins
- Funding (\$20,000) for a study of restoration success

Preservation at this site was required pursuant to Biological Opinion 1-1-80-F-90. This site is outside the MHPA and does not have a conservation easement recorded over the site. This area has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP. No long-term management was required as part of the Biological Opinion, nor is any management being required as part of the VPHCP. The City may approach the property owner to discuss the management recommendations below.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required at that time, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

Management Recommendations²

Management Level 2 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct cyst collection and inoculation for any basins that do not have San Diego fairy shrimp (*B. sandiegonensis*).
- Conduct container plant propagation and installation.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
I 12 (Pueblo Lands South)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City

Management Responsibility: City of San Diego Public Utilities Department

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

The Pueblo Lands South (I 12) site is located directly east of I-805, directly south of Miramar Road, and directly north of Nobel Dr. A large San Diego Gas and Electric transmission corridor with two sets of high voltage transmission lines is located immediately west of the site. This 34 acre site in the University Community Planning Area is owned and managed by the City of San Diego Public Utilities Department and is not conserved. The site is almost completely inside the MHPA and is zoned for residential use. Adjacent land uses include transportation, military, commercial, and undeveloped lands.

Two vernal pools occur at this site in Redding gravelly loams, these pools and the surrounding watershed areas are dominated by nonnative grassland. The site also contains Chamise Chaparral, Diegan Coastal Sage Scrub and Scrub Oak Chaparral in close proximity to the pools. The pools do not have any sensitive plant species but San Diego fairy shrimp (*B. sandiegonensis*) was found on October 21, 2008 (Fairy Shrimp Protocol Surveys, Technology Associates).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the I 12 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Pueblo Lands	75	2	0.04	SDFS (2)	NONE
		0	5	0.05	SDFS (4)	NONE
Baseline	Pueblo Lands	75	2	0.04	SDFS (2)	NONE
		0	5	0.05	SDFS (4)	NONE
Expanded Alternative	Pueblo Lands	75	2	0.05	SDFS (5)	NONE
		0	5	0.03	SDFS (1)	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

While this site is relatively isolated, it is surrounded by roads and development, all of which present a threat for edge effects.

Fire and Fire Suppression

The long-term impact of fire on vernal pool plants and animals appears to be minimal (see *Post Fire Evaluation of Vernal Pools* in MSCP Monitoring Report [City of San Diego 2004]). The area might be impacted by fire suppression activities in the event of a wildland fire.

Trespass

Trespass is a threat to Pueblo Lands due to the adjacency of roads and the 805 Freeway.

Litter

The site is currently unfenced and is at risk from dumping and other trash accumulation.

Topographic Disturbance

There is evidence from aerial mapping of vehicle disturbance so issues may exist with concern to hydrological flow patterns, inundation levels, and general watershed function.

Invasive Species

The site is characterized by nonnative grasses that may be a factor in the lack of sensitive vernal pool plant species.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

The following tasks in Management Level 1 are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

Management Level 1 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-3 (hand, mechanical and/or herbicide application).
- Conduct cyst collection and inoculation only if basins have San Diego Fairy Shrimp (*B. sandiegonensis*).
- Conduct topographic reconstruction where appropriate

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 2 (Cal Terraces [North], Otay Mesa Road Parcels; Clayton Parcel; St. Jerome's)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Cal Terraces [North], Otay Mesa Road Parcels; Clayton Parcel)
2. Protect and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia, Orcutt's grass, Otay Mesa mint, and Riverside fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of these species on a range-wide basis. (Cal Terraces [North], Otay Mesa Road Parcels; Not yet observed: Clayton Parcel; St. Jerome's)
3. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis. (Cal Terraces [North], Otay Mesa Road Parcels; Clayton Parcel; St. Jerome's)

Management Level: Level 1: Cal Terraces (North), Otay Mesa Road Parcels, Clayton Parcel.
None: St. Jerome's

Ownership: City of San Diego Park and Recreation Department: Cal Terraces (North), Otay Mesa Road Parcels, and Clayton Parcel.
Private: St. Jerome's

Management Responsibility: City of San Diego Park and Recreation Department: Cal Terraces (North), Otay Mesa Road Parcels, and Clayton Parcel.
Private (Catholic Diocese): St. Jerome's

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations by conducting all Management Level 1 recommended activities.

Complex Description

Cal Terraces (North), Otay Mesa Road Parcels

Cal Terraces (North) is a 172.7-acre vernal pool preserve and restoration site located northwest of the intersection of SR-905 and Corporate Center Drive, and southeast of the intersection of SR-905 and Innovative Drive in Otay Mesa. These two areas were restored and conserved as mitigation for Otay Corporate Center North and South (LDR 88-1144) and California Terraces (LDR 86-1032); U.S. Fish and Wildlife Service Biological Opinion 1-6-95-F-35 and U.S. Army Corps of Engineers File No. 9520130-DZ were issued regarding this site. The mitigation project has completed the 5-year management and monitoring requirement, and the land will be deeded to the City of San Diego upon the approval of a long-term management funding source. Both sites are within the MHPA and the land is zoned Open Space. Surrounding land uses include the open space/MHPA in Dennery Canyon, transportation, institutional facilities, multi-family residential and office parks.

Restoration of 335 vernal pools was performed according to the specifications set forth in the *Dennery Canyon Vernal Pool, Coastal Sage Scrub, and Mule Fat Scrub Restoration and Preservation Plan* (RECON 1997). For additional information, see also the *Conceptual Mitigation Plan for Impacts to Areas within the Jurisdiction of the California Department of Fish and Game, Otay Mesa Projects* (Glenn Lukos Associates 1995) and the *As-Built Dennery Canyon Vernal Pool, Coastal Sage Scrub, and Mule Fat Scrub Restoration and Preservation Plan* (RECON 1997). Vernal pools occurred in this area historically, but many were disturbed or destroyed by off-road vehicle use prior to restoration. The site is characterized by Stockpen gravelly clay loam, and upland areas have been revegetated with coastal sage scrub. Sensitive species on-site include San Diego button celery (*E. aristulatum*), Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), Otay Mesa mint (*P. nudiuscula*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

U.S. Fish and Wildlife Service Biological Opinion 1-6-95-F-35 addressed impacts to 162 vernal pools, including San Diego button celery (*E. aristulatum*), Spreading navarretia (*N. fossalis*), Otay Mesa mint (*P. nudiuscula*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*). Mitigation of impacts was required at a 2:1 ratio with a minimum of 2.55 acres.

Otay Mesa Road Helix (J 2) is a 1-acre site northwest of the intersection of Otay Mesa Road and Corporate Center Drive in Otay Mesa. This site was preserved as mitigation for the Otay Mesa Road Widening project per U.S. Fish and Wildlife Service Biological Opinion 1-6-97-F-20, which includes vernal pool restoration and upland restoration components. The parcel is dedicated open space within the MHPA and owned by the City of San Diego. Surrounding land uses include business parks, vernal pool preserves, and transportation.

Thirteen vernal pools were restored according to the specifications included in the *Otay Mesa Road Vernal Pool Mitigation Plan* (Helix 1998). Vernal pools occurred in this area historically, but many were disturbed or destroyed by off-road vehicle use prior to restoration. The soils are Stockpen gravelly clay loam, and upland areas have been revegetated with coastal sage scrub. Sensitive vernal pool species recorded include San Diego button celery (*E. aristulatum*), Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), Spreading navarretia (*P. nudiuscula*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*). Impacts to 0.09 acre of vernal pools and 0.67 acre of associated watersheds were approved as part of the Otay Mesa Road Widening project.

Prior to preservation and vernal pool restoration, the site was impacted by off-road vehicle use and illegal dumping. However, mima mounds and coastal sage scrub vegetation were still present in some areas. The site is currently fenced.

Otay Mesa Road RECON is a 2.5-acre site northwest of the intersection of Otay Mesa Road and Corporate Center Drive in Otay Mesa. The site is designated open space within the MHPA and is owned by the City of San Diego. Surrounding land uses include business parks, vernal pool preserves, and transportation.

Twenty vernal pools were restored according to the specifications included in the *City of San Diego Vernal Pool and Coastal Sage Scrub Restoration and Preservation Plan on Otay Mesa* (RECON 1998), and funded through an NCCP Local Assistance Grant to the City of San Diego in 1998. Vernal pools occurred in this area historically, but many were disturbed or destroyed by off-road vehicle use prior to restoration. The site is characterized by Stockpen gravelly clay loam, and upland areas have been revegetated with coastal sage scrub. Sensitive species on-site include San Diego button celery (*E. aristulatum*), Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), Otay Mesa mint (*P. nudiuscula*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Clayton Parcel

The Clayton Parcel (J 2) vernal pools occur on the 17.24 acre parcel located northwest of Otay Mesa Road and Ocean View Hills intersection. Clayton was purchased for conservation by the City of San Diego in 2011 with funding from a USFWS Section 6 grant. The site is zoned for community shopping centers and is outside the MHPA. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP.

Nearby land uses include residential development, transportation, educational facilities, MHPA open space, a vernal pool preserve, and undeveloped land.

Thirty-five natural vernal pools and road ruts were mapped at the 17.24-acre site. San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni*) were present in 2003.

St. Jerome's

The St. Jerome's (J 2) vernal pools occur on the 18.44-acre parcel located northwest of the Otay Mesa Road and Ocean View Hills intersection. St. Jerome's is privately owned and is currently proposed for development. The site is zoned for community commercial that allows for a shopping center including retail, civic, service, and office uses. The site is outside the MHPA. Nearby land uses include residential development, transportation, educational facilities, MHPA open space, a vernal pool preserve, and undeveloped land.

Twenty-four vernal pools and road ruts were mapped at the 18.44-acre site. Eighteen vernal pools are proposed for 100% conservation on 7.33 acres (see VPHCP, Covered Projects). Stockpen gravelly clay loam and Olivenhain cobbly loam support nonnative grasslands, ruderal vegetation, and small areas of disturbed coastal sage scrub. Stockpen gravelly clay loam and Olivenhain cobbly loam support nonnative grasslands, ruderal vegetation, and small areas of disturbed coastal sage scrub. San Diego fairy shrimp (*Branchinecta sandiegonensis*) and Riverside fairy shrimp (*Streptocephalus woottoni*) were present in 2003.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the J 2 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Cal Terraces (North) and Otay Mesa Road Parcels	100	304	3.53	PONU (286) NAFO (79) ERAR (275) ORCA (52) RFS (93) SDFS (209)	RFS SDFS NAFO
	Clayton Parcel	100	35	0.27	ERAR (1) SDFS (2)	RFS SDFS NAFO
	St. Jerome's	0	6	0.23	NONE	RFS SDFS NAFO
		100	18	0.18	RFS (3) SDFS (1)	RFS SDFS NAFO

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Baseline	Cal Terraces (North) and Otay Mesa Road Parcels	100	304	3.53	PONU (286) NAFO (79) ERAR (275) ORCA (52) RFS (93) SDFS (209)	RFS SDFS NAFO
	Clayton Parcel	100	35	0.27	ERAR (1) SDFS (2)	RFS SDFS NAFO
	St. Jerome's	0	24	0.41	<i>RFS (3)</i> <i>SDFS (1)</i>	<i>RFS</i> <i>SDFS</i> <i>NAFO</i>
Expanded Alternative	Cal Terraces (North) and Otay Mesa Road Parcels	100	304	3.53	PONU (286) NAFO (79) ERAR (275) ORCA (52) RFS (93) SDFS (209)	RFS SDFS NAFO
	Clayton Parcel	100	35	0.27	ERAR (1) SDFS (2)	RFS SDFS NAFO
	St. Jerome's	0	6	0.23	<i>NONE</i>	<i>RFS</i> <i>SDFS</i> <i>NAFO</i>
		100	18	0.18	RFS (3) SDFS (1)	RFS SDFS NAFO

PONU = Otay Mesa mint

RFS = Riverside fairy shrimp

SDFS = San Diego fairy shrimp

Italics = Outside Project Preserve area or outside City jurisdiction.

ORCA = California Orcutt grass

NAFO = spreading navarretia

ERAR = San Diego button-celery

Threats

Cal Terraces [North], Otay Mesa Road Parcels

Edge Effects

The restoration sites are adjacent to an existing industrial park/warehouse complex and a high-traffic roadway, and litter and nonnative species from the developed area may impact the preserve. However, the site is fenced and is also connected to a large open space/MHPA area, including additional vernal pool sites, which minimizes impacts from isolation.

Fire and Fire Suppression

Cal Terraces is part of the larger Dennery Canyon open space system that may be subject to fire in the future. The sensitive species at this site have evolved in natural fire regimes and are not

expected to be impacted in the case of fire. Fencing, bollards, and K-rails have been installed and would likely prevent fire suppression impacts occurring in this area.

Trespass

The potential for trespassing at this site has been lowered through the installation of fencing and signage. However, limited impacts from foot traffic may occur.

Litter

With the installation of secure fencing and signage, the threat of litter is primarily from the traffic (vehicle and foot) along the Otay Mesa Road.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Prior to restoration, nonnative invasive species were introduced through disturbance such as off-road vehicle use. Both uplands and vernal pools were revegetated in accordance with the approved mitigation plan, which included thresholds for tolerance of nonnative species (based on relative total cover) and mechanisms for removal, as necessary. *Chrysanthemum* spp. was observed invading adjacent sites in 2005 and may represent a threat to this site.

Clayton Parcel

Edge Effects

The site is adjacent to the St. Jerome's site along the south boundary, Oceanview Hills Boulevard bounds the site to the west and north, and existing and proposed development is located to the west and northeast of the site. The MHPA is located across Oceanview Hills Boulevard on the southeast portion of the site. This site has potential threats from edge effects from adjacent nonnative landscaping and trash accumulation.

Fire and Fire Suppression

The Clayton vernal pools are located between Dennery Canyon and residential and educational developments. The site may be disrupted by fire suppression activities in the event of a canyon fire, and the developed nature of much of the surrounding areas would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited to foot-traffic, although the area was historically impacted by off-road vehicles.

Litter

The site may be impacted by wind-blown trash and litter from trespassers.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at Clayton.

St. Jerome's

Edge Effects

The site is adjacent to the conserved Clayton Parcel on the north boundary and by Otay Mesa Road to the south, Oceanview Hills Boulevard on the east, and housing development to the west. This site has potential threats from edge effects such as adjacent nonnative landscaping and trash accumulation.

Fire and Fire Suppression

The St. Jerome's vernal pools are located between Dennery Canyon and residential and educational developments. The site might be disrupted by fire suppression activities in the event of a canyon fire, and the developed nature of much of the surrounding area would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited to foot traffic, as most of the access for illegal off-road activity has been eliminated.

Litter

The site may be impacted by wind-blown trash and litter from trespassers.

Topographic Disturbance

This complex has damage remaining from historical off-road activity that has affected the vernal pool hydrological functions, ponding characteristics, and flow patterns.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at St. Jerome's.

Current Management Activities

Cal Terraces [North], Otay Mesa Road Parcels

The contractual obligations contained in the *Dennery Canyon Vernal Pool, Coastal Sage Scrub, and Mule Fat Scrub Restoration and Preservation Plan* (RECON 1997) has been fulfilled. As

stated in the plan, upon establishment of a long-term management fund, the property and management obligation will be the responsibility of the City of San Diego.

As part of the project, the site has been fenced with permanent chain-link and off-road vehicle deterrent fencing and appropriate signage has been posted.

The contractual obligations contained in the *Otay Mesa Road Vernal Pool Mitigation Plan* (Helix 1998) and the Biological Opinion 1-6-97-F-20 have been fulfilled, including topographic reconstruction, fencing, and signage. The land is managed by the City Park and Recreation Department.

The contractual obligations contained in the *City of San Diego Vernal Pool and Coastal Sage Scrub Restoration and Preservation Plan on Otay Mesa* (RECON 1998) have been fulfilled. Long-term maintenance will be performed as required, in accordance with natural open space maintenance procedures established by the City of San Diego.

As part of the project, the site has been fenced with permanent chain-link and appropriate signage has been posted.

Clayton Parcel

Stewardship management at Clayton is conducted by the City Park and Recreation Department.

St. Jerome's

The draft *Vernal Pool, Habitat Planning, and Mitigation Plan* was prepared by J. Whalen Associates, Inc. in July 2008 for the proposed St. Jerome's Parish. The proposed project includes activities for on-site and off-site mitigation to restore and enhance vernal pools and permanent stewardship of restored pools.

Implementation of the draft *Vernal Pool, Habitat Planning, and Mitigation Plan* would require preparation of a Property Analysis Record (PAR) or equivalent analysis including assumptions that funds for restoration and enhancement would be provided by St. Jerome Parish as well as funding for the long-term management of restored vernal pools. The project is currently being reassessed and may or may not include a Catholic parish. Any revised or new proposal would require similar measures including a mitigation/restoration plan and a funded long-term management plan consistent with ESL, City's Biology Guidelines, and the VPHCP.

Vernal Pool HCP Management Requirements¹

Cal Terraces (North), Otay Mesa Road Parcels, Clayton Parcel

The following tasks in Management Level 1 are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

St. Jerome's

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

Cal Terraces [North], Otay Mesa Road Parcels

As part of the restoration and management of these individual parcels, these sites have separate fencing that overlaps and restricts access and wildlife movement between the parcels. This internal fencing between the parcels is providing no benefit and should be removed to improve habitat connectivity and wildlife movement between the parcels.

Clayton Parcel

The following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-3 (hand, mechanical and/or herbicide application).
- Conduct a seed collection/bulking program for *Eryngium aristulatum* and *Navarretia fossalis*. Under Management Level 3, off-site seed collection may be considered.
- Conduct cyst collection and inoculation as needed.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

St. Jerome's

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 discussed below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and VPHCP.

Management Level 3 and the following list of tasks are recommended for the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.
 - Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*) and Riverside fairy shrimp (*S. woottoni*) as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 4-5 (Robinhood Ridge; California Crossings)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Robinhood Ridge)
2. Establish, protect and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia, Otay Mesa mint, and Riverside fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of these species on a range-wide basis. (Robinhood Ridge; California Crossings – establish populations)
3. Establish, protect and manage existing vernal pools and their associated watersheds currently occupied by Orcutt’s grass complexes within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Robinhood Ridge and California Crossings – establish populations)
4. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis. (Robinhood Ridge, California Crossings)

Management Level: Level 2: Robinhood Ridge
None: California Crossings

Ownership: City of San Diego: Robinhood Ridge
Private (Otay Mesa LLC): California Crossings

Management Responsibility: City of San Diego Park and Recreation Department: Robinhood Ridge
Private: California Crossings

Management Goal

The management goal for California Crossing and Robinhood Ridge is to contribute to the recovery of the habitat conditions and covered species population status consistent with the Management Recommendations by conducting all Management Level 2 recommended activities.

Complex Description

Robinhood Ridge

Robinhood Ridge (J 4) is a City-owned Otay Mesa site along the eastern edge of Dennery Canyon near Vista San Isidro. This site is on the border of Multi-Family Residential and Open Space land use zones, and is conserved; nearby land uses include open space and MHPA (including the Robinhood Ridge Vernal Pool Preserve), transportation, and residential development.

Eighty-three vernal pools were mapped at Robinhood Ridge. Soils for the site include Stockpen gravelly clay loam and upland vegetation is characterized by patchy Diegan coastal sage scrub. *Branchinecta* spp. were present in 2003.

Although considered separately here due to ownership and conservation status, California Crossings and Robinhood Ridge vernal pools are geographically related and part of the same complex and series. Extensive restoration has occurred at Robinhood Ridge while the California Crossing basins are in a natural and often disturbed state. The restoration efforts at Robinhood Ridge have resulted in establishing populations of Otay Mesa mint (*P nudiuscula*), spreading navarretia (*N. fossalis*), San Diego button celery (*E. aristulatum* spp. *Parishii*), Riverside fairy shrimp (*S. woottoni*), and San Diego fairy shrimp (*B. sandiegonensis*).

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiscula*), Orcutt's grass (*O. californica*), spreading navarretia (*N. fossalis*), San Diego fairy shrimp (*B. sandiegonensis*) and Riverside fairy shrimp (*S. woottonii*), by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

California Crossings

California Crossings (J 4) is a privately owned Otay Mesa site along the eastern edge of Dennery Canyon near Vista San Isidro. This site is on the border of Multi-Family Residential and Open Space land use zones, and has not been conserved; nearby land uses include open space and

MHPA (including the Robinhood Ridge Vernal Pool Preserve), transportation, and residential development.

As discussed above, California Crossings and Robinhood Ridge vernal pools are geographically related and part of the same complex and series. Eleven vernal pools were mapped at California Crossings. Soils for the site include Stockpen gravelly clay loam and upland vegetation is characterized by patchy Diegan coastal sage scrub. *Branchinecta* spp. were present in 2003.

California Crossings is privately owned and is located outside of the MHPA. A portion of the site has been used for mitigation for a County project. The vernal basins are located on the southwest perimeter of the parcel adjacent to conserved open space areas. If development is proposed within the remaining portion of the parcel, the City’s MHPA Land Adjacency Guidelines would be required to ensure indirect impacts would not occur to the preserved area.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 4 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Robinhood Ridge	100	83	0.56	PONU (19) NAFO (4) ERAR (46) RFS (6) SDFS (41)	RFS SDFS NAFO
	California Crossing	100	11	0.09	SDFS (5)	RFS SDFS
Baseline	Robinhood Ridge	100	83	0.56	PONU (19) NAFO (4) ERAR (46) RFS (6) SDFS (41)	RFS SDFS NAFO
	California Crossing	100	11	0.09	SDFS (5)	RFS SDFS
Expanded Alternative	Robinhood Ridge	100	83	0.56	PONU (19) NAFO (4) ERAR (46) RFS (6) SDFS (41)	RFS SDFS NAFO
	California Crossing	100	11	0.09	SDFS (5)	RFS SDFS

PONU = Otay Mesa mint ERAR = San Diego button-celery SDFS = San Diego fairy shrimp
 NAFO = Spreading navarretia RFS = Riverside fairy shrimp

Threats

Robinhood Ridge

Edge Effects

Both portions of J 4 are adjacent to an existing industrial complex and residential housing. Litter and nonnative species from the developed area may impact the preserve. However, the site is fenced and is also connected to a large open space/MHPA area, including additional vernal pool sites, which minimizes impacts from isolation.

Trespass

Trespass is generally limited to foot traffic, although the area was historically impacted by off-road vehicles.

Litter

The site may be impacted by wind-blown trash and litter from trespassers. The impact of trash dumping has been minimized through the development of nearby residential neighborhoods.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at J 4.

California Crossing

Edge Effects

Both portions of J 4 are adjacent to an existing industrial complex and residential housing. Litter and nonnative species from the developed area may impact the preserve. However, the site is fenced and is also connected to a large open space/MHPA area, including additional vernal pool sites, which minimizes impacts from isolation.

Fire and Fire Suppression

The J 4 vernal pools are located between Dennery Canyon and residential neighborhoods. The site might be disturbed as the result of fire suppression activities in the event of a canyon fire, and the developed nature of much of the surrounding area would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited to foot traffic, although the area was historically impacted by off-road vehicles.

Litter

The site may be impacted by wind-blown trash and litter from trespassers. The impact of trash dumping has been minimized through the development of nearby residential neighborhoods.

Topographic Disturbance

While a portion of the J 4 complex has had some topographic reconstruction, historical off-road disturbance is still present in some areas and may be resulting in an altered hydrological system, inundation levels, and flow patterns for portions of the site.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at J 4.

Current Management Activities

Robinhood Ridge

The U.S. Fish and Wildlife Service issued a Biological Opinion 1-6-97-F-57 in February 1998 through a Section 7 consultation for the U.S. Army Corps of Engineers Section 404 Permit. The Biological Opinion permitted incidental take of Riverside fairy shrimp, San Diego fairy shrimp, San Diego button-celery, Otay Mesa mint, and spreading navarretia for the Robinhood Ridge project (VTM/PRD 86-1014, LDR 98-0189) for impacts to 404 square feet of vernal pools and 2,950 square feet of road rut vernal pools.

The *Robinhood Ridge Vernal Pool Mitigation Plan* (Helix 1998) was accepted by the permitting agencies as mitigation for vernal pool impacts. The plan required translocation of soils from impacted basins, preservation of 4,714 square feet of vernal pools and restoration/creation of 3,354 square feet of vernal pool basins that are disturbed to two on-site preserves. Biological mitigation was completed to the satisfaction of the permitting agencies, and subsequently the site was dedicated in fee title to the City of San Diego for continued long-term preserve management.

California Crossing

No known management.

Vernal Pool HCP Management Requirements¹

Robinhood Ridge

The following tasks in Management Level 2 shall be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

California Crossing

Permittee is responsible to implement the management requirements per permit issued by the County.

Management Recommendations²

Robinhood Ridge

Management Level 2 tasks are recommended for the complex.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct a seed collection/bulking program for spreading navarretia (*Navarretia fossalis*), if deemed appropriate.

California Crossing

If property comes into City ownership and/or under City jurisdiction, conduct an initial assessment to determine the appropriate Management Level. At a minimum, Management Level 1 activities would be required. If site has not been restored and is proposed for mitigation, Management Level 3 would be recommended for the complex:

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.
 - Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), Riverside fairy shrimp (*S. woottoni*) as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 11 E (Slump Block Pools)

Species-Specific Objectives:

1. Establish Orcutt's grass and Riverside fairy shrimp populations consistent with Recovery Plan (USFWS), and protect and manage occupied vernal pools to increase genetic diversity and population stability of these species within the VPHCP Plan Area.

Management Level: Level 2

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *enhance* the habitat conditions and focal species population status consistent with Management Recommendations in order to conduct all Management Level 2 recommended activities.

Complex Description

J 11 East is located on two privately owned parcels east of San Ysidro Boulevard near the Mexican border in Otay Mesa. The vernal pools are located within the MHPA and are not conserved. The site is zoned Open Space, and surrounding land uses include MHPA and non-MHPA open space and the U.S. border fence, with residential developments being proposed for areas to the north.

Two vernal pools were mapped in 2003. The basins occur in Olivenhain cobbly loam and upland vegetation is Diegan coastal sage scrub. San Diego fairy shrimp (*B. sandiegonensis*) was present at the site in 2003. Orcutt's grass (*O. californica*) was observed in 1986 (Bauder 1986) and Riverside fairy shrimp (*S. woottoni*) is historically known from these pools as well (no citation for this occurrence).

This area is often referred to as the "slump block" pools due to the mass settling of slopes that led to the formation of these basins. The average size of these vernal pools is significantly greater than other natural pools in San Diego because of this unique topography. The vegetation

at these basins is characterized by wetlands species, and the basins have been invaded by *Tamarisk* spp.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Orcutt’s grass (*O. californica*), Spreading navarretia (*N. fossalis*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*), by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 11 East complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Slump Block Pools	75	2	0.63	NONE	RFS
Baseline	Slump Block Pools	75	2	0.63	NONE	RFS
Expanded Alternative	Slump Block Pools	75	2	0.63	NONE	RFS

RFS = Riverside fairy shrimp

Threats

Edge Effects

Development of southern Otay Mesa may isolate the J 11 East vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 11 East vernal pools are located in an open space area. The site might be disturbed as a result of fire suppression activities in the event of a canyon fire if defensible structures are developed in the vicinity.

Trespass

Impacts occur from recreational off-road vehicles, illegal immigrant traffic, and Border Patrol vehicles.

Litter

The site may be impacted by wind-blown debris, litter, itinerant encampments, and illegal dumping. Development of proposed residential neighborhoods around the site may either minimize or exacerbate these impacts.

Topographic Disturbance

The slump pools have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species such as *Tamarisk* spp. occur in the vernal pools basins.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 2 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level sited below and the City's Environmentally Sensitive Lands Ordinance (ESL) and VPHCP.

While this site has historical occurrences for both Orcutt's grass (*O. californica*) and Riverside fairy shrimp (*S. woottoni*), neither of these species have been recorded for over fifteen years and they may be extirpated from the complex. Recovery of these focal species populations at this complex is considered to be a desired action and not required so the management goal of this complex is the maintenance of the existing San Diego fairy shrimp (*B. sandiegonensis*) populations.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

Management Level 2 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application). Conduct a seed collection/bulking program.
- Under Management Level 2, off-site seed collection for Orcutt's grass (*O. californica*) may be considered based on the USFWS Recovery Plan (1998), the City's Vernal Pool Inventory (2004), and AECOM's knowledge of historical occurrences in San Diego.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 11 W (J 11 West)

Species-Specific Objectives:

1. Establish viable populations of Orcutt's grass consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.
2. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp and Riverside fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *restore* the habitat conditions and focal species population status consistent with Management Recommendations in order to conduct all Management Level 3 recommended activities.

Complex Description

J 11 West is located on two privately owned parcels (a total of 101.3 acres) east of San Ysidro Boulevard near the Mexican border in Otay Mesa. The vernal pools are located within the MHPA and are not conserved. These sites are zoned Open Space, and surrounding land uses include MHPA and non-MHPA open space and the U.S. border fence, with residential developments being proposed for areas to the north.

Five vernal pools were mapped in 2003. The basins occur in Olivenhain cobbly loam and are surrounded by Diegan coastal sage scrub. Little moustail (*M. minimus*) and San Diego fairy shrimp (*B. sandiegonensis*) were present in 2003.

The J 11 West basins, along with the J 11 East basins, are often referred to as the “slump block” vernal pools due to the mass settling of slopes that led to their formation. The average size and depth of these vernal pools is significantly greater than other natural pools in San Diego because of their unique origin. The vegetation at these basins tends to favor long inundation and true wetlands species, and the basins have been invaded by *Tamarisk* spp.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Orcutt’s grass (*O. californica*), Spreading navarretia (*N. fossalis*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*), by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 11 West complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	J 11 West	75	5	0.49	SDFS(1) RFS (1)	RFS
Baseline	J 11 West	75	5	0.49	SDFS(1) RFS (1)	RFS
Expanded Alternative	J 11 West	75	5	0.49	SDFS(1) RFS (1)	RFS

SDFS = San Diego fairy shrimp
RFS = Riverside fairy shrimp

Threats

Edge Effects

Development of lower Otay Mesa may isolate the J 11 West vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 11 West vernal pools are located in an open space area. The site might be disturbed by fire suppression activities in the event of a canyon fire if defensible structures are developed in the vicinity.

Trespass

Impacts occur from recreational off-road vehicles, immigrant traffic, and Border Patrol vehicles.

Litter

The site may be impacted by wind-blown debris, litter, itinerant encampments, and illegal dumping. Development of proposed residential neighborhoods around the site may either minimize or exacerbate these impacts.

Topographic Disturbance

The slump pools have suffered considerable off-road damage over the years, which has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. While this disturbance has been greatly reduced since the installation of the current border fence, the effects of the past disturbance continues to impact the hydrological function and health of these pools.

Invasive Species

Invasive species such as *Tamarisk* spp. occur in the vernal pool basins.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level sites below and the City's Environmentally Sensitive Lands Ordinance (ESL), Biology Guidelines, and VPHCP.

Management Level 3 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
- Conduct a seed collection/bulking program for Orcutt's grass (*Orcuttia californica*). Under Management Level 3, off-site seed collection may be considered.
- Conduct cyst collection and inoculation for Riverside fairy shrimp (*Streptocephalus woottoni*) based on the USFWS Recovery Plan (1998), the City's Vernal Pool Inventory (2004), and AECOM's knowledge of historical occurrences in San Diego.
- Conduct topographic reconstruction where appropriate.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 13 E (South Otay J 13 East)

Species-Specific Objectives:

1. Establish viable populations of Orcutt's grass, Otay Mesa mint, and Riverside fairy shrimp consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations for each site in order to conduct all Management Level 3 recommended activities.

Complex Description

J 13 East is located on a 163-acre private parcel in Spring Canyon in Otay Mesa. Two of the vernal pools are located within the MHPA and the site is not conserved. The parcels are zoned Residential and Open Space, and surrounding land uses include MHPA and non-MHPA open space. J 12 is located on the same parcel.

Five vernal pools occur at this complex. The basins occur in Olivenhain cobbly loam and Hueruero loam, and upland vegetation is nonnative grasslands and coastal sage scrub. San Diego button celery (*E. aristulatum*) was observed at J 13 East in 2003 while Orcutt's grass (*O. californica*) was not relocated after 1986.

The site has been historically impacted by cattle, border traffic, and Border Patrol activities (Bauder 1986). Currently, the cattle have been removed but impacts from border enforcement and off-road vehicles continue.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Orcutt’s grass (*O. californica*), Spreading navarretia (*N. fossalis*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*), by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 13 East complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	South Otay J 13 E	75	2	0.01	ERAR (1)	SDFS RFS
		100	6	0.05	NONE	SDFS RFS
Baseline	South Otay J 13 E	75	2	0.01	NONE	SDFS RFS
		0	6	0.05	ERAR (1)	SDFS RFS
Expanded Alternative	South Otay J 13 E	75	2	0.01	ERAR (1)	SDFS RFS
		100	6	0.05	NONE	SDFS RFS

ERAR = San Diego button-celery
 SDFS = San Diego fairy shrimp
 RFS = Riverside fairy shrimp

Threats

Edge Effects

Development of lower Otay Mesa may isolate the J 13 East vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 13 East vernal pools are located in a currently undeveloped area. The site might be disturbed by fire suppression activities in the event of a fire if defensible structures are developed in the vicinity.

Trespass

Impacts occur from recreational off-road vehicles, foot traffic, and Border Patrol vehicles.

Litter

The site may be impacted by wind-blown debris, dumping, litter, and itinerant encampments. Development of proposed nearby residential neighborhoods may minimize these impacts.

Topographic Disturbance

The slump pools have suffered considerable off-road damage over the years which has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. While this disturbance has been greatly reduced since the installation of the current border fence, the effects of the past disturbance continues to impact the hydrological function and health of these pools.

Invasive Species

Invasive species occur in the upland areas and the vernal pools basins.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below. For sites located outside of the MHPA, it is anticipated that the mitigation would occur within the southwest Otay Mesa vernal pool preserve areas that have been identified and added to the MHPA as part of the VPHCP process.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 3 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level sited below and the City's Environmentally Sensitive Lands Ordinance (ESL) and VPHCP.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

Management Level 3 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
- Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Orcutt's grass (*O. californica*) and San Diego button celery (*E. aristulatum*) may be considered based on the USFWS Recovery Plan (1998), the City's Vernal Pool Inventory (2004), and AECOM's knowledge of historical occurrences in San Diego.
- Conduct cyst collection and inoculation for Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 13 N (South Otay 1 acre [City])

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, spreading navarretia, and Orcutt's grass within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis (South Otay 1 acre [City]).
2. Establish viable populations of Otay Mesa mint consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal of this complex is to *restore* the habitat conditions and focal species populations consistent with the Management Recommendations by conducting all Management Level 3 recommended activities.

Complex Description

J 13 North is located on the mesa between Spring Canyon and Dennery Canyon in Otay Mesa. Four parcels, approximately 1 acre each and containing seven vernal pools, were managed by The Environmental Trust prior to bankruptcy proceedings; these parcels are now owned and managed by the City of San Diego Park and Recreation Department. Through a Federal Section Six Grant and City funds, the City has acquired an additional eight one-acre parcels with the goal of establishing a vernal pool preserve in this location. These conserved parcels have been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the bankruptcy settlement and grant requirements, no development would be allowed within these parcels.

The remaining vernal pools at J 13 North are not conserved. The area is zoned for multi- and single-family residential development. Surrounding land uses include MHPA and non-MHPA open space, with residential developments being proposed for adjacent and northern parcels. The basins occur in Olivenhain cobbly loam and Hueruero loam, and upland vegetation is nonnative grasslands and coastal sage scrub.

The J 13N vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Spreading navarretia (*N. fossalis*), Orcutt’s grass (*O. californica*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 13 North complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	NDU 1 & 2	0	13	0.07	NAFO (1) ERAR (2) SDFS (13)	NONE
	South Otay 1 Acre (City)	100	17	0.22	NAFO (1) ERAR(1) ORCA (1)	NONE
	South Otay 1 Acre (Private)	0	7	0.02	NONE	NONE
Baseline	NDU 1 & 2	0	13	0.07	NAFO (1) ERAR (2) SDFS (13)	NONE
	South Otay 1 Acre (City)	100	17	0.22	NAFO (1) ERAR(1) ORCA (1)	NONE
	South Otay 1 Acre (Private)	0	7	0.02	NONE	NONE
Expanded Alternative	NDU 1 & 2	0	13	0.07	NAFO (1) ERAR (2) SDFS (13)	NONE
	South Otay 1 Acre (City)	100	17	0.22	NAFO (1) ERAR(1) ORCA (1)	NONE
	South Otay 1 Acre (Private)	75	7	0.2	NONE	NONE

NAFO =Spreading navarretia; ERAR =San Diego button-celery; ORCA =California Orcutt grass; SDFS =San Diego fairy shrimp

Threats

Edge Effects

Development of adjacent privately owned parcels may isolate the J 13 North vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 13 North vernal pools are located in a currently undeveloped area. The site might be disturbed as a result of fire suppression activities in the event of a fire if defensible structures are developed in the vicinity.

Trespass

Impacts occur from recreational off-road vehicles, immigrant traffic, and Border Patrol vehicles.

Litter

The site may be impacted by wind-blown debris, dumping, litter, and itinerant encampments. Development of proposed residential neighborhoods around the site may limit the occurrences of these impacts.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years which has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species occur in both the upland areas and vernal pool basins.

Current Management Activities

City of San Diego Park and Recreation Department Open Space Division is conducting stewardship management for City-owned parcels. As part of the Federal Section Six Grant and bankruptcy settlement, funding for management activities has been placed into two City special funds designated for this purpose. The City may also seek grant funding to implement the Management Requirements.

Some parcels in this complex are privately held and owners may seek development entitlement in the future. During the development entitlement process associated with the Southwest Specific Planning Area and future individual projects, the City will ensure the property owners implement the Management Recommendations activities as identified below. For sites located outside of the MHPA, it is anticipated that the mitigation would occur within the southwest Otay Mesa

vernal pool preserve areas that have been identified and added to the MHPA as part of the VPHCP process.

Vernal Pool HCP Management Requirements¹

Management Level 1:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program.
- Conduct cyst collection and inoculation for Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation if necessary.
- Conduct topographic reconstruction where appropriate.

Management Recommendations²

If parcels are developed in the future, require preparation of a management plan that includes all Management Level 1 activities would as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level sited below and the City's Environmentally Sensitive Lands (ESL), Biology Guidelines, and VPHCP.

The following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 recommended activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct cyst collection and inoculation for Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation if necessary.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 13 S (South Otay J 13 South; Bachman, NDU 1 & 2)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis. (South Otay J 13 South)
2. Establish viable populations of Orcutt's grass and Otay Mesa mint consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3: South Otay J 13 S/eastern mesa; Bachman
None: South Otay: J 13 S/western mesa; NDU 1 & 2

Ownership: Private: South Otay J 13 S, Bachman, NDU 1 & 2

Management Responsibility: Private: South Otay J 13 S, Bachman, NDU 1 & 2

Management Goal

The management goal of this complex is to *restore* the habitat conditions and focal species populations consistent with the Management Recommendations in order to conduct all Management Level 3 recommended activities.

Complex Description

South Otay J 13 South, NDU 1 & 2 and Bachman

The parcels within these complexes are located within the Southwest Village of the Otay Mesa community planning area. J 13 South is located on 11 private parcels covering approximately 494 acres on the mesa between Spring Canyon and Dennery Canyon in Otay Mesa. NDU 1 & 2 includes 5 parcels covering approximately 80 acres. The portion of the Bachman parcel within the Southwest Village area covers approximately 8 acres. These vernal pools are not conserved

and are located outside of the MHPA. J 13 South is zoned for residential, elementary schools, and active parks; surrounding land uses include undeveloped lands.

The vernal pool basins occur in the Hueruero loam soil series and upland vegetation is primarily nonnative grasslands on the mesa with coastal sage scrub in canyons. San Diego button celery (*E. aristulatum*) and *Branchinecta* spp. were observed in 2003, and Orcutt’s grass (*O. californica*) was observed in 2007. As part of the adoption of the VPHCP, approximately 39 acres located on the eastern mesa top within the Southwest Village would be added to the expanded MHPA. It is anticipated that vernal pool restoration, enhancement, and long-term management and monitoring would occur within this preserve area as mitigation for impacts to vernal pools and/or road pools located outside of the MHPA.

Historically, the site was subject to pressure from grazing and land squatters, while current impacts are generally related to off-road vehicles, Border Patrol vehicles, and immigrant traffic.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Orcutt’s grass (*O. californica*), Spreading navarretia (*N. fossalis*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*), by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 13 South complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	NDU 1&2	0	4	0.21	SDFS (2)	NONE
	Bachman	100	2	0.01	NONE	SDFS NAFO
	South Otay J 13S	0	36	0.58	ERAR (7)	NONE
		100	3	0.01	NONE	NONE
Baseline	NDU 1&2	0	4	0.21	SDFS (2)	NONE
	South Otay J 13S	0	39	0.58	ERAR (7)	NONE
	Bachman	0	2	0.01	NONE	SDFS NAFO

Expanded Alternative	NDU 1&2	0	4	0.21	SDFS (2)	NONE
	Bachman	100	2	0.01	NONE	SDFS NAFO
	South Otay J 13S	0	2	0.01	NONE	NONE
		75	34	0.56	ERAR (7)	NONE
		100	3	0.01	NONE	NONE

SDFS = San Diego fairy shrimp
ERAR = San Diego button-celery
NAFO = spreading navarretia

Threats

South Otay J 13 South, NDU 1 & 2 and Bachman

Edge Effects

Development of Southwest Village may isolate the J 13 South, NDU 1 & 2, and Bachman vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 13 South, NDU 1 & 2, and Bachman vernal pools are located in a currently undeveloped area. The site might be impacted by emergency fire suppression efforts in the event of a fire if defensible structures are developed in the vicinity.

Trespass

Impacts occur from recreational off-road vehicles, immigrant traffic, and Border Patrol vehicles.

Litter

The site may be impacted by wind-blown debris, dumping, litter and itinerant encampments. In addition, existing vacant structures remain on portions of the site. Development of proposed nearby residential neighborhoods may alter the pattern of these impacts.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species occur both in upland areas and in the vernal pool basins.

Current Management Activities

South Otay J 13 South, NDU 1 & 2 and Bachman

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

South Otay J 13 South, NDU 1 & 2 and Bachman

These sites are privately held and owners may seek development entitlements in the future. During the development entitlement process associated with the Southwest Village Specific Planning Area, the City will ensure the property owner implements the Management Recommendations activities as identified below. For sites located outside of the MHPA, it is anticipated that the mitigation would occur within the southwest Otay Mesa vernal pool preserve areas that have been identified and added to the MHPA as part of the VPHCP process.

Management Recommendations²

South Otay J 13 South, NDU 1 & 2 and Bachman

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 sited below and the City's Environmentally Sensitive Lands Regulations, (ESL), Biology Guidelines, and VPHCP.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O.*

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

californica), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.

- Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 14 (*Anderprises [City]; Cal Terraces [South]; Handler; Bachman*)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, Orcutt's grass, and Otay mesa mint within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Cal Terraces [South])
2. Establish viable populations of spreading navarretia, Orcutt's grass, San Diego mesa mint, and Riverside fairy consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.
3. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis. (Cal Terraces [South])

Management Level:

Level 1: Anderprises (City), Cal Terraces (South)

Level 3: Bachman, Handler

Ownership: City of San Diego: Anderprises (City), Cal Terraces (South)

Private: Bachman, Handler

Management Responsibility: City of San Diego Park and Recreation Department: Anderprises (City), Cal Terraces (South)

Private: Bachman, Handler

Management Goal

The management goal for Anderprises (City) and Cal Terraces (South) is to *maintain* existing habitat conditions and focal species population status by conducting all Management Level 1 recommended activities. The management goal for Handler and Bachman is to *restore* existing

habitat conditions and focal species population status consistent with the Site-specific Management Plan.

Complex Description

Cal Terraces (South)

At this complex, 107 acres are in the Cal Terraces (South) portion of the site which has been conserved pursuant to City Permit (DEP No. 86-1032 and LDR No. 88-1144) and Biological Opinion (1-6-95-F-35). Stockpen gravelly clay loam and Olivenhain cobbly loam supports nonnative grasses, ruderal vegetation, and disturbed coastal sage scrub. San Diego fairy shrimp (*B. sandiegonensis*) was observed in 2003.

Although considered separately here due to ownership and conservation status, the 905 basins and Cal Terraces vernal pools south of SR-905 are geographically related and part of the same complex and series (J 14). However, extensive restoration has occurred at Cal Terraces while the 905 vernal pools are in a natural and often disturbed state. Vernal pools in the J 14 complex have been identified as necessary for the reclassification of the federally listed San Diego button celery (*E. aristulatum*) and Spreading navarretia (*N. fossalis*) by the adopted *Recovery Plan of Vernal Pools in Southern California* (USFWS 1998) for these species.

Anderprises (City)

This portion of the site has a total of three pools located on the parcel. These pools support both San Diego fairy shrimp (*B. sandiegonensis*) and Riverside fairy shrimp (*S. woottonii*).

Bachman

This portion of the parcel has a total of two pools. These pools do not support any focal species. Bachman is a privately owned site not currently proposing development.

Handler

In development of the Handler site, also known as Otay Mesa East, the City adopted a *Mitigated Negative Declaration* (PTS No. 3159) which required a Vernal Pool Management Plan to be implemented.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the J 14 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Brown Field Basins	100	4	0.83	NONE	NONE
	Anderprises (City)	100	2	0.01	NONE	NONE
	Bachman	75	2	0.02	NONE	RFS SDFS
	Cal Terraces (South)	100	73	1.45	PONU (63) NAFO (6) ERAR (55) ORCA (5) RFS (26) SDFS (32)	RFS SDFS NAFO
	Handler	100	24	0.07	NONE	RFS SDFS
Alt 1	Brown Field Basins	100	4	0.83	NONE	NONE
	Anderprises (City)	100	2	0.01	NONE	NONE
	Bachman	75	2	0.02	NONE	RFS SDFS
	Cal Terraces (South)	100	73	1.45	PONU (63) NAFO (6) ERAR (55) ORCA (5) RFS (26) SDFS (32)	RFS SDFS NAFO
	Handler	0	24	0.07	NONE	RFS SDFS
Alt 2	Brown Field Basins	100	4	0.83	NONE	NONE
	Anderprises (City)	100	2	0.01	NONE	NONE
	Bachman	75	2	0.02	NONE	RFS SDFS
	Cal Terraces (South)	100	73	1.45	PONU (63) NAFO (6) ERAR (55) ORCA (5) RFS (26) SDFS (32)	RFS SDFS NAFO
	Handler (City)	100	24	0.07	NONE	RFS SDFS

PONU = Otay Mesa mint
 NAFO = spreading navarretia
 ERAR = San Diego button-celery

ORCA = California Orcutt grass
 RFS = Riverside fairy shrimp
 SDFS = San Diego fairy shrimp

Threats

Anderprises (City)

Edge Effects

While many of the basins are in areas with open space adjacent, SR-905 and Otay Mesa Road are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

This site might be impacted by fire and/or fire suppression activities if defensible structures are built in the vicinity.

Trespass

Impacts from trespass occur both from foot traffic and off-road vehicle use.

Litter

The site may be impacted by wind-blown debris, motorist litter from Otay Mesa Road, and illegal dumping.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species occur in both upland and vernal pool habitats at this site.

Cal Terraces (South)

Edge Effects

While many of the basins are in areas with open space adjacent, SR-905 and Otay Mesa Road are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

This site may be impacted by fire and/or fire suppression activities if defensible structures are built in the vicinity.

Trespass

Impacts from trespass occur from foot traffic but a cable barrier around the site protects it from vehicle access or damage.

Litter

The site may be impacted by wind-blown debris, motorist litter from Otay Mesa Road, and illegal dumping.

Topographic Disturbance

The vernal pools at this complex have been restored in hydrologic connection, flow patterns, and inundation characteristics so no current topographic disturbance exist on the portion of the complex site.

Invasive Species

There are low levels of invasive species that occur in both upland and vernal pool habitats at this site.

Bachman

Edge Effects

While many of the basins are in areas with open space adjacent, SR-905 and Otay Mesa Road are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

This site might be impacted by fire and/or fire suppression activities if defensible structures are built in the vicinity.

Trespass

Impacts from trespass occur both from foot traffic and off-road vehicle use.

Litter

The site may be impacted by wind-blown debris, motorist litter from Otay Mesa Road, and illegal dumping.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species occur in both upland and vernal pool habitats at this site.

Handler

Edge Effects

While many of the basins are in areas with open space adjacent, SR-905 and Otay Mesa Road are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

This site might be impacted by fire and/or fire suppression activities if defensible structures are built in the vicinity.

Trespass

Impacts from trespass occur both from foot traffic and off-road vehicle use.

Litter

The site may be impacted by wind-blown debris, motorist litter from Otay Mesa Road, and illegal dumping.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. While the pools at the Cal Terraces (South) site have been topographically repaired, the remainder of the pools have substantial topographic disturbance.

Invasive Species

Invasive species occur in both upland and vernal pool habitats at all the sites except the Cal Terraces (South).

Current Management Activities

Anderprises (City)

This site is currently managed at a stewardship level by the City, Park and Recreation Department Open Space Division consistent with the MSCP.

Cal Terraces (South)

The contractual obligations contained in the *Dennery Canyon Vernal Pool, Coastal Sage Scrub, and Mule Fat Scrub Restoration and Preservation Plan* (RECON 1997) has been fulfilled. As stated in the plan, upon establishment of a long-term management fund, the property and management obligation will be the responsibility of the City of San Diego.

As part of the project, the site has been fenced with permanent chain-link and off-road vehicle deterrent fencing and appropriate signage has been posted.

Bachman

There are currently no management activities occurring.

Handler

Upon issuance of the grading permit and in accordance with the *Mitigated Negative Declaration* (Project/PTS No. 3159), a Vernal Pool Management Plan shall be implemented that requires the owner/permittee to provide, in perpetuity, the following maintenance activities coordinated by a qualified vernal pool biological monitor:

- Weed control
- Construction/repair of fencing and signage
- Trash and debris removal
- Remedial measures
- General maintenance (2x/year)
- Monitoring visits (4x/year)
- Annual reporting

The project also requires a conveyance of easement or dedication to the City of the vernal pool resources on the Handler parcel. Consistent with the approved project, this area has been identified as a 100% hardline preserve area pursuant to the adoption of the VPHCP.

Vernal Pool HCP Management Requirements¹

Anderprises (City)

The following tasks in Management Level 1 are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Cal Terraces (South)

The following tasks in Management Level 1 are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Bachman

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Handler

Upon issuance of a grading permit for the Otay Mesa East EOT project, the City will require implementation of the site-specific vernal pool plan in accordance with *Mitigated Negative Declaration* (Project/PTS No. 3159) as discussed above.

Management Recommendations²

Anderprises (City)

None.

Cal Terraces (South)

None.

Bachman

If parcels are developed in the future, require preparation of a management plan that includes all Management Level 1 activities as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 sited below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and VPHCP.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for spreading navarretia (*N. fossalis*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered based on the USFWS Recovery Plan (1998), the City's Vernal Pool Inventory (2004), and AECOM's knowledge of historical occurrences in San Diego.
 - Conduct cyst collection and inoculation as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

Handler

None.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 16-18 (Goat Mesa [Private], Goat Mesa [City], Wruck Canyon)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Goat Mesa [City])
2. Establish viable populations of spreading navarretia consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.
3. Establish viable populations of Orcutt's grass consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area area and, in doing so, contribute to recovery of the species on a range-wide basis.
4. Establish viable populations of Otay Mesa mint consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area area and, in doing so, contribute to recovery of the species on a range-wide basis.
5. Protect and manage existing vernal pool complexes and their associated watersheds currently occupied by Riverside fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP Plan Area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Goat Mesa [City])

Management Level: None (Goat Mesa [Private]), Level 1 (Goat Mesa [City]), Level 1 Wruck Canyon)

Ownership: Private (Goat Mesa [Private]), City of San Diego (Goat Mesa/Wruck Canyon)

Management Responsibility: City of San Diego: Public Utilities Department and Park and Recreation Department (Goat Mesa [City], Wruck Canyon)

Management Goal

The management goal of this complex is to *stabilize* the habitat conditions and focal species population status.

Complex Description

Goat Mesa (City)

Goat Mesa is a conserved site on three City-owned parcels (totaling 99 acres) in the Spring Canyon area of Otay Mesa along the U.S. border with Mexico. The site is within the MHPA and is designated open space; surrounding land uses include open space, undeveloped land, and the international border. Residential developments have been proposed for several nearby parcels.

Historically, the site was subject to pressure from grazing and land squatters, while current impacts are generally related to off-road vehicles, Border Patrol vehicles, and immigrant traffic.

The Goat Mesa vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following endangered and threatened species: *E. aristulatum*, *P. nudiuscula*, *N. fossalis*, *O. californica*, *B. sandiegonensis*, and *S. woottoni*.

Restoration – including topographic re-contouring, fencing, signage, dethatching, and species and cyst bank re-introduction – was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* Grant to restore vernal pool and Quino checkerspot butterfly habitat (*City of San Diego Vernal Pool and Quino Habitat Restoration Project Implementation Report*, AECOM 2010). Follow-up maintenance work was performed in 2010, and an additional 3200-feet of fencing paid for by the City’s Public Utilities Department was installed in 2014.

Goat Mesa (Private)

This is a private 1-acre parcel is surrounded by the City-owned parcels described above. The site is within the MHPA and is designated open space; surrounding land uses include open space, undeveloped land, and the international border. Residential developments have been proposed for several nearby parcels. Historically, the site was subject to pressure from grazing and land squatters, while current impacts are generally related to off-road vehicles, Border Patrol vehicles, and immigrant traffic.

The Goat Mesa vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following

endangered and threatened species: *E. aristulatum*, *P. nudiuscula*, *N. fossalis*, *O. californica*, *B. sandiegonensis*, and *S. woottoni*.

Wruck Canyon

Wruck Canyon is a 9.3-acre parcel located in the Spring Canyon area of Otay Mesa along the U.S. border with Mexico. This site was conserved as part of the Wruck Canyon conservation bank and was managed by The Environmental Trust prior to its bankruptcy. The site is now owned and managed by the City of San Diego Park and Recreation Department. The vernal pools are located inside the MHPA with surrounding land uses including open space, undeveloped land, and the international border.

Twenty-three vernal pools occur at this complex (six of which are in Wruck Canyon). The basins occur in Stockpen gravelly clay loam, and upland vegetation is primarily nonnative grasslands on the mesa with coastal sage scrub in finger canyons. *E. aristulatum* was observed in 2003.

The Wruck Canyon vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as a necessary to stabilize populations of the following endangered and threatened species: *E. aristulatum*, *P. nudiuscula*, *N. fossalis*, *O. californica*, *B. sandiegonensis*, and *S. woottoni*.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 16-18 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Goat Mesa (City)	75	2	0.01	Erar (4) Stwo (1)	Stwo Brsa
	Goat Mesa (Private)	100	15	0.34	NA	Stwo Brsa
	Wruck Canyon	100	6	0.02	NA	Stwo Brsa
Baseline	Goat Mesa (City)	75	2	0.01	Erar (4) Stwo (1)	Stwo Brsa
	Goat Mesa (Private)	100	21	0.35	NA	Stwo Brsa
	Wruck Canyon	100	6	0.02	NA	Stwo Brsa

Expanded Alternative	Goat Mesa (City)	75	2	0.01	Erar (4) Stwo (1)	Stwo Brsa
	Goat Mesa (Private)	100	21	0.35	NA	Stwo Brsa
	Wruck Canyon	100	6	0.02	NA	Stwo Brsa

Brsa = San Diego fairy shrimp
 Erar = San Diego button-celery
 Stwo = Riverside fairy shrimp
 N/A = not applicable

Threats

Goat Mesa (City)/Wruck Canyon/Goat Mesa (Private)

Edge Effects

Development of southern Otay Mesa may isolate J 16-18 from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 16-18 vernal pools are located in a currently undeveloped area. The site may serve as a staging area in the event of a fire if defensible structures are developed in the vicinity.

Trespass

Major impacts have occurred from recreational off-road vehicles, immigrant traffic, and Border Patrol vehicles.

Litter

Sites may be impacted by wind-blown debris, dumping, and litter.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. While most of the pools were topographically repaired at this site as part of restoration conducted in 2008–2009 (AECOM 2010), the remainder of the pools have substantial topographic disturbance.

Invasive Species

Invasive species occur in the upland areas and the vernal pool basins.

Current Management Activities

Goat Mesa (Private)

No management activities are occurring at this site

Goat Mesa/Wruck Canyon

This site is managed by the City of San Diego Park and Recreation Open Space Division and City of San Diego Public Utilities Metropolitan Water Division.

Vernal Pool HCP Management Requirements¹

Goat Mesa (Private)

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Goat Mesa/Wruck Canyon

Minimization of impacts from off-road vehicles, including Border Patrol, is the primary management objective. City of San Diego Public Utilities and Park and Recreation Department and *TransNet* EMP funds have been utilized for fencing, additional signage, and additional enforcement personnel.

Management Level 1:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Additional Management Recommendations²

Goat Mesa (Federal)

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

Goat Mesa (Private)

Management Level 1:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program.
- Conduct cyst collection and inoculation for Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation if necessary.
- Conduct topographic reconstruction where appropriate.

Goat Mesa/Wruck Canyon

- Continue the Conduct dethatching program begun with the *TransNet*-funded restoration.
- Conduct topographic reconstruction on basins that were not recontoured during the *TransNet*-funded restoration where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 20-21 (La Media ITS)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations in order to control all Management Level 3 recommended activities.

Complex Description

La Media ITS (J 20-21) is a 10-acre site located southwest of Siempre Viva Road and La Media Road in Otay Mesa. These vernal pools occur immediately adjacent to the U. S. border with Mexico, along a drainage near undeveloped lands and agriculture. The site is not conserved; it is zoned Light Industrial and is outside the MHPA. The site has been included in the VPHCP Vernal Pool Preserve Area.

Thirty-three vernal pools occur at the La Media ITS complex. Huerhuero loam underlies the vernal pools, and upland vegetation is disturbed nonnative grasslands. No sensitive species were present in 2003.

Six pools from the La Media ITS have San Diego fairy shrimp (*B. sandiegonensis*). San Diego button celery (*E. aristulatum*), Spreading navarretia (*N. fossalis*), and Otay Mesa mint (*P. nudiuscula*) were known to occur on this site prior to it being graded in the 1970s but are now considered extirpated from this site.

The La Media ITS vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as a necessary to stabilize populations of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Spreading navarretia (*N. fossalis*), Orcutt’s grass (*O. californica*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 20-21 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	La Media ITS	100	33	1.43	SDFS (6)	NONE
Baseline	La Media ITS	75	33	1.43	SDFS (6)	NONE
Expanded Alternative	La Media ITS	100	33	1.43	SDFS (6)	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

SR-905, adjacent roads, and the U. S. border with Mexico are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

These vernal pools are located in an undeveloped area along the U.S. border with Mexico. If defensible structures are developed in the future, the site might be impacted by emergency fire suppression activities in the event of a fire.

Trespass

Impacts occur from foot traffic and off-road vehicles.

Litter

The site may be impacted by wind-blown debris, litter, and dumping.

Topographic Disturbance

The vernal pools at this complex have been impacted by off-road damage, agricultural disking, and other physical impacts over the years which resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 3 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level 3 sited below and the City's Environmentally Sensitive Lands Ordinance (ESL).

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 recommended activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*) and Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 21 (La Media Swale South)

Species-Specific Objectives: None

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations in order to conduct all Management Level 3 recommended activities.

Complex Description

J 21 (La Media Swale South) is a 49-acre site located southwest of Siempre Viva Road and La Media Road in Otay Mesa. These vernal pools occur along a drainage near undeveloped lands and agriculture. The site is not conserved; it is zoned Light Industrial and is outside the MHPA. A portion of the site along the southern and western boundaries has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP.

Seven natural vernal pools were mapped at J 21. Huerhuero loam underlies the vernal pools, and upland vegetation is disturbed nonnative grasslands. No sensitive species were present in 2003.

The J 21 vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the J 21 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	La Media Swale South	100	7	0.21	NONE	NONE
Baseline	La Media Swale South	0	7	0.21	NONE	NONE
Expanded Alternative	La Media Swale South	100	7	0.21	NONE	NONE

Threats

Edge Effects

SR-905, adjacent roads, and the U. S. border with Mexico are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

These vernal pools are located in an undeveloped area along the international border. If defensible structures are developed in the future, the site might be impacted by emergency fire suppression activities in the event of a fire.

Trespass

Impacts occur from foot traffic and off-road vehicles.

Litter

The site may be impacted by wind-blown debris, litter, and dumping.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road damage over the years, which resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats.

Current Management Activities

No management activities are currently occurring at this site

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level 3 sited below and the City's Environmentally Sensitive Lands Ordinance (ESL), Biology Guidelines, and VPHCP.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 recommended activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.
 - Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*) as needed.
 - Conduct container plant propagation and installation where appropriate.
 - Conduct topographic reconstruction where appropriate.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 27 (Empire Center)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: None

Ownership: Private

Management Responsibility: Private (Robinhood III)

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 3 recommended activities.

Complex Description

J 27 is located on a 6.4-acre site northwest of the intersection of La Media Road and Airway Road in Otay Mesa. A Mitigated Negative Declaration (EQD No. 86-0526) was prepared for the project and required payment into the Vernal Pool Preservation Fund as mitigation for impacts to vernal pool habitat. In 1995, the USFWS issued Biological Opinion 1-6-96-F-3 which replaced this requirement with 5.5 acres of on-site preservation. Subsequently, the site was conserved via a conservation easement granted to The Environmental Trust (TET). TET was responsible for management of the site until filing for bankruptcy in 2005. The bankruptcy proceedings resulted in the site remaining under the ownership of Robinhood III. The Court required all TET parcels to record updated conservation easements granted to the State.

The site is zoned Specialty Commercial and is not within the MHPA. Adjacent land uses include agriculture, transportation, truck lots, and undeveloped lands (including MHPA). Residential and industrial developments are proposed adjacent and northern parcels. The site has been included

within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP and consistent with the Biological Opinion no development would be allowed within this site.

Ten vernal pools were mapped in 2003. The basins occur in Stockpen gravelly loam and Hueruero loam, and upland vegetation is nonnative grasslands. San Diego button celery (*E. aristulatum*) was observed in 2003.

The J 27 vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Spreading navarretia (*N. fossalis*), Orcutt’s grass (*O. californica*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 27 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Empire Center	100	10	0.23	ERAR (9)	NONE
Baseline	Empire Center	100	10	0.23	ERAR (9)	NONE
Expanded Alternative	Empire Center	100	10	0.23	ERAR (9)	NONE

ERAR = San Diego button-celery

Threats

Edge Effects

Development of southern Otay Mesa may isolate the J 27 vernal pools from surrounding open space and nearby vernal pool complexes.

Fire and Fire Suppression

The J 27 vernal pools are located in a currently undeveloped area. The site might be disturbed as a result of fire suppression activities, particularly if habitable structures are developed in the vicinity.

Trespass

Impacts occur from Border Patrol and recreational illegal off-road vehicles, and immigrant traffic.

Litter

The site may be impacted by wind-blown debris, dumping, litter, and itinerant encampments.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road and other damage over the years which resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species occur in both the upland areas and vernal pool basins.

Current Management Activities

Preservation at this site was required pursuant to Biological Opinion 1-6-96-F-3. This site is outside the MHPA and has been included within the proposed expanded MHPA. No long-term management was required as part of the Biological Opinion, nor is any management being required as part of VPHCP. The City may approach the property owner to discuss the management recommendations below.

Vernal Pool HCP Management Requirements¹

None. This site has been developed pursuant to prior approval by City of San Diego and prior to the adoption of the Multiple Species Conservation Plan (MSCP). No management was required at that time, nor is any management being required as part of the VPHCP. As funding becomes available the City may work with the owner to implement the Recommended Management activities identified below.

Management Recommendations²

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 28 East (La Media Swale North)

Species-Specific Objectives: None

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations in order to conduct all Management Level 3 recommended activities.

Complex Description

J 28 East is a 20-acre site located southwest of the intersection of La Media Road and Avenida de la Fuente in Otay Mesa. These vernal pools occur along a drainage near undeveloped lands, agriculture, a truck lot, and open space. The site is zoned Light Industrial, is partially within the MHPA, and is not conserved.

Five natural vernal pools were mapped at J 28 East. Huerhuero loam and Stockpen gravelly clay loam underlie the vernal pools, and upland vegetation is nonnative grasslands. No sensitive species were present in 2003.

The J 28 East vernal pools were identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary to stabilize populations of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), Otay Mesa mint (*P. nudiuscula*), Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the 28 East complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	La Media Swale North	75	5	0.16	NONE	NONE
Baseline	La Media Swale North	75	5	0.16	NONE	NONE
Expanded Alternative	La Media Swale North	75	5	0.16	NONE	NONE

Threats

Edge Effects

While many of the basins are in areas with open space adjacent, SR-905 and Otay Mesa Road are threats to the site for edge effects like irrigation, nonnative landscaping, and litter.

Fire and Fire Suppression

These vernal pools are located in a generally undeveloped area near the U.S. border with Mexico. If defensible structures are developed in the future, the site might be disturbed as a result of emergency fire suppression activities in the event of a fire.

Trespass

Impacts occur from foot traffic and off-road vehicles.

Litter

The site may be impacted by wind-blown debris, litter, and illegal dumping.

Topographic Disturbance

The vernal pools at this complex have been impacted off-road and other damage over the years which resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at J 28 East.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with management level 3 sited below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and VPHCP.

Management Level 3 and the following list of tasks are recommended for the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Under Management Level 3, off-site seed collection for, Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.
 - Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*) as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 31 (*Hidden Trails*)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis. (Hidden Trails)
2. Establish, protect and manage existing vernal pool complexes and their associated watersheds currently occupied by Riverside fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis. (Not yet observed: Hidden Trails)

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation

Management Goal

The management goal of Hidden Trails is to *maintain* the habitat conditions and focal species population status by conducting all Management Level 1 recommended activities.

Complex Description

Hidden Trails (J 31) is located east of Hidden Trails Road and north of Seaglen Way in Otay Mesa. The vernal pool areas, on a north and south mesa, total 5.5 acres within a 130-acre preserve conserved through approval of the Hidden Trails project (LDR No. 89-0739). The site was adjusted into the MHPA as part of the Hidden Trails project and is zoned Open Space. The Hidden Trails vernal pools occur between a large residential development and conserved portions of Dennery Canyon, northwest of the Cal Terraces vernal pool preserve.

Twenty-nine vernal pools and road ruts were mapped during surveys for the Hidden Trails EIR (City of San Diego, 2000), while six natural vernal pools and road ruts (42 m² [457 ft²] combined

basin area) were mapped at Hidden Trails during the Vernal Pool Inventory (City of San Diego, 2004). Soils on the Hidden Trails site include Olivenhain cobbly loam and Stockpen gravelly clay loam, and upland vegetation is disturbed coastal sage scrub and maritime succulent scrub. *Branchinecta* spp. were present in 2003.

Prior to restoration, impacts by recreational off-road vehicles and illegal immigrant and Border Patrol traffic contributed to invasion by exotic species.

Although considered separately here due to ownership and conservation status, the Hidden Trails site is geographically related to vernal pools at Dennery Canyon West, J 2 West, Otay Mesa Road, and Cal Terraces.

Existing Conditions

The table below shows the baseline data from the City’s vernal pool database for the J 31 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Hidden Trails	100	66	0.66	SDFS (1)	RFS SDFS
Baseline	Hidden Trails	100	66	0.66	SDFS (1)	RFS SDFS
Expanded Alternative	Hidden Trails	100	66	0.66	SDFS (1)	RFS SDFS

RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Hidden Trails vernal pools are adjacent to residential development on the west side. Impacts may occur from litter, unauthorized access, dumping, invasive species, etc.; however, these impacts are somewhat minimized by perimeter fencing.

Fire and Fire Suppression

The Hidden Trails vernal pools are located between Dennery Canyon and residential neighborhoods. The site may be impacted as a result of emergency fire suppression activities in

the event of a canyon fire, and the developed nature of much of the surrounding area would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited to foot traffic, although the area was historically impacted by off-road vehicles. The site has been fenced and signed along its boundaries with development as part of the restoration effort; fencing was not recommended for installation along the boundaries of the preserve where it abuts natural open space in Dennery Canyon.

Litter

The site may be impacted by wind-blown trash and litter from trespassers; occurrences of dumping have been limited by nearby developments.

Topographic Disturbance

Currently, no threats exist from topographic disturbance at this site.

Invasive Species

Prior to restoration, non-native invasive species were introduced through disturbance associated with off-road vehicle use, etc. Both uplands and vernal pools were re-vegetated in accordance with accepted mitigation plans, which included weeding during the maintenance period.

Current Management Activities

Pursuant to development permits acquired for the Hidden Trails project (LDR 89-0739) and associated CDFG 1603 Streambed Alteration Agreement (R5-2002-0004), ACOE NWP 39, and the RWQCB 401 water quality certification, the following mitigation and management activities have been required as permit conditions. The Hidden Trails project did not impact vernal pools; however, CDFG and RWQCB mitigation specified acceptance of vernal pool enhancement/restoration for general wetland impacts.

The *Mitigation Plan for Hidden Trails* (Helix 2003) specifies enhancement of 0.08 acre and restoration of 0.50 acre of vernal pools, with restoration of maritime succulent scrub in the watershed and upland areas. These areas were monitored and managed for 5 years after the initial restoration efforts, and met success criteria for species richness, vegetative cover, vernal pool species, weed cover, and hydrology.

Vernal Pool HCP Management Requirements¹

Development projects were approved on this site after the adoption of the City of San Diego's Multiple Species Conservation Plan (MSCP). The City was granted a Conservation Easement as a condition of the discretionary land use entitlement. The City committed to provide the biological management of this site as a condition easement pursuant to the requirements of the MSCP.

Management Level 1 and the following list of tasks are required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 32 (West Otay B, West Otay C)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of the species on a range-wide basis. (West Otay C)
2. Establish viable populations of Otay Mesa mint, spreading navarretia, and Riverside fairy shrimp consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1: West Otay B, West Otay C

Ownership: City of San Diego: West Otay B, West Otay C

Management Responsibility: City of San Diego Park and Recreation Department: West Otay B, West Otay C

Management Goal

The management goal of West Otay Mesa B is to *maintain* the habitat conditions and focal species population status consistent with the Site-specific Management Plan by conducting all Management Level 1 recommended activities.

The management goal of West Otay Mesa C is to *maintain* the habitat conditions and focal species population status consistent with the Management Recommendations by conducting all Management Level 1 recommended activities.

Complex Description

West Otay Mesa B, and West Otay Mesa C

West Otay Mesa B and West Otay Mesa C (J 32) is located near the San Diego Gas and Electric (SDG&E) substation south of Old Otay Mesa Road in Otay Mesa. The vernal pool basins occur on conserved lands.

The site is located in Otay Mesa, is zoned Open space, and is adjacent to the MHPA. Surrounding land uses include transportation, residential, utility, and open space.

Twenty-two vernal pools occur in this complex. The vernal pools are underlain by Huerhuero loam or Stockpen gravelly clay loam at this complex. Upland vegetation is disturbed southern mixed chaparral and nonnative grasslands. Sensitive species include San Diego button celery (*E. aristulatum*), little moustail (*M. minimus*), spreading navarretia (*N. fossalis*), Otay Mesa mint (*P. nudiuscula*), San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*).

Prior to restoration, impacts to the site by recreational off-road vehicle, and immigrant and Border Patrol traffic contributed to invasion by exotic species. Several of the vernal pools appear to have been graded and/or trenched, although vernal pool species continue to persist.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the J 32 complex.

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	West Otay A	100	3	0.01	PONU (1) ERAR (2)	NAFO
	West Otay B	100	15	0.06	NONE	NAFO
	West Otay C	100	7	0.04	ERAR (1)	NAFO
Baseline	West Otay A	100	3	0.01	PONU (1) ERAR (2)	NAFO
	West Otay B	100	15	0.06	NONE	NAFO
	West Otay C	100	7	0.04	ERAR (1)	NAFO

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Expanded Alternative	West Otay A	100	3	0.01	PONU (1) ERAR (2)	NAFO
	West Otay B	100	15	0.06	NONE	NAFO
	West Otay C	100	7	0.04	ERAR (1)	NAFO

SDFS = San Diego fairy shrimp
ERAR= San Diego button-celery
NAFO = spreading navarretia
PONU = Otay Mesa mint
RFS = Riverside fairy shrimp

Threats

West Otay Mesa B, and West Otay Mesa C

Edge Effects

The restoration site is adjacent to an SDG&E substation and a multi-family residential development, which may result in some edge effects. The area is connected to a large open space/MHPA area, including additional vernal pool sites, which minimizes impacts from isolation.

Fire and Fire Suppression

The Otay B and C vernal pools are located adjacent to a multi-family residential development. The site may be impacted as a result of emergency fire suppression activities in the event of a canyon fire.

Trespass

Fencing was installed upon conservation of the property; it was subsequently stolen and has since been replaced with three-strand barbless wire along the boundaries of restoration areas. Neighbors, immigrants and transients may trespass by foot along with potential impacts from off-road vehicles and Border Patrol.

Litter

The site may be impacted by wind-blown debris, litter, and illegal dumping.

Invasive Species

Nonnative invasive species occur in both uplands and vernal pools. Restoration areas are being revegetated in accordance with the accepted *Vernal Pool Mitigation Plan for the SUHSD Otay Mesa High School Site* (Helix 2000). Other areas within West Otay B and C are being managed by City staff pesticide applicators and SANDAG-funded County of San Diego staff.

Current Management Activities

West Otay B

Pursuant to Biological Opinion 1-6-99-F-77, issued through a Section 7 consultation for a U.S. Army Corps of Engineers 404 permit, the following mitigation and management activities have been required as conditions of incidental take of San Diego fairy shrimp (*Branchinecta sandiegonensis*) and spreading navarretia (*Navarretia fossalis*) resulting from the Sweetwater Union High School project.

The *Vernal Pool Mitigation Plan for the SUHSD Otay Mesa High School Site* (Helix 2000) was accepted by the permitting agencies as mitigation for vernal pool impacts. The plan requires preservation and restoration of 0.11 acre of vernal pool basin area.

Additionally, 1.05 acres of the site has been used for mitigation for the San Ysidro School District Vista Del Mar Elementary (*Vista Del Mar Elementary School Habitat Management Plan for the Otay Mesa West Preserve Parcel B* (Helix 2011). The project permits required restoration of 18 vernal pool basins (0.111 acre), enhancement of 14 vernal pool basins (0.107 acre), and enhancement of 0.92 acre of upland habitat as mitigation for impacts to ten vernal pool basins (0.02 acre) (Final Subsequent EIR for Vista del Mar [The Planning Center 2009], USFWS Biological Opinion FWS-SDG-09B0258-11F0076 and USACE SPL-2009-00028-LLC), along with the following long-term management activities:

- Update habitat mapping (every five years)
- Baseline biological inventory (first year of management)
- General site condition surveys (2x/year)
- Vernal pool monitoring (2x/year)
- Exotic plant control (2x/year)
- Fire response planning (as needed)
- Fence and sign repair (as needed)
- Trash removal (2x/year)
- Annual reporting (annually on July 15)

Large populations of little mousetail (*M. minimus*) naturally occur in these basins. This species was found at only 17 natural basins in 2003, with fourteen of these at West Otay A+B; all other major populations within the City occur in created vernal pool basins.

West Otay C

This site is currently managed at a stewardship level by the City, Park and Recreation Department Open Space Division consistent with the MSCP.

Vernal Pool HCP Management Requirements¹

West Otay B

The San Ysidro School District or their contractor or designee will implement the *Vista del Mar Elementary School Habitat Management Plan for the Otay Mesa West Preserve Parcel B* (Helix/TAIC 2011).

West Otay C

The following tasks in Management Level 1 shall be required for the site for the non-restored portions of the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

West Otay B

None.

West Otay C

The following list of tasks are recommended for the non-restored portions of the complex:

- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate on the fill pad area and disturbed roadbeds.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 34 (Bachman; Candlelight)

Species-Specific Objectives:

1. Establish viable populations of Riverside fairy shrimp consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3: Bachman

Level 1: Candlelight, after implementation of the Candlelight Vernal Pool Restoration Plan

Ownership: Private: Bachman, Candlelight

Management Responsibility: Private: Bachman, Candlelight

Management Goal

The management goal for Bachman is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations in order to conduct all Management Level 3 recommended activities. The management goal for Candlelight is to *maintain* existing habitat conditions and existing focal species population status consistent with the Site-specific Management Plan in order to conduct all Management Level 1 recommended activities.

Complex Description

Bachman (J 34)

The Bachman site includes three vernal pool complexes (J 34, J 14, and J 13S). Vernal pools occur on a parcel located south of Otay Mesa Road and east of Caliente Avenue. This parcel is in private ownership, is partially within the MHPA, and is not conserved. The site is zoned for residential development and freeways; nearby land uses include residential development, transportation, educational facilities, MHPA open space, the Sweetwater High vernal pool preserve, and undeveloped land. A 7.97-acre portion (includes J 34 and J 13S) of the parcel located within the Southview Village area, south of Dillion Canyon, has been included within the proposed expansion to the MHPA pursuant to the adoption the VPHCP.

Two vernal pools and road ruts were mapped at the 148-acre site. Huerhuero loam supports nonnative grasslands, and sensitive plant and animal species were not observed in 2003. *B. sandiegonensis* is known from this site in one pool.

This site has been disturbed by off-road vehicle use, foot traffic, and illegal dumping.

Candlelight

The Candlelight site vernal pools occur on two parcels located south of Otay Mesa Road and east of Caliente Avenue. All parcels are in private ownership and are not conserved. The site is zoned for residential development and freeways; nearby land uses include residential development, transportation, educational facilities, MHPA open space, the Sweetwater High School vernal pool preserve, and undeveloped land.

Ten vernal pools and road ruts were mapped at the 50-acre site. Huerhuero loam supports nonnative grasslands, and sensitive plant and animal species were not observed in 2003. Riverside fairy shrimp (*S. wottonii*) has been documented from the site in one pool.

This site has been disturbed by off-road vehicle use, foot traffic, and illegal dumping.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 34 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Bachman	0	10	0.06	SDFS (1)	RFS SDFS
		75	2	0.02	NONE	RFS SDFS
		100	3	0.01	NONE	RFS SDFS
	Candlelight	100	10	0.08	RFS (1) SDFS (1)	RFS SDFS
Baseline	Bachman	0	13	0.07	SDFS (1)	RFS SDFS
		75	2	0.02	NONE	RFS SDFS
	Candlelight	100	10	0.08	RFS (1) SDFS (1)	RFS SDFS

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Expanded Alternative	Bachman	0	10	0.06	SDFS (1)	RFS SDFS
		75	2	0.02	NONE	RFS SDFS
		100	3	0.01	NONE	RFS SDFS
	Candlelight	100	10	0.08	RFS (1) SDFS (1)	RFS SDFS

RFS = Riverside fairy shrimp
SDFS = San Diego fairy shrimp

Threats

Bachman

Edge Effects

Many of the basins are surrounded by open space. However, threats from edge effects such as irrigation, invasive landscaping, and litter may occur from the adjacent SR-905 and Otay Mesa Road.

Fire and Fire Suppression

The Bachman vernal pools are currently surrounded by open space. However, development is being proposed throughout Otay Mesa and the remaining open space areas may be impacted by emergency fire suppression efforts following construction of adjacent habitable structures.

Trespass

Impacts occur from foot traffic and off-road vehicle use.

Litter

The site may be impacted by wind-blown debris, itinerant encampments, and illegal dumping. Illegal dumping has become an increasingly problematic issue at the site.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road and other damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at the Bachman site.

Candlelight

Edge Effects

Currently, many of the basins are in located on undeveloped land adjacent to Caliente Avenue and Sweetwater High School which may cause negative edge effects from irrigation, invasive landscaping, and litter. The proposed Candlelight project would implement the MSCP Land Use Adjacency Guidelines to address edge effects.

Fire and Fire Suppression

The Candlelight vernal pools are currently on undeveloped land adjacent to Caliente Avenue and Sweetwater High School and may be impacted by fire suppression efforts. Implementation of the proposed Candlelight project would locate the brush management zones outside of the fenced vernal pool preserve areas.

Trespass

Currently, impacts may occur from foot traffic and off-road vehicle use. With implementation of the Candlelight project, the proposed vernal pool preserve areas will include fencing and signage to prevent trespassing.

Litter

The site may be impacted by wind-blown debris, itinerant encampments, and illegal dumping. The proposed Candlelight project would implement the Biological Opinion (FWS-SDG-08B0715-08F0817) and MSCP Land Use Adjacency Guidelines that would provide fencing, signage, and long-term management of the vernal pool preserve areas.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road and other damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. The proposed Candlelight project would implement a vernal pool restoration plan.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at the Candlelight site. The proposed Candlelight project would implement the MSCP Land Use Adjacency Guidelines that would prohibit invasive species adjacent to the MHPA and vernal pool preserve areas.

Current Management Activities

Bachman

No management activities are currently occurring at this site.

Candlelight

The U.S. Fish and Wildlife Service issued a Biological Opinion (FWS-SDG-08B0715-08F0817) in June 2010 as a result of a Formal Section 7 Consultation by the U.S. Army Corps of Engineers for their Section 404 Permit (File No. 200501638-LAM) on the Candlelight Villas project (PTS No. 40329) currently in progress. The Biological Opinion concluded the effects and cumulative effects of the Candlelight Villas Project East and West developments that the proposed project is not likely to jeopardize the continued existence of the San Diego fairy shrimp and Riverside fairy shrimp.

The Biological Opinion authorizes the proposed loss of 0.38 acre (22 pools) supporting San Diego fairy shrimp, including 0.17 acre (1 pool) that also supports Riverside fairy shrimp. The project would provide preservation, restoration, enhancement and perpetual management of 96 (1.02 acres) of vernal pools on site. Approximately 79 (0.7 acre) and 17 (0.32 acre) of the restored and enhanced vernal pools would support San Diego fairy shrimp and Riverside fairy shrimp, respectively. Both phases of the project would proceed through the City's discretionary process consistent with the approved Biological Opinion and no additional take authorization would be authorized under the VPHCP.

Vernal Pool HCP Management Requirements¹

Bachman

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Candlelight

This site is privately held and is currently seeking development entitlements. During the development entitlement process, the City will ensure the property owner/permittee implements the vernal pool restoration plan and long-term management activities in accordance with the requirements of the Biological Opinion (FWS-SDG-08B0715-08F0817) prepared the Candlelight Villas project.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Management Recommendations²

Bachman

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 sited below and the City's Environmentally Sensitive Lands Regulations, (ESL), Biology Guidelines, and VPHCP.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiuscula*) may be considered.
 - Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*) as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

Candlelight

The private owner/permittee shall implement the conditions of the Biological Opinion (FWS-SDG-08B0715-08F0817) prepared for the Candlelight Villas project and requirements of the Candlelight Project (PTS No. 40329) including implementation of the Vernal Pool Restoration Plan and Long-term Management Plan to preserve, restore, enhance, and provide management of 96 vernal pools on-site. Approximately 79 (0.7 acre) and 17 (0.32 acre) of the restored and enhanced vernal pools will support San Diego fairy shrimp and riverside fairy shrimp, respectively.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 35 (Brown Field)

Species-Specific Objectives: None

Management Level: Level 1, after implementation of Metropolitan Airpark Restoration Plan

Ownership: City

Management Responsibility: City of San Diego Real Estate Assets Department Airports Division and Metropolitan Airpark

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and existing focal species population status

Complex Description

Brown Field Airport (J 35) is located north of State Route 905 in Otay Mesa. The site is owned and managed by the City of San Diego Real Estate Assets Department Airport Division and is partially within the MHPA. The site is zoned for airports, and land uses adjacent to the airport include industrial and commercial uses as well as open space.

The Metropolitan Airpark project (PTS No. 208889) has been approved by the City Council and includes the development and lease of supportive aviation and non-aviation facilities located on the 880-acre Brown Field Municipal Airport. The project consists of approximately 331 acres located north and south of the airport runway and is bound by La Media Road on the east, Otay Mesa Road on the south and Heritage Road on the west. Aviation uses would include a jet aviation fixed base operation and related support facilities; hangars, tie-downs, fuel station, and maintenance area for general and corporate aviation; a helicopter fixed base operation with hangars, a heliport, and an aviation hub for the San Diego Fire Department and other users. Supportive aviation and non-aviation related uses would include: a solar photovoltaic energy generation facility; an industrial park, and a commercial center that would include two business hotels, alternative fuels station, a bus transit station, and other commercial uses.

The project was approved at City Council on October 22, 2013 (Resolution 308483) and is currently in consultation with the USFWS to obtain a Biological Opinion. The project will impact 0.275 acre of vernal pool habitat within the project footprint and will implement a

restoration and enhancement plan and long-term management plan to restore 1.38 acres of vernal pools and associated watersheds located in the northern portion of the airport.

Additionally, the City owns and operates Brown Field Municipal Airport and City staff has the responsibility of maintaining the airports in conformance with Federal Aviation Administration regulations and guidelines. Federal aviation regulations require that the airport be maintained and operated in a manner that promotes the health, safety, and welfare of airport users, and the surrounding communities. As a result of this mandate, there are large areas of undeveloped land surrounding the airport. The required operations and standard activities are Covered Activities under the VPHCP. These activities have the potential to impact the covered species and/or vernal pool habitat and include the following:

- Maintenance and inspection of all existing safety areas, object-free areas, runway protection zones, critical areas, infields, runway and taxiway shoulders, and storm water conveyances.
- Maintenance, access, inspections, and operation of all existing equipment and infrastructure for public safety and normal airport operations.
- Capital Improvement Program rehabilitation and/or maintenance of existing airport infrastructure.
- Maintenance and inspection of existing public right-of-way access.

Existing Conditions

The table below shows the baseline data for the J 35 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Brown Field	0	14	2.91	ERAR (1) SDFS (3)	NONE
		100	3	0.02	NONE	NONE
Baseline	Brown Field	0	14	2.91	ERAR (1) SDFS (3)	NONE
		100	3	0.02	NONE	NONE
Expanded Alternative	Brown Field	0	14	2.91	ERAR (1) SDFS (3)	NONE
		100	3	0.02	NONE	NONE

ERAR = San Diego button-celery

SDFS = San Diego fairy shrimp

Threats

Edge Effects

Edge effects are limited by the high level of security required by operational airfields, but may include wind-blown trash or indirect operational impacts.

Fire Suppression and Emergency Procedures

This site has the potential to be impacted due to fire suppression and/or emergency procedures. The long-term impact of fire on vernal pool plants and animals appears to be minimal (see Post Fire Evaluation of Vernal Pools in *Multiple Species Conservation Program (MSCP) Monitoring Report* [City of San Diego 2004]). However, the airport, airplanes, and associated fuel and structures are a high priority during fire suppression, and vernal pools may be impacted in the course of these activities. In addition, emergencies such as plane crashes and any associated life- and property-saving procedures may damage on-site resources.

Trespass

Trespass is limited by the high level of security required by operational airfields.

Litter

Trash, dumping, and litter are common in the Otay Mesa area and may impact the vernal pools; however, these threats are minimized at Brown Field due to the high level of security required by operational airfields.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road and other damage over the years which resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. However, as a requirement of the Metropolitan Airpark project (PTS No. 208889) a vernal pool restoration plan will be implemented in the northern portion of the site.

Invasive Species

The site is characterized by nonnative grasses, which may be a significant factor in the lack of sensitive vernal pool plant species.

Maintenance Activities

Impacts may occur from on-going maintenance operations such as mowing, weed abatement, and maintenance in accordance with FAA requirements.

Current Management Activities

The site is currently managed for the use and safety of Brown Field Airport, and in conformance with a storm water runoff protection plan.

Vernal Pool HCP Management Requirements¹

In accordance with the requirements of Metropolitan Airport project (PTS No. 208889/Resolution No. 308483), 1.38 acres of vernal pool habitat will be restored in the northern portion of the site and a funded, long-term management plan will be implemented after completion of the 5-year restoration plan.

VPHCP Covered Activities/Brown Field Maintenance: If any unanticipated impacts to vernal pools and/or covered species occur, mitigation would be provided consistent with the VPHCP.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
J 36 (Southview)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.
2. Establish viable populations of Riverside fairy shrimp consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 3

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *restore* existing habitat conditions and existing focal species population status consistent with the Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Southview

The complex is located east of Caliente Avenue, south of Otay Mesa Road and west of Spring Canyon on the Otay Mesa Community Planning Area. On July 24, 2012 City Council approved tentative map (PTS No. 2204) to allow for multi-family residential development of 21.44 acres of a 42.62 acre site. The remaining 21.17 acres is a separate project site, Southview East (PTS No. 371807) and is partially within the MHPA. The project proposes development of two multi-family residential condominium subdivision. The project identifies approximately 10.5 for conservation including all vernal pool resources with the exception of the alignment for Airway

Road. The conservation area has been included in the proposed expansion to the MHPA pursuant to the adoption of the VPHCP.

Airway Road, a community-planned road bisects both parcel and has been constructed through the Southview project. The future alignment of Airway Road extends through Southview East. The right-of-way will be reserved but will not be fully constructed until the connection to the east is approved. The final construction of Airway Road would be separate project and would require implementation of the *Southview East Project Mitigation Plan* (Alden Environmental, 2016).

Per the Southview Project Stipulated Settlement Agreement [Case No. 98-CV-02234-B (JMA)] management, in perpetuity, of the vernal pools on the eastern parcel (Southview East) would include maintaining a perimeter fence, eliminating weeds, and constructing and maintaining no-trespass signs to protect the conserved areas. These activities shall be monitored at least every two months to ensure the management activities are their goal of preserving vernal pools on the eastern area. Additionally, the Southview East project will also include implementation of the MSCP Adjacency Guidelines and a Covenant of Easement on the conservation area.

The parcel consists of seventeen vernal pools: eight of which are inside the MHPA, and three of these MHPA pools are on the east property line bordering the Bachman parcel. San Diego fairy shrimp are present in twelve pools, nine of which are considered conserved.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the J 36 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Southview (Airway Road)	0	4	0.01	SDFS (4)	RFS SDFS
	Southview	75	3	0.01	NONE	RFS SDFS
		100	10	0.07	SDFS (8)	RFS SDFS
Baseline	Southview (Airway Road)	0	14	0.10	SDFS (9)	RFS SDFS
	Southview	75	3	0.01	SDFS (3)	RFS SDFS

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Expanded Alternative	Southview (Airway Road)	0	4	0.01	SDFS (4)	RFS SDFS
	Southview	75	3	0.01	NONE	RFS SDFS
		100	10	0.07	SDFS (8)	RFS SDFS

SDFS = San Diego fairy shrimp

RFS = Riverside fairy shrimp

Threats

Edge Effects

Residential development and Airway Road may impact this site when the extension is approved. However, the potential for impacts would be limited due to implementation of the MSCP Adjacency Guidelines that would be required as part of any discretionary approval for the site.

Fire and Fire Suppression

The Southview vernal pools are currently surrounded by open space. However, development has been approved on the site and remaining open space lot might be impacted by emergency fire suppression efforts following construction of adjacent habitable structures. Fencing and signage have been implemented around the vernal pools which will aid in the protection of the vernal pools.

Trespass

Impacts occur from foot traffic and off-road vehicle use. Fencing and signage have been implemented around the vernal pools which will aid in the protection of the vernal pools.

Litter

The site may be impacted by wind-blown debris, itinerant encampments, and illegal dumping. Illegal dumping has become an increasingly problematic issue in the area. Trash pick-up, fencing and signage has been implemented within the vernal pool location which will aid in the control of on-site litter within the vernal pools.

Topographic Disturbance

The vernal pools at this complex have suffered considerable off-road and other damage over the years and this damage has resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at the Southview site. Annual weeding in accordance with the Southview Project Stipulated Settlement Agreement is occurring which will aid in the control of the invasive species.

Current Management Activities

A Stipulated Settlement Agreement [Case No. 98-CV-02234-B (JMA)] governs the management and monitoring requirements for the on-site vernal pool resources and responsible party for implementation.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 sited below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and VPHCP.

Management Level 3 and the following list of tasks are recommended for the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Management Level 3 Activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed collection for Spreading navarretia (*N. fossalis*), Orcutt's grass (*O. californica*), San Diego button celery (*E. aristulatum*), and Otay Mesa mint (*P. nudiusscula*) may be considered.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

- Conduct cyst collection and inoculation for San Diego fairy shrimp (*B. sandiegonensis*), and Riverside fairy shrimp (*S. woottoni*) as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
K 5 (Otay Lakes)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of these species on a range-wide basis.
2. Protect and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City of San Diego (Cornerstone Lands)

Management Responsibility: City of San Diego Public Utilities Department/Water

Management Goal

The management goal for Otay Lakes is to *maintain* existing habitat conditions and focal species population status in order to conduct all Management Level 1 recommended activities.

Complex Description

The Otay Lakes (K 5) vernal pool site is located on 632 acres owned and managed by the City of San Diego Public Utilities Department. Although the area is not covered by a conservation easement, it is obligated open space as part of the MSCP Cornerstone Bank Agreement and is included in the MHPA (City of San Diego 1997).

Eighty-five vernal pools occur at the Otay Lakes complex. Soils include loams from the Olivenhain, San Miguel, and Redding series. Upland vegetation is characterized by chamise chaparral with herbaceous cover such as *Erodium* spp., and the vernal pools support populations of San Diego button celery (*E. aristulatum*) and Spreading navarretia (*N. fossalis*).

The site was leased for grazing until 2001, and impacts from cattle (e.g., hoof indentations) are still visible in vernal pool basins. The vernal pools at Otay Lakes were burned in the Otay Fire of 2003.

This site was identified as necessary to stabilize the populations of San Diego button celery (*E. aristulatum*) and Spreading navarretia (*N. fossalis*) by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS, 1998).

Restoration, including additional signage installation, seed bulking, weeding and dethatching was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the K 5 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Otay Lakes	100	85	3.20	NAFO (2) ERAR (46) SDFS (6)	NAFO SDFS
Baseline	Otay Lakes	100	85	3.20	NAFO (2) ERAR (46) SDFS (6)	NAFO SDFS
Expanded Alternative	Otay Lakes	100	85	3.20	NAFO (2) ERAR (46) SDFS (6)	NAFO SDFS

ERAR = San Diego button-celery

NAFO = spreading navarretia

SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Otay Lake complex is surrounded by large expanses of open space and has a very low threat from edge effects.

Fire/Fire Suppression

Otay Lakes is adjacent to large rural and preserve areas where fire plays an important part in the natural ecologic regime. These vernal pools burned most recently in 2003, and comparison of pre- and post-fire surveys does not appear to reveal damage to sensitive species or their physical habitat. Therefore, fire does not appear to threaten species presence or abundance of vernal pool ecosystems.

As noted in the Vernal Pool Management Plan (City of San Diego, 1996), fire-fighting activities may disturb this area. Although the site burned in 2003, Lower Otay Reservoir provided a natural fire-break between the open space and nearby development so that destructive fire suppression efforts in sensitive habitat areas were not necessary.

Trespass

The threat of trespass (i.e., ORVs) is reduced due to natural barriers such as Lower Otay Reservoir and Otay Mountain. In addition, the City Public Utilities Department has fenced sections of the boundary to discourage access and has provided gates at vehicle entrance points. As noted in the *Vernal Pool Management Plan* (City of San Diego 1996), although the potential exists, this threat is relatively minor.

Litter

The site has a very low threat from litter due to its isolated location.

Topographic Disturbance

The vernal pools at this complex have been affected by limited off-road damage over the years and topographic reconstruction is not needed at this time. With the border patrol activity around the site, this issue remains a threat.

Invasive Species

The primary herbaceous species at Otay Lakes are *Hemizonia fasciculata* and *Erodium* spp. While *H. fasciculata* is a native plant and does not appear to negatively affect the vernal pools, high concentrations of *Erodium* spp. are commonly found within vernal pool basins.

Current Management Activities

The Otay Lakes vernal pools were surveyed 1 month and 7 months after the 2003 Otay Fire to determine damage, if any, sustained by the vernal pools.

Restoration including additional signage installation, seed bulking, weeding and dethatching – was conducted in 2008–2009 on a portion of the pools in this complex as part of a *Transnet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010).

Access to the area supporting vernal pools is limited by the City Public Utilities Department, which provides patrols, fencing, and signage.

Vernal Pool HCP Management Requirements¹

The following tasks in Management Level 1 shall be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
KK2 (*Pasatiempo*)

Species-Specific Objectives: None

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal for Pasatiempo is to *maintain* existing habitat conditions and focal species population status in order to conduct all Management Level 1 recommended activities.

Complex Description

The Pasatiempo parks sites are located east of Pasatiempo Avenue near the intersection with Caminito Tenedor in the Navajo Community Planning Area. A portion of this location is a 10-acre site that is proposed for a neighborhood park on the east of Pasatiempo Avenue. The site is not currently conserved. The remainder of the site is west, across Pasatiempo Avenue, which is a conserved 5.2 –acre open space park. These sites are owned and managed by the City of San Diego Park and Recreation Department. Both park sites are outside the MHPA and are zoned for Open Space. As part of the adoption of the VPHCP, these sites would be added to the expanded MHPA. Adjacent land uses include residential and transportation. The 10-acre neighborhood park is a covered project in the VPHCP and will include a fenced 5-acre vernal pool preserve area, where all the on-site pools will be managed and preserved in perpetuity.

Ten vernal pools were mapped in 2005. Nonnative grasslands and disturbed coastal sage scrub occur in Redding gravelly loams; no sensitive vernal pool species were observed, and fairy shrimp surveys were not conducted. The site has been impacted by trash, nonnative species and historic grading.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the KK2 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Pasatiempo	100	10	0.04	NONE	NONE
Baseline	Pasatiempo	0	10	0.04	NONE	NONE
Expanded Alternative	Pasatiempo	100	10	0.04	NONE	NONE

Threats

Edge Effects

The Pasatiempo vernal pools are adjacent to residential development on all sides. Impacts may occur from litter, unauthorized access, dumping, and invasive species.

Fire and Fire Suppression

The long-term impact of fire on vernal pool plants and animals appears to be minimal (see Post Fire Evaluation of Vernal Pools in *Multiple Species Conservation Program (MSCP) Cornerstone Bank Agreement* [City of San Diego 2004]). Due to the developed nature of the surrounding area, this site might be impacted by emergency fire suppression activities in the event of a wildland fire.

Trespass

The site is unfenced and is at risk from BMX bicycle activity and foot traffic.

Topographic Disturbance

The vernal pools at this complex have been impacted by off-road and other damage over the years resulting in potential changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

There are many nonnative species, including grasses and *Chrysanthemum* spp.

Current Management Activities

No management activities are currently occurring on the future park site; the conserved open space area is managed by the Park and Recreation Department Open Space Division.

Vernal Pool HCP Management Requirements¹

Management Level 1 is required for the conserved open space site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants and animals), trash removal, and other general management activities.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process for the future park site. The future park site has been identified as a covered project and any proposed project will be designed consistent with the VPHCP, the City's Environmentally Sensitive Lands Regulations (ESL), and Biology Guidelines.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
MM 1 (Marron Valley)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Public Utilities Department/Water

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status in order to conduct all Management Level 1 recommended activities.

Complex Description

The Marron Valley (MM 1) vernal pool site is located on 2,644 acres owned and managed by the City Public Utilities Department. This remote area is located approximately 40 kilometers east of the Pacific Ocean along the U.S. border with Mexico. The site is within the Marron Valley Conservation Bank, which is included in the MSCP Cornerstone Lands Bank Agreement. Marron Valley is within the MHPA; however, this site is not zoned or within a Community Planning Area because it is outside City of San Diego boundaries.

Eighteen vernal pools occur at the Marron Valley complex. Soils on-site include Huerhuero loam and Visalia gravelly sandy loam, with nonnative grasses and forbs (including *Erodium* spp.) and southern mixed chaparral in the upland areas. Populations of *M. minimus* and San Diego fairy shrimp (*B. sandiegonensis*) occur at Marron Valley.

The site was leased for grazing until 2001 and continues to be used by cattle crossing onto City property from the privately-owned ranch to the south, and impacts from cattle (e.g., hoof indentations) are visible in vernal pool basins.

The *Marron Valley Preserve Wildland Fire Management Plan* (Tierra Data 2006) was completed through funding from the California Department of Fish and Game. The plan assesses the impact of high fire frequency on natural resources such as vernal pools and included the installation of no-trespassing signs around vernal pools and other sensitive areas.

Restoration was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010). This restoration included invasive species removal; dethatch of nonnative grasses and hand-reshaping of basins.

Existing Conditions

The table below shows the baseline data for the MM 1 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Marron Valley	100	18	0.18	SDFS (5)	SDFS
Baseline	Marron Valley	100	18	0.18	SDFS (5)	SDFS
Expanded Alternative	Marron Valley	100	18	0.18	SDFS (5)	SDFS

SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Marron Valley complex is surrounded by large expanses of open space and has a very low threat from edge effects.

Wildland Fire/Fire Suppression

Marron Valley is part of a large rural preserve system where fire plays an important part in the natural ecologic regime. While some of the vernal pools do not appear to burn frequently, others have burn frequencies of 10–15+ years based on data from 1969–2006. *M. minimus* has been observed at the basins with a low burn frequency, and San Diego fairy shrimp (*B. sandiegonensis*) is present at basins in all burn frequency locations. Therefore, fire does not appear to have impacted the fairy shrimp populations, and further study is needed to determine the relationship, if any, to occurrence of *M. minimus*.

The *Marron Valley Preserve Wildland Fire Management Plan* (Tierra Data 2006) was completed in March, 2006, through Local Assistance Grant funding, and includes information on fire behavior in Marron Valley, recommends actions to restore a more natural fire regime and facilitates interagency communication in the event of fire to minimize risk of impacts from fire suppression activities.

Trespass

There is minimal trespass through this site from off-road vehicles due to locked gates at the perimeter of the preserve. This area is frequented by Border Patrol, but the major threat to this area results from the high intensity foot traffic of immigrants. Impacts from trampling of sensitive vegetation, litter, and an unnaturally short fire interval are all visible in Marron Valley as a result of undocumented migrants. In addition, cattle from Mexican lands cross the river to feed in preserved areas in Marron Valley.

Litter

The site has a low threat from litter due to its isolated location, although trash may be left by undocumented workers passing through the area.

Topographic Disturbance

The vernal pools at this complex were impacted by off-road damage over the years, and the basins were topographically reconstructed in 2008. With continued Border Patrol activity, this issue remains a threat.

Invasive Species

The primary herbaceous species at Marron Valley are grasses, and *Erodium* spp. are often found within the vernal pool basins.

Current Management Activities

Access to the area supporting vernal pools is limited by the City Public Utilities Department, which provides patrols, fencing, and signage.

The *Marron Valley Preserve Wildland Fire Management Plan* (Tierra Data 2006) was completed in March, 2006, through a Local Assistance Grant funding. The *Plan* includes information on fire behavior in Marron Valley, recommends actions to restore a more natural fire regime and facilitates interagency communication in the event of fire to minimize risk of impacts from fire suppression activities. In addition, installation of signs funded through a grant, have been installed to inform fire crews of the sensitive resources within this area.

Restoration was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010). This restoration included invasive species removal; dethatch of nonnative grasses and hand-reshaping of basins. Follow-up maintenance work was performed in 2010.

Vernal Pool HCP Management Requirements¹

The vernal pools at Marron Valley should be managed in accordance with the *Marron Valley Preserve Wildland Fire and Management Plan* (Tierra Data Inc. 2006) to encourage a natural fire frequency and support an optimum environment for the vernal pool species found in Marron Valley. The following tasks in Management Level 1 shall be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

In order to complete the work initiated through the *TransNet* grant program, Management Level 1 and the following list of tasks are recommended for the site:

- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
N 1-4 (Teledyne Ryan)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego mesa mint and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 2

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal for this complex is to *enhance* the habitat conditions and focal species population status consistent with the Management Recommendations in order to conduct all Management Level 2 recommended activities.

Complex Description

Teledyne Ryan (N 1-4) is an 11.25-acre site located south of Tech Way between Kearny Villa Road and Overland Avenue in Kearny Mesa. The site is privately owned, outside the MHPA, and zoned for industrial and business park uses. Surrounding land uses include transportation, industrial, and business parks. The site has been included within the proposed expansion to the MHPA pursuant to the adoption of the VPHCP. Consistent with sites wholly within the MHPA, the site would have a development potential of 25% within the least sensitive portion of the site; the remaining 75% of the site would be conserved.

A total of 0.59 acre (2,388 square meters) of vernal pool basin area was mapped in 1995 as part of a development proposal (*Teledyne Balboa Project* [Helix 1998]). A total of forty-three vernal pools occur at this complex. The vernal pools at Teledyne Ryan are of natural origin and are underlain by Redding gravelly loam. Upland areas are dominated by coastal sage scrub and nonnative grasslands. In 1995, San Diego mesa mint (*Pogogyne abramsii*) and *Brodiaea orcuttii* were observed at the site; surveys for fairy shrimp were not conducted.

Although separated by developed areas, this site is geographically related to Montgomery Field (N 5-6) and Serra Mesa Library (N 7).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the N 1-4 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Teledyne Ryan	75	43	0.59	POAB(1) SDFS (11)	NONE
Baseline	Teledyne Ryan	0	43	0.59	POAB(1) SDFS (11)	NONE
Expanded Alternative	Teledyne Ryan	75	43	0.59	POAB(1) SDFS (11)	NONE

POAB = San Diego Mesa mint
SDFS = San Diego fairy shrimp

Threats

Edge Effects

The Teledyne Ryan vernal pools are adjacent to business park/industrial development and may be impacted by isolation, litter, unauthorized access, and trash.

Fire and Fire Suppression

It is unlikely that wildfire or fire suppression activities will impact an urban site such as Teledyne Ryan.

Trespass

This site is well protected by fencing, signage, and other access control measures.

Litter

The site is surrounded by commercial development or Tech Way roadway, so trash from these businesses or vehicles may pose a threat to the complex.

Topographic Disturbance

The vernal pools at this complex have been impacted by off-road vehicle and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species were documented in 1995, including high numbers of nonnative grasses (Helix 1998).

Current Management Activities

No management activities are currently occurring at this site

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Additional Management Recommendations as identified below.

Management Recommendations²

At a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watershed, and/or buffers, would require additional mitigation measures consistent with management level 2 sited below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and the VPHCP.

Management Level 2 and the following list of tasks are recommended for the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.
- Conduct a dethatching program.
- Conduct Weed Control-2 (hand, mechanical, and/or herbicide application).
- Conduct a seed collection/bulking program for San Diego Mesa mint as needed.
- Conduct cyst collection and inoculation for San Diego fairy shrimp as needed.
- Conduct container plant propagation and installation.
- Conduct topographic reconstruction where appropriate.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
N 5-6 (Montgomery-Gibbs Field)

Species-Specific Objectives: None

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Real Estate Assets Department Airports Division

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and existing focal species population status

Complex Description

Montgomery-Gibbs Field Airport (N 5-6) is located east of State Route 163, north of Aero Drive, and south of Balboa Avenue in Kearny Mesa. The site is owned and managed by the City of San Diego Real Estate Assets Department Airport Division and is partially within the MHPA. The site is zoned for airports, and land uses adjacent to the airport include commercial, industrial, and residential uses.

The airport totals 549 acres and consists of general aviation and non-aviation related businesses, runway, taxiways and aircraft and vehicle parking. General aviation encompasses all aviation except air carrier and military aircraft. General aviation aircraft include private, corporate, charter, air ambulance, law enforcement, fire rescue, flight training and cargo. The airport is located within the Kearny mesa community planning area and is bounded by Aero Drive to the south, Kearny Villa Road to the west, Ruffin Road to the east, and Balboa Avenue to the north.

A MHPA Boundary Line Adjustment (BLA) was processed concurrently with the adoption of the VPHCP. The BLA added vernal pools and surrounding habitat into the MHPA that increased occupation by sensitive vernal pool resources and higher value habitat. The BLA resulted in a net increase of 13 acres to the existing MHPA and provided for the conservation of higher quality vernal pool habitat and sensitive species, as well as allowing for improved connectivity within the vernal pool complex and ability to restore, enhance, and manage the vernal pool resources. The BLA also removed the Runway Safety Areas (RSAs) from the MHPA in order to meet the

Federal Aviation Administration (FAA) regulations and identified areas of lower quality vernal pool habitat where development of aviation and non-aviation uses may occur. Any impacts to vernal pool resources would be mitigated on-site consistent with the VPHCP, Biology Guidelines, and ESL. The VPPMP figure for Vernal Pool Complex N 4-5 identifies the adjusted MHPA and locations where potential vernal pool mitigation/restoration and enhancement may occur.

The airport uses an on-site localizer to aid in the navigation of inbound aircraft during inclement weather. During the rainy season of 2010 and 2011, the VHF radio waves emitted by the localizer were being refracted by water ponding in an adjacent vernal pool. This resulted in inaccurate readings and unsafe situations for airport users. The Montgomery Field Localizer Project (PTS No. 212101) was implemented under an emergency CEQA exemption, United States Army Corps of Engineers (ACOE) RGP 63 permit with Section 7 consultation with the United States Fish and Wildlife Service (USFWS), and a Regional Water Quality Control Board (RWQCB) 401 Water Quality Certificate in order to restore critical aviation safety service to the airport in compliance with Federal Aviation Administration (FAA) standards. The project resulted in impacts to 0.19 acre of vernal pool habitat and 1.25 acres of non-native grasslands. The mitigation for the impacts has been addressed in The Montgomery Field Localizer Project Mitigation Plan (November 25, 2015) prepared by Merkel and Associates. The plan includes restoration of 0.95 acre of vernal pool habitat and 0.65 acre of upland habitat (non-native/native grasslands). The restoration site is located north and east of Runway 28R.

Additionally, the City staff has the responsibility of maintaining the airports in conformance with Federal Aviation Administration regulations and guidelines. Federal aviation regulations require that the airport be maintained and operated in a manner that promotes the health, safety, and welfare of airport users, and the surrounding communities. As a result of this mandate, there are large areas of undeveloped land surrounding the airport. The required operations and standard activities are Covered Activities under the VPHCP. These activities have the potential to impact the covered species and/or vernal pool habitat and include the following:

- Maintenance and inspection of all existing safety areas, object-free areas, runway protection zones, critical areas, infields, runway and taxiway shoulders, and storm water conveyances.
- Maintenance, access, inspections, and operation of all existing equipment and infrastructure for public safety and normal airport operations.
- Capital Improvement Program rehabilitation and/or maintenance of existing airport infrastructure.
- Maintenance and inspection of existing public right-of-way access.

Existing Conditions

The table below shows the baseline data for the N 5-6 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Montgomery	100	272	6.50	POAB (127)	SDFS, NAFO
	– Gibbs Field	0	61	2.28	SDFS (24)	
Baseline	Montgomery	100	252	5.94	POAB (127)	SDFS, NAFO
	– Gibbs Field	0	81	2.84	SDFS (11)	
Expanded Alternative	Montgomery	100	272	6.50	POAB (127)	SDFS, NAFO
	– Gibbs Field	0	61	2.28	SDFS (24)	

ERAR = San Diego button-celery

SDFS = San Diego fairy shrimp

Threats

Edge Effects

Edge effects are limited by the high level of security required by operational airfields, but may include wind-blown trash or indirect operational impacts.

Fire Suppression and Emergency Procedures

This site has the potential to be impacted due to fire suppression and/or emergency procedures. The long-term impact of fire on vernal pool plants and animals appears to be minimal (see Post Fire Evaluation of Vernal Pools in *Multiple Species Conservation Program (MSCP) Monitoring Report* [City of San Diego 2004]). However, the airport, airplanes, and associated fuel and structures are a high priority during fire suppression, and vernal pools may be impacted in the course of these activities. In addition, emergencies such as plane crashes and any associated life- and property-saving procedures may damage on-site resources.

Trespass

Trespass is limited by the high level of security required by operational airfields and the perimeter security fencing surrounding the airport is adequate to provide boundary control and prevention of trespass on the site. No additional fencing is required.

Litter

Potential impacts from trash and litter are minimized at Montgomery-Gibb Field due to the high level of security required by operational airfields.

Topographic Disturbance

Habitat within the western portion of the site is highly disturbed but could be resurrected through implementation of a restoration plan and recontouring of the area. Portions of vernal pool habitat located to the north, south, and west of Runway 28R may benefit from low to moderate recontouring.

Invasive Species

The western portion of the airport is characterized by nonnative grasses. This portion of the site has been identified as having for high potential for restoration, which would include weeding and upland restoration as appropriate. Restoration effort would occur through mitigation for future development.

Maintenance Activities

Impacts may occur from on-going maintenance operations such as mowing, weed abatement, and maintenance in accordance with FAA requirements. With adoption of the VPHCP, an operation plan and Management Level 1 activities will be implemented to minimize the potential for inadvertently impacting vernal pool resources.

Current Management Activities

The site is currently managed for the use and safety of Montgomery-Gibbs Airport, and in conformance with a storm water runoff protection plan.

Vernal Pool HCP Management Requirements¹

The Montgomery Field Localizer Project Mitigation Plan (November 25, 2015) prepared by Merkel and Associates will be implemented. The plan includes restoration of 0.95 acre of vernal pool habitat and 0.65 acre of upland habitat (non-native/native grasslands). The restoration site is located north and east of Runway 28R.

Additionally, Management Level 1 activities shall occur including: targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
N 7 (Serra Mesa Library)

Species-Specific Objectives: None

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Library and Park and Recreation Departments

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Site-specific Management Actions per PTS No. 4813 by conducting all Management Level 1 recommended activities.

Complex Description

The Serra Mesa Library (N 7) site is located directly south of Montgomery Field Airport across Aero Drive. Twenty-six vernal pools occur on this 9.2-acre site. These basins occur within the MHPA and were conserved as a condition of the Serra Mesa Library project (PTS 4813); the site is owned by the City and managed by the Library and Park and Recreation Departments. The area is zoned Active Parks and is bounded by a major road, residential development, and commercial and library facilities.

The vernal pools at Serra Mesa Library are of natural origin, and occur within Redding gravelly loam soils. Upland vegetation is primarily disturbed coastal sage scrub and ruderal. No sensitive vernal pool species were observed at Serra Mesa Library.

Prior to construction of the library, the site was occasionally disturbed by foot traffic and vehicle storage. The vernal pools and their watersheds have been conserved and fenced as part of the approved project.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the N 7 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Serra Mesa Library	100	26	0.41	NONE	NONE
Baseline	Serra Mesa Library	100	26	0.41	NONE	NONE
Expanded Alternative	Serra Mesa Library	100	26	0.41	NONE	NONE

Threats

Edge Effects

The Serra Mesa Library vernal pools are bounded on all sides by development. Litter and unauthorized access have the potential to occur. To minimize these impacts, fencing and regular trash removal were required as conditions of project approval for Serra Mesa Library (PTS No. 4813).

Fire and Fire Suppression

Given the developed surroundings, it is unlikely that wildfire or fire suppression activities pose a threat to the Serra Mesa Library vernal pools.

Trespass

Unauthorized access is likely to occur.

Litter

Litter may occur.

Topographic Disturbance

Prior to fencing of this complex, the vernal pools were impacted by off-road vehicles and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Chrysanthemum spp. and other nonnative species occur in disturbed and ruderal portions of the Serra Mesa Library site.

Current Management Activities

The current management activities discussed below were conditions of project approval for the Serra Mesa Library project (PTS No. 4813):

- 1) A permanent fence, made of non-combustible material (i.e. chain link) and six feet in height, was installed around the vernal pools.
- 2) Signage was installed identifying the sensitive nature of the habitat.
- 3) Keep the vernal pool area free of trash and debris.
- 4) Brush management zone activities are required in the vernal pool preserve area. Park and Recreation Department, Open Space staff shall ensure that a biological monitor is present to ensure that vernal pool basins or watershed are not impacted.

Vernal Pool HCP Management Requirements¹

The following tasks in Management Level 1 may be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

The land manager should encourage research studies, including projects to assess the impact of edge effects and isolation on vernal pool habitats and their associated species. This site may be an appropriate location for environmental education due to the nearby library.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
N 8 (*General Dynamics*)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint, and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 1

Ownership: Private

Management Responsibility: Private: LNR Kearny Mesa

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status and to conduct all Management Level 1 recommended activities.

Complex Description

General Dynamics (N 8) is a vernal pool preserve located within the New Century Center development. The site is west of Ruffin Road and north of Balboa, and is accessed via an industrial complex at the corner of Overland Avenue and Tech Way. This area was restored and preserved via conservation easement as mitigation for New Century Center (LDR 96-0165; U.S. Fish and Wildlife Service Biological Opinion 1-6-98-F-32). The site is within the MHPA. Surrounding land uses include transportation, industrial, and business parks.

The General Dynamics site has 22 vernal pools: 15 are natural and seven were restored. The basins occur in Redding gravelly loam soil. Upland vegetation includes coastal sage scrub and disturbed coastal sage scrub. San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and San Diego fairy shrimp (*B. sandiegonensis*) were observed in 2003.

Prior to preservation and vernal pool restoration, some impacts had occurred to the vernal pools due to unrestricted access. However, natural basins and coastal sage scrub vegetation were still present on portions of the site. The site is currently fenced; with restoration implemented in 1998.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the N 8 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	General Dynamics	100	22	0.40	POAB (20) ERAR (2) SDFS (6)	NONE
Baseline	General Dynamics	100	22	0.40	POAB (20) ERAR (2) SDFS (6)	NONE
Expanded Alternative	General Dynamics	100	22	0.40	POAB (20) ERAR (2) SDFS (6)	NONE

POAB = San Diego Mesa mint
ERAR = San Diego button-celery
SDFS = San Diego fairy shrimp

Threats

Edge Effects

The restoration site was designed to minimize litter, artificial night-lighting, and nonnative invasive species; however, the proximity to development may result in impacts from these and other edge effects. Litter removal, fencing, and signage are included in the maintenance requirements of the restoration plan.

Fire/Fire Suppression

This is unlikely to be impacted by fire or fire suppression due to the developed nature of the surrounding area.

Trespass

Fencing and signage were installed to minimize trespass. Off-road vehicles are not a threat in this area; however, the potential remains for trespass from nearby businesses and transients.

Litter

The site has been fenced with permanent, six-foot high chain-link. With the fencing and access control, the site does not get much trash dumping. Litter from the airport facility and users, as well as surrounding development, does pose a threat.

Topographic Disturbance

The vernal pools at this complex have been impacted by historical physical damage over the years; however, this does not appear to have caused substantial changes in hydrologic connection, flow patterns, and inundation characteristics and the site was restored in 1998.

Invasive Species

Nonnative species occur in limited numbers, including nonnative grasses, *Nicotiana glauca*, and *Eucalyptus* spp. Removal of *Lythrum hyssopifolium* and *Rumex crispex* above certain thresholds was specified in the mitigation plan.

Current Management Activities

Pursuant to Biological Opinion 1-6-98-F-32, issued through a Section 7 consultation for a U.S. Army Corps of Engineers 404 permit, mitigation and management activities are required as conditions of incidental take of San Diego mesa mint (*Pogogyne abramsii*) and San Diego fairy shrimp (*Branchinecta sandiegonensis*) resulting from the New Century Center project (LDR 96-0165).

The *Final Mitigation Plan for San Diego Spectrum* (Glen Lukos Associates 1998) was accepted by the permitting agencies as mitigation for vernal pool impacts. Implementation of the mitigation plan includes a 5-year monitoring and maintenance program, debris removal, fence installation, hand-reshaping of vernal pool basins, preservation (via conservation easement) and enhancement of 0.4 acre of vernal pool area, including translocation of soil and cysts from impacted vernal pools. Funding for the mitigation plan and long-term maintenance was the responsibility of the Permittee (LNR Kearny Mesa).

As part of the mitigation plan, the site has been fenced with permanent, 6-foot-high chain-link.

Vernal Pool HCP Management Requirements¹

Development projects were approved on this site after the adoption of the City of San Diego's Multiple Species Conservation Plan (MSCP). The City was granted a Conservation Easement as a condition of the discretionary land use entitlement. If access is granted to the City from the

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

private landowner, the City has committed to ensure Management Level 1 activities occur at this site as a requirement of the VPHCP.

The following task in Management Level 1 is required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

None.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
OO (Salk Institute)

Species-Specific Objectives: None

Management Level: Site Specific Management Plan/Level 1

Ownership: Private

Management Responsibility: Private: The Salk Institute for Biological Studies is responsible for funding and implementation of *Salk Institute Master Plan Habitat Management Plan* (2008).

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Site-specific Management Plan.

Complex Description

The Salk Institute (OO) vernal pool area is within the 1.3-acre Salk Institute North Preserve Area. It is located on private property west of North Torrey Pines Road and south of Torrey Pines Scenic Drive near the San Diego Gliderport. The vernal pools, their watershed, and adjacent upland areas are preserved through the approved Salk Institute Master Plan project (PTS 44675). A Covenant of Easement is currently under review for the vernal pool area.

Fourteen vernal pool basins were mapped by Helix in 2004. No sensitive species were observed, and the underlying sandy loam soils are not associated with vernal pools at other locations within San Diego. The basins occur within a matrix of disturbed Diegan coastal sage scrub.

Based on historic aerial photographs, the pools appear to have originated from soil dumping following construction activities in the 1970s. However, the vernal pools are proposed for conservation through a covenant of easement and will be managed in perpetuity according to directives of the *Salk Institute Master Plan Habitat Management Plan* (Helix 2008).

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the OO complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Salk Institute	100	15	0.09	NONE	NONE
Baseline	Salk Institute	0	15	0.09	NONE	NONE
Expanded Alternative	Salk Institute	100	15	0.09	NONE	NONE

Threats

Edge Effects

The proposed development will increase the distance between the vernal pools and development, and will also minimize unnatural runoff through the construction of a grass-lined swale. Edge effects will be minimized through preserve design, proximity to open space, and management in perpetuity.

Fire and Fire Suppression

The conserved areas might be impacted during an emergency fire suppression event.

Trespass

Given the urban location and adjacent trail use, illegal trespass may occur infrequently.

Litter

The site may be impacted by litter from neighborhood residents or the nearby North Torrey Pines Road.

Invasive Species

Nonnative species occur in the disturbed and ruderal portions of the Salk Institute site.

Current Management Activities

The management activities in this section are project conditions required for the Salk Institute Master Plan (PTS No. 44675). Specific details are available in the *Salk Institute Master Plan Habitat Management Plan* (Helix 2008).

A baseline inventory will be conducted within 1 year of issuance of the grading permit.

Vernal pool monitoring will be conducted twice a year during the rainy season to evaluate habitat and assess site condition. Control of invasive plant and animal species will occur twice a year and as necessary, respectively. Trash and debris will be removed from the site at 2-month intervals.

Trails are not allowed within the vernal pool preserve. Permanent fencing and signage was installed along potential access routes, and will be maintained as necessary. Additional barriers will also be installed if unauthorized access becomes a problem in the future. Lighting is not allowed within the conserved areas and, in adjacent lots, will be shielded to direct spillage away from vernal pool areas.

Biannual letter reports, including monitoring results and documentation of management activities, will be submitted by January 15 of each year to the Salk Institute, U.S. Fish and Wildlife Service, California Department of Fish and Game, and the City of San Diego. The report will contain the following information:

- Summary of management actions taken during the reporting period;
- Summary of the results of annual surveys;
- Description of measures undertaken to remove exotic plant or animal species;
- Site maps of areas of concerns (i.e., trespass, dumping, invasives);
- Photo-documentation of any significant management issues or biological observation;
- Discussion of any management problems and recommendation of changes in management, if needed;
- Summary of the status on the endowment, funds generated, expenses incurred, and year-end balance

Vernal Pool HCP Management Requirements¹

The Salk Institute for Biological Studies is responsible for funding and implementation of the *Salk Institute Master Plan Habitat Management Plan* (Helix 2008).

Management Recommendations²

Due to the location adjacent to the Salk Institute, this site may be appropriate for educational purposes.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
Q 2 (Mission Trails Regional Park)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with the Mission Trails Regional Park (MTRP) Natural Resource Management Plan by conducting all Management Level 1 recommended activities.

Complex Description

Mission Trails Regional Park (Q 2) is a 9,696-acre open space park owned and managed by the City of San Diego Park and Recreation Department. The park is located both north and south of SR-52 and west of Santee, and is conserved, designated open space within the MHPA in the Active Parks land use zone. Surrounding land uses include open space, transportation, commercial, and residential.

Seventeen vernal pools and an ephemeral wetland occur at Mission Trails. The basins are natural, although some have been impacted by human activities prior to the establishment of the park. Soils include Redding gravelly loam, and upland vegetation is characterized by coastal sage scrub, southern mixed chaparral and nonnative grasslands. San Diego fairy shrimp (*B. sandiegonensis*) utilizes the vernal pool habitat at Mission Trails Regional Park; no additional sensitive plant species have been reported.

Prior to preservation, some impacts occurred due to military training and other activities. The park is used for passive recreation, and official trails now limit impacts to natural resources. The Park and Recreation Department has developed the *Draft Mission Trails Regional Park Master Plan Update* (KTUA April 29, 2016) and the *Draft Natural Resource Management Plan for Mission Trails Regional Park, San Diego, California* (RECON April 29, 2016) to provide management guidelines and objectives for this preserve.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the Q 2 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Mission Trails Regional Park	100	17	0.25	SDFS (6)	NONE
Alt 1	Mission Trails Regional Park	100	17	0.25	SDFS (6)	NONE
Alt 2	Mission Trails Regional Park	100	17	0.25	SDFS (6)	NONE

SDFS = San Diego fairy shrimp

Threats

Fire/Fire Suppression

Mission Trails Regional Park is part of several large, interconnected open space areas where fire is an important part in the natural ecologic regime. Fires occurred in portions of Mission Trails during the 1990s and in October 2003, when 14 vernal pool basins were burned. The basins were surveyed in March of 2003 and 2004 to assess pre- and post-fire ecosystem health.

Edge Effects

This open space area is heavily used by residents of both the adjacent neighborhoods and the region. Potential impacts from edge effects are limited by continuous ranger patrols, signage, and environmental education programs.

Trespass

The public is allowed limited, non-motorized access to Mission Trails Regional Park. The existing trail system was reviewed and revisions proposed as part of the master plan update

process; proposed changes include re-routing of trails to increase the buffer around vernal pools and other environmentally sensitive areas. Fences have been installed to direct access where official trails are adjacent to vernal pool basins, and patrols enforce appropriate use of the park.

Litter

Litter is a threat due to the recreational use of the park; however, continuous ranger and maintenance staff patrols limit litter impacts through enforcement and litter collection.

Topographic Disturbance

The vernal pools at this complex have been impacted by physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Vegetation species at Mission Trails Regional Park are primarily native near the vernal pool site; however, some nonnative grasses and *Lythrum hyssopifolium* occur.

Current Management Activities

The site is managed by rangers and other staff of the Park and Recreation Department. Management activities include installation and maintenance of trails and barriers, enforcement of park regulations, environmental education, habitat restoration, trail maintenance and weed control.

In addition, a vernal pool mitigation site associated with the San Diego County Water Authority's Flow Regulatory Structure II (FRS II) is located within the site. The U.S. Fish and Wildlife Service issued a Biological Opinion ([BO] 2007-B-14/2007-F-22) for the FRS II in October 2007 through a Section 7 consultation for the U.S. Army Corps of Engineers Section 404 Permit. The BO permitted incidental take of San Diego fairy shrimp through the enhancement and creation of 0.1243-acre of vernal pool basins.

The *Master Restoration Plan for Work within Mission Trails Regional Park* (RECON 2009) serves as the guiding document for the vernal pool restoration work and includes vernal pool recontouring, seed collection, translocation of soils from impacted basins, installation of container plants, and continued maintenance and monitoring. A total of 0.1604-acre of vernal pool basins and 1.63-acre of associated uplands has been created and enhanced as part of this project. As of spring 2016, mitigation requirements for San Diego fairy shrimp have been achieved but requirements for upland and vernal pool vegetation are on-going.

Vernal Pool HCP Management Requirements¹

The City will implement the site-specific management activities pursuant to the *Draft Natural Resource Management Plan for Mission Trails Regional Park, San Diego, California* (RECON April 29, 2016) which are consistent with the Management Level 1 requirements.

Management Recommendations²

Due to the high visitor volume at Mission Trails, consider including vernal pool information and areas as part of the numerous on-going educational opportunities such as interpretive signs, ranger-led hikes, children's programs, and nature center displays.

Management Level 1 and the following list of tasks are recommended for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
Q 3 (Castlerock)

Species-Specific Objectives: None

Management Level: Site-specific Management Plan

Ownership: Private

Management Responsibility: Private (Pardee Homes or management group approved by the City of San Diego)

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status consistent with the Site-specific Management Plan.

Complex Description

The Castlerock vernal pool site (Q 3) is located in the East Elliott area, northwest of the intersection of Mast Boulevard and Mona Kai Lane, and north of State Route 52. This privately owned, 192-acre site is located in the vicinity of Mission Trails Regional Park and is being proposed for development as the Castlerock project (PTS 10046). The project site is zoned for Residential and Open Space; adjacent land uses include MHPA/open space, residential, and transportation.

Five vernal pools occur at this complex site. The site occurs within the Diablo Olivenhain soil complex. Upland vegetation surrounding the vernal pools includes Diegan coastal sage scrub, and native and nonnative grasslands; San Diego fairy shrimp (*B. sandiegonensis*) was detected during U.S. Fish and Wildlife Service protocols surveys in 2004 (Glen Lukos Associates 2005).

The area has historically been used for passive recreation. Several of the Castle Rock vernal pools are natural in origin, but road ruts have also been created through impacts from off-road vehicles, BMX bikes, and pedestrians.

Existing Conditions

The table below includes that baseline data from the City’s vernal pool database for the Q 3 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Castlerock	100	5	0.02	NONE	NONE
Baseline	Castlerock	100	5	0.00	NONE	NONE
Expanded Alternative	Castlerock	100	5	0.02	NONE	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

The majority of the Castlerock vernal pools are adjacent to development.

Fire and Fire Suppression

The conserved areas might be impacted if used as staging area during a fire suppression event; however, this threat is limited by required fencing around the vernal pool preserve area.

Trespass

Limited trespass may occur; however, the vernal pool preserve area will be fenced as a condition of development.

Litter

Some threats occur from litter due to the surrounding development.

Topographic Disturbance

The vernal pools at this complex have been impacted by off-road vehicles and BMX biking over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics. As part of project approval, a vernal pool preserve area has been identified and vernal pool restoration plan will be implemented.

Invasive Species

Nonnative species occur in the disturbed and ruderal portions of the Castlerock site. As part of project approval, a native grassland restoration plan will be implemented.

Current Management Activities

Restoration of the vernal pool preserve area shall be implemented consistent with the *San Diego Fairy Shrimp/Vernal Pool Restoration and Enhancement Plan for the Castlerock Project* dated December 15, 2014. Management of the on-site vernal pool preserve is required as a condition of the Castlerock project approval. A *Vernal Pool Management Plan for the Castlerock Project* dated December 15, 2014 shall be implemented for the life of the project. Proposed long-term maintenance requirements include planting, brush management, weed control, barriers/fencing, lighting, drainage, signage/public information, and trash removal.

Vernal Pool HCP Management Requirements¹

The Castlerock project permittee shall implement the *Vernal Pool Management Plan for the Castlerock Project* dated December 15, 2014 as part of the development entitlement process.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
QQ (Tecolote Canyon)

Species-Specific Objectives: None

Management Level: None

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

None.

Complex Description

Tecolote Canyon (QQ) is a 950-acre open space park owned and managed by the City of San Diego Park and Recreation Department. The park is located west of I-5 and north of Friars Road in Linda Vista and is conserved, zoned Open Space within the MHPA. Surrounding land uses include residential and transportation.

Nine vernal pools were mapped in two areas at Tecolote Canyon. The basins are natural and occur in the Chesterton Urban complex and Huerhuero loam. The upland vegetation is characterized by coastal sage scrub, southern mixed chaparral, and ruderal vegetation. No sensitive plant species were observed, and the site has not been surveyed for fairy shrimp.

Prior to establishment of the park, the area was used for livestock grazing. The park is now used for passive recreation, and official trails limit impacts to natural resources.

Existing Conditions

The table below includes the baseline data from the City's vernal pool database for the QQ complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Tecolote Canyon	100	9	0.09	NONE	NONE
Baseline	Tecolote Canyon	100	9	0.09	NONE	NONE
Expanded Alternative	Tecolote Canyon	100	9	0.09	NONE	NONE

Threats

Edge Effects

This open space area is heavily used by residents of both the adjacent neighborhoods and the region. Potential impacts from edge effects are limited by ranger patrols and environmental education programs.

Fire/Fire Suppression

Tecolote Canyon is located in an urban area surrounded by residential development. In the unlikely event of a fire in this location, impacts might occur from fire suppression activities.

Trespass

The public is allowed limited, nonmotorized access to Tecolote Canyon.

Litter

Litter is a threat due to the recreational use of the park; however, ranger and docent patrols limit litter impacts through enforcement and litter collection.

Invasive Species

Vegetation species at Tecolote Canyon are primarily native; however, some nonnative grasses occur.

Current Management Activities

The site is managed by rangers and other staff of the Park and Recreation Department in accordance with the draft *Tecolote Canyon Natural Park Natural Resource Management Plan* (Helix 2006). Management activities include trail and barrier installation/maintenance, regular park patrols, environmental education, and enforcement of park regulations.

Vernal Pool HCP Management Requirements¹

None.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
R-1 (Proctor Valley)

Species-Specific Objectives:

1. Establish viable populations of spreading navarretia consistent with the Recovery Plan (USFWS 1998), and protect and manage occupied vernal pools within the Preserve to maximize the likelihood that occurrences are sustained in the VPHCP Plan Area and, in doing so, contribute to recovery of the species on a range-wide basis.
2. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Public Utilities Department

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and existing focal species population status in order to conduct all Management Level 1 recommended activities.

Complex Description

This site (R 1) occurs on 157 acres owned and managed by the City of San Diego Public Utilities Department in Proctor Valley. Although the site is not conserved by a conservation easement, it is obligated open space as part of the MSCP Cornerstone Lands Bank Agreement and is within in the MHPA (City of San Diego 1997).

One hundred and twenty-four vernal pools occur at this complex. All vernal pools are natural and occur on Olivenhain cobbly loam soil, and upland vegetation is characterized by grasslands and coastal sage scrub. San Diego fairy shrimp (*Branchinecta sandiegonensis*) were observed at Proctor Valley.

This site has been used for cattle grazing, which resulted in a colonization of the site by exotic plant species. Currently, Proctor Valley Road bisects the vernal pool complex and provides access for off-road vehicle users and trash dumping. Major impacts from off-road vehicles were recorded in 1996, 2004, 2005, and 2006 and an off-road vehicle barrier was installed along the entirety of Proctor Valley Road in 2009-2010 to minimize these impacts in the future.

Restoration – including additional signage installation, seed dispersal, weeding and dethatching – was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the R 1 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Proctor Valley	100	126	1.40	SDFS (3)	NAFO
Baseline	Proctor Valley	100	126	1.46	SDFS (3)	NAFO
Expanded Alternative	Proctor Valley	100	126	1.40	SDFS (3)	NAFO

SDFS= San Diego fairy shrimp
 NAFO = spreading navarretia

Threats

Edge Effects

The Proctor Valley complex is surrounded by large expanses of open space and has a very low threat from edge effects.

Fire/Fire Suppression

Proctor Valley is adjacent to large rural and preserve areas where fire plays an important part in the natural ecologic regime. This site was at the western edge of the 2003 Otay Fire. The nearby Otay Lakes vernal pools burned in 2003 and comparison of pre- and post-fire surveys do not appear to reveal damage to sensitive species or their physical habitat. Therefore, fire does not appear to threaten the species presence or abundance of vernal pool ecosystems. However, fire-fighting activities might disturb this area.

Trespass

Trespass is a major threat, as noted in the *Vernal Pool Management Plan* (City of San Diego 1996). In particular, off-road vehicles tracks are present in the basins and watershed of several vernal pools. Dumping has also been a continuing problem in this area in spite of increased enforcement activities.

Litter

Dumping and litter are continuing problems in this area in spite of increased enforcement activities. Trash is removed by the maintenance staff of the City of San Diego Public Utilities Department.

Topographic Disturbance

The vernal pools at this complex have suffered major off-road and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Natural upland areas are coastal sage scrub/chamise chaparral; however, historic grazing introduced nonnative grasses and *Erodium* spp. to many areas, and off-road vehicles have denuded large areas within and adjacent to the vernal pools.

Current Management Activities

City of San Diego Public Utilities Department field crews respond to litter problems. The Public Utilities Department coordinates with the San Diego National Wildlife Refuge and the San Diego Sheriff's Department to enforce trespass laws, including installation of signage and an off-road vehicle barrier along Proctor Valley Road.

Several management actions recommended by the City of San Diego Vernal Pool Management Plan (1996) have been accomplished. The 1996 document suggested a thorough investigation of any unidentified resources, which was completed as part of the City of San Diego *2002–2003 Vernal Pool Inventory* (City of San Diego 2004). An assessment of vernal pool resources and an inspection of the physical condition of the site were also included in the inventory.

Restoration was conducted in 2008–2009 on a portion of the pools in this complex as part of a *TransNet* grant to restore vernal pool and Quino checkerspot butterfly habitat (AECOM 2010). This restoration included invasive species removal; dethatch of nonnative grasses, and hand-reshaping of basins. Follow-up maintenance work was performed in 2010.

Vernal Pool HCP Management Requirements¹

The following tasks in Management Level 1 shall be required for the site:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

None.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
U 19 (Cubic)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego button celery, San Diego mesa mint, and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area, and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 1

Ownership: Private

Management Responsibility: Private

Management Goal

The management goal of this complex is to *maintain* the habitat conditions and focal species population status consistent with Management Recommendations in order to conduct all Management Level 1 recommended activities.

Complex Description

Cubic is a 13.5-acre site located between Highways 52 and 163 at the northeastern terminus of Kearny Mesa Road in Kearny Mesa. This privately owned parcel is outside the MHPA and is not conserved. The site is zoned Industrial and Business Parks, and surrounding land uses include military, transportation, and industrial. A hardline vernal pool preserve area has been identified on site and will be included within the expansion to the MHPA pursuant to the adoption of the VPHCP.

Twenty-three vernal pools occur at the Cubic complex. Redding gravelly loam underlies the vernal pools, which are surrounded by disturbed coastal sage scrub and chamise chaparral. San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), and *Branchinecta* spp. were present in 2003.

Although considered separately here due to ownership and conservation status, the Cubic site is geographically related to vernal pools at Sander, Magnatron, and MCAS Miramar.

The Cubic site was identified by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998) as necessary for the reclassification of the following endangered and threatened species: San Diego button celery (*E. aristulatum*), San Diego mesa mint (*P. abramsii*), Orcutt’s grass (*O. californica*), and San Diego fairy shrimp (*B. sandiegonensis*).

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the U 19 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Magnatron	0	1	0.05	SDFS (1)	SDFS
	Cubic	100	23	0.37	POAB (1) ERAR (2) SDFS (6)	SDFS
Baseline	Magnatron	0	1	0.05	SDFS (1)	SDFS
	Cubic	0	23	0.37	POAB (1) ERAR (2) SDFS (6)	SDFS
Expanded Alternative	Magnatron	0	1	0.05	SDFS (1)	SDFS
	Cubic	100	23	0.37	POAB (1) ERAR (2) SDFS (6)	SDFS

SDFS = San Diego fairy shrimp
ERAR = San Diego button-celery
POAB = San Diego Mesa mint

Threats

Edge Effects

The site is adjacent to roadways and industrial developments. Impacts may occur from unauthorized access, trash, etc., although these may be minimized by existing fencing.

Fire and Fire Suppression

The Cubic vernal pools are located between MCAS Miramar and business park developments. The site might be impacted as a result of emergency fire suppression activities in the event of a

fire at Miramar, and the developed nature of the surrounding area would necessitate stringent fire-fighting measures.

Trespass

Trespass is generally limited to foot traffic, although the area was impacted by off-road vehicles and grading historically.

Litter

The site may be impacted by wind-blown trash and litter from trespassers.

Topographic Disturbance

The vernal pools at this complex have been affected by off-road vehicles and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Invasive species, particularly grasses, occur in both upland and vernal pool habitats at Cubic.

Current Management Activities

No management activities are currently occurring at this site.

Vernal Pool HCP Management Requirements¹

This site is privately held and may seek development entitlement in the future. During the development entitlement process, the City will ensure the property owner implements the Management Recommendations as identified below.

Management Recommendations²

Due to the presence of vernal pools and to the “Necessary to Declassify” designation by the U.S. Fish and Wildlife Service Recovery Plan, this site is recommended for conservation through public acquisition or private mitigation. The site is also near large military open space areas and within 0.6 kilometers of the Sander vernal pool site.

Development within the hardline preserve/MHPA area is precluded. However, development may occur outside this area in accordance with the City’s regulations. If a discretionary project

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

is proposed, at a minimum, preparation of a management plan that includes all Management Level 1 activities would be required as part of the development entitlement approval process. Any impacts to the vernal pools, watersheds, and/or buffers, would require additional mitigation measures consistent with Management Level 3 activities cited below and the City's Environmentally Sensitive Lands Regulations (ESL), Biology Guidelines, and VPHCP.

Management Level 1 and the following list of tasks are recommended for the complex:

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities
- Management Level 3 activities:
 - Conduct a dethatching program.
 - Conduct Weed Control-3 (hand, mechanical, and/or herbicide application).
 - Conduct a seed collection/bulking program. Under Management Level 3, off-site seed and cyst collection for San Diego mesa mint (*P. abramsii*), and San Diego button celery (*E. aristulatum*) may be considered if they are not found onsite.
 - Conduct cyst inoculation for San Diego fairy shrimp (*B. sandiegonensis*) as needed.
 - Conduct container plant propagation and installation.
 - Conduct topographic reconstruction where appropriate.

City of San Diego VPMMP Site Evaluation *X5 (Nobel Drive)*

Species-Specific Objectives:

1. Protect and manage existing vernal pool complexes and their associated watersheds currently occupied by spreading navarretia and San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the Plan area and, in doing so, contribute to recovery of these species on a range-wide basis.

Management Level: Level 1

Ownership: City of San Diego

Management Responsibility: City of San Diego Park and Recreation Department

Management Goal

The management goal is to *maintain* existing habitat conditions and focal species population status by conducting all Management Level 1 recommended activities.

Complex Description

The Nobel Drive (X5) site is located south of Nobel Drive and west of I-805 in the University Community Planning Area. Fifty-five acres of a 94-acre parcel were preserved as mitigation for the Eastgate Technology Park (EQD #81-21-31); however, the California Department of Transportation (Caltrans) has proposed a park-and-ride project for the northeastern corner near the Nobel Drive on-ramp that includes on-site mitigation. The site is owned and managed by the City of San Diego Real Estate Assets and Park and Recreation Departments. The majority of the site is within the MHPA and a portion has been designated as open space. The area is zoned for scientific research and industrial parks, and adjacent land uses include open space, transportation, multi-family residential, and research parks.

The vernal pools are natural in origin and are underlain by Redding gravelly loam. Upland vegetation is characterized by mixed chaparral, disturbed coastal sage scrub, and nonnative grasslands.

A total of 11 vernal pools occur at this complex. In 2003, seven vernal pools at Nobel Drive supported San Diego fairy shrimp (*B. sandiegonensis*). San Diego button celery (*E. aristulatum*)

was observed by Pacific Southwest Biological Services in 1993. *N. fossalis* was observed by Bauder in 1986, and in 2009, 155 spreading navaretia plants were observed on-site.

Restoration was conducted in 2008–2009 as part of a *TransNet* grant to restore vernal pool habitat (AECOM 2010) and additional weeding and dethatching was performed in 2010 by a City contractor. A portion of the site is also undergoing enhancement as part of the Caltrans’ Interstate 805 North Managed Lanes Project (USFWS BO FWS-SDG-09B0274-10F0485 and 08BO418-090555).

The site was identified as necessary to stabilize the population of San Diego fairy shrimp (*B. sandiegonensis*) by the adopted *Recovery Plan for Vernal Pools of Southern California* (USFWS 1998).

Existing Conditions

The table below shows the baseline data for the Nobel Drive (X5) complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools (acres)	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Nobel Drive	100	11	0.10	NAFO (1) POAB (1) SDFS (6)	NAFO
Baseline	Nobel Drive	100	11	0.10	NAFO (1) SDFS (6)	NAFO
Expanded Alternative	Nobel Drive	100	11	0.10	NAFO (1) POAB (1) SDFS (6)	NAFO

SDFS = San Diego fairy shrimp

NAFO = spreading navaretia

Threats

Edge Effects

Nobel Drive is located adjacent to roadways and other developed areas; however, the preserve is relatively large (55 acres) and is connected to preserved lands in Rose Canyon. The *Vernal Pool Management Plan* (City of San Diego 1996) noted trespass as a threat and subsequently the City installed fencing around individual vernal pools as well as property boundaries that border streets and other pedestrian corridors. Additional fencing of the pools was installed in 2008 as part of the *TransNet* grant-funded restoration program and the Caltrans mitigation project.

Fire and Fire Suppression

The site might be disturbed as a result of fire suppression activities in the event of a fire; however, wildfire is unlikely due to the density of surrounding development.

Trespass

The site has an established trail system that is being used and no illegal trespass within the vernal pools is evident.

Litter

With the adjacent Nobel Drive, I- 805 and the recreation uses of the site for hiking and biking, litter will continue to be a threat for the site.

Topographic Disturbance

There are currently no issues with topographic disturbance.

Invasive Species

Nonnative grasses and forbs are prevalent in both the uplands and vernal pools.

Current Management Activities

The site is managed by the City of San Diego Park and Recreation Open Space Division. Fencing was installed around the vernal pools and adjacent to nearby roadways to minimize trespass. Funding was secured through a SANDAG *TransNet* grant for invasive species control, local reintroduction of extirpated focal species populations and basin reshaping. This work occurred between 2007 and 2009 and resulted in reestablishment of spreading navarettia at the site, but no San Diego button-celery was seen as a result of this restoration. Additional weeding and dethatching was performed in 2010 by a City contractor.

Caltrans initiated vernal pool restoration and habitat enhancement as mitigation for the park-and-ride facility in 2012. The project was implemented consistent with the Del Mar Mesa and Nobel Vernal Pool Mitigation Sites Project Description (December 2012) prepared by Caltrans and included recontouring, weeding & dethatching, upland watershed restoration, hydrological monitoring, and fencing.

Vernal Pool HCP Management Requirements¹

Management Level 1 and the following list of tasks are required for the site:

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

Management Recommendations²

None.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.

City of San Diego VPMMP
Vernal Pool Complex Evaluation and Management Recommendations
X 7 (Nobel Research Park)

Species-Specific Objectives:

1. Protect and manage extant populations across the range of existing vernal pool complexes and their associated watersheds currently occupied by San Diego fairy shrimp within the Preserve to maximize the likelihood that existing occurrences are sustained in the VPHCP area and, in doing so, contribute to recovery of the species on a range-wide basis.

Management Level: Level 1

Ownership: Private

Management Responsibility: Private (IDEC Nobel Research Park, LLC)

Management Goal

The management goal for this complex is to *maintain* existing habitat conditions and focal species population status in order to conduct all Management Level 1 recommended activities.

Complex Description

Nobel Research Park (X 7) is located north of Nobel Drive and west of I-805 in the University Community Planning Area. The 3.29-acre vernal pool preserve was conserved via conservation easement as mitigation for the Nobel Research Park project (LDR 99-0034). This area is on the site of the IDEC Nobel Research Center and is outside the MHPA; it is zoned for scientific research and industrial parks. Adjacent land uses include transportation, multi-family residential and research parks. The site has been included within the proposed expansion of the MHPA pursuant to the adoption of the VPHCP and consistent with the prior approval no development would be allowed within the site.

Twenty-eight vernal pools were mapped in 2003. The vernal pools are natural in origin and are underlain by Redding gravelly loam. Upland vegetation is characterized by disturbed coastal sage scrub and nonnative grasslands, and San Diego fairy shrimp (*B. sandiegonensis*) was recorded in 2003.

This site appears to be relatively undisturbed, although there is evidence of historic off-road vehicle use. An itinerant encampment within the preserve was reported in 2006.

Existing Conditions

The table below includes the baseline data from the City’s vernal pool database for the X 7 complex:

	Site Name	% VP Conservation	Number of Pools	Surface Area of Pools	Focal Species Populations (# of pools)	Focal Species Critical Habitat
Project	Nobel Research Park	100	28	0.10	SDFS (1)	NONE
Baseline	Nobel Research Park	100	28	0.10	SDFS (1)	NONE
Expanded Alternative	Nobel Research Park	100	28	0.10	SDFS (1)	NONE

SDFS = San Diego fairy shrimp

Threats

Edge Effects

Nobel Research Park is located adjacent to roadways and other developed areas and is likely to be impacted by trash and nonnative species. The site is not completely isolated, however, because the Nobel Drive site is located approximately 705 feet away.

Fire and Fire Suppression

Due to fencing and artificial slopes, it is unlikely that impacts would occur due to fire suppression activities. There is a low potential for wildland fire at Nobel Research Park due to the developed nature of the adjacent lands.

Trespass

Fencing was installed at the edges of the preserve as part of the mitigation requirements. However, a large itinerant camp was reported in 2006.

Litter

The site is fenced and located on private property; litter is unlikely excepting windblown trash.

Topographic Disturbance

The vernal pools at this complex have been impacted by some off-road and other physical damage over the years, which may have resulted in changes in hydrologic connection, flow patterns, and inundation characteristics.

Invasive Species

Nonnative species, particularly grasses, are present and may impact the basins.

Current Management Activities

The site was conserved (via conservation easement) and fenced as conditions of project approval contained within the 1999 Mitigated Negative Declaration (MND) for the Nobel Research Park project (LDR 99-0034). A final report was submitted by the owner to the resource agencies to evaluate the success of mitigation and a site visit was conducted to confirm project success. Pursuant to the requirements of the project, Nobel Research Park – Vernal Pool Maintenance Program (RECON Number 3068B) dated September 27, 2002 has been prepared for the site and includes fencing, signage, trash pick-up, repair of any damage due to inadvertent encroachment into the vernal pool preserve area, maintenance of berm surrounding vernal pool preserve to ensure excess water from adjacent development does not enter the vernal pool watershed, and removal of any new invasions on non-native species within the vernal pool preserve area. Funding for the long-term maintenance program is the responsibility of the Permittee (IDEC Nobel Research Park, LLC).

Vernal Pool HCP Management Requirements¹

The project was approved on this site after the adoption of the City of San Diego's Multiple Species Conservation Plan (MSCP). The City was granted a Conservation Easement as a condition of the discretionary land use entitlement. If access is granted to the City from the private landowner, the City has committed to ensure Management Level 1 activities occur at this site as a requirement of the VPHCP.

The following tasks in Management Level 1 shall be required for the site:

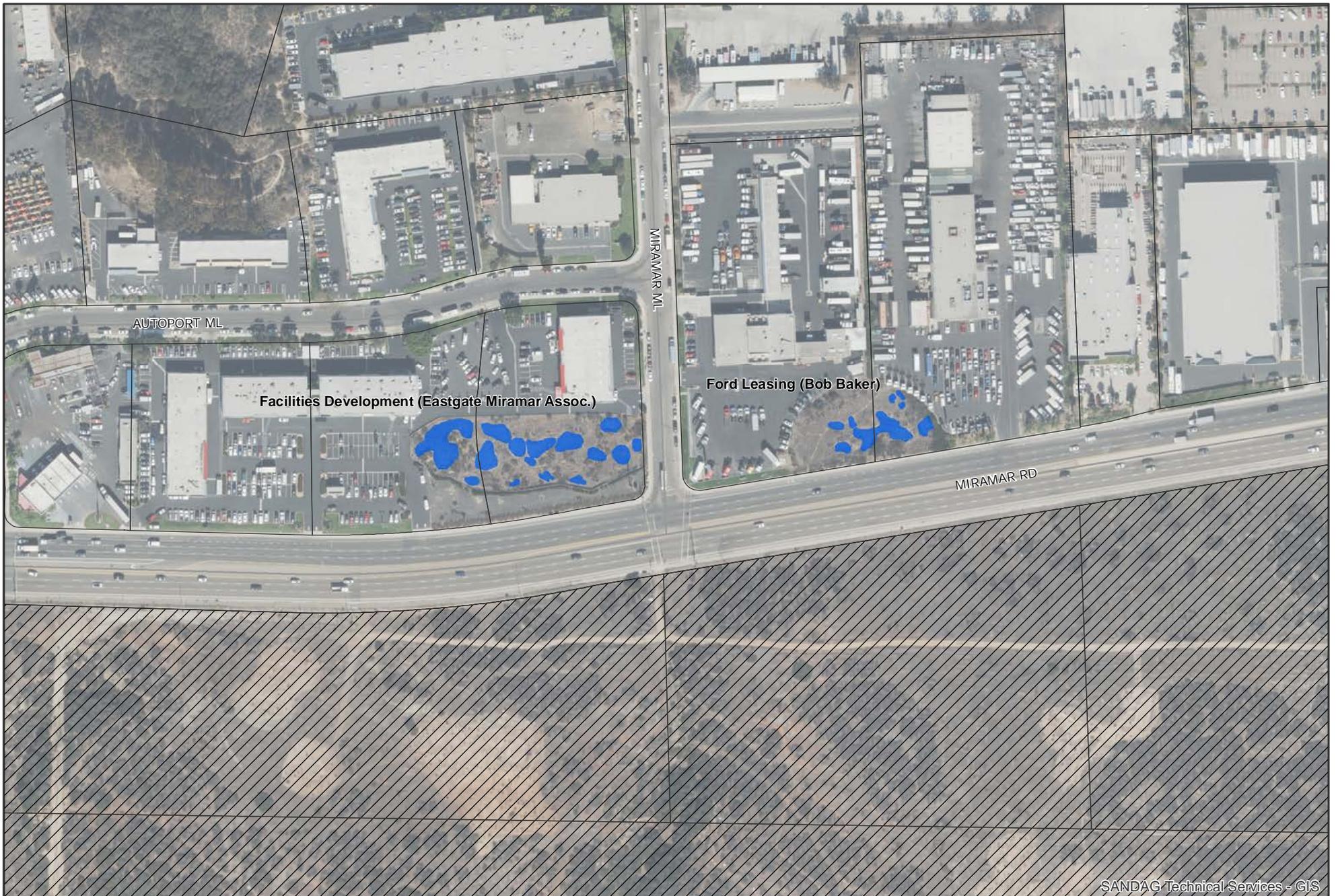
- Conduct all Management Level 1 recommended activities, including targeting the serious invasive problems (plants or animals), trash removal, and other general management activities.

¹ Action required as part of the VPHCP to ensure coverage of the seven focal species.

Management Recommendations²

None.

² Actions other than those required that may be implemented during the life of the VPHCP as funding becomes available.



SANDAG Technical Services - GIS



16B & 16C

- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land

Date: 9/15/2016 Document Path: S:\ERA\MSCP\VP\HCP\Verbal Pool HCP\DRAFT VP\HCP 2016\Management Plan Sites\Map\MXD\116B_C_Vernal_Pool_Complex_2016.mxd

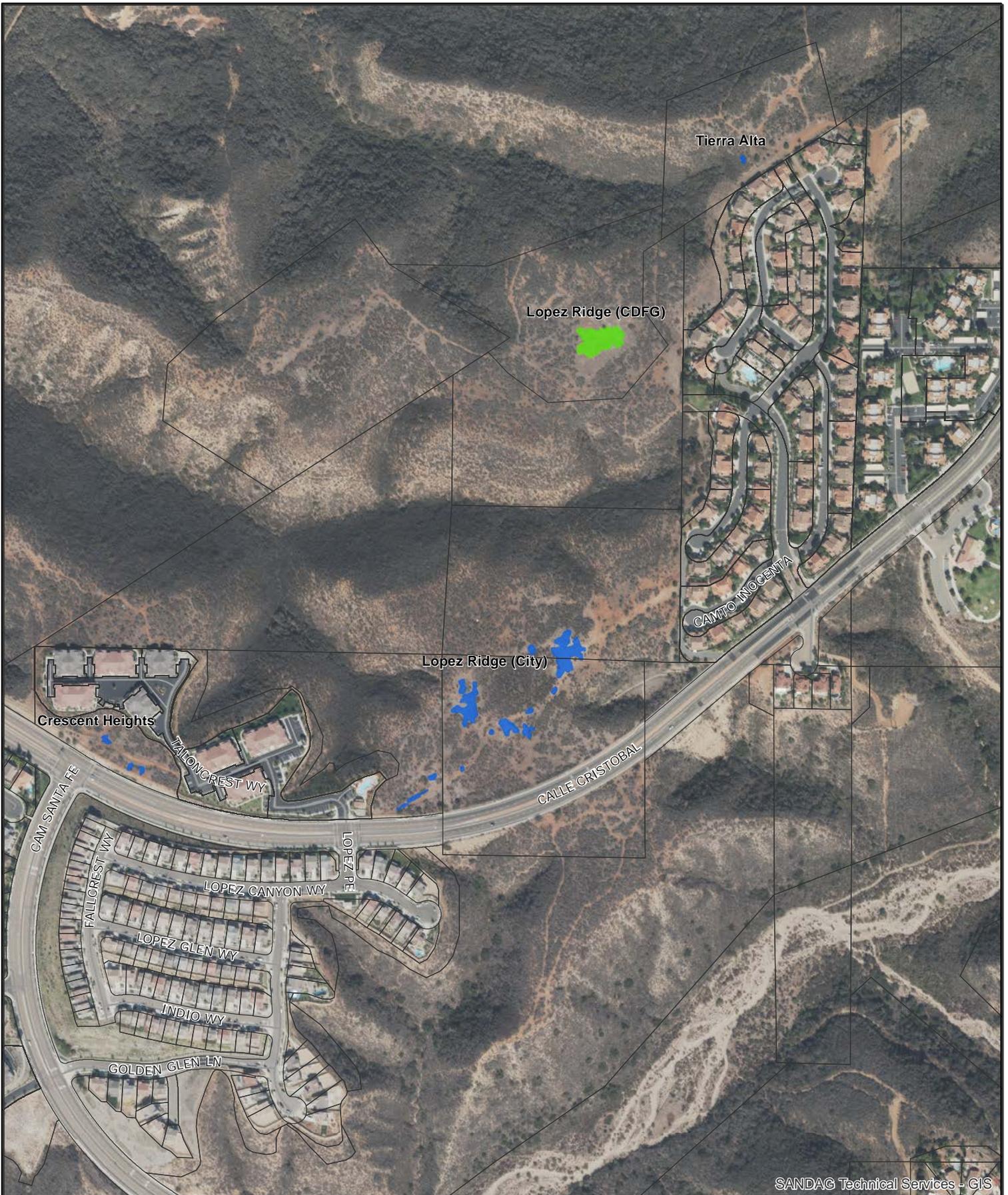
0 37.5 75 150
Feet

Imagery - 2014

EAGLE AERIAL

www.eagleair.com
714.734.7870

SANDAG
San Diego Regional Water Authority



SANDAG Technical Services - GIS

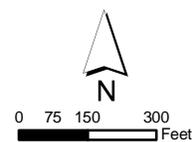
Date: 9/15/2016 Document Path: S:\ERA\MSCP\VP\HCP\Wernal Pool HCP\Draft VP\HCP 2016\Management Plan Sites\Map\MXD\B5_6_7_8_Sites_Wernal_Pool_Complex_2016.mxd



B5, B6, B7 & B8

- City Jurisdiction, Conserved or Proposed for Conservation
- Non-City Jurisdiction, Conserved

- Parcels
- Publicly Owned Land



Imagery - 2014



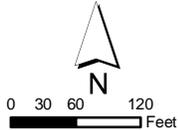
SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAMSCP\PHCP\vernal Pool HCP\Draft VP\HCP 2016\Management Plan Sites\Map\MXD\B11_Vernal_Pool_Complex_2016.mxd



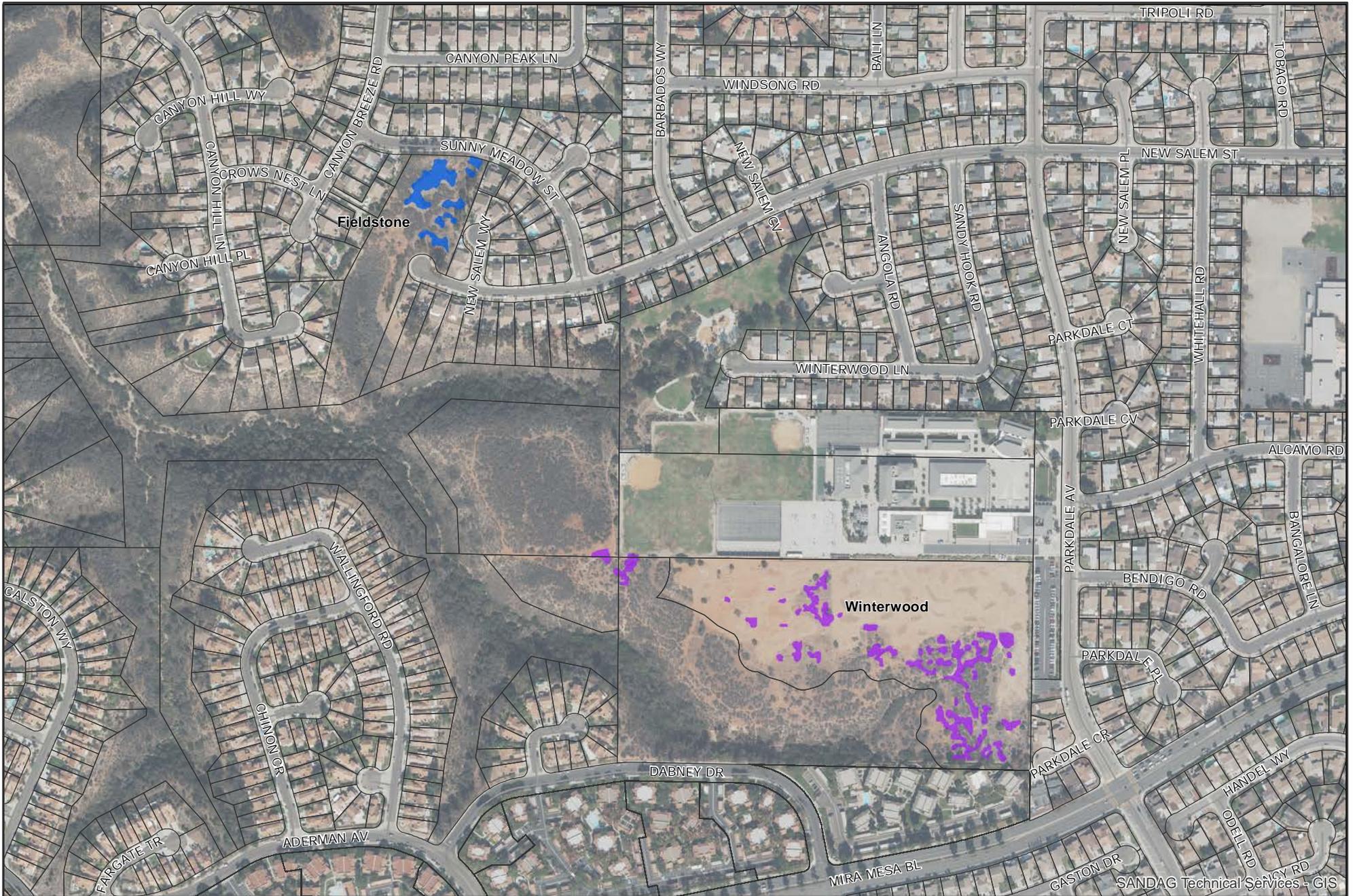
B 11

- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land



Imagery - 2014

SANDAG



C10-C16,C17 & C18

 City Jurisdiction, Conserved or Proposed for Conservation	 Parcels
 Not Subject to VPHCP*	 Publicly Owned Land

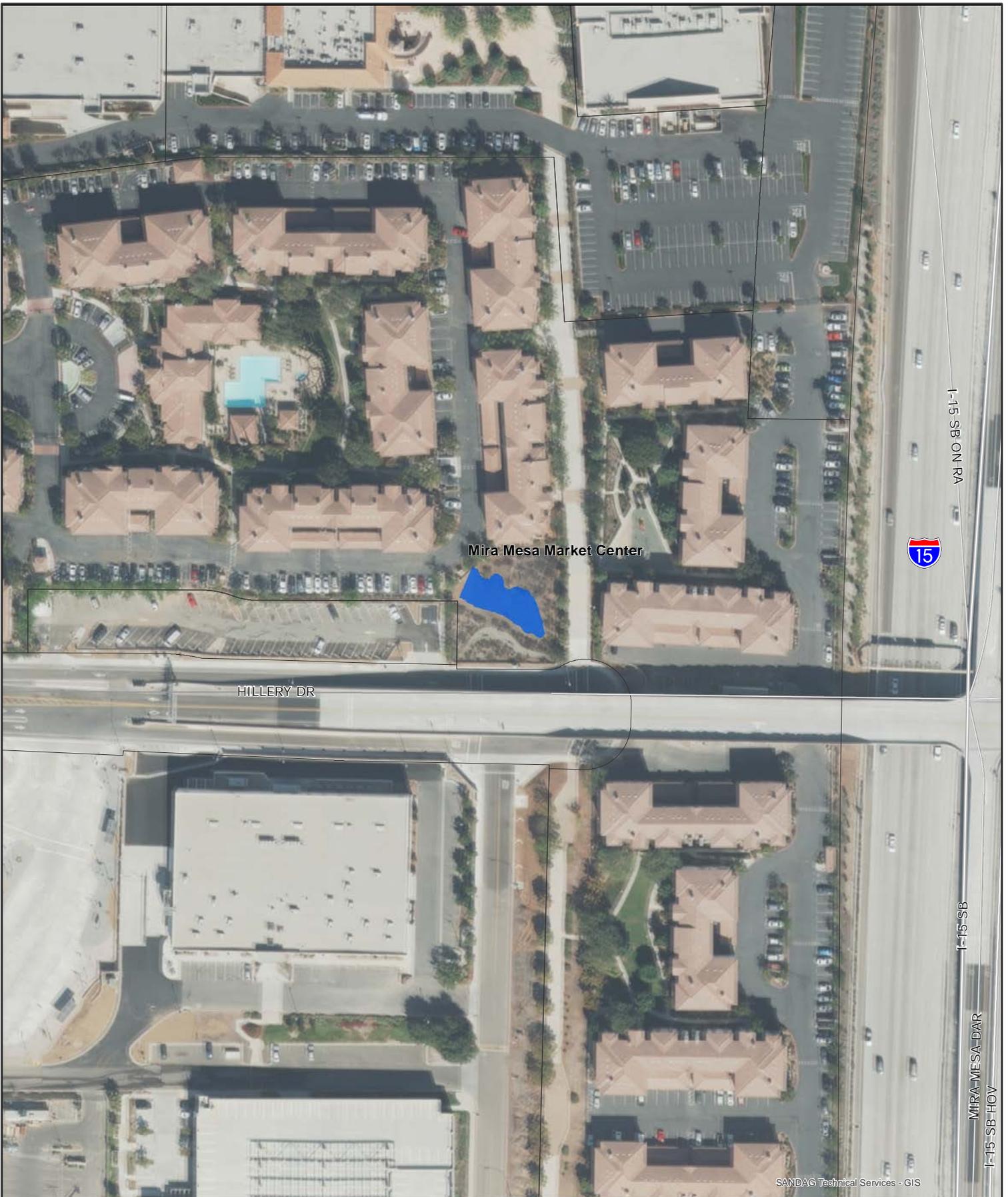
*Vernal pools are either currently conserved or take-authorized under separate permitting process

Date: 9/15/2016 Document Path: S:\ER\AMSC\VP\HCP\Vernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXDs\C_10_16_17_18_Vernal_Pool_Complex_2016.mxd

Imagery - 2014

 www.eagleaerial.com
 714.794.7870


0 75 150 300 Feet



C 27

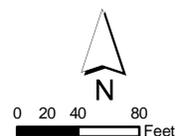
 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land

Date: 9/15/2016 Document Path: S:\ERAMS\CPWP HCP\Verbal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\C27_Vermal_Pool_Complex_2016.mxd

Imagery - 2014





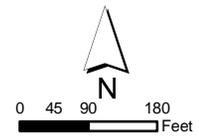
SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP HCP\Verml Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\6\D5_8_Vermal_Pool_Complex_2016.mxd



D5 & D8

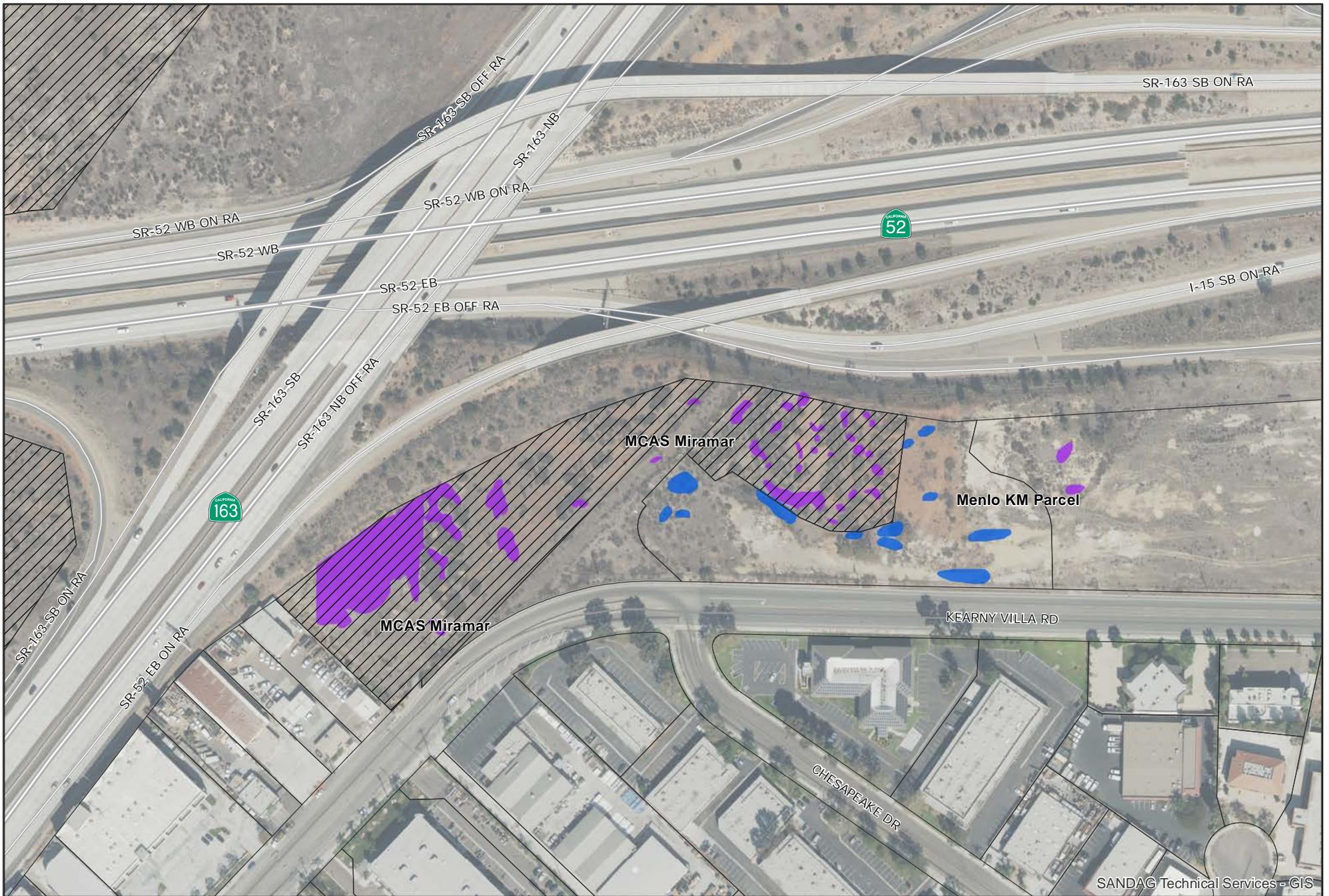
- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land



Imagery - 2014

EAGLE AERIAL
www.eagleaerial.com
714.784.7670

SANDAG
San Diego Regional Air Quality District



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ER\AIMSCP\VP\HCP\Verml Pool\HCP\Draft VPHCP 2016\Management Plan\Stes\Map\MXD\F16_17_Vernal_Pool_Complex_2016.mxd



F16 & F17

- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Not Subject to VPHCP*
- Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process

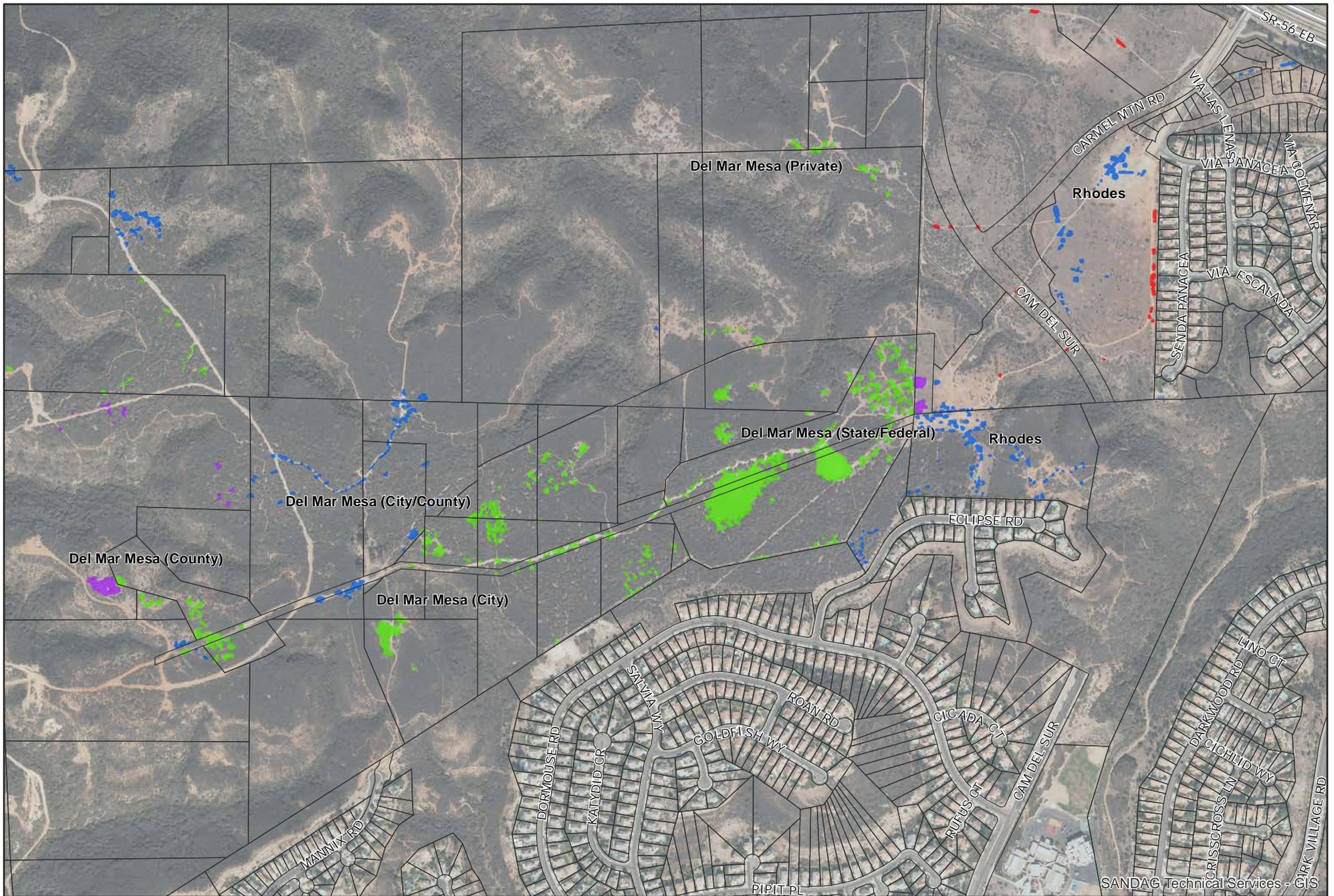
N

Imagery - 2014

www.eagleaerial.com
714.754.7870

0 37.5 75 150 Feet

SANDAG
San Diego Area Regional Council



H 1-H10, H13-H15 & H18-H26

■ City Jurisdiction, Not Conserved

■ City Jurisdiction, Conserved or Proposed for Conservation

■ Non-City Jurisdiction, Conserved

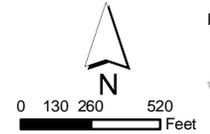
■ Not Subject to VPHCP*

Parcels

Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process

Date: 9/15/2016 Document Path: S:\ERAIMSCP\PHCP\Vernal Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\H_1_26_Vernal_Pool_Complex_2016.mxd



Imagery - 2014

ESRI Aerial Imagery

www.esri.com

714.754.7570

SANDAG

San Diego Area Regional Water Authority



SANDAG Technical Services - GIS

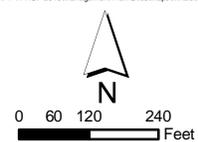


H 17

- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation

- Parcels
- Publicly Owned Land

Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP HCP\Vernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\H_17_Vernal_Pool_Complex_2016.mxd



Imagery - 2014

EAGLE AERIAL
www.eagleair.com
714.764.7870

SANDAG
San Diego Air & Motion Transportation Services



SANDAG Technical Services - GIS

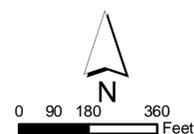


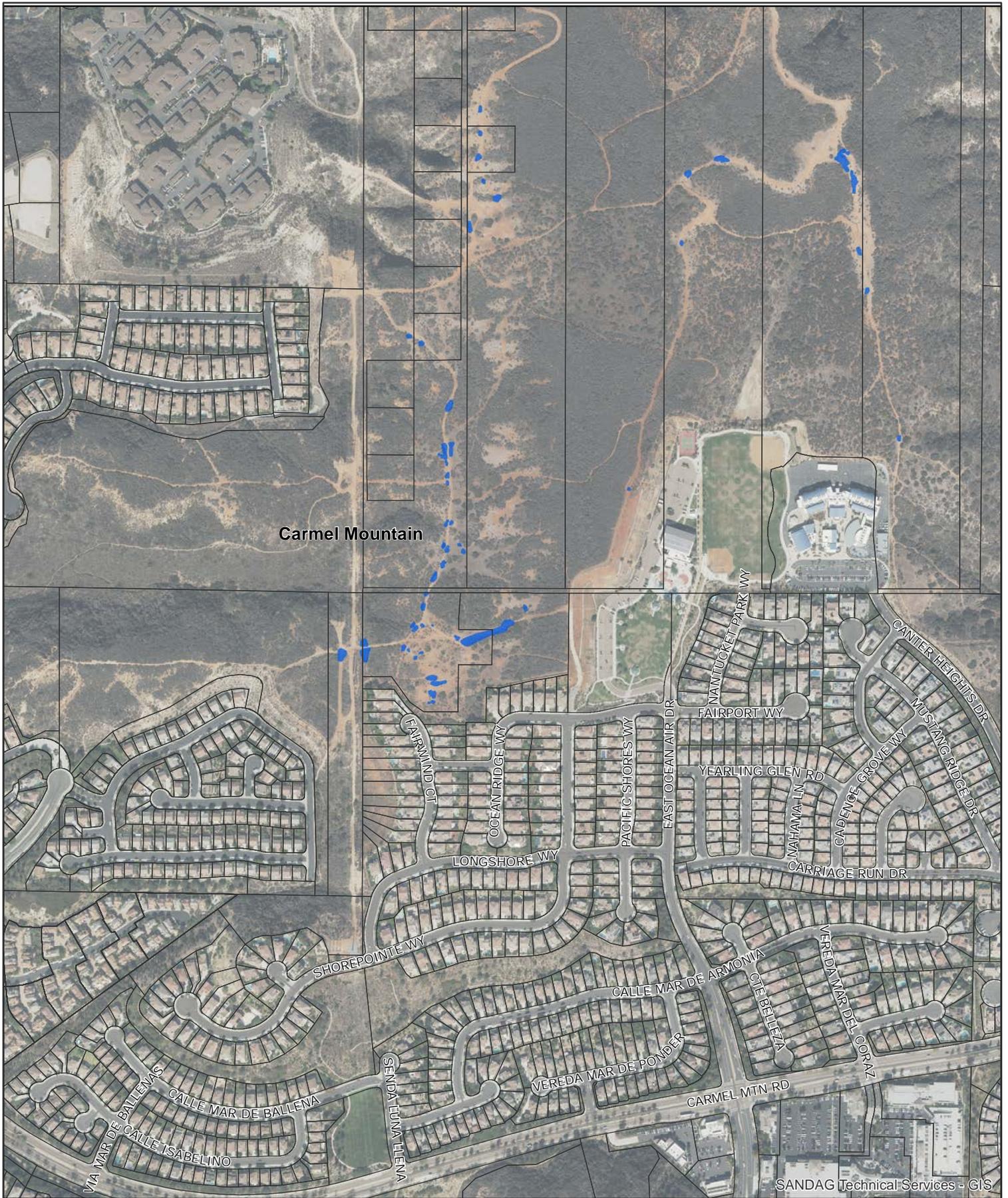
H 33

- City Jurisdiction, Conserved or Proposed for Conservation
- Not Subject to VPHCP*
- Parcels

*Vernal pools are either currently conserved or take-authorized under separate permitting process

Date: 9/15/2016 Document Path: S:\ERAMSCP\VP\HCP\Vernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\H_33_Vernal_Pool_Complex_2016.mxd





Date: 9/15/2016 Document Path: S:\ERAIMSCPIV\HCP\Verbal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Map\MXD\H_38_Vernal_Pool_Complex_2016.mxd



H 38

City Jurisdiction, Conserved or Proposed for Conservation

Parcels

Publicly Owned Land

Imagery - 2014

EAGLE AERIAL

www.eagleaerial.com
714.764.7970

SANDAG

No Right to Privacy Agency

N

0 100 200 400 Feet



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERA\MSCP\VP HCP\Verbal Pool HCP\Draft VP HCP 2016\Management Plan Sites\Map\MXD\H_39_Vernal_Pool_Complex_2016.mxd



H 39

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land



0 30 60 120
Feet

Imagery - 2014





SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAMSCP\VP\HCP\Verml Pool HCP\Draft VP\HCP 2016\Management Plan Sites\Map\MXD\1_1_Vermal_Pool_Complex_2016.mxd



I 1

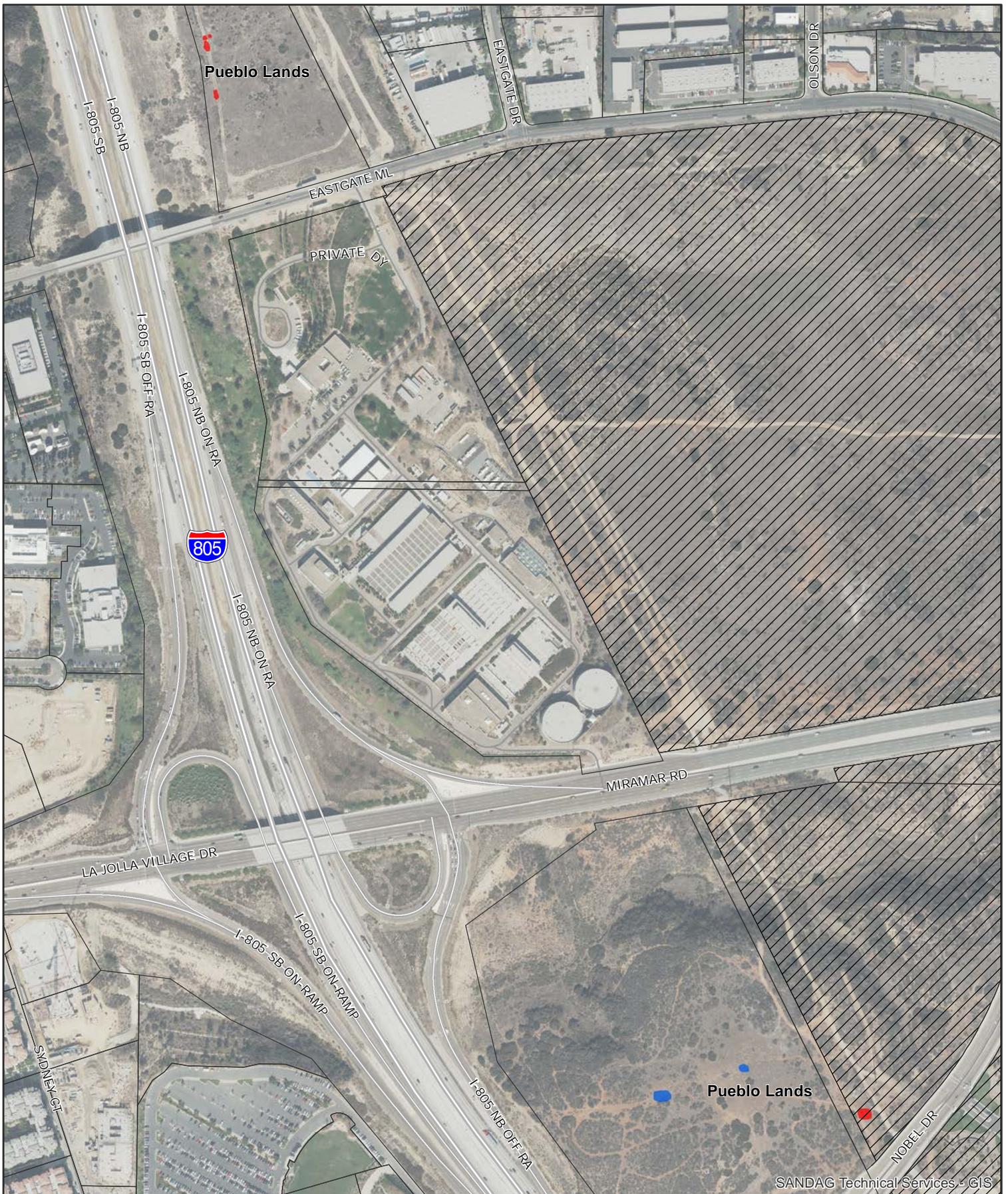
- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land

0 37.5 75 150
Feet

Imagery - 2014

EAGLE AERIAL

www.eagleair.com
714.784.7870



SANDAG Technical Services - GIS



I 12

- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation

- Parcels
- Publicly Owned Land

Date: 9/15/2016 Document Path: S:\ERAIMSCP\IP\HCP\Verml Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\I_12_Vermal_Pool_Complex_2016.mxd

Imagery - 2014

EAGLE AERIAL
www.eagleaerial.com
714.754.7870

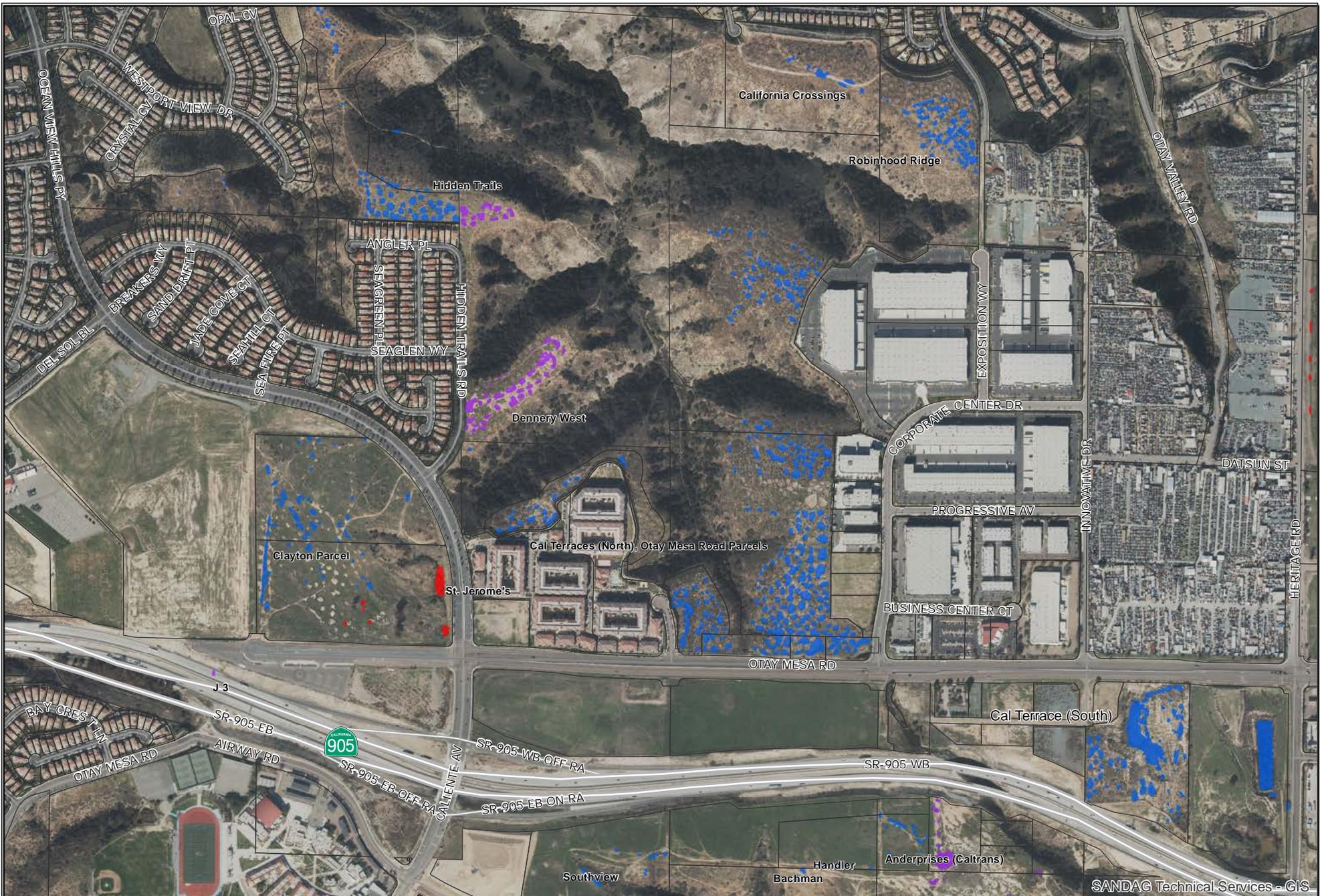
SANDAG
San Diego Area Regional Transit Authority



N



0 80 160 320
Feet



J2, J4, J5 & J31

- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation
- Not Subject to VPHCP*
- Parcels
- Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process

Date: 9/15/2016 Document Path: S:\ERA\MSCP\W\HCP\Vernal Pool HCP-DRAFT VPHCP 2016\Management Plan Sites\Maps\Map\J2_3_4_5_31_Vernal_Pool_Complex_2016.mxd



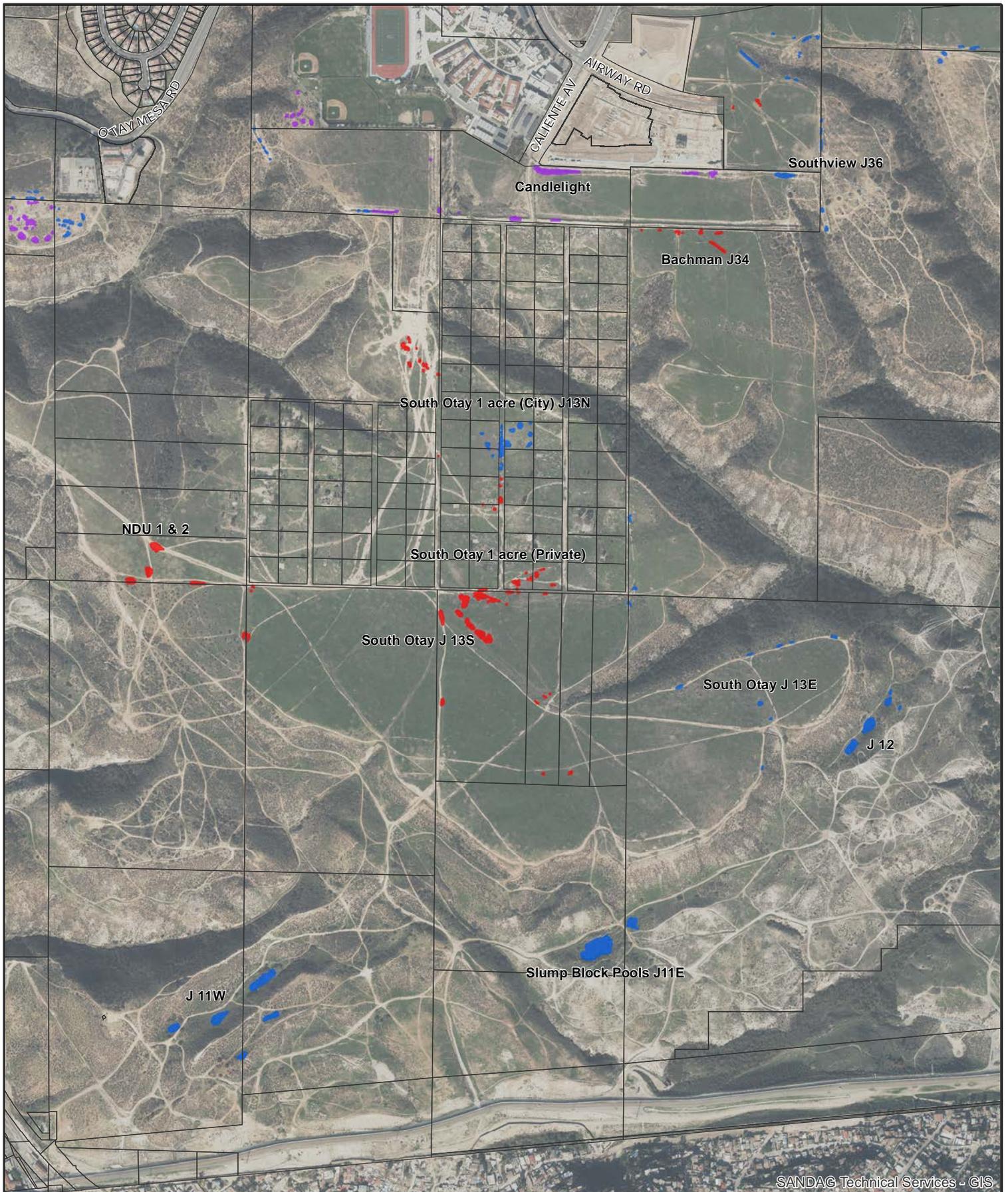
0 150 300 600
Feet



Imagery - 2014
EAGLE AERIAL
www.eagleair.com
714.654.1870



SANDAG
San Diego Area Regional Public Utility District



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ER\AMSCP\VP HCP\Vernal Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\J11_12_13_34_36_Vernal_Pool_Complex_2016.mxd

J11E, J11W, J12, J13S, J13E, J13N, J34 & J36

■ City Jurisdiction, Not Conserved

■ City Jurisdiction, Conserved or Proposed for Conservation

■ Not Subject to VPHCP*

Parcels

Publicly Owned Land



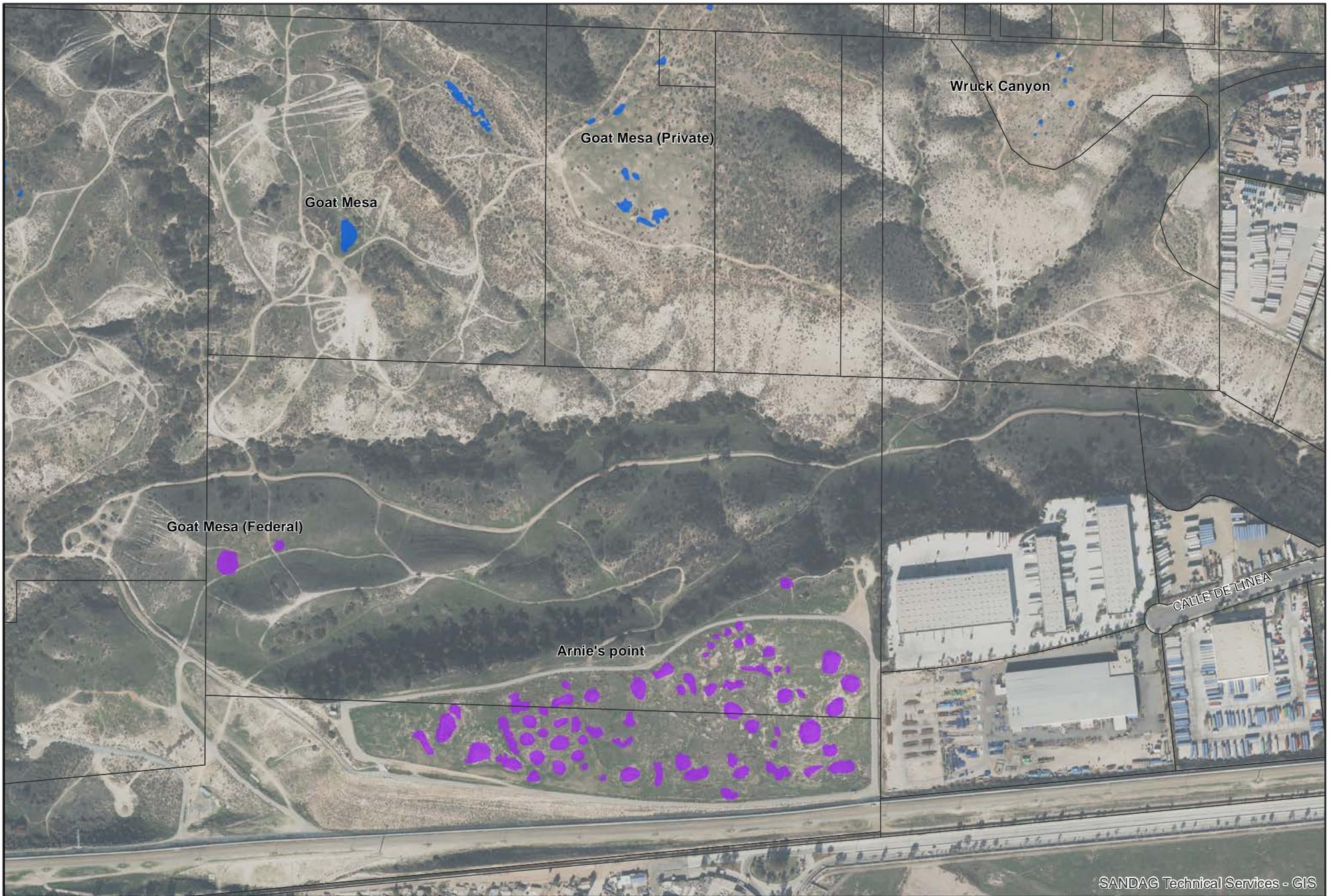
0 165 330 660 Feet

Imagery - 2014



SANDAG
San Diego Regional Planning Agency

*Vernal pools are either currently conserved or take-authorized under separate permitting process



SANDAG Technical Services - GIS

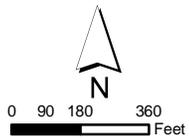
Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP HCP\Vernal Pool HCP\DRIFT VP\HCP 2016\Management Plan Sites\Maps\MXD\J15_16_18_Vernal_Pool_Complex_2016.mxd



J15,J16-J18

- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Not Subject to VPHCP*
- Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process



Imagery - 2014

SANDAG
San Diego Area Regional Transit Authority



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP HCP\Verinal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\J20_21_Vernal_Pool_Complex_2016.mxd



J20 & J21

City Jurisdiction, Conserved or Proposed for Conservation

Parcels

Publicly Owned Land



0 90 180 360 Feet

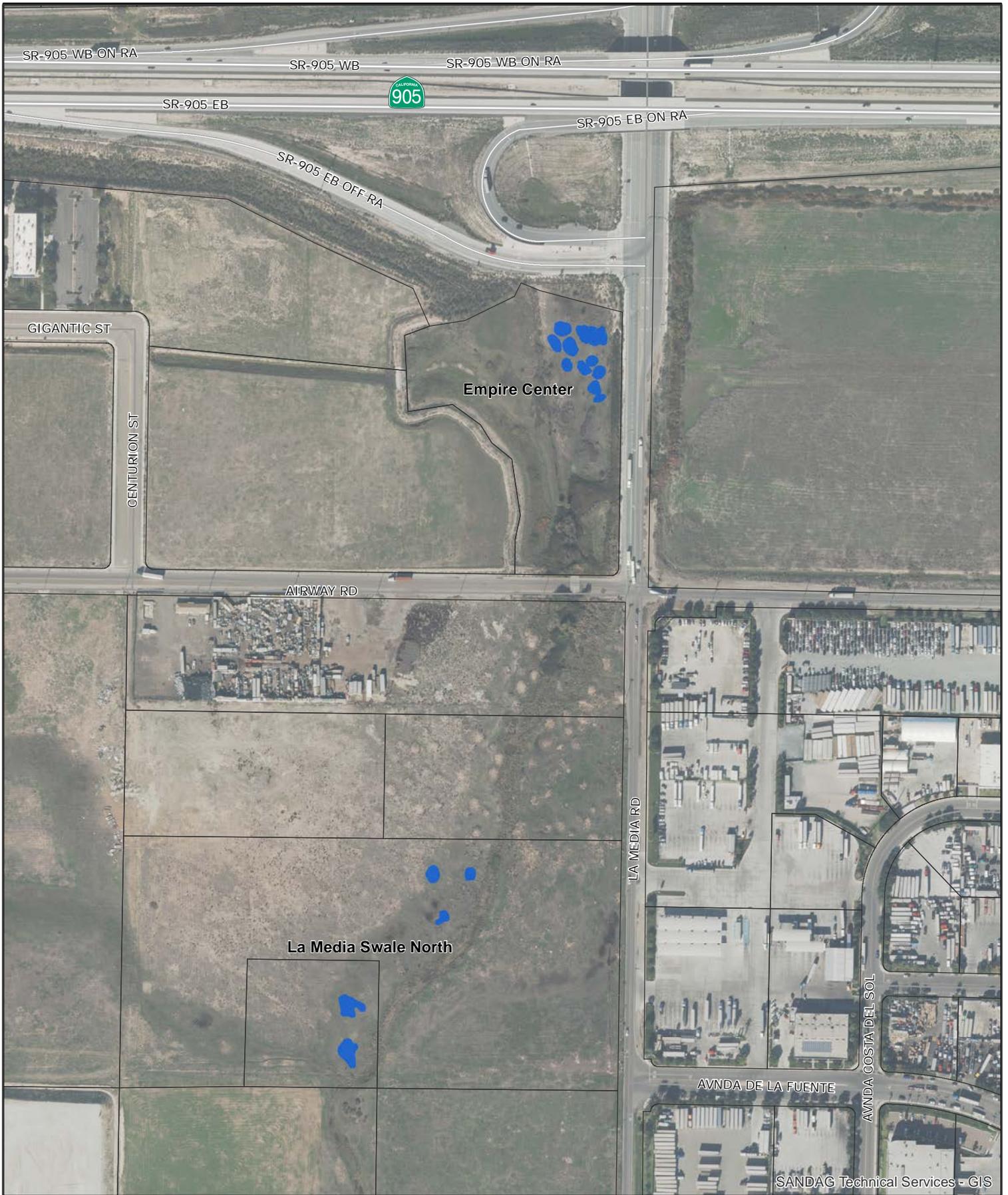
Imagery - 2014

EAGLE AERIAL

www.eagleaerial.com
714.754.7870

SANDAG

San Diego Regional Authority



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAMSCP\VP HCP\Verml Pool HCP\Draft VPHCP-2016\Management Plan Sites\Map\MXD\J27_Vermal_Pool_Complex_2016.mxd



J 27

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land



Imagery - 2014



www.eagleaerial.com
714.754.7870





J 35

	City Jurisdiction, Not Conserved		Parcels
	City Jurisdiction, Conserved or Proposed for Conservation		Publicly Owned Land

Imagery - 2014

SANDAG
San Diego Regional Air Quality Agency

Date: 9/15/2016 Document Path: S:\ER\AMSCP\VP\HCP\Vernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\J35_Vernal_Pool_Complex_2016.mxd



Lake Murray
KK2

Pasatiempo
KK1

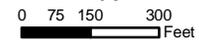
SANDAG Technical Services - GIS

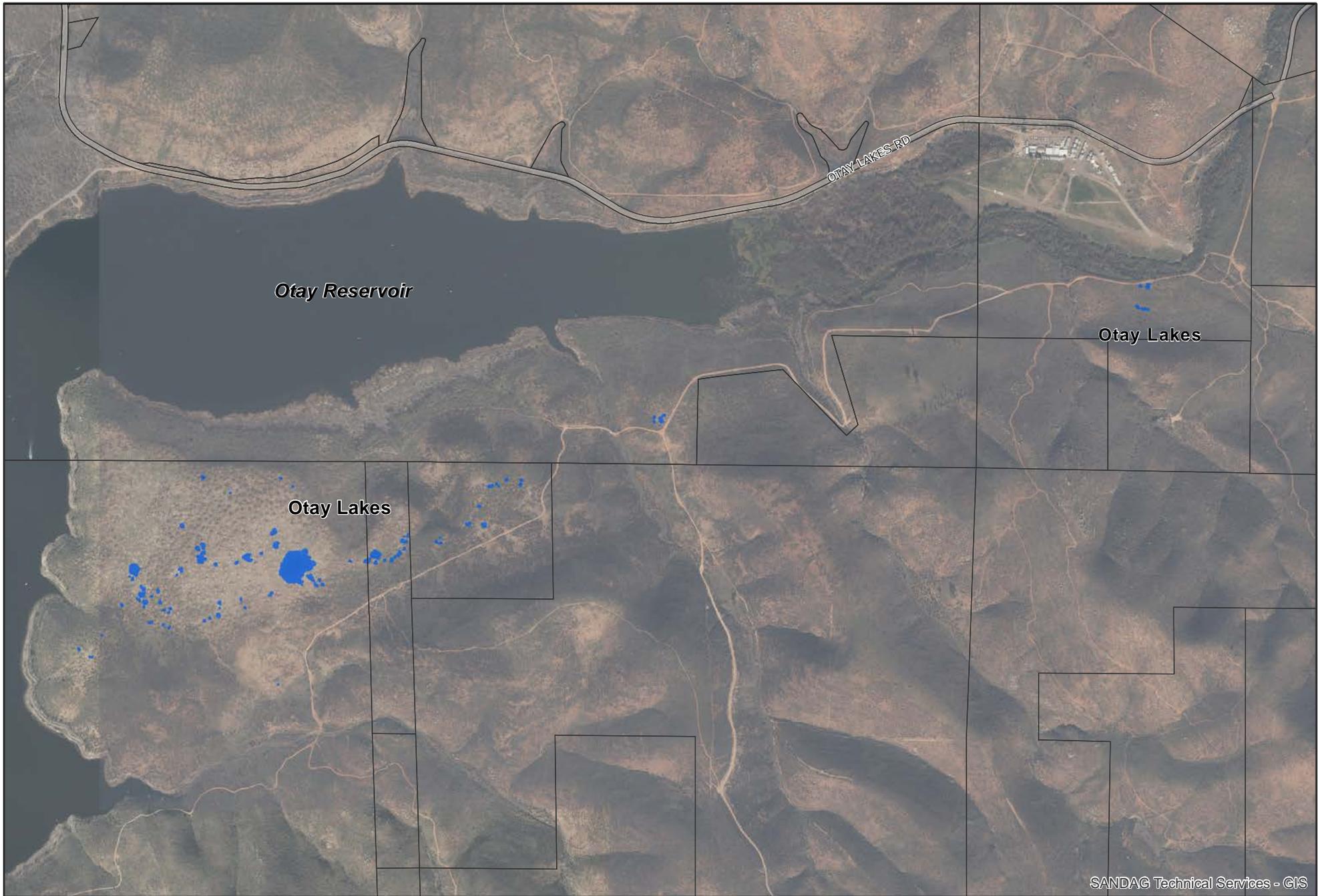
Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP\HCP\Verml Pool HCP\Draft VP\HCP 2016\Management Plan Sites\Map\MXDs\K1_2_Vermal_Pool_Complex_2016.mxd



KK1 & KK2

- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land





Otay Reservoir

OTAY LAKES RD

Otay Lakes

Otay Lakes

SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIN\SC\VP\HCP\Verinal Pool\HCP\DRRAFT\VP\HCP 2016\Management Plan Sites\Maps\MXD\K5_Vernal_Pool_Complex_2016.mxd



K5

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land



0 235 470 940
Feet



Imagery - 2014



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERA\MSCP\VP\HCP\Vernal Pool HCP\Draft VP\HCP 2016\Management Plan Sites\Map\MM1_Sites_Vernal_Pool_Complex_2016.mxd



MM1

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

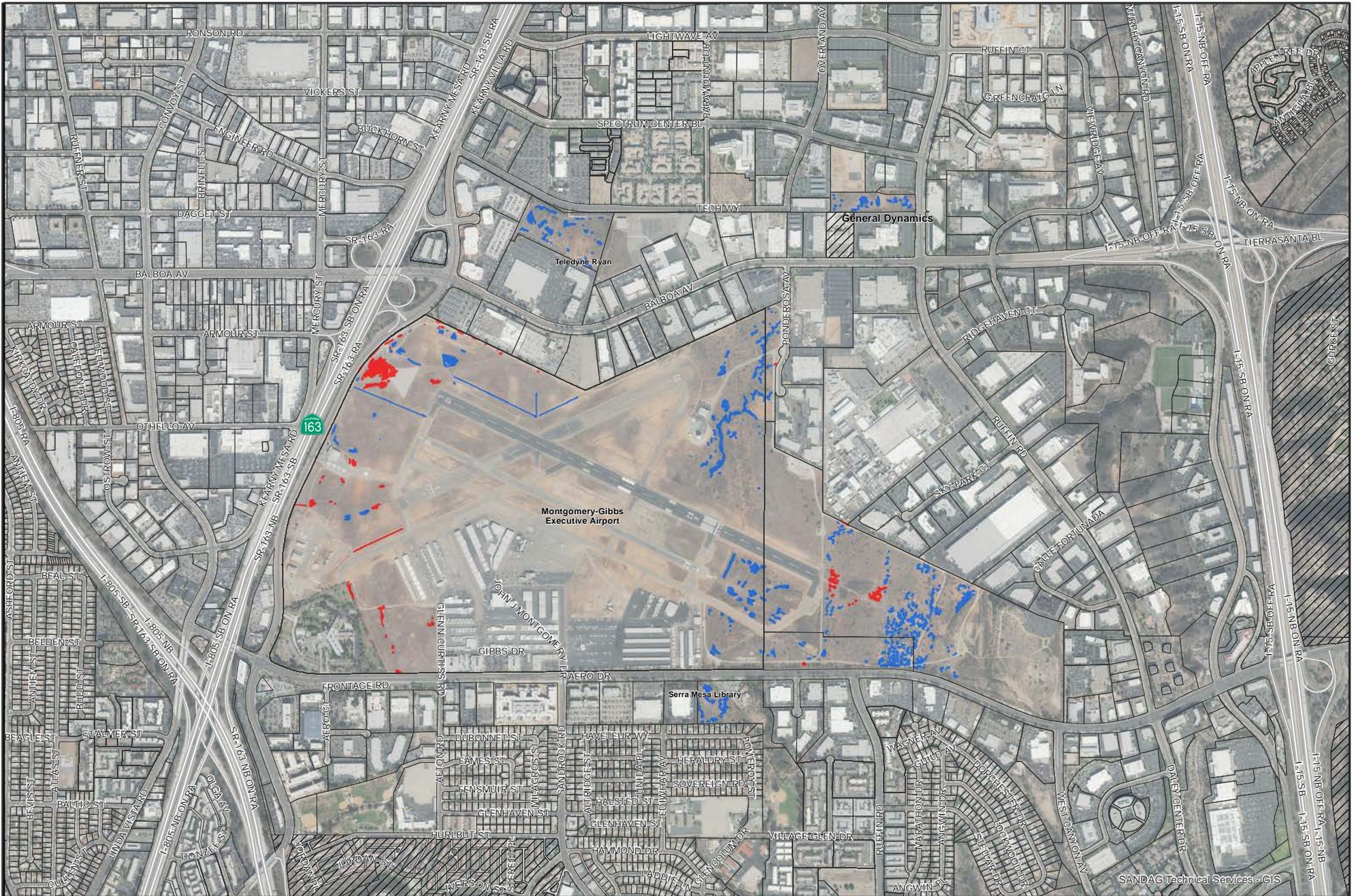
 Publicly Owned Land



0 115 230 460 Feet

Imagery - 2014





SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMS\CPV\HCP\Verinal Pool\HCP\Draft\VP\HCP 2016\Management Plan Sites\Maps\MXD\N1_8_Vernal_Pool_Complex_2016.mxd

N1-4,N5-6,N7 & N8

- City Jurisdiction, Not Conserved
- Parcels
- City Jurisdiction, Conserved or Proposed for Conservation
- Publicly Owned Land



Imagery - 2014

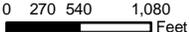


www.eagleaerial.com
1-858-581-7000

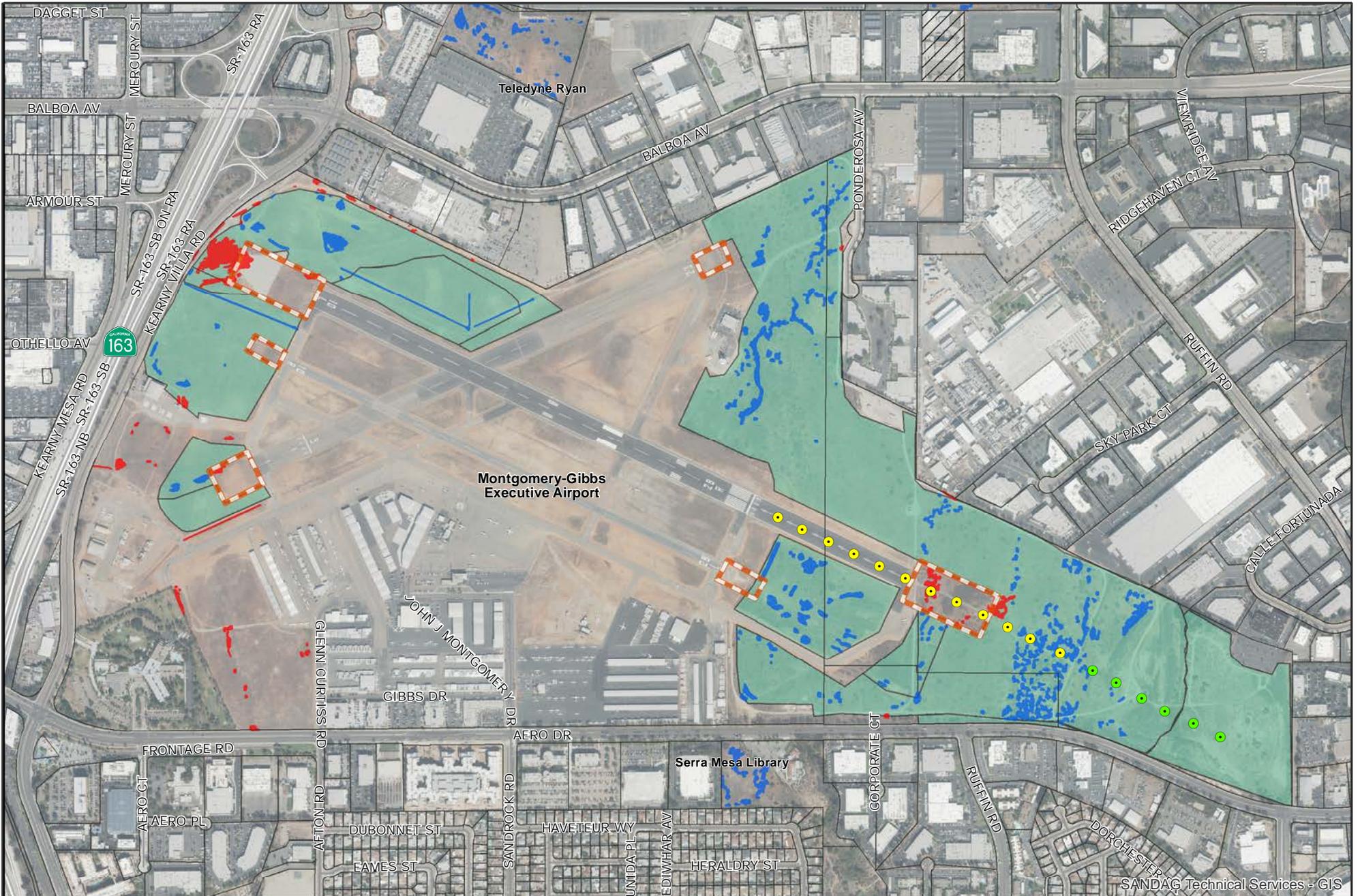




N



0 270 540 1,080 Feet



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMS\CPVP HCP\Verinal Pool HCP DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\N5_6_Vernal_Pool_Complex_2016.mxd



N5 & N6

- Baseline
- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation

- Parcels
- Publicly Owned Land
- Runway Safety Areas
- Light Pole - Existing
- Light Pole - Proposed



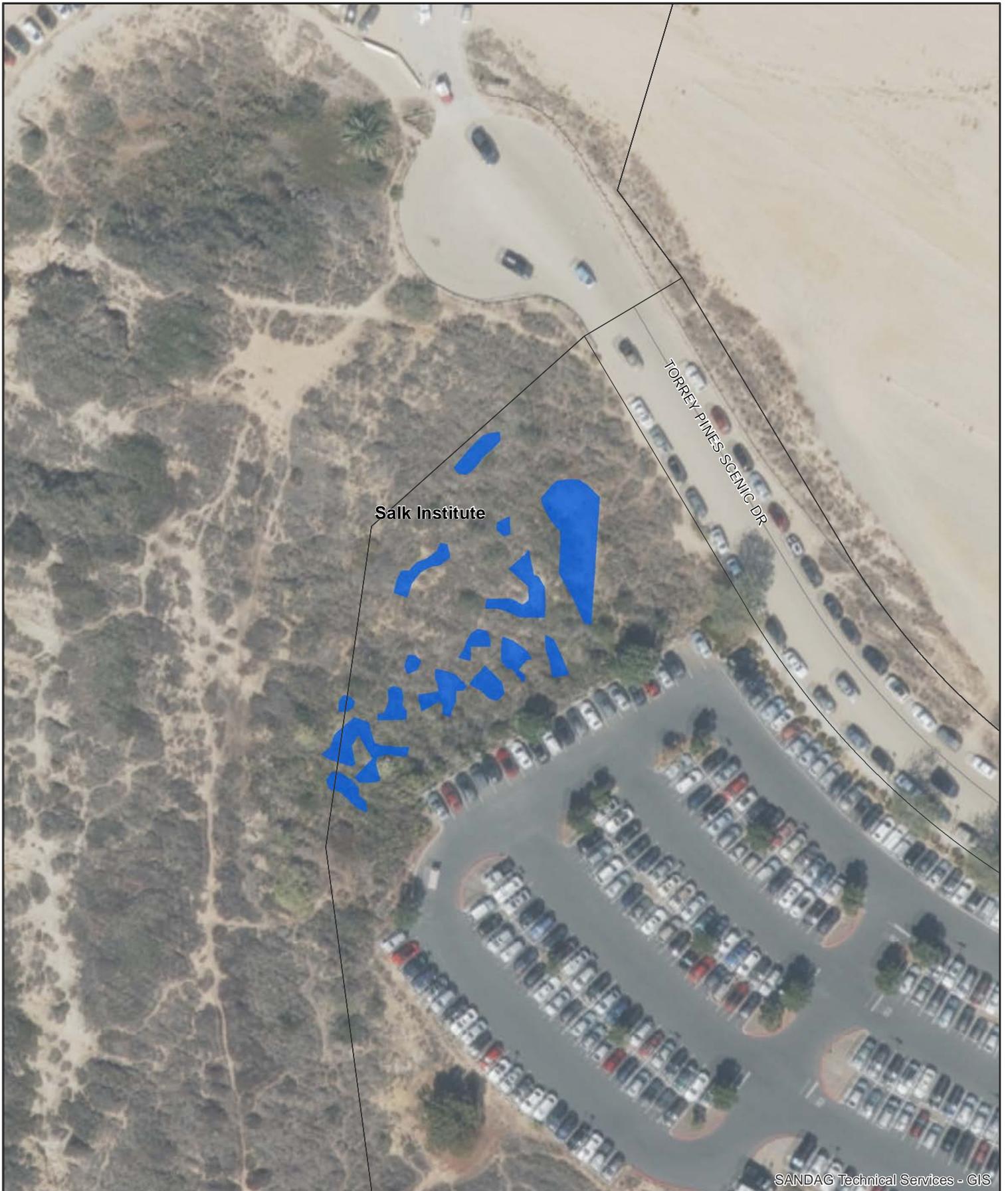
Imagery - 2014



www.eagleaerial.com
1-415-54-7070



0 170 340 680
Feet



SANDAG Technical Services - GIS



00

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land

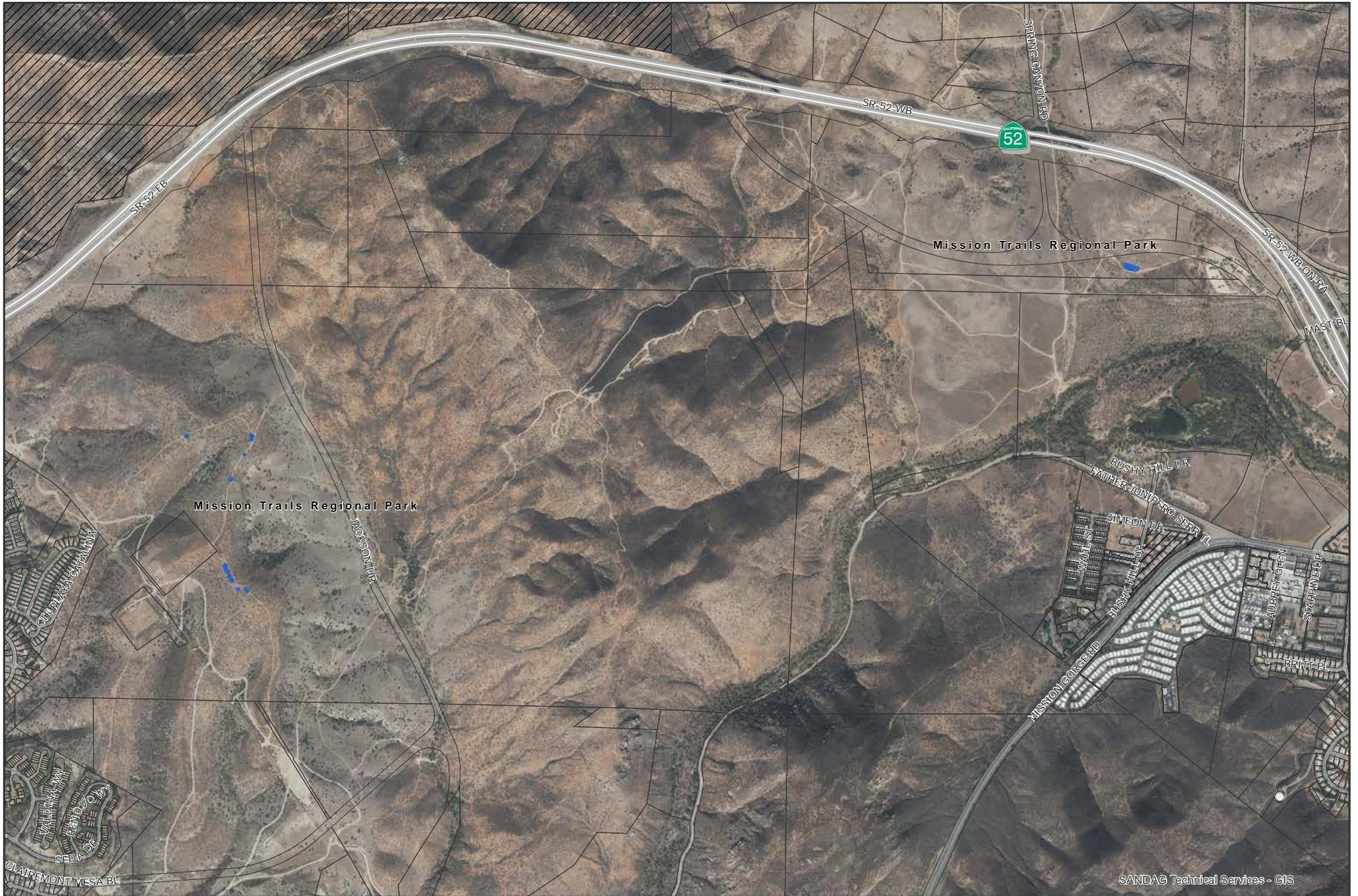
Date: 9/15/2016 Document Path: S:\ER\MSCP\WPHCP\Venal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\00_Venal_Pool_Complex_2016.mxd



0 10 20 40
Feet

Imagery - 2014





SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMSCP\VP HCP\Verml Pool HCP DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\Q2_Verml_Pool_Complex_2016.mxd



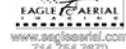
Q2

- City Jurisdiction, Conserved or Proposed for Conservation
- Parcels
- Publicly Owned Land



0 310 620 1,240
Feet

Imagery - 2014



www.aerial.com
714.764.7870



SAN Diego Superior Transit Agency



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAIMSCP\PHCP\Vernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Map\MXD\Q3_Vernal_Pool_Complex_2016.mxd

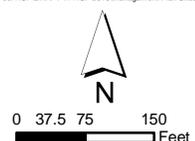


Q3

- City Jurisdiction, Conserved or Proposed for Conservation
- Not Subject to VPHCP*

- Parcels
- Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process



Imagery - 2014





Tecolote Canyon

Tecolote Canyon

SANDAG Technical Services - GIS

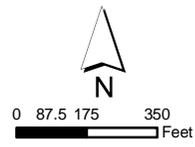


QQ

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels
 Publicly Owned Land

Date: 9/15/2016 Document Path: S:\ERAIMSCP\PHCP\ernal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Maps\MXD\QQ_Vernal_Pool_Complex_2016.mxd



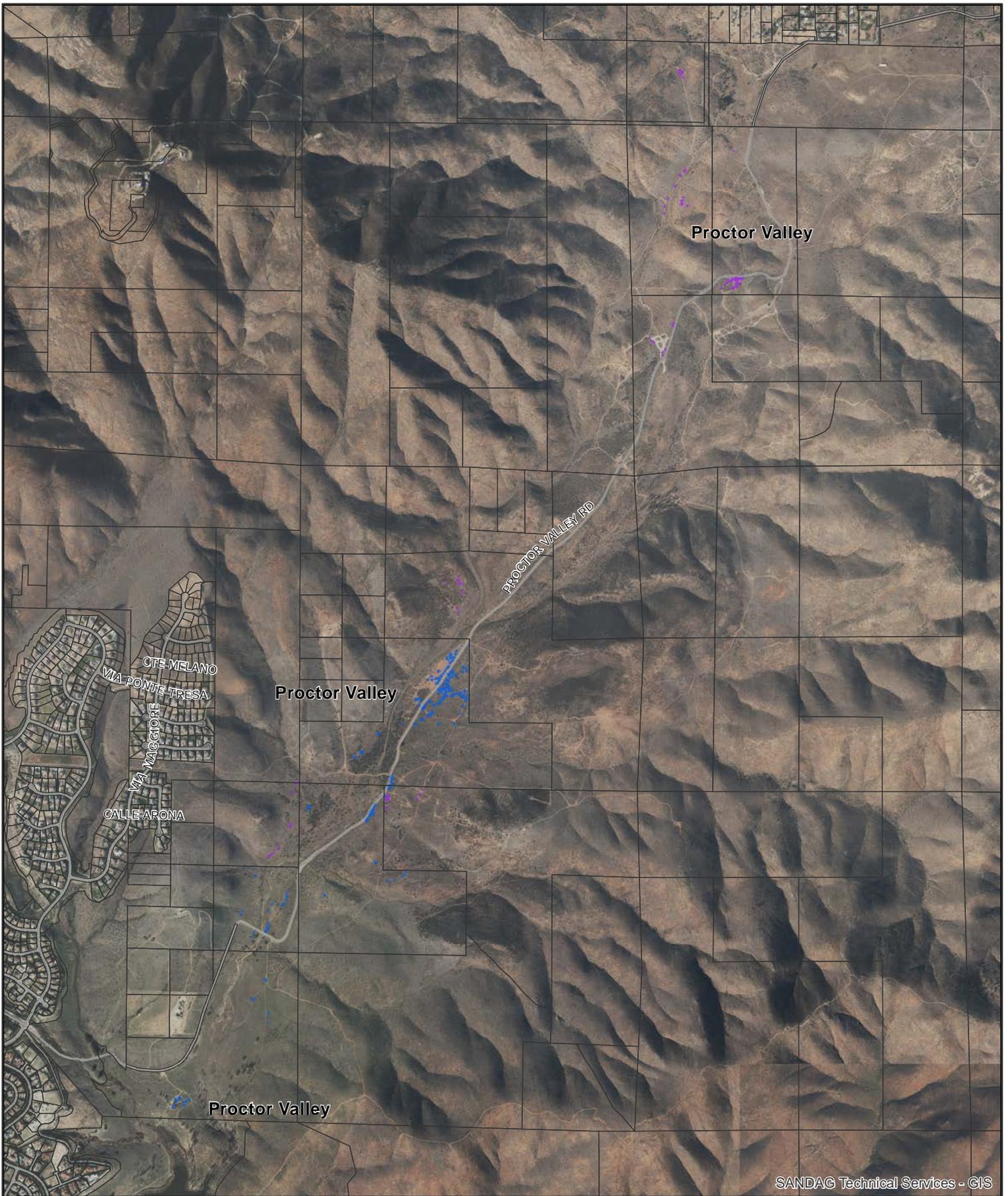
Imagery - 2014



www.eagleaerial.com
714.754.7870



San Diego's Regional Planning Agency



SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAM\SCPI\VP\HCP\Vernal Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\R1_Vernal_Pool_Complex_2016.mxd



R1

- City Jurisdiction, Conserved or Proposed for Conservation
- Not Subject to VPHCP*

- Parcels
- Publicly Owned Land

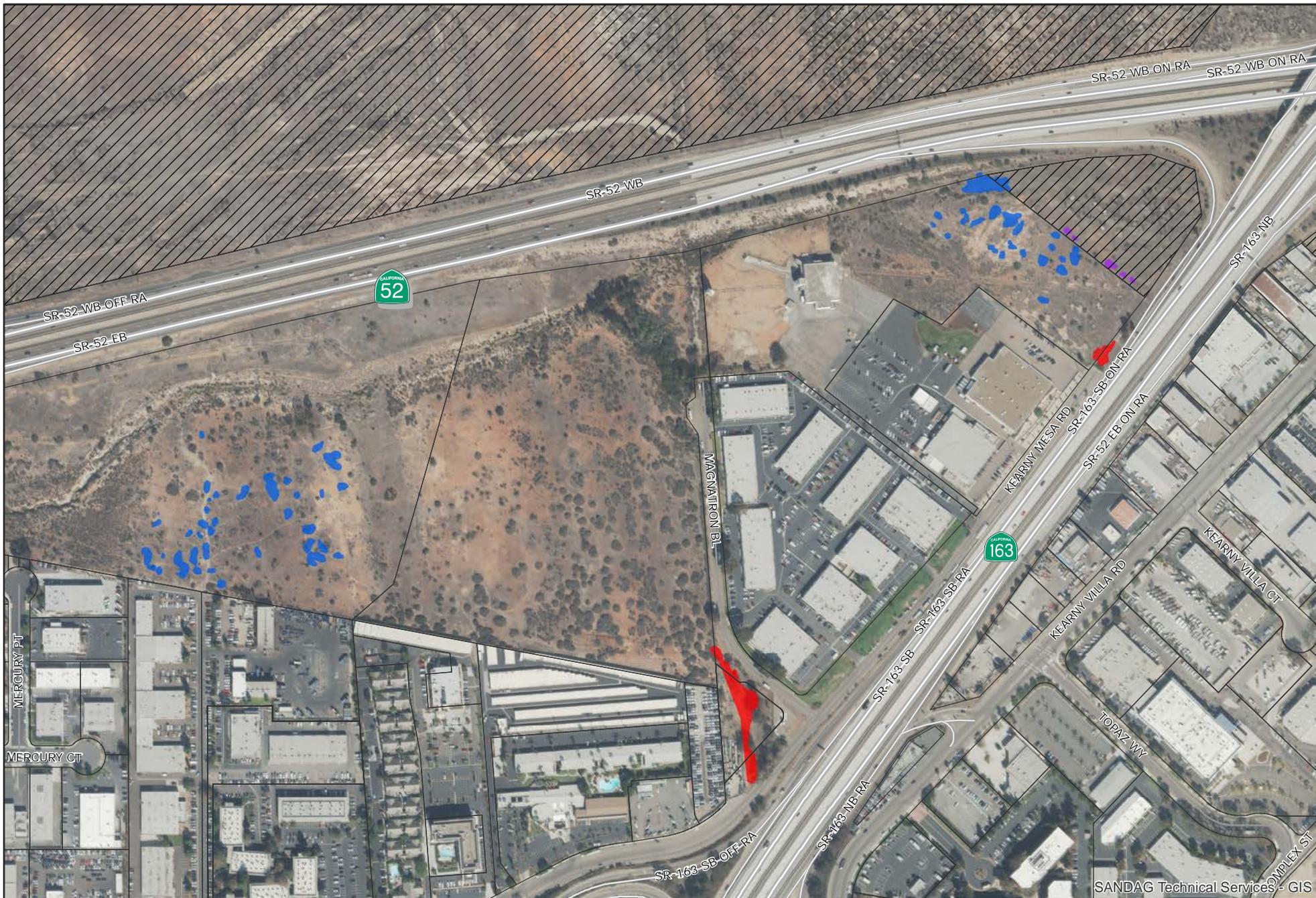
*Vernal pools are either currently conserved or take-authorized under separate permitting process



Imagery - 2014

EAGLE AERIAL

www.sandag.com 714.295.7800



SANDAG Technical Services - GIS

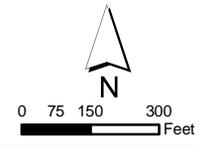
Date: 9/15/2016 Document Path: S:\ER\MS\CP\VP\HCP\Vernal Pool HCP\DRAFT VPHCP 2016\Management Plan Sites\Maps\MXD\U16_19_Vernal_Pool_Complex_2016.mxd

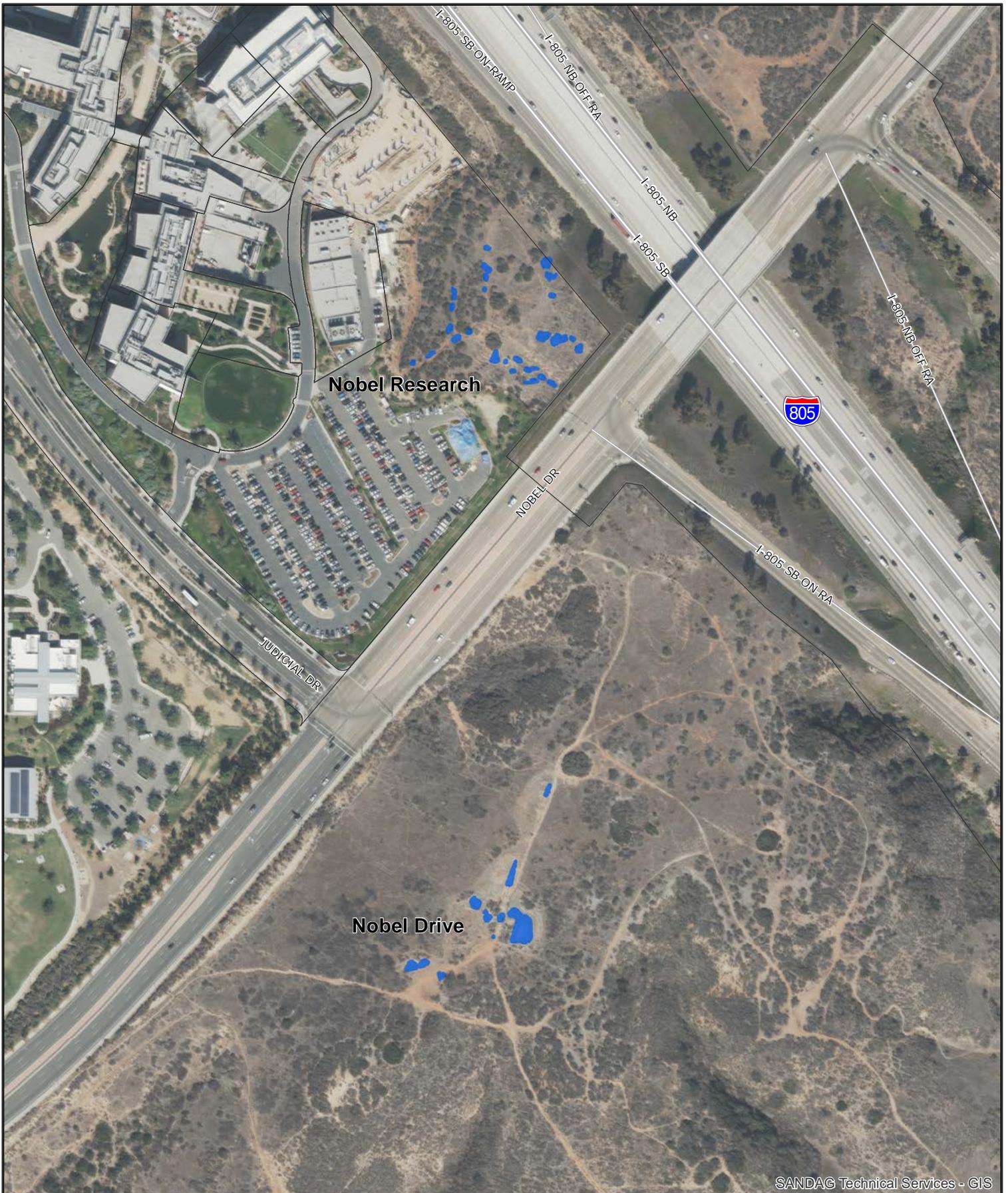


U15 & U19

- City Jurisdiction, Not Conserved
- City Jurisdiction, Conserved or Proposed for Conservation
- Not Subject to VPHCP*
- Parcels
- Publicly Owned Land

*Vernal pools are either currently conserved or take-authorized under separate permitting process





SANDAG Technical Services - GIS

Date: 9/15/2016 Document Path: S:\ERAM\SCPI\VP\HCP\Verbal Pool HCP\Draft VPHCP 2016\Management Plan Sites\Map\MXD\X5_7_Vermal_Pool_Complex_2016.mxd

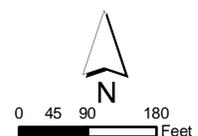


X5 & X7

 City Jurisdiction, Conserved or Proposed for Conservation

 Parcels

 Publicly Owned Land



Imagery - 2014



APPENDIX C

EXAMPLE MONITORING FORM

Modified Trudgen & Keighery Vegetation Condition Scale

Very Good-Excellent	80-100% Native Flora Composition Vegetation Structure intact or nearly so Cover /abundance of weeds < 5% No or minimal signs of disturbance
Fair to Good	50-80% Native Flora Composition Vegetation structure modified or somewhat modified Cover/abundance of weeds 5-20% any number of individuals Possible minor signs of disturbance
Poor	20-50% Native Flora Composition Vegetation structure modified Cover/abundance of weeds 20-60% any number of individuals Disturbance incidence high
Very Poor	0-20% Native Flora Composition Vegetation Structure disappeared Cover/abundance of weeds 60-80% any number of individuals Disturbance incidence very high

Disturbance Categories and Descriptions (Bauder et al. 2009)

1	<p>Minimal disturbance/no disturbance no known disturbance light past grazing or brushing ungraded tracks or trails</p>
2	<p>Light to moderate disturbance --not recent, self-recovered or restorable brushing, blading, disking, cultivation and/or vehicles (not recent) grazing trash/dumping fire sediment deposition</p>
3	<p>Moderate to substantial disturbance --restorable or has been restored; some potential for self-recovery disking, blading and/or plowing (cultivation)- may or may not be recent sediment deposition vehicle damage landscape altered by roads, culverts, and/or loss of mounds</p>
4	<p>Substantial disturbance--restoration potential, but extensive restoration efforts needed on-going grazing, frequent fires and/or recent blading/brushing extensive vehicle damage landscape altered by roads, culverts, and/or loss of mounds past extensive blading, bulldozing, plowing (cultivation) or grading</p>
5	<p>Substantial disturbance--developed or restoration potential low blading, grading, trenching or filling extensive development with hard surfaces, roads, culverts severe or ongoing disturbance (brushing, blading, disking, grading, bulldozing, irrigation, cultivation, vehicles)</p>
6	<p>Severe disturbance--surrounding landscape dominated by development, restoration potential minimal to none deep blading, extensive trenching or ripping native soil profile no longer evident artificial landscape dominates, either hard surface or cultivated turf and landscaping few or no vestiges of the natural topography</p>